THE 2012 FEASIBILITY STUDY FOR CANAVERAL HARBOR, BREVARD COUNTY, FLORIDA

COMMUNICATION

FROM

THE ASSISTANT SECRETARY OF THE ARMY, CIVIL WORKS, THE DEPARTMENT OF DEFENSE

TRANSMITTING

THE 2012 FINAL INTEGRATED SECTION 203 NAVIGATION STUDY REPORT AND ENVIRONMENTAL ASSESSMENT FOR THE CANAVERAL HARBOR, BREVARD COUNTY, FLORIDA

PART 1 OF 2

JULY 26, 2013.—Referred to the Committee on Transportation and Infrastructure and ordered to be printed

U.S. GOVERNMENT PRINTING OFFICE

82–283 WASHINGTON : 2013

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

HOUSE DOCUMENT NUMBER 113- 49

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

JUL - 2 2013

RECEIVED
2013 JUL -8 PM 4: 02
SPEAKER'S ROOM

Honorable John Boehner
Speaker of the House
of Representatives
U.S. Capitol Building, Room H-232
Washington, D.C. 20515-0001

Dear Mr. Speaker:

In response to section 203(c) of Water Resources Development Act (WRDA) of 1986 (P.L. 99-662), I am providing the Final Integrated Section 203 Navigation Study Report and Environmental Assessment (FIR/EA) for the Canaveral Harbor, Brevard County, Florida Project. This report was prepared by the Canaveral Port Authority (CPA) under the authority granted by Section 203(a) of WRDA of 1986, which allows non-federal interests to undertake feasibility studies of proposed harbor projects. The report has resulted in a recommendation from the Chief of Engineers, dated February 25, 2013. The FIR/EA and the report of the Chief of Engineers constitute the final report and recommendation submitted to the Secretary as described in Section 203(b) of WRDA 1986.

The enclosed FIR/EA, dated December 2012, provides sufficient formulation information and complies with federal laws and regulations applicable to feasibility studies of navigation projects for harbors. The plan recommended by the Chief of Engineers is technically sound, environmentally acceptable, and economically justified. The plan complies with all essential elements of the U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. The views of interested parties, including Federal, State and local agencies, have been considered.

The report recommends authorizing a project that would contribute to the economic efficiency of commercial navigation, provide greater safety for the operation of commercial and naval vessels, and increase the operational effectiveness of the national defense missions of the U.S. Army, U.S. Navy, and U.S. Air Force. The recommended plan would increase the nominal depth of the federal channel to -44 feet mean lower low water (mllw) with a middle and outer reach zone of 27,458 feet or about 5.2 miles, deepened to -46 feet mllw; a widening of the federal channel to 500 feet; an increase in the area of the Middle turning basin to encompass 68.9 acres at a depth of -43 feet mllw; an increase to the diameter of the West turning basin by 325 feet, for a total turning circle area of 53.6 acres at a depth of -35 feet mllw; and a deepening of the bend widener to -46 feet mllw to encompass 46.6 acres. Widening the federal channel requires removal of 8 acres of U.S. Air Force property. The U.S. Air Force is in

concurrence with this action. Environmental impacts of the recommended plan are minor, short-term impacts, which do not require mitigation and have no impacts to threatened and endangered species. A portion of the material excavated for the project would be used as fill or for containment dike improvements. The remaining dredged material is suitable for placement in the U.S. Environmental Protection Agency designated Canaveral Ocean Dredged Material Disposal Site.

The recommended plan is not the National Economic Development (NED) plan, nor is it called the Locally Preferred Plan (LPP). It is referred to as the recommended plan because it was formulated within specified physical constraints of the harbor. An NED plan was not identified in the analysis because the non-federal sponsor requested that the channel widening alternatives be limited to no greater than 500 feet and that deepening alternatives be limited to a depth no greater than -44 feet mllw. Because smaller scale plans than the -44 foot deepening did not maximize net benefits and the non-federal sponsor identified physical constraints on channel depth, the recommended plan qualifies for a Categorical Exemption to NED plans in accordance with Corps guidance in ER 1105-2-100 paragraph 3-2 b. (10), and a formal waiver to deviate from the NED plan was not necessary.

The estimated project first cost is $40,240,000, which includes the cost of constructing the general navigation features and the value of lands, easements, rights-of-way and relocations (LERRs) estimated as follows: $40,136,000 for channel modifications and dredged material placement, and $104,000 for the administrative costs of obtaining lands, easements, rights-of-way, and relocations. Additional costs of operation and maintenance (O&M) for the recommended plan over and above the costs to operate and maintain the existing federal project are estimated to be $633,000 annually.

Based on October 2012 price levels, a discount rate of 3.75-percent and a 50-year period of analysis, the average annual benefits are estimated to be $5,393,000 and the average annual costs of the project are estimated to be $2,647,000, which includes annual O&M costs. The recommended plan average annual net benefits are $2,747,000 and the benefit cost ratio is 2.0 to 1. The recommended plan has been formulated to avoid, minimize and mitigate for potential environmental losses.

The CPA fully supports the recommended plan and is legally capable of fulfilling the requirements as the non-federal sponsor for construction of all proposed project features. The estimated federal and non-federal shares of the project first cost are $28,652,000 and $11,588,000, respectively, as apportioned in accordance with the cost sharing provisions of Section 101 of WRDA 1986, as amended. The cost of general navigation features for depths greater than -20 feet to -45 feet would be shared at a rate of 75 percent federal and 25 percent non-federal or $25,783,000 federal and $8,615,000 non-federal and the cost of general navigation features for depths greater than -45 feet will be shared at a rate of 50 percent federal and 50 percent non-federal,

or at $2,034,000 each. The annual cost of $633,000 attributable to O&M would be cost shared as $451,000 federal and $182,000 non-federal, because a portion of the dredging will take place in the zone less than -45 feet (for which the federal government is 100 percent responsible) and a portion of the dredging will occur in the zone that is greater than 45 feet (for which the O&M is cost-shared 50 percent federal and 50 percent non-federal).

The CPA intends to pursue a separate legislative request to seek credit eligibility for construction costs of $13,775,000 for the Interim Corner Cut Off, which the CPA has already constructed. It has not been included as part of the current project cost. Credit for previously completed work is not currently authorized and such credit would be inconsistent with the general authorization of in-kind credit in accordance with Section 221 of the Flood Control Act of 1970, as amended by Section 2003 of WRDA 2007, because the work was carried out prior to the execution of an in-kind Memorandum of Agreement with the Secretary.

The Office of Management and Budget (OMB) advises that there is no objection to the submission of the report to Congress and concludes that the report recommendation is consistent with the policy and programs of the President. However, OMB also noted that should the Congress authorize this project for construction, it would need to compete with other proposed investments for funding in future budgets. A copy of OMB's letter, dated June 14, 2013, is enclosed. I am providing a copy of this transmittal and the OMB letter to the Subcommittee on Water Resources and Environment of the House Committee on Transportation and Infrastructure, and the Subcommittee on Energy and Water Development of the House Committee on Appropriations. I am also sending an identical letter to the President of the Senate.

Very truly yours,

Jo-Ellen Darcy
Assistant Secretary of the Army
(Civil Works)

Enclosures

9 Enclosures

1. OMB clearance letter, June 14, 2013
2. Report of the Chief of Engineers, Feb. 25, 2013
3. Letter from Dept of Commerce (NOAA), May 14, 2012
4. Letter from Dept of the Interior, Nov 16, 2012
5. Letter US Air Force, Nov 9, 2012
6. Letter from US Navy, Nov 27, 2012
7. Letter of support from Canaveral Port Authority, Dec 16, 2011
8. Summary for Office of the Parliamentarian
9. Integrated Section 203 Navigation Report and Environmental Assessment, December 2012

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

June 14, 2013

The Honorable Jo-Ellen Darcy
Assistant Secretary of the Army (Civil Works)
108 Army Pentagon
Washington, DC 20310-0108

Dear Ms. Darcy:

As required by Executive Order 12322, the Office of Management and Budget has reviewed your report on a December 2012 feasibility study prepared by the Port of Canaveral, Florida, under section 203 of the Water Resources Development Act of 1986. The study proposes that the Army Corps of Engineers deepen and widen the Federal channels and turning basins at this port, at a first cost of $40.2 million (October 2012 prices). The Chief of Engineers signed a report supporting this recommendation on February 25, 2013. Based on our review, we conclude that this project is consistent with the policy and programs of the President.

The Office of Management and Budget does not object to you submitting this study to the Congress. When you do so, please advise the Congress that the project would need to compete with other proposed investments in future Budgets.

Thank you for your assistance and the assistance of your staff during our review of this project.

Sincerely,

John Pasquantino
Deputy Associate Director
Energy, Science, and Water

DEPARTMENT OF THE ARMY
CHIEF OF ENGINEERS
2600 ARMY PENTAGON
WASHINGTON, DC 20310-2600

FEB 2 5 2013

DAEN

SUBJECT: Canaveral Harbor Section 203 (WRDA 1986) Navigation Study, Brevard County, Florida

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress the final feasibility report and environmental assessment on navigation improvements for Canaveral Harbor, Brevard County, Florida. It is accompanied by the reports of the Canaveral Port Authority (CPA), and the endorsements of the Jacksonville District Engineer and the South Atlantic Division Engineer. These reports were prepared by the CPA under the authority granted by Section 203 of Water Resources Development Act (WRDA) of 1986 (P.L. 99-662), which allows non-Federal interests, such as the CPA, to undertake feasibility studies of proposed harbor projects and submit them to the Secretary of the Army. This report constitutes the final report submitted to the Secretary as described in Section 203 of WRDA 1986.

2. The report recommends authorizing a project that will contribute to the economic efficiency of commercial navigation, provide greater safety for the operations of commercial and naval vessels, and increase the operational effectiveness of the national defense missions of the U.S. Army, U.S. Navy, and U.S. Air Force. The recommended plan increases the nominal depth of the federal channel to -44 feet mean lower low water (mllw) for the inner channel and -46 feet mllw for the outer channel (middle and outer reach), widens the federal channel to a width of 500 feet, increases the diameters of two turning circles, and widens the bend widener in the entrance channel. Widening the federal channel requires removal of 8 acres of U. S. Air Force property. The U. S. Air Force concurs with this action. Environmental impacts of the recommended plan are minor, short-term impacts, which, in coordination with the appropriate resource agencies, do not require mitigation. Effects on Threatened and Endangered species have been addressed through special measures and conditions. A portion of the material excavated for the project will be beneficially used as fill or for containment dike improvements. The remaining dredged material is suitable for placement in the U. S. Environmental Protection Agency designated Canaveral Ocean Dredged Material Disposal Site (ODMDS).

3. The reporting officers recommend the most economical plan analyzed, which is the plan that has the greatest net economic benefits of all plans considered. At the request of the non-Federal sponsor, plans greater in depth and width were not analyzed due to financial and logistical constraints[1]. The recommended plan is described in terms of outer, middle, and inner reaches, the Middle Turning Basin and west access channels, and the West Turning Basin. The outer reach is oriented on roughly a northwest-southeast alignment. The remainder of the channels is oriented in a generally east-west alignment. Various cuts comprise the outer, middle, and inner reaches. The recommended plan consists of widening the main ship channel from the harbor entrance inland to the West Turning Basin and West Access Channel, from its current authorized

width of 400 feet to 500 feet. In addition to widening, deepening of the existing Federal project and expansion of turning basins is recommended in the following reaches (all depths mllw):

a. Outer Reach, Cut 1A: deepen from -44' to -46' for a length of 11,000';

b. Outer Reach, Cut1B: deepen from -44' to -46' depth for a length of 5,500';

c. Outer Reach, Cut 1: deepen from -44' to -46' for the 5,300' long portion of Cut 1 that is seaward of buoys 7/8 (Station 0+00 to Station 53+00). The remainder of Cut 1 from buoys 7/8 to the apex of the channel turn, a length of 7,200', would also be deepened from -44' to -46';

d. New 203 Turn Widener: deepen to -46' X 23.1 acres (irregular shaped area) bounded to the north and northeast by the Civil Turn Widener and Outer Reach, Cut1;

e. US Navy Turn Widener: deepen from -44' to -46' X 7.7 acres (triangular shaped area) bounded by outer and middle reaches to the north and northeast and the Civil Turn Widener to the southwest;

f. Civil Turn Widener: deepen from -41' to -46' X 15.6 acres (irregular shaped area) bounded to the north and northeast by the middle reach and the US Navy Turn Widener;

g. Middle Reach: deepen from -44' to -46' for a length of 5,658'. The middle reach extends from the apex of the channel turn westward to the western boundary of the Trident access channel;

h. Inner Reach, Cut 2 and Cut 3: deepen from -40' to -44' for a length of 3,344';

i. Middle Turning Basin: expand and deepen to encompass 68.9 acres to a project depth of -43' and a turning circle diameter of 1422';

j. West Access Channel (east of Station 260+00): deepen from -39' to -43' for a length of 1,840'; and

k. West Turning Basin and West Access Channel (west of Station 260+00): expand the turning circle diameter from 1,400' to 1,725' X 141 acres at a depth of -35'.

4. Project Cost Breakdown Based on October 2012 Prices.

a. Project First Cost. The estimated project first cost is $40,240,000, which includes the cost of constructing the general navigation features and the value of lands, easements, rights-of-way and relocations (LERR) estimated as follows: $40,136,000 for channel modifications and

dredged material placement and $104,000 for the administrative costs of obtaining LERRs. There is no environmental mitigation required due to short term impacts.

b. Estimated Federal and non-Federal Shares. The estimated Federal and non-Federal shares of the project first cost are $28,652,000 and $11,588,000, respectively, as apportioned in accordance with the cost sharing provisions of Section 101 of WRDA 1986, as amended (33 U.S.C. 2211), as follows:

(1) The cost for dredging to a depth in excess of 20 feet, but not in excess of 45 feet will be shared at a rate of 75 percent by the Government and 25 percent by the non-Federal sponsor. Accordingly, the Federal and non-Federal shares of the costs in this zone are estimated to be $25,783,000 and $8,615,000, respectively. The cost for dredging in excess of 45 feet will be shared at a rate of 50 percent by the Government and 50 percent by the non-Federal sponsor. Accordingly, the Federal and non-Federal shares of the costs in this zone are estimated to be $2,870,000 and $2,870,000, respectively.

(2) In addition to the costs outlined in sub-paragraph (1) above, the project first cost includes administrative costs for LERR estimated at $104,000. The administrative costs include project real estate planning, review, and incidental costs between the U.S. Air Force and the U.S. Army Corps of Engineers (USACE). This cost will be a non-Federal cost. Credit is given for the incidental costs borne by the non-federal sponsor for LERR per Section 101 of WRDA 1986.

c. Additional 10 Percent Payment. In addition to the non-Federal sponsor's estimated share of the total first cost of constructing the project in the amount of $11,588,000, pursuant to Section 101(a)(2) of WRDA 1986, as amended, the non-Federal sponsor must pay an additional 10% of the costs of general navigation features of the project, $4,013,700, in cash over a period not to exceed 30 years, with interest. The value of the administrative costs for lands, easements, rights-of-way and relocations provided by the Federal sponsor under Section 101(a)(3) of WRDA 1986 as amended ($103,300) will be credited toward this payment, which results in a net 10% General Navigation Features (GNF) requirement of $3,910,400.

d. Operations and Maintenance Costs. Additional costs of operation and maintenance for this recommended plan, over and above the costs to operate and maintain the existing Federal project, are estimated to be $633,000 annually. In accordance with Section 101(b)(1) of WRDA 1986, as amended (33 U.S.C. 2211(b)(1))), the non-Federal sponsor will be responsible for an amount equal to 50 percent of the excess of the cost of operation and maintenance of the project over the cost of which would be incurred for operation and maintenance for the depth in excess of 45 feet. The excess annual cost attributable to operation and maintenance for the depth in excess of 45 feet is $364,000, with the non-Federal sponsor responsible for $182,000. Therefore the Federal share of the incremental annual maintenance cost is estimated to be $451,000.

e. Associated Costs. Estimated associated costs of $3,251,000 include $364,000 in non-Federal costs associated with development of local service facilities (including dredging of berthing areas) and $2,886,000 for navigation aids (a U.S. Coast Guard expense).

DAEN
SUBJECT: Canaveral Harbor Section 203 (WRDA 1986) Navigation Study, Brevard County, Florida

f. Authorized Project Cost and Section 902 Calculation. The project first cost, for the purposes of authorization and calculating the maximum cost of the project pursuant to Section 902 of WRDA 1986, as amended, includes the cost of constructing the (GNF) construction costs and the value of LERRs provided under Section 101(a)(3) of WRDA 1986, as amended (33 U.S.C. 221(A)(3)). Accordingly, as set forth in paragraph 4.a. above, based on October 2012 prices, the estimated project first cost for these purposes is $40,240,000 with a Federal share of $28,652,000 and a non-Federal share of $11,588,000.

5. Based on October 2012 price levels, a 3.75-percent discount rate, and a 50-year period of analysis, the total equivalent average annual costs of the project are estimated to be $2,647,000. The average annual equivalent benefits are estimated to be $5,393,000. The average annual net benefits are $2,747,000. The benefit-to-cost ratio for the recommended plan is 2.0.

6. In accordance with the Corps Engineering Circular EC 1165-2-212 on sea level change, the study performed an analysis of three Sea Level Rise (SLR) rates, a baseline estimate representing the minimum expected sea level change, an intermediate estimate, and a high estimate representing the maximum expected sea level change. The results of calculations from the project completion in 2014 through 2064 indicate that sea-level change estimates over a 50-year life of the project range from 0.120 meters (0.39 ft) for the low rate of change scenario, to 0.245 m (0.80 ft) for the intermediate rate scenario, and 0.653 m (2.14 ft) for the high rate scenario. Sea-level rise at these rates will have little or no impacts related to the proposed navigation improvements.

In accordance with the Corps Engineering Circular EC 1165-2-209 on review of decision documents, all technical, engineering and scientific work underwent an open, dynamic and vigorous review process to ensure technical quality. This included District Quality Control (DQC), Agency Technical Review (ATR), Policy and Legal Compliance Review, Cost Engineering Directory of Expertise (DX) Review and Certification, and Model Review and Approval. Given the project uses standard economic analyses, has a cost estimate of less than $45 million; does not represent a threat to health and safety; is not controversial; and has not had a request for Independent External Peer Review (IEPR) from a Governor or the head of a Federal or State agency, I have granted an exclusion from the requirement to conduct a Type I IEPR.

7. Washington level review indicates that the plan recommended by the reporting officers is technically sound, environmentally and socially acceptable, and on the basis of congressional directives, economically justified. The plan complies with all essential elements of the U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Land Related Resources Implementation Studies. The recommended plan complies with other administration and legislative policies and guidelines. The views of interested parties, including Federal, State and local agencies, have been considered.

8. I concur in the findings, conclusions, and recommendations of the reporting officers. Accordingly, I recommend that navigation improvements for Canaveral Harbor be authorized in

accordance with the reporting officer's recommended plan at an estimated cost of $40,240,000 with such modifications as in the discretion of the Chief of Engineers may be advisable. My recommendation is subject to cost sharing, financing, and other applicable requirements of Federal and State laws and policies, including Section 101 of WRDA 1986, as amended. This recommendation is subject to the non-Federal sponsor agreeing to comply with all applicable Federal laws and policies including that the non-Federal sponsor must agree with the following requirements prior to project implementation.

The CPA will:

a. Provide 25 percent of design costs in accordance with the terms of a design agreement entered into prior to commencement of design work for the project;

b. Provide, during the first year of construction, any additional funds necessary to pay the full non-Federal share of design costs;

c. Provide, during the period of construction, a cash contribution equal to the following percentages of the total cost of construction of the general navigation features:

i. Twenty-five percent of the costs attributable to dredging to a depth in excess of 20 feet, but not in excess of 45 feet; plus

ii. Fifty percent of the costs attributable to dredging to a depth in excess of 45 feet;

d. Provide 50 percent of the excess cost of operation and maintenance of the project over that cost which the Federal Government determines would be incurred for operation and maintenance for depths deeper than 45 feet;

e. Pay with interest, over a period not to exceed 30 years following completion of the period of construction of the project, up to an additional 10 percent of the total cost of construction of GNFs. The value of LERRs and deep-draft utility relocations provided by the Sponsor for the GNFs, described below, may be credited toward this required payment. The value of deep-draft utility relocations for which credit may be afforded shall be that portion borne by the Sponsor, but not to exceed 50 percent, of deep-draft utility relocation costs;

f. If the amount of credit equals or exceeds 10 percent of the total cost of construction of the general navigation features, the Sponsor shall not be required to make any contribution under this paragraph, nor shall it be entitled to any refund for the value of LERRs and deep-draft utility relocations in excess of 10 percent of the total cost of construction of the general navigation features;

g. Provide all LERRs and perform or ensure the performance of all relocations and deep-draft utility relocations determined by the Federal Government to be necessary for the construction, operation, maintenance, repair, replacement, and rehabilitation of the general

navigation features (including all LERRs, and deep-draft utility relocations necessary for the dredged material disposal facilities);

h. Provide, operate, maintain, repair, replace, and rehabilitate, at its own expense, the local service facilities in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and State laws and regulations and any specific directions prescribed by the Federal Government;

i. Accomplish all removals determined necessary by the Federal Government other than those removals specifically assigned to the Federal Government;

j. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the Sponsor owns or controls for access to the project for the purpose of operating, maintaining, repairing, replacing, and rehabilitating the general navigation features;

k. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project, any betterments, and the local service facilities, except for damages due to the fault or negligence of the United States or its contractors;

l. Keep, and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of 3 years after completion of the accounting for which such books, records, documents, and other evidence is required, to the extent and in such detail as will properly reflect total cost of construction of the general navigation features, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and local governments at 32 CFR, Section 33.20;

m. Perform, or cause to be performed, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights of way that the Federal Government determines to be necessary for construction, operation, maintenance, repair, replacement, or rehabilitation of the general navigation features. However, for lands that the Government determines to be subject to the navigation servitude, only the Government shall perform such investigation unless the Federal Government provides the Sponsor with prior specific written direction, in which case, the Sponsor shall perform such investigations in accordance with such written direction;

n. Assume complete financial responsibility, as between the Federal Government and the Sponsor, for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights of way that the Federal Government determines to be necessary for the construction, operation, maintenance, repair, replacement, and rehabilitation of the project;

o. To the maximum extent practicable, perform its obligations in a manner that will not cause liability to arise under CERCLA;

p. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the Sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

q. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987, and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights of way, required for construction, operation, maintenance, repair, replacement, and rehabilitation of the general navigation features, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

r. Comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army." The State is also required to comply with all applicable Federal labor standards requirements including, but not limited to, the Davis-Bacon Act (40 USC 3144 et seq.), the Contract Work Hours and Safety Standards Act (40 USC 3701 et seq.), and the Copeland Anti-Kickback Act (40 USC 3145 et seq.);

s. Provide the non-Federal share that portion of the costs of mitigation and data recovery activities associated with historic preservation, that are in excess of 1 percent of the total amount authorized to be appropriated for the project, in accordance with the cost sharing provisions of the agreement;

t. Prevent obstructions of or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) which might reduce the ecosystem restoration, hinder its operation and maintenance, or interfere with its proper function, such as any new development on project lands or the addition of facilities which would degrade the benefits of the project;

u. Do not use Federal funds to meet the Sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds in authorized;

v. Provide a cash contribution equal to the non-Federal cost share of the project's total historic preservation mitigation and data recovery costs attributable to commercial navigation

DAEN
SUBJECT: Canaveral Harbor Section 203 (WRDA 1986) Navigation Study, Brevard County, Florida

that are in excess of 1 percent of the total amount authorized to be appropriated for commercial navigation; and

w. In the case of a deep-draft harbor, provide 50 percent of the excess cost of operation and maintenance of the project over that cost which the Secretary determines would be incurred for operation and maintenance if the project had a depth of 45 feet.

9. The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the State of Florida, the CPA (the non-Federal sponsor), interested Federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

THOMAS P. BOSTICK
Lieutenant General, USA
Chief of Engineers

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701-5505
727.824.5312, FAX 824.5309
http://sero.nmfs.noaa.gov

MAY 14 2012

F/SER31:DK

Mr. Stuart Appelbaum
Chief, Planning and Policy Division
Jacksonville District Corps of Engineers
Department of the Army
P.O. Box 4970
Jacksonville, FL 32232-0019

Dear Mr. Appelbaum:

This responds to your request for Endangered Species Act (ESA) Section 7 consultation dated October 23, 2007, regarding the Port Canaveral Improvements Section 203 Feasibility Study project. You determined that the proposed project may affect, but is not likely to adversely affect, any ESA-listed species in the project area. The Canaveral Port Authority (CPA) is proposing a five-component project to enhance the operating efficiency at the port. The components include ocean channel widening, north side inner reach widening, south side west access channel widening, existing west access channel deepening, and west turning basin expansion and deepening. On June 12, 2008, we requested more information via e-mail concerning clarification needed as to whether the project is being proposed to simply accommodate larger, more efficient vessels, or if it is interconnected with a larger plan to increase capacity and number of vessels using the port. We also requested information on whether the proposed changes would result in a potential increase in the approach speed to the port. These concerns were related to the potential for increased threats to North Atlantic right whales that utilize the the waters off Port Canaveral. We received an e-mail from the Army Corps of Engineers (COE) in April 2011, inquiring on the status of the consultation. On April 18, 2011, we replied via e-mail that we had not received a response to our 2008 request for additional information, and re-sent a copy of that request. On May 3, 2011, the COE responded with an e-mail providing the additional information requested.

Our agencies had subsequent discussions related to the likelihood of sea turtle capture by clamshell dredge within the basin after notification that on May 19, 2011, a loggerhead sea turtle was lethally taken during clamshell dredging for another project in the Canaveral area. Our discussions centered around how that information may alter our determination for this and similar projects, and any precautions to be required for the project. On February 14, 2012, the COE received an e-mail, with attached copy of the necropsy report, from the Florida Fish and Wildlife Conservation Commission. The necropsy was performed October 27, 2011, and the report stated the cause of death was undetermined, but the turtle was dead prior to being taken up in the dredge.

Based upon all of the available information, we have determined that the proposed project may affect, but is not likely to adversely affect, ESA-listed sea turtles, smalltooth sawfish, or North Atlantic right whales that are expected to occur in the project area. Our findings on the effects of the proposed action are based on the description of the action in this consultation and subsequent information provided to us. Any changes to the proposed action may require reinitiation of consultation with NMFS.

The project is located at Port Canaveral in Brevard County, Florida, bounded to the south by the city of Cape Canaveral and the north by the Cape Canaveral Air Force Station and the Banana River (latitude 20.407778°N, longitude 80.583889°W [North American Vertical Datum 1983] at the entrance channel). All dredging will be accomplished using mechanical-type dredges, i.e., clamshell/bucket-type excavators, or other non-hopper-type dredges. Descriptions of the five components of the plan are as follows:

Ocean Channel Widening
Approximately 600,000 cubic yards (cy) of sediment is expected to be dredged for this component, over approximately 34 acres. The stretch of channel to be widened is approximately 8,350 feet long, entirely on the south side of the channel. The existing grade is 30 feet below mean low water (MLW), and the final depth of the area to be dredged will be 41 feet below MLW.

North Side Inner Reach Widening
A total of about 620,000 cy of sediment from 16 acres would be dredged for this component, with the current elevation of -40 to +10 feet MLW being reduced to -41 feet MLW. The widening consists of dredging an approximate 6,700-feet-long strip along the north side of the harbor channel between the Trident Turning Basin and the Middle Turning Basin. It will effectively widen the channel from 400 feet to 500 feet adjacent to a natural, rock revetment shoreline.

South Side West Access Channel Widening
Approximately 190,000 cy of sediment from 13 acres would be dredged. The area to be dredged down to -41 feet MLW currently slopes from an average low elevation of -34 feet MLW to an average high elevation of -16 feet MLW. The area of the access channel to be widened is approximately 4,200 feet long and lies along the south side of the harbor channel, which is predominantly bordered by commercial and retail business operations. This area is currently the east end of the Barge Canal and is not part of the regular COE or CPA dredging programs.

Existing West Access Channel Deepening
Deepening this channel that is currently maintained by the CPA at -35 feet MLW to a depth of -41 feet MLW will remove approximately 250,000 cy of sediment from 26 acres. This portion of the channel is at the west end of the channel and represents the western limit for cruise and cargo ships in the port. The area to be deepened is about 2,810 feet long and 400 feet wide.

West Turning Basin Expansion (Corner Cut-Off) and Deepening
Dredging of the southerly 52-acre (7 acres of uplands) portion of the West Turning Basin (WTB) from -35 feet MLW to -41 feet MLW will result in the removal of a total of 1,090,000 cy of sediment. The expansion will occur by dredging the undeveloped upland area which currently forms a corner of the existing turning basin. The existing and new area will be deepened and maintained at -41 feet MLW. No new dredging is required for the northerly part of the WTB, which is currently maintained at -35 feet MLW. This 57-acre area is currently maintained at depth by the CPA, but the proposal will shift that responsibility to the COE.

All dredging will be performed by either hydraulic or clamshell dredge. All of the dredged material will be disposed of at the previously authorized Canaveral Offshore Dredged Material Dispsoal Site (CODMDS) that is centered 4.5 miles offshore of Cocoa Beach. Project construction is expected to begin in the summer of 2013 and last approximately nine months.

Five species of sea turtles (loggerhead, green, hawksbill, Kemp's ridley, and leatherback), the North Atlantic right whale, and smalltooth sawfish, protected by the ESA, can be found in or near the action area and may be affected by the project. The project site is located near a known North Atlantic right whale calving area. The project is not located in designated critical habitat for any ESA-listed species.

We believe the proposed project may affect, but is not likely to adversely affect, sea turtles or smalltooth sawfish by injury or death as a result of interactions during dredging activities. However, the chance of injury or death from interactions with non-hopper-type dredging equipment is discountable as these species are highly mobile and can easily avoid these interactions. Our biological opinions on COE dredging projects have previously concluded that clamshell and pipeline dredges are not likely to adversely affect sea turtles, and we have no new information that would change our previous conclusion. To date, we have received only one confirmed report of a sea turtle interaction with a mechanical dredge over the past 20 years (one green turtle captured alive in the bucket at Cape Canaveral, Florida). Due to the infrequency of these incidents despite a history of extensive dredging in the action area, we believe that the likelihood of sea turtles being taken by a mechanical dredge during the proposed action is discountable. There are no reports of smalltooth sawfish being taken by mechanical dredging; thus, we believe the risk of a smalltooth sawfish being taken during this project is also discountable. Additionally, the applicant will be required to implement our March 23, 2006, *Sea Turtle and Smalltooth Sawfish Construction Conditions*, which will further reduce the chance of an interaction.

We also believe that the proposed project may affect, but is not likely to adversely affect, the North Atlantic right whale. The potential route of effect to North Atlantic right whales would be changes to ship traffic that could increase the likelihood of collision with these whales, such as increased traffic and increased ship speeds. Based upon information provided by the applicant and the COE, the modifications resulting from the project are not expected to increase ship traffic, but will instead allow existing traffic to operate more efficiently and with a larger safety margin. Approach speeds of ships passing through the areas outside of the port, which are utilized by North Atlantic right whales, will not increase as a result of the proposed modifications. The COE determined that if any change in approach speed did occur, it would be

a reduction in speed. The wider channels would limit the need for increased speeds to reduce crab angles for the larger cruise ships as they transit the narrower existing channel. Additionally, all non-Federal vessels longer than 65 feet in length are required to comply with the federal speed zone rule (73 FR 60173, October 2008), and travel at no more than 10 knots between November 15 and April 15 within the North Atlantic Right Whale Seasonal Management Area.

This concludes your consultation responsibilities under the ESA for species under our purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action.

We have enclosed additional information relevant for your review. If you have any questions, please contact Dennis Klemm, Consultation Biologist, at 727-824-5312 or by e-mail at Dennis.Klemm@noaa.gov. Thank you for your continued cooperation in the conservation of listed species.

Sincerely,

Miles M. Croom

for Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosures

File: 1514-22.F.4
Ref: I/SER/2007/07229

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006

PCTS Access and Additional Considerations for ESA Section 7 Consultations (Revised 7-15-2009)

Public Consultation Tracking System (PCTS) Guidance: PCTS is an online query system at **https://pcts.nmfs.noaa.gov/** that allows federal agencies and U.S. Army Corps of Engineers' (COE) permit applicants and their consultants to ascertain the status of NMFS' Endangered Species Act (ESA) and Essential Fish Habitat (EFH) consultations, conducted pursuant to ESA section 7, and Magnuson-Stevens Fishery Conservation and Management Act's (MSA) sections 305(b)2 and 305(b)(4), respectively. Federal agencies are required to enter an agency-specific username and password to query the Federal Agency Site. The COE "Permit Site" (no password needed) allows COE permit applicants and consultants to check on the current status of Clean Water Act section 404 permit actions for which NMFS has conducted, or is in the process of conducting, an ESA or EFH consultation with the COE.

For COE-permitted projects, click on "Enter Corps Permit Site." From the "Choose Agency Subdivision (Required)" list, pick the appropriate COE district. At "Enter Agency Permit Number" type in the COE district identifier, hyphen, year, hyphen, number. The COE is in the processing of converting its permit application database to PCTS-compatible "ORM." An example permit number is: SAJ-2005-000001234-IPS-1. For the Jacksonville District, which has already converted to ORM, permit application numbers should be entered as SAJ (hyphen), followed by 4-digit year (hyphen), followed by permit application numeric identifier with no preceding zeros. For example: SAJ-2005-123; SAJ-2005-1234; SAJ-2005-12345.

For inquiries regarding applications processed by COE districts that have not yet made the conversion to ORM (e.g., Mobile District), enter the 9-digit numeric identifier, or convert the existing COE-assigned application number to 9 numeric digits by deleting all letters, hyphens, and commas; converting the year to 4-digit format (e.g., -04 to 2004); and adding additional zeros in front of the numeric identifier to make a total of 9 numeric digits. For example: AL05-982-F converts to 200500982; MS05-04401-A converts to 200504401. PCTS questions should be directed to Eric Hawk at Eric.Hawk@noaa.gov. Requests for username and password should be directed to PCTS.Usersupport@noaa.gov.

EFH Recommendations: In addition to its protected species/critical habitat consultation requirements with NMFS' Protected Resources Division pursuant to section 7 of the ESA, prior to proceeding with the proposed action the action agency must also consult with NMFS' Habitat Conservation Division (HCD) pursuant to the MSA requirements for EFH consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-.930, subpart K). The action agency should also ensure that the applicant understands the ESA and EFH processes; that ESA and EFH consultations are separate, distinct, and guided by different statutes, goals, and time lines for responding to the action agency; and that the action agency will (and the applicant may) receive separate consultation correspondence on NMFS letterhead from HCD regarding their concerns and/or finalizing EFH consultation.

Marine Mammal Protection Act (MMPA) Recommendations: The ESA section 7 process does not authorize incidental takes of listed or non-listed marine mammals. If such takes may occur an incidental take authorization under MMPA section 101 (a)(5) is necessary. Please contact NMFS' Permits, Conservation, and Education Division at (301) 713-2322 for more information regarding MMPA permitting procedures.

Port Canaveral Sea Turtle Foraging Report
Brevard County, Florida

August 2007

Prepared for:
Canaveral Port Authority
200 George J. King Blvd.
Cape Canaveral, FL 32920

Prepared by:
Dial Cordy and Associates Inc.
490 Osceola Ave.
Jacksonville Beach, FL 32250

DC&A Project No. 05-850

TABLE OF CONTENTS

Page

LIST OF FIGURES III

LIST OF TABLES III

1.0 INTRODUCTION 1

1.1 Study Purpose 1

1.2 Study Area Location 1

1.3 Background 1

2.0. METHODOLOGY 4

2.1 Algal Community Study 4

2.2 Sea Turtle Survey 4

3.0 RESULTS 6

3.1 Algal Community 6

3.2 Sea Turtle Distribution 9

4.0 SUMMARY 10

5.0 LITERATURE CITED 11

Appendix A Algal List

Appendix B Inwater Research Group Reports

LIST OF FIGURES

Page

Figure 1 Location Map 2
Figure 2 Study Area 3
Figure 3 Algal Survey Locations 5
Figure 4 Survey Transects 8

LIST OF TABLES

Page

Table 1 Algae Families Collected From Port Canaveral Rip-Rap Habitat Summer 2005 and Winter 2006. 7
Table 2 Observation Data for Port Canaveral Sea Turtle Census, August 2005 and September 2006 9

1.0 INTRODUCTION

1.1 Study Purpose

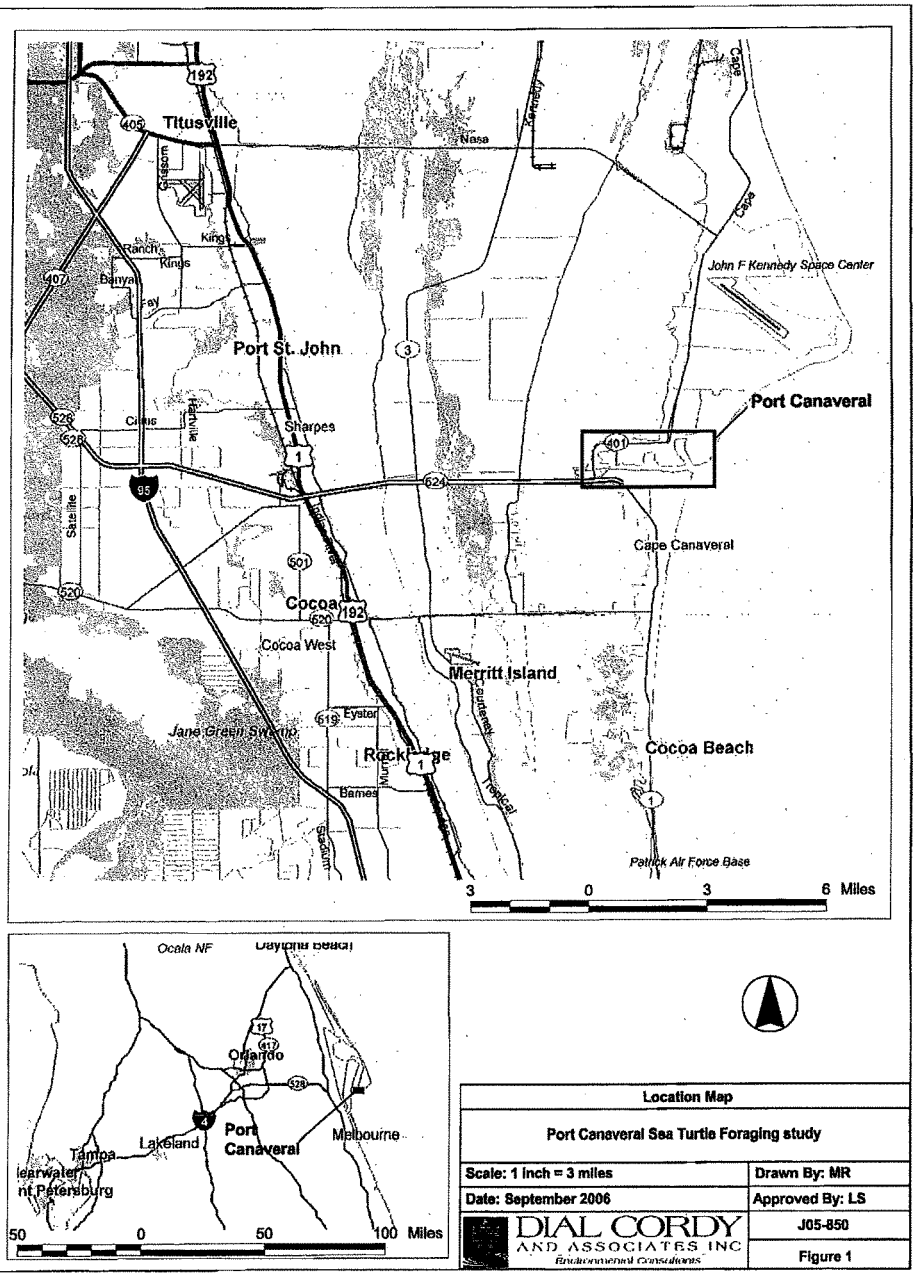
The Canaveral Port Authority (CPA) is currently conducting a feasibility study of potential navigation improvements under the authority granted under Section 203 of the Water Resources Development Act (WRDA), 1986. The study is in response to problems and issues identified by the CPA and Canaveral Pilots Association with regard to ship maneuvering within the existing federal project. Dial Cordy and Associates Inc. (DC&A) was contracted by the CPA to conduct a study to determine the potential impact to the juvenile sea turtle population within the study area from the proposed port improvements identified in the current Section 203 Study.

1.2 Study Area Location

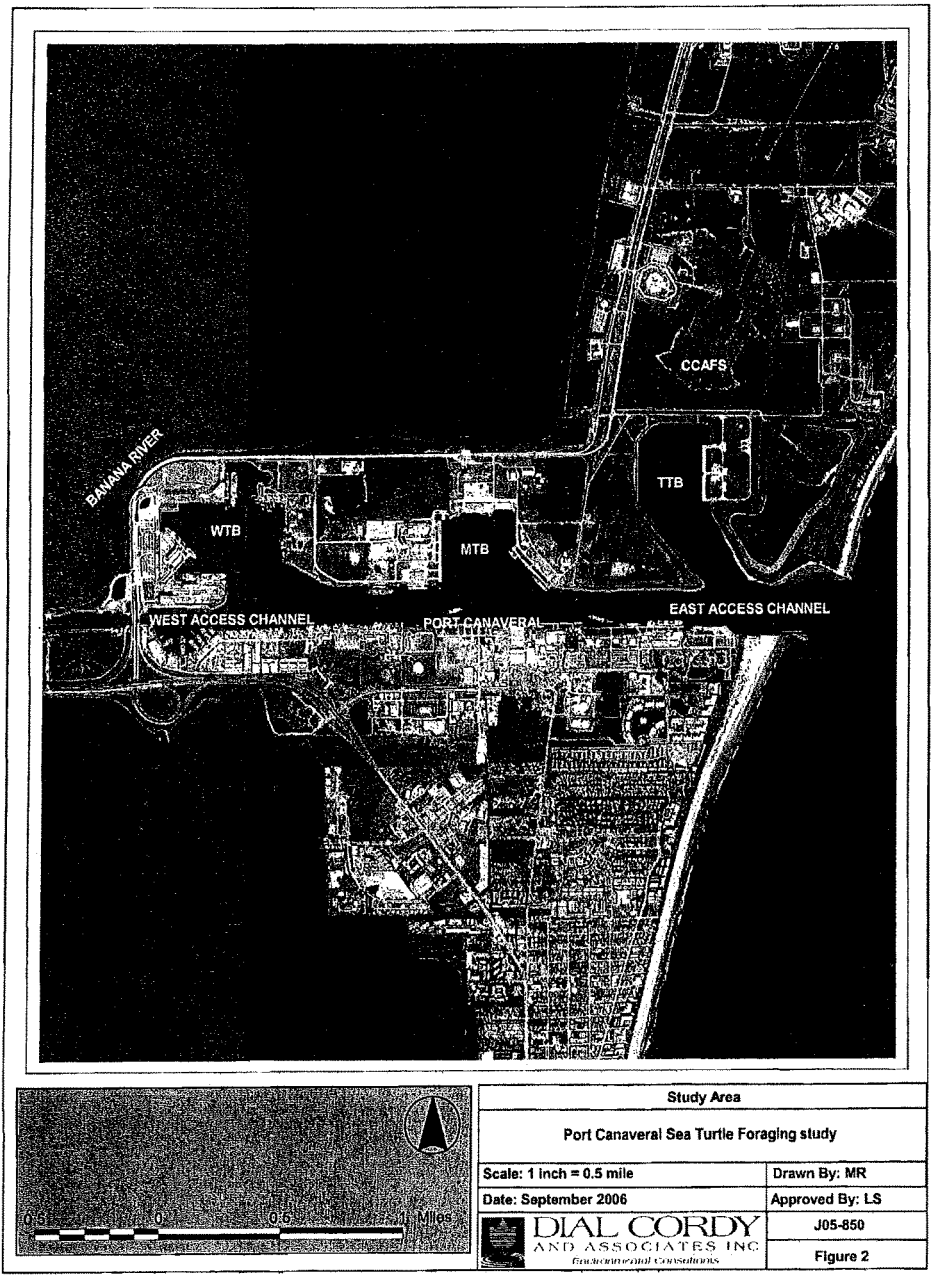
Port Canaveral is located in Brevard County on the east coast of Florida, approximately nine miles north of Cocoa Beach (Figure 1). The main port is orientated in an east – west direction, extending from the Atlantic coast to the Banana River. The port is bounded to the north by the Cape Canaveral Air Force Station (CCAFS) and the Banana River, and bounded to the south by the City of Cape Canaveral. The harbor consists of three turning basins (Figure 2). Starting from the east they are: the Trident Turning Basin (TTB), the Middle Turning Basin (MTB), and the West Turning Basin (WTB). The basins are connected by a channel (East Access Channel and West Access Channel) that forms the south boundary of each basin. Within this channel, a Federally maintained Barge Canal extends from the south side of the MTB, through the Banana River, across Merritt Island, and connects with the Intracoastal Waterway (ICWW) system in the Indian River. Where the Barge Canal enters the Banana River, a 600-foot long Corps of Engineers' lock (Canaveral Lock) separates the tidal harbor from the almost non-tidal river.

1.3 Background

The Atlantic and Gulf of Mexico coastal waters of the United States are utilized by five species of marine turtles during parts of their life histories. All five are protected under the Endangered Species Act of 1973. Of these, the green turtle (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempi*), Leatherback, (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricata*) are classified as endangered in Florida waters; and the loggerhead (*Caretta caretta*) is classified as threatened (Dial Cordy 2006; Redfoot 1997). Sea turtles use the habitats offshore of Brevard County to different degrees during different stages of their life cycle. During the summer months hatchlings utilize this habitat as a corridor to deeper waters farther off the coast. Juvenile and sub-adult turtles use the inshore and offshore habitats as a foraging areas, while adult turtles are present year round with seasonally high abundances during the breeding season.



Location Map	
Port Canaveral Sea Turtle Foraging study	
Scale: 1 inch = 3 miles	Drawn By: MR
Date: September 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 1



Study Area	
Port Canaveral Sea Turtle Foraging study	
Scale: 1 inch = 0.5 mile	Drawn By: MR
Date: September 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 2

Green turtles are found in a variety of habitats in the waters in and adjacent to Brevard County depending on their developmental stage (Redfoot 1997). After hatching, they utilize the pelagic habitat where they spend the next two to three years of their lives (Frazer and Ehrhart 1985; Carr 1987) and subsequently take up residence as juveniles and subadults in coastal lagoons, estuaries, and near-shore reefs (Redfoot 1997). They eventually migrate to foraging habitats and migrate to nesting beaches to reproduce.

The waters within Port Canaveral, particualry the Trident Turning Basin, were previously identified as foraging areas for juvenile sea turtles, particularly green turtles (Redfoot 1997). Algae, which grows on the rocky riprap areas in the basin, is the major component of the green turtles diet within the Trident Turning Basin. Many areas within Port Canaveral (including the riprap area that may be affected by the proposed project) are rocky riprap areas similar to those found in the Trident Turning Basin, and have potential as foraging habitat for juvenile green turtles. This study was conducted to specifically determine the extent of habitat and utilization by the species.

2.0. METHODOLOGY

2.1 Algal Community Study

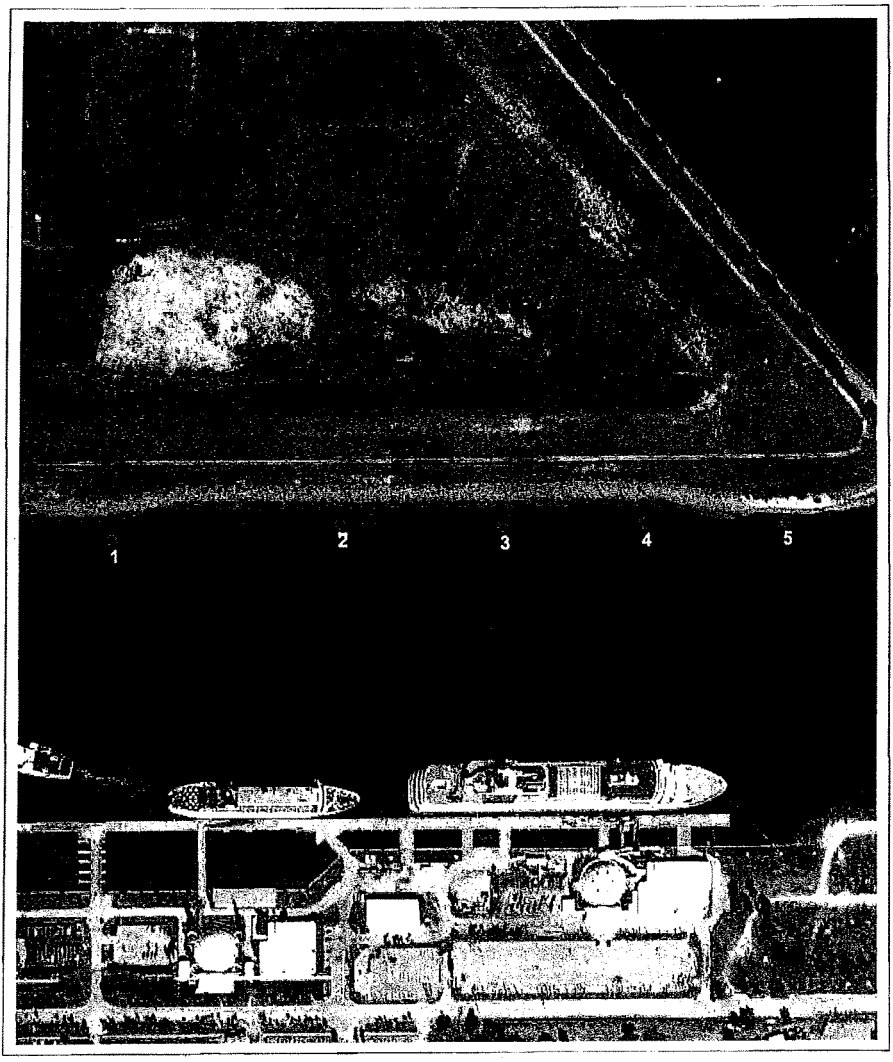
Algal community surveys and sample collections were conducted in August 2005 and February 2006. Five survey locations were randomly established along the approximately 2,500-foot area of rip rap adjacent to the U. S. Air Force property on the northern shore of the main channel (Figure 3). The position of each survey location was marked with a Differential Geographical Positioning System (DGPS) with accuracy of less than 1 meter.

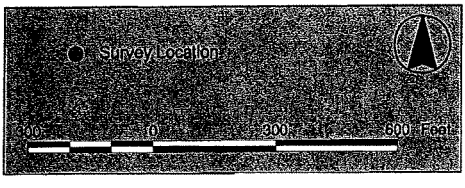
At each survey location, a diver established a transect from the waters edge to the seaward edge of the rip rap. Along each transect, algal abundance and distribution was documented by photographing 0.25 m^2 quadrats along the depth gradient (shallow [approximately 1 meter from waters edge], mid depth, and deep [approximately 1 m from deep edge of rock]).

Additionally, along each transect, a 10cm x 10cm area at each depth station (i.e. shallow, mid, and deep) a scraping was collected and samples sent to a lab for analysis. The analysis determined the species of algae and other marine species present and identified them to the lowest practical identification level. In total, 15 samples were collected for each of the two surveys (i.e. 5 transects x 3 depth stations).

2.2 Sea Turtle Survey

Sea turtle surveys were conducted by the Inwater Research Group Inc. (IRG) August 27-29, 2005 and February 11-13, 2006 using methodology developed by IRG and accepted by the





Algal Survey Locations	
Port Canaveral Sea Turtle Foraging study	
Scale: 1 inch = 300 feet	Drawn By: MR
Date: September 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 3

Florida Department of Environmental Protection (FDEP) and the National Marine Fisheries Service (NMFS). The methodology entailed subjecting each survey site to repetitive censusing, using observers in an elevated tower on a small boat. This technique allows for the calculation of observations per transect kilometer (an index of turtle abundance which can be used to directly compare different sites within a single area or sites over time). Data recorded for each siting included turtle species and size, whether the turtle was observed on the surface or underwater, proximity to the transect line, and activity (i.e., foraging, swimming, etc.) Locations of the turtles were recorded using GPS.

Five specific sites of probable sea turtle utilization within the Port were surveyed (Figure 4). Site 1 was the 988 meter riprap rock habitat along the north side of the entrance channel between the middle and east turning basins. Site 2 was the 266-meter riprap area on the south side of the channel at Jetty Park. Site 3 was the 98-meter stretch of riprap on the south side of the channel in the vicinity of marker 19. Site 4 was the 258-meter riprap shoreline on the north side of the channel just west of the west turning basin. Site 5 consisted of a 3,490 meter transect down the middle of the main channel.

An additional survey was conducted on June 6 and 7, 2007 to identify additional areas within Canaveral Harbor that had the potential to support juvenile sea turtle foraging. The survey crew examined additional rocky habitat for algal growth and the presence of juvenile sea turtles.

3.0 RESULTS

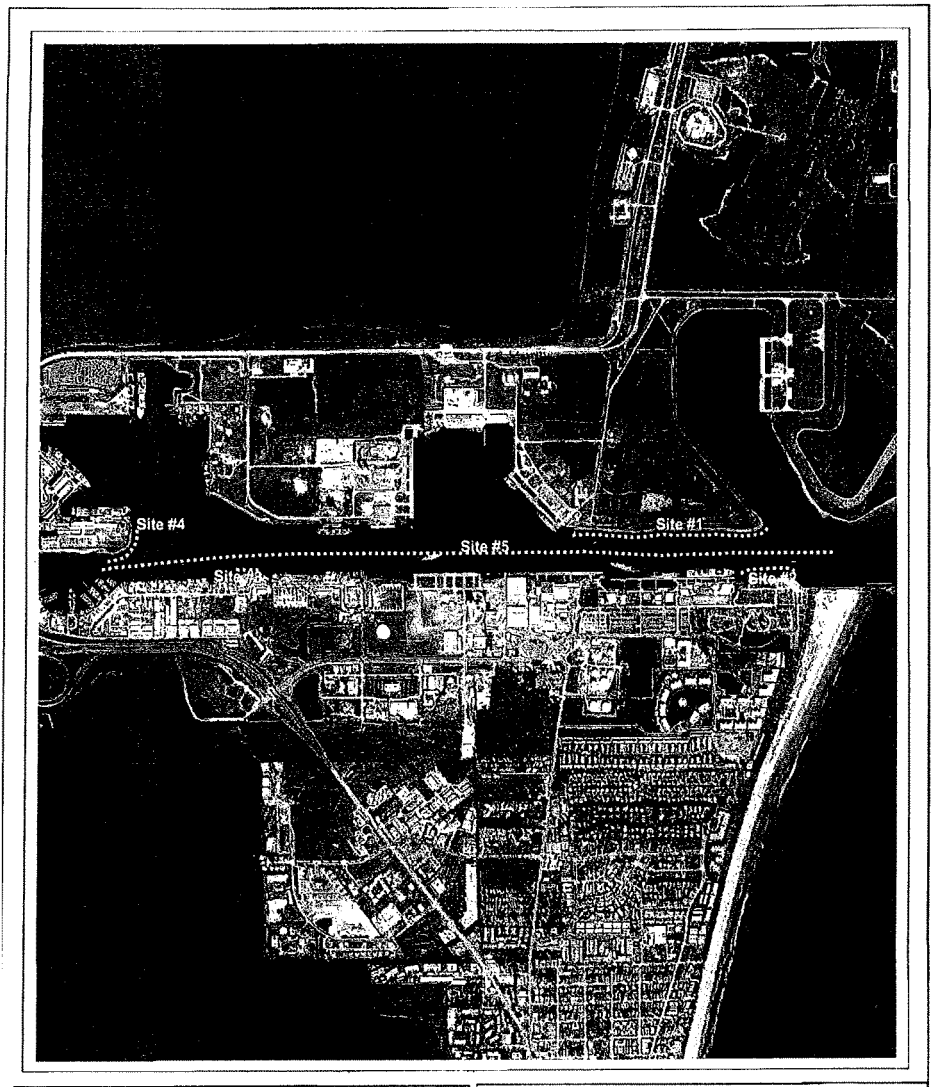
3.1 Algal Community

Algae were present along the entire length and depth of the rip-rap within the surveyed portion of the basin. In fact, algae maintained 100 percent cover on the majority of the area. Algae collected along the 988 m north side of the channel entrance was identified only to the family level due to the large amount of material and high complexity (Table 1). Redfoot's analysis of algal species in the adjacent Trident submarine basin (1997) yielded a number of species that most likely are also represented at the current survey site including *Gelidium americanum, Hypnea cervicornis, Polysiphonia subtilissima, Solieria filiformis, Ulva lactuca, Centroceras clavulatum, Cladophora catenata, Amphiroa rigida var. antillana,* and *Enteromorpha compressa.*

There were only minor variations in algal community between summer and winter. Algal species of the families Rhodomeleaceae and Ulvaceae were present on the winter that were not present during the summer sampling event. During the June 2007 survey, an additional total of 1952 meters of riprap rock shoreline were examined in areas not previously examined in prior surveys. Similar algal species were present along this riprap area, although no algal samples were obtained for identification. Sea turtles were also observed foraging along these additional areas.

Table 1 Algae Families Collected From Port Canaveral Rip-Rap Habitat Summer 2005 and Winter 2006.

Station	Shallow	Mid-Depth	Deep
August 2005			
1	None	Hypneaceae	Caulerpaceae Hypneaceae
2	Corallinaceaea Ceramiaceae Cladophoraceae Hypneaceae	Ceramiaceae Gelidiaceae Hypneaceae	Hypneaceae
3	Corallinaceaea Ceramiaceae Hypneaceae	Caulerpaceae Gelidiaceae Hypneaceae	Hypneaceae
4	Hypneaceae	Caulerpaceae Gelidiaceae Corallinaceaea Ceramiaceae Hypneaceae	Cladophoraceae Hypneaceae
5	Caulerpaceae Hypneaceae Corallinaceaea	Ceramiaceae Hypneaceae Corallinaceaea	Hypneaceae
February 2006			
1	Caulerpaceae Cladophoraceae Ceramiaceae Hypneaceae Rhodomelaceae	Hypneaceae Rhodomelaceae	Ceramiaceae Corallinaceaea Hypneaceae Rhodomelaceae
2	Corallinaceaea Hypneaceae Rhodomelaceae	Ceramiaceae Cladophoraceae Corallinaceaea Hypneaceae Rhodomelaceae	Ceramiaceae Cladophoraceae Hypneaceae Rhodomelaceae
3	Cladophoraceae Corallinaceaea Hypneaceae Rhodomelaceae	Cladophoraceae Ceramiaceae Hypneaceae Rhodomelaceae Ulvaceae	Cladophoraceae Ceramiaceae Hypneaceae Rhodomelaceae Ulvaceae
4	Cladophoraceae Hypneaceae Rhodomelaceae	Ceramiaceae Corallinaceaea Hypneaceae Rhodomelaceae	Cladophoraceae Corallinaceaea Rhodomelaceae Ulvaceae
5	Caulerpaceae Cladophoraceae Ceramiaceae Hypneaceae Rhodomelaceae	Cladophoraceae Ceramiaceae Corallinaceaea Hypneaceae Rhodomelaceae	Cladophoraceae Hypneaceae Rhodomelaceae Ulvaceae



Sea Turtle Survey Transects	
Port Canaveral Sea Turtle Foraging study	
Scale: 1 inch = 2,000 feet	Drawn By: MR
Date: September 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 4

3.2 Sea Turtle Distribution

Sea turtles were mainly observed along transect 1, which paralleled the riprap shoreline between the MTB and TTB. In the fall 2005, 200 individuals were observed along the 980 m transect on 30 repetitions and yielded an average of 6.8 turtles/kilometer (Table 2). Nine individuals were observed along transect 2 on the southside of the channel on 27 repetitions. Five turtles were observed along transect 3 (31 repetitions), and 3 turtles were observed along transect 5 (3 repetitions). Respectively transects 2, 3, and 5 had averages of 1.25 turtles/kilometer, 1.64 turtles/kilometer and 0.29 turtles/kilometer. No turtles were observed during 31 repetitions along transect 4.

In the spring 2006, 111 turtles were observed along transect 1 (36 repetitions) for an average of 3.21 turtles/kilometer, and six turtles were observed along transect 2 (38 repetitions) or 0.593 turtles/kilometer (Table 2). No other turtles were observed.

During the June 2007 survey, turtles were observed along both the North Jetty and the South Jetty, with eight turtles being observed along the North Jetty and 25 turtles observed along the South Jetty or 0.39 turtles/kilometer and 1.18 turtles/kilometer respectively (Table 2).

Table 2 Observation Data for Port Canaveral Sea Turtle Census, August 2005 and September 2006

Transect	Length (meters)	No. of Repetitions	Total Turtles Observed	Turtles (observations) per kilometer
August 2005				
1	980	30	200	6.80
2	266	27	9	1.25
3	98	31	5	1.64
4	258	31	0	0
5	3490	3	3	0.29
February 2006				
1	980	36	111	3.21
2	266	38	6	0.593
3	98	18	0	0
4	258	23	0	0
5	3490	4	0	0
June 2007				
North Jetty	740	28	8	0.39
South Jetty	590	36	25	1.18

4.0 SUMMARY

Green turtles are found in a variety of habitats in the waters in and adjacent to Brevard County depending on their developmental stage (Witherington and Ehrhart 1989; Ehrhart et al., 1996; Redfoot 1997). After hatching, they utilize the pelagic habitat where they spend the next two to three years of their lives (Frazer and Ehrhart 1985; Carr 1987) and subsequently take up residence as juveniles and subadults in coastal lagoons, estuaries, and near-shore reefs (Ehrhart et al., 1996; Redfoot 1997). They eventually migrate to foraging habitats and to nesting beaches to reproduce.

Research on juvenile green sea turtles that began in the 1990s has documented that algal communities on riprap areas within Port Canaveral are important foraging grounds for these turtles (Ehrhart and Redfoot 1994; Ehrhart and Redfoot 1997; Redfoot 1997; Redfoot and Ehrhart 2002; Ehrhart and Redfoot 2005; Ehrhart and Redfoot 2006). Most of the previous studies have centered on the extensive riprap areas present within the Trident Turning Basin. This study shows that the area directly adjacent to the Trident Turning Basin has similar algal cover and is also heavily utilized by these juvenile turtles within the Port. During the surveys in August 2005 and February 2006 the majority of juvenile sea turtles were observed along the riprap between the Main Turning Basin and Trident Turning Basin , it has been previously shown that significant numbers of sea turtles also use the Trident basin for foraging, and this area was not available for observation during these surveys (Redfoot 1997; Redfoot and Ehrhart 2000; Ehrhart and Redfoot 2006). While there is likely to be some exchange between this assemblage and other developmental habitats, we are not aware of any extensive areas of suitable habitat immediately adjacent to Port Canaveral, and turtles may remain resident in the Port for considerable lengths of time. Some turtles in previous studies have been caught over 20 times over a period of up to 12 years (pers. communication Bagley). Based on these past and present observations it should be assumed that many of the turtles observed utilizing the riprap areas along the main Port channel also use the riprap foraging areas in the adjacent Trident Turning Basin. This additional foraging habitat is available to support juvenile turtle populations in the Port during the time between removal of the existing riprap and the time that the new riprap would be recolonized by algal species.

Re-colonization of the riprap by the algal communities should begin quickly after re-placement of new riprap along the shoreline. Previous studies have shown rapid colonization (<2 weeks) of marine algal species on bare rock substrates (Littler et. al 1987). These early successional species will allow more mature successional species to colonize these rock riprap areas. Adjacent algal communities will play a role in helping to recolonize the now bare rock substrates and these habitats should start rebounding quickly following placement of riprap.

Therefore, it is not likely that the proposed project would have a significant impact on foraging juvenile sea turtles.

5.0 LITERATURE CITED

Carr, A. 1987. New Perspectives on the pelagic stage of sea turtle development. Conservation Biology 1(2): 103-121.

Dial Cordy and Associates Inc. 2006. Environmental Baseline Report, Port Canaveral Navigation Improvements, Port Canaveral, FL

Ehrhart, L. M. and W.E. Redfoot. 1994. Assessment of green turtle relative abundance and behavior in Cape Canaveral AFS Port Area, Trident Submarine Basin. Final Report to USAE Waterways Experiment Station, Coastal Ecology Group, Environmental Laboratory. 40 pp.

Ehrhart, L.M., W.E. Redfoot, and D.A. Bagley. 1996. A study of the population ecology of in-water marine turtle populations on the east-central Florida coast from 1982-96. Comprehensive final report to NOAA, the National Marine Fisheries Service, pp. 163

Ehrhart, L. M. and W.E. Redfoot. 1997. Assessment of the species composition of marine algae utilized by juvenile green turtles in the Trident Submarine Basin, Cape Canaveral Air Force Station, Florida. Final Report to USAE Waterways Experiment Station, Coastal Ecology Group, Environmental Laboratory. 41 pp

Ehrhart, L.M. and W.E. Redfoot. 2002. The structure, size, and feeding ecology of the unique juvenile green turtle population utilizing the Trident Turning Basin, Cape Canaveral Air Force Station, Florida as developmental habitat. Comprehensive Report to Specpro Inc. 37 pp.

Ehrhart, L.M. and W.E. Redfoot. 2005. Final Report: Assessment of the Status and Population Dynamics of Marine Turtles in the Trident Submarine Basin at Port Canaveral, Florida in 2003 and 2004.

Ehrhart, L.M., W.E. Redfoot. 2006. Final Report to Patrick Air Force Base Environmental Planning. Assessment of the Status and Population Dynamics of Marine Turtles in the Trident Submarine Basin at Port Canaveral, Florida in 2004 and 2005. Prepared for the United States Air Force, Patrick Air Force Base. Air Force Contract No. FA252104P0269.

Frazer, N.B. and L.M. Ehrhart. 1985. Preliminary growth models for green (*Chelonia mydas)* and loggerhead (*Caretta caretta)* turtles in the wild. Copeia 1985: 73-79.

Littler, M.M; D. S. Littler.; J.N. Norris; and K.E. Buchler. 1987. Recolonization of Algal Communities Following the Grounding of the Freighter Wellwood on Molasses Reef, Key Largo National Marine Sanctuary. Phase 2: Suvey of Algae and Experimental Design. Report to NOAA U.S. Department of Commerce. NOAA Technical Memoranda Series NOS/MEMD 15

Redfoot, W. E. 1997. Population Structure and Feeding Ecology of Green Turtles Utilizing the Trident Submaring Basin, Cape Canaveral, Florida as Developmental Habitat, Master Thesis, University of Central Florida, Orlando, FL.

Redfoot, W. E., and L. M. Ehrhart. 2000. The feeding ecology of juvenile green turtles utilizing the Trident Basin, Port Canaveral, Florida as developmental habitat. Page 33 (abstract) in F. A. Abreu-Grobois, R. Briseno-Duenas, R. Marquez, and L. Sarti, compilers. Proceedings of the 18th International Symposium on Sea Turtle Biology and Conservation. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SEFSC-436.

Witherington, B.E. and L.M. Ehrhart. 1989. Hypothermic stunning and mortality of marine turtles in the Indian River Lagoon System, Florida. Copeia 1989(3):696-703.

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

TAKE PRIDE IN AMERICA

NOV 16 2012

9043.1
PEP/NRM

ER 12/774

Mr. Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works
U.S. Army Corps of Engineers
CECW-P (SA)
7701 Telegraph Road
Alexandria, VA 22315-3860

RE: Chief of Engineers and the Report of the District Engineer on Canaveral Harbor, Brevard County, FL

Dear Mr. Brown:

The U.S. Department of the Interior has reviewed the U.S. Army Corps of Engineers, Chief of Engineers Report, and supporting documents on Canaveral Harbor, Brevard County, FL. We offer the following recommendation based upon the analysis of our U.S. Fish and Wildlife Service (FWS).

Under paragraph 2, lines 8 - 11, replace "Environmental impacts of the recommended plan are minor, short-term impacts, which, in coordination with the appropriate agencies, do not require mitigation and have no impacts to threatened and endangered species" with "Environmental impacts of the recommended plan are minor, short-term impacts, which, in coordination with the appropriate agencies, do not require mitigation. Effects on threatened and endangered species have been addressed through special measures and conditions."

We appreciate the opportunity to provide comments. If you have any questions or need further assistance, please contact Mr. John Milio, FWS, at 904-731-3098 or email John_Milio@fws.gov.

Sincerely,

Willie R. Taylor
Director, Office of Environmental Policy
and Compliance

DEPARTMENT OF THE AIR FORCE
45th SPACE WING (AFSPC)

NOV 09 2012

MEMORANDUM FOR HEADQUARTERS, U.S. ARMY CORPS OF ENGINEERS
7701 TELEGRAPH ROAD, ALEXANDRIA, VA 22315-3860
ATTN: MR. THEODORE BROWN, CECW-P (SA)

FROM: 45 SW/CC
1201 Edward H. White II Street
Patrick AFB FL 32925-3299

SUBJECT: Canaveral Harbor Section 203 Proposed Report (Your Memo, 16 Oct 12)

1. We appreciate the opportunity to formally review the final feasibility report and environmental assessment (EA) on navigation improvements for Canaveral Harbor, Brevard County, Florida. The report/EA, dated October 2012, will be considered acceptable once the attached comment is addressed for our approval.

2. We look forward to our continued partnership as this channel widening project moves ahead. Our point of contact for any questions on our input to the report/EA is Mr. Dave Stone, 45 SW/XPR, DSN 854-7402, david.stone@us.af.mil. Our point of contact for the design and construction phases of this project is Ms. Lee Ann Pfister, 45 CES/CEPMD, DSN 467-0961, leeann.pfister.1@us.af.mil.

ANTHONY J. COTTON
Brigadier General, USAF
Commander

Attachment:
45 SW Comment

cc:
Canaveral Port Authority
U.S. Army Corps of Engineers, Jacksonville District

Attachment -- 45th Space Wing Comments to Final Report/EA on Channel Widening dated Oct 2012

ORG	Page #	Para #	Line #	Comments
45 SW	Vol 1, Main Report, page 7-34	7.4		**Comment:** EA fails to address occupational safety and health impacts in accordance with 32 CFR 989.27. Para 7.4 of EA simply states all project activities will comply with USACE requirements. **Rationale:** 32 CFR 989.27 requires us to assess direct and indirect impacts of the proposed action on the safety and health of Air Force employees and others at a work site. The EA should also discuss impacts that require a change in work practices to achieve an adequate level of health safety.
				Comment: **Rationale:**
				Comment: **Rationale:**
				Comment: **Rationale:**
				Comment: **Rationale:**
				Comment: **Rationale:**
				Comment: **Rationale:**
				Comment: **Rationale:**
				Comment: **Rationale:**

(XIXXX)

DEPARTMENT OF THE NAVY
NAVAL ORDNANCE TEST UNIT
CAPE CANAVERAL, FLORIDA 32920-1623

1000
Ser SPP00/0220
27 NOV 2012

From: Commanding Officer, Naval Ordnance Test Unit
To: Chief, Planning and Policy Division, U. S. Army Corps of Engineers

Subj: COMMENTS REGARDING PROPOSED REPORT OF THE CHIEF OF ENGINEERS

Ref: (a) Proposed report of the Chief of Engineers, 16 October 2012

1. Naval Ordnance Test Unit (NOTU) has no concerns with the channel widening project as a whole at this time and concurs with reference (a). Previous concerns expressed by NOTU were answered satisfactorily by Canaveral Port Authority (CPA) surge study, which assessed impacts of the project on basin surge effects. That report determined the overall change in surge effect would not negatively impact NOTU or Naval vessels berthed in the Navy Port area of Cape Canaveral Air Force Station (CCAFS).

2. Further concerns may be brought forward to the CPA or U.S. Army Corps of Engineers (USACE) should they arise during the design and construction phases of the project.

3. Any questions or concerns contact LT Maples at 321-853-1120 or at matthew.maples@ssp.navy.mil.

J. P. HEATHERINGTON

CANAVERAL
PORT AUTHORITY

16 December 2011

Mr. David S Hobbie
Deputy District Engineer for Programs and Project Management
USACOE/Jacksonville District
701 San Marco Blvd.
Jacksonville, FL 32207-8175

RE: Port Canaveral, Florida
Integrated Section 203 Navigation Study Report and Assessment
Draft Environmental Assessment Document

Dear Mr. Hobbie:

On behalf of Canaveral Port Authority, I am writing to express full support for the plan recommended within the *Integrated Section 203 Navigation Study Report and Assessment and Draft Environmental Assessment Documents (October 2011)* prepared for the Section 203 Feasibility Project. The Canaveral Port Authority staff and Board of Commissioners have both approved support of pursuing this project as presented; therefore this office fully supports the recommendation and implementation plan of the Section 203 Study Report. Canaveral Port Authority understands that under the project partnership agreement it will be responsible for sharing the costs of the project as the non-federal sponsor.

Sincerely,

Canaveral Port Authority

J. Stanley Payne
Chief Executive Officer

Cc: Osvaldo Rodriguez, U.S. Corps of Engineers Jacksonville District
Jerry Scarborough, U.S. Corps of Engineers Jacksonville District
Candida Bronson, U. S. Corp of Engineers Jacksonville District

Port Canaveral
445 Challenger Road P.O. Box 267 Cape Canaveral, Florida 32920 USA
321.783.7831 888. 767.8226 www.portcanaveral.com

CANAVERAL
PORT AUTHORITY

NON-FEDERAL SPONSOR'S
SELF CERTIFICATION OF FINANCIAL CAPABILITY
FOR DECISION DOCUMENTS

I, Jeffrey M. Long, do hereby certify that I am the Chief Financial Officer of the Canaveral Port Authority (the "Non-Federal Sponsor"); that I am aware of the financial obligations of the Non-Federal Sponsor for the Canaveral Harbor Deepening and Widening Project; and that the Non-Federal Sponsor will have the financial capability to satisfy the Non-Federal Sponsor's obligations for that project. I understand that the Government's acceptance of this self-certification shall not be construed as obligating the Government or the Non-Federal Sponsor to implement a project.

IN WITNESS THEROF, I have made and executed this certification this fourteenth (14th) Day of October, two thousand and eleven (2011).

BY: Jeffrey M. Long

TITLE: CFO

DATE: 10-14-11

Port Canaveral
445 Challenger Road P.O. Box 267 Cape Canaveral, Florida 32920 USA
321.783.7831 888. 767.8226 www.portcanaveral.com

COVER SHEET

FINAL

Canaveral Harbor, Florida

Integrated Section 203 Navigation Study Report & Final Environmental Assessment

This feasibility study of improvements to the federal navigation project at Canaveral Harbor, Florida has been prepared by the Canaveral Port Authority (CPA) under the authority granted by Section 203 of Water Resources Development Act (WRDA) of 1986 (P.L. 99-662). Section 203 of WRDA 1986 allows non-Federal interests, such as the Canaveral Port Authority, to undertake feasibility studies of proposed harbor projects and submit them to the Secretary of the Army. The Canaveral Port Authority has conducted this Section 203 study to determine the feasibility of deepening and widening the channels, wideners, and turning basins at Port Canaveral to accommodate the most modern vessels in the world's cruise ship fleet and to allow for the passage of deeper draft cargo vessels within the Port.

The Secretary will review this study to determine whether the study, and the process under which it was developed, complies with Federal laws and regulations applicable to feasibility studies of navigation projects for deep draft harbors. Following that review, the Secretary will transmit to Congress, in writing, the results of his review and any recommendations the Secretary may have concerning the project.

As part of the Secretary's review, this draft report will be submitted by the Jacksonville District, U.S. Army Corps of Engineers (Corps), on behalf of the Secretary, for agency and public review and comment following the requirements of the National Environmental Policy Act (NEPA) and the U.S. Army Corps of Engineers (Corps) implementing regulations, ER 200-2-2. To facilitate that review, this report has been prepared following the format and requirements of an integrated feasibility report and Environmental assessment, complying with requirements of the Corps and the Council of Environmental Quality, and is intended to reduce duplication and paperwork. An asterisk in the table of contents and report notes sections that are required for NEPA compliance.

Abstract

This Integrated Section 203 Navigation Study Report & Final Environmental Assessment analyzes the feasibility and potential environmental consequences of implementing improvements to the existing Federal navigation project at Canaveral Harbor, Florida. The recommended plan consists of widening plus deepening, which more specifically includes widening the main ship channel from 400 feet to 500 feet, expanding the West Turning Basin turning circle from 1,400 feet to 1,725 feet, and deepening the following channel segments:

- Outer Reach, Cut 1A
- Outer Reach, Cut1B
- Outer Reach, Cut 1
- US NAVY Turn Widener
- Civil Turn Widener
- New 203 Turn Widener

- Middle Reach
- Trident Access Channel and Trident Turning Basin
- Inner Reach, Cut 2 and Cut 3
- Middle Turning Basin
- West Access Channel (east of Station 260+00)
- West Turning Basin and West Access Channel (west of Station 260+00).

A detailed description of the proposed improvements by project segment is provided in Section 6.7. The other alternatives considered are different increments of deepening and widening, non-structural solutions, and as required, the No Action alternative. The recommended plan (Preferred Alternative) is the most economical plan analyzed.

Public Comments

Public involvement has been conducted throughout the course of the study. At the request of CPA, the Jacksonville District, U.S. Army Corps of Engineers published a Notice of Intent in the Federal Register. While not required at this stage of the Section 203 study process, CPA requested that the Corps initiate the public scoping process in order to solicit public input while plan formulation and evaluation was still being conducted by CPA.

A public scoping meeting was held by the Corps, as was a study initiation public meeting hosted by CPA at Port Canaveral. Coordination with resource agencies was conducted through agency coordination letters that solicited their comments. The Canaveral Port Authority considered the comments received by letter and statements made at public meetings in the plan formulation, evaluation, and alternative selection process. Individuals and agencies were provided the opportunity to present written comments relevant to the Section 203 study or request to be placed on the mailing list for announcements and for the eventual distribution of the Final Environmental Assessment by the Headquarters, U.S. Army Corps of Engineers (HQUSACE). The comments received were limited, but were considered in the preparation of the Integrated Section 203 Navigation Study Report & Final Environmental Assessment. Upon review by the Assistant Secretary of the Army (Civil Works), the Integrated Section 203 Navigation Study Report & Final Environmental Assessment will be circulated by the U.S. Army Corps of Engineers for formal review and comment as an Integrated Feasibility Report and Final Environmental Assessment.

SYLLABUS

Authority and Purpose

This study of potential navigation improvements at Canaveral Harbor, Florida has been prepared by the Canaveral Port Authority (CPA) under the authority granted by Section 203 of Water Resources Development Act (WRDA) of 1986 (P.L. 99-662).

The purpose of this Section 203 study is to determine the feasibility of improvements to the existing Federal navigation project at Port Canaveral[1] and to identify the solution that best meets the economic, environmental, physical, and social needs of the region and the nation. Pursuant to Section 203 of WRDA 1986, this study is also intended to determine the advisability and extent of both Federal and non-Federal participation in cost sharing the proposed improvements.

The Principles and Guidelines require that the plan which maximizes net benefits, the NED plan, be identified. Typically, the incremental analysis includes depths beyond the depth which maximizes net benefits in order to "bracket" the NED plan and to show that net benefits in fact decline at deeper depths. However, ER 1105-2-100 paragraph 3-2 b.(10) Categorical Exemption to NED Plan states:

> *For harbor and channel deepening studies where the non-Federal sponsor has identified constraints on channel depths it is not required to analyze project plans greater (deeper) than the plan desired by the sponsor.*

This study identifies the most economical plan analyzed, the plan that has the greatest net economic benefits of all plans considered. At the request of the non-Federal sponsor, plans greater in depth and width were not analyzed due to financial and logistical constraints.

Problems and Needs

The last major navigation improvements to the Federal navigation project at Port Canaveral were completed by the Corps of Engineers in 1995. Since that time, the demand by users of the Port to accommodate larger and deeper cruise ships and cargo vessels has resulted in a need to provide deeper and wider channels and expanded turning basins. Opportunities exist to increase the efficiency of existing operations by providing deeper and wider channels that allow larger cruise ships to use the Port and larger cargo vessels to carry greater loads.

There are vessels presently calling at Port Canaveral that could significantly benefit from deeper, wider channels, as well as newer, larger vessels that would use Port Canaveral if existing channels were improved. Since 2009, three new cruise ships which are among the largest in the world fleet have been homeported at Port Canaveral and a fourth is due to arrive in spring 2012. All of these vessels exceed the design dimensions of the project (nearly 300 feet longer and nearly 30 feet wider than the design vessel). The Canaveral Port Authority has made

[1] The existing project for deep draft navigation at Canaveral Harbor, Florida, authorized by the River and Harbor Acts of March 1945 and October 1962, and Sections 101, 114, and 117 of the Water Resources Development Act (WRDA) of 30 October 1992. The official name of the Federal project is Canaveral Harbor, Florida. Throughout the remainder of this report, this will be used interchangeably with the locally recognized name, Port Canaveral.

modifications to the Federal project (limited channel widening to 450 feet in selected locations, interim corner cutoff in West Turning Basin) in order to accommodate these vessels temporarily until the project can be upgraded. In addition, the new Seaport Canaveral facility, which began operations in 2010, provides the opportunity for substantial transportation cost savings if the project is deepened and widened to accommodate the longer and deeper tankers (up to 250 feet longer and 5 feet deeper than the design vessel) that Seaport Canaveral would like to use to transport petroleum products to their new facility. Additional transportation cost savings from project deepening would also accrue to other bulk carriers (rock, slag, cement), if existing vessels could be loaded more deeply and larger vessel could be used.

Projections for cruise traffic and cargo movements indicate sustained growth. The costs of transporting commodities could be significantly reduced if larger, more fully loaded vessels could call at Port Canaveral. Additionally, the cost of vessel operations within the Port could be substantially reduced by the improved vessel maneuverability afforded by a wider channel. Navigational safety, especially surge impacts on moored cargo and naval vessels, would be substantially improved by a wider channel.

Alternatives Considered

This study identified and evaluated alternatives to solve the following problems and take advantage of the following opportunities: 1) reduce ship congestion at Port Canaveral; 2) accommodate recent and anticipated future growth in cargo and cruise vessel traffic; 3) improve the efficiency of operations and improve safety for cruise ships and cargo vessels currently operating within the Port complex; 4) allow for use of the Port by larger cruise ships and larger and more efficient cargo vessels; and 5) allow for development of additional terminals/berths without encroaching on the existing Federal channels and turning basins.

Potential improvements evaluated in this study include: the No Action Plan; non-structural alternatives; and structural alternatives such as deepening and widening of navigational channels, expansion of the turning basins, and expanded wideners at the port. All viable alternative plans were considered that had the potential to improve the efficiency of operations and reduce the costs to cargo shippers and cruise lines. The only viable alternatives identified in the analysis involved various combinations of channel deepening, widening, turning basin extensions, and expanded wideners that would allow larger vessels to operate more efficiently and safely within in the Federal navigation project.

The formulation of alternative plans carefully considered the optimization of channel widths and depths to maximize net average annual benefits and contributions to the NED account. This included identification of design vessels (cruise and cargo) and associated dredging requirements, identification of structural and non-structural improvements, and estimation of incremental costs and benefits. The plan formulation process also considered the characteristics and quality of dredged material and requirements for disposal. All non-Federal ancillary facilities that are required to deliver project benefits were identified, costs estimated, and are included as associated costs in the alternative evaluation and economic analysis. All plans were evaluated using the System of Accounts framework established in the Principles and Guidelines (P&G 1983) promulgated by the Water Resources Council. The final alternatives were evaluated based on comparison to the No Action Plan, in order to identify the plan that maximized net economic benefits to the nation. Physical conditions at the Port constrained the array of

alternatives that were evaluated such that the most economical plan analyzed may be a smaller scale plan than the NED Plan. Environmental impacts were identified and evaluated to determine conformity with environmental laws, policies, and other guidelines. Finally, as previously mentioned, the views of the public were solicited and considered in the alternative formulation and evaluation process.

The Recommended Plan

The recommended plan, which is the most economical plan analyzed consists of widening the main ship channel from the harbor entrance inland to the West Turning Basin and West Access Channel, from its current authorized width of 400 feet to 500 feet. In addition to widening, deepening of the existing Federal project and expansion of turning basins is recommended in the following reaches:

- Outer Reach, Cut 1A: deepen from -44' to -46' for a length of 11,000';
- Outer Reach, Cut1B: deepen from -44' to -46' depth for a length of 5,500';
- Outer Reach, Cut 1: deepen from -44' to -46' for the 5,300' long portion of Cut 1 that is seaward of buoys 7/8 (Station 0+00 to Station 53+00). The remainder of Cut 1 from buoys 7/8 to the apex of the channel turn, a length of 7,200', would also be deepened from -44' to -46';
- US Navy Turn Widener: deepen from -44' to -46' X 7.7 acres (triangular shaped area) bounded by outer and middle reaches to the north and northeast and the civil turn widener to the southwest;
- Civil Turn Widener: deepen from -41' to -46' X 15.6 acres (irregular shaped area) bounded to the north and northeast by the middle reach and the US Navy turn widener;
- New Turn Widener: deepen to -46' X 23.1 acres (irregular shaped area) bounded to the north and northeast by the civil turn widener and Cut 1 of the outer reach. To maintain the sediment trap's design capacity, it is proposed that the trap be deepened consistent with the new channel depth, and slightly expanded to the south;
- Middle Reach: deepen from -44' to -46' for a length of 5,658' and widen from 400' to 500' for a length of 2,282'. The middle reach extends from the apex of the channel turn westward to the western boundary of the Trident access channel;
- Inner Reach, Cut 2 and Cut 3: deepen from -40' to -44' and widen from 400' to 500' for a length of 3,344';
- Trident Access Channel and Trident Basin: With exclusive use by US Navy, the Trident Access channel connects the middle reach to the Trident basin. Existing dimensions are -44' project depth throughout an irregularly shaped area to remain as is, except at the southern boundary of the existing Trident Access channel, where the new 100' north side channel widener will consume a portion of the Trident Access Channel;
- Middle Turning Basin: expand and deepen to encompass 68.9 acres to a project depth of -43' and a turning circle diameter of 1422'. The existing -39' federal project provides a turning circle diameter of 1200';

- West Access Channel (east of Station 260+00): deepen from -39' to -43' and widen from 400' to 500' for a length of 1,840'; and

- West Turning Basin and West Access Channel (west of Station 260+00): expand the existing federally authorized turning circle from 1,400' diameter at a depth of -31' to 1,725' X 141 acres at a depth of -35'. The existing West Turning circle was deepened and is maintained to -35' by the Canaveral Port Authority. As part of the proposed expansion and shifting of the turning circle, the federally authorized depth will be increased to -35'.

The recommended plan for commercial navigation is economically feasible based upon a 50-year project life at the current FY 2013 price levels and Federal discount rate of 3.75 percent. The total average annual benefits are $5,393,000, total average annual costs are $2,647,000, which result in total net annual benefits of $2,747,000, and a benefit-cost ratio of 2.0 to 1.

Plan Implementation

In accordance with the provisions of Federal laws and policies, the Federal share of the project first cost is estimated to be $28,652,000. The estimated non-Federal share of the recommended plan is $15,862,000, including lands, easements, rights-of-way, disposal areas, and associated non-Federal costs. Incremental annual maintenance costs are estimated to be $633,000 annually. In accordance with Section 101(b)(1) of WRDA 1986, as amended (33 U.S.C. 2211(b)(1))), the non-Federal sponsor will be responsible for an amount equal to 50 percent of the excess of the cost of operation and maintenance of the project over the cost of which would be incurred for operation and maintenance for the depth in excess of 45 feet. The excess annual cost attributable to operation and maintenance for the depth in excess of 45 feet is $364,000, with the non-Federal sponsor responsible for $182,000. Therefore the Federal share of the incremental annual maintenance cost is estimated to be $451,000. Maintenance of any non-Federal ancillary facilities is a 100% non-Federal responsibility.

While the feasibility study was being conducted, a new fleet of larger cruise ships arrived at Port Canaveral. The dimensions of these vessels exceeded the design limits of the existing Federal navigation project (as predicted by the feasibility study) so, at the request of the cruise lines and Canaveral Pilots, CPA made the decision to advance construction of a portion of the planned improvements to the project to accommodate this new fleet of larger vessels, rather than turn them away. Navigation improvements in the West Turning Basin were constructed by the CPA in advance of completing the feasibility study in order to maintain safe navigation within the harbor for the newer, larger cruise ships that were entering the Port Canaveral fleet within the last several years.

The construction costs of these completed components ($13,775,063) are not included as a project cost in this report, because a prior agreement or authorization for these improvements to the existing Federal project was not yet in place between the Corps of Engineers and the non-Federal sponsor, the Canaveral Port Authority. However, as has been the case for a number of previous Federal navigation projects, the CPA intends to seek post-facto credit for those costs as part of the specific Congressional authorization for construction of the project improvements recommended in this report. The proposed project, including the costs of the advanced

construction of navigation improvements, remains economically justified and the recommended plan does not change if the expended costs of this completed element are included. The required environmental documentation and coordination was also conducted by CPA prior to construction of these navigation improvements.

This Section 203 Study report includes an Integrated Final Environmental Assessment prepared in accordance with the requirements of the National Environmental Policy Act. This report is being submitted by the Canaveral Port Authority to the Assistant Secretary of the Army (Civil Works) for approval, processing of the NEPA document, and submission to Congress for authorization of construction. Upon approval and authorization, the study will proceed to preconstruction, engineering and design (PED), and construction by the Corps of Engineers. The schedule to proceed with construction is estimated to be as early at 2013, subject to Congressional authorization and appropriations, and the project base year is estimated to be 2014.

Environmental Considerations

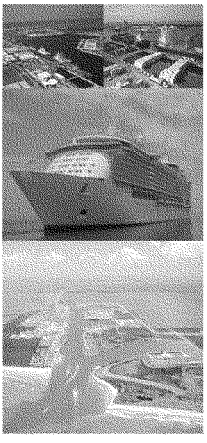
This report includes an integrated Final Environmental Assessment, which will be processed by the U.S. Army Corps of Engineers as a Final Environmental Assessment, and was prepared in accordance with the requirements of the National Environmental Policy Act. This Final Environmental Assessment presents the assessment and evaluation of impacts to environmental resources and other attributes in accordance with Federal and State laws, ordinances, regulations, statutes, and other guidelines. The selected plan will result in minor, short-term adverse impacts related to temporary disruptions to the marine algal community, sea turtle feeding habitat, a temporary increase in turbidity, and temporary transportation disruptions during construction. The selected plan has been found to be in conformance with Federal, State, and local statutes and policies.

Agency and Public Coordination

Coordination with the public and with Federal, State, and local agencies (Section 8: Public Involvement, Review and Consultation) was conducted to aid in the formulation and evaluation of the Recommended Plan. Public and agency views including informal comments received to date from representatives of the 45th Space Wing, Weather Squadron, Cape Canaveral Air Force Station U.S. Environmental Protection Agency, Seminole Tribe of Florida, U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Coast Guard, Florida Department of Environmental Protection, and Florida Fish and Wildlife Conservation Commission, which have indicated no opposition or major issues with the proposed action.

CANAVERAL HARBOR, FLORIDA

Integrated Section 203 Navigation Study Report
&
Final Environmental Assessment



Volume 1: Integrated Section 203 Navigation Study Report &
Final Environmental Assessment

December 2012

PORT
CANAVERAL

COVER SHEET

FINAL

Canaveral Harbor, Florida

Integrated Section 203 Navigation Study Report & Final Environmental Assessment

This feasibility study of improvements to the federal navigation project at Canaveral Harbor, Florida has been prepared by the Canaveral Port Authority (CPA) under the authority granted by Section 203 of Water Resources Development Act (WRDA) of 1986 (P.L. 99-662). Section 203 of WRDA 1986 allows non-Federal interests, such as the Canaveral Port Authority, to undertake feasibility studies of proposed harbor projects and submit them to the Secretary of the Army. The Canaveral Port Authority has conducted this Section 203 study to determine the feasibility of deepening and widening the channels, wideners, and turning basins at Port Canaveral to accommodate the most modern vessels in the world's cruise ship fleet and to allow for the passage of deeper draft cargo vessels within the Port.

The Secretary will review this study to determine whether the study, and the process under which it was developed, complies with Federal laws and regulations applicable to feasibility studies of navigation projects for deep draft harbors. Following that review, the Secretary will transmit to Congress, in writing, the results of his review and any recommendations the Secretary may have concerning the project.

As part of the Secretary's review, this report will be submitted by the Jacksonville District, U.S. Army Corps of Engineers (Corps), on behalf of the Secretary, for agency and public review and comment following the requirements of the National Environmental Policy Act (NEPA) and the U.S. Army Corps of Engineers (Corps) implementing regulations, ER 200-2-2. To facilitate that review, this report has been prepared following the format and requirements of an integrated feasibility report and Environmental assessment, complying with requirements of the Corps and the Council of Environmental Quality, and is intended to reduce duplication and paperwork. An asterisk in the table of contents and report notes sections that are required for NEPA compliance.

Abstract

This Integrated Section 203 Navigation Study Report & Final Environmental Assessment analyzes the feasibility and potential environmental consequences of implementing improvements to the existing Federal navigation project at Canaveral Harbor, Florida. The recommended plan consists of widening plus deepening, which more specifically includes widening the main ship channel from 400 feet to 500 feet, expanding the West Turning Basin turning circle from 1,400 feet to 1,725 feet, and deepening the following channel segments:

- Outer Reach, Cut 1A
- Outer Reach, Cut1B
- Outer Reach, Cut 1
- US NAVY Turn Widener
- Civil Turn Widener
- New 203 Turn Widener

- Middle Reach
- Trident Access Channel and Trident Turning Basin
- Inner Reach, Cut 2 and Cut 3
- Middle Turning Basin
- West Access Channel (east of Station 260+00)
- West Turning Basin and West Access Channel (west of Station 260+00).

A detailed description of the proposed improvements by project segment is provided in Section 6.7. The other alternatives considered are different increments of deepening and widening, non-structural solutions, and as required, the No Action alternative. The recommended plan (Preferred Alternative) is the most economical plan analyzed.

Public Comments

Public involvement has been conducted throughout the course of the study. At the request of CPA, the Jacksonville District, U.S. Army Corps of Engineers published a Notice of Intent in the Federal Register. While not required at this stage of the Section 203 study process, CPA requested that the Corps initiate the public scoping process in order to solicit public input while plan formulation and evaluation was still being conducted by CPA.

A public scoping meeting was held by the Corps, as was a study initiation public meeting hosted by CPA at Port Canaveral. Coordination with resource agencies was conducted through agency coordination letters that solicited their comments. The Canaveral Port Authority considered the comments received by letter and statements made at public meetings in the plan formulation, evaluation, and alternative selection process. Individuals and agencies were provided the opportunity to present written comments relevant to the Section 203 study or request to be placed on the mailing list for announcements and for the eventual distribution of the Final Environmental Assessment by the Headquarters, U.S. Army Corps of Engineers (HQUSACE). The comments received were limited, but were considered in the preparation of the Integrated Section 203 Navigation Study Report & Final Environmental Assessment. Upon review by the Assistant Secretary of the Army (Civil Works), the Integrated Section 203 Navigation Study Report & Final Environmental Assessment will be circulated by the U.S. Army Corps of Engineers for formal review and comment as an Integrated Section 203 Navigation Study Report and Final Environmental Assessment.

SYLLABUS

Authority and Purpose

This study of potential navigation improvements at Canaveral Harbor, Florida has been prepared by the Canaveral Port Authority (CPA) under the authority granted by Section 203 of Water Resources Development Act (WRDA) of 1986 (P.L. 99-662).

The purpose of this Section 203 study is to determine the feasibility of improvements to the existing Federal navigation project at Port Canaveral[1] and to identify the solution that best meets the economic, environmental, physical, and social needs of the region and the nation. Pursuant to Section 203 of WRDA 1986, this study is also intended to determine the advisability and extent of both Federal and non-Federal participation in cost sharing the proposed improvements.

The Principles and Guidelines require that the plan which maximizes net benefits, the NED plan, be identified. Typically, the incremental analysis includes depths beyond the depth which maximizes net benefits in order to "bracket" the NED plan and to show that net benefits in fact decline at deeper depths. However, ER 1105-2-100 paragraph 3-2 b.(10) Categorical Exemption to NED Plan states:

> *For harbor and channel deepening studies where the non-Federal sponsor has identified constraints on channel depths it is not required to analyze project plans greater (deeper) than the plan desired by the sponsor.*

This study identifies the most economical plan analyzed, the plan that has the greatest net economic benefits of all plans considered. At the request of the non-Federal sponsor, plans greater in depth and width were not analyzed due to financial and logistical constraints.

Problems and Needs

The last major navigation improvements to the Federal navigation project at Port Canaveral were completed by the Corps of Engineers in 1995. Since that time, the demand by users of the Port to accommodate larger and deeper cruise ships and cargo vessels has resulted in a need to provide deeper and wider channels and expanded turning basins. Opportunities exist to increase the efficiency of existing operations by providing deeper and wider channels that allow larger cruise ships to use the Port and larger cargo vessels to carry greater loads.

There are vessels presently calling at Port Canaveral that could significantly benefit from deeper, wider channels, as well as newer, larger vessels that would use Port Canaveral if existing channels were improved. Since 2009, three new cruise ships which are among the largest in the world fleet have been homeported at Port Canaveral and a fourth is due to arrive in spring 2012. All of these vessels exceed the design dimensions of the project (nearly 300 feet longer and nearly 30 feet wider than the design vessel). The Canaveral Port Authority has made

[1] The existing project for deep draft navigation at Canaveral Harbor, Florida, authorized by the River and Harbor Acts of March 1945 and October 1962, and Sections 101, 114, and 117 of the Water Resources Development Act (WRDA) of 30 October 1992. The official name of the Federal project is Canaveral Harbor, Florida. Throughout the remainder of this report, this will be used interchangeably with the locally recognized name, Port Canaveral.

modifications to the Federal project (limited channel widening to 450 feet in selected locations, interim corner cutoff in West Turning Basin) in order to accommodate these vessels temporarily until the project can be upgraded. In addition, the new Seaport Canaveral facility, which began operations in 2010, provides the opportunity for substantial transportation cost savings if the project is deepened and widened to accommodate the longer and deeper tankers (up to 250 feet longer and 5 feet deeper than the design vessel) that Seaport Canaveral would like to use to transport petroleum products to their new facility. Additional transportation cost savings from project deepening would also accrue to other bulk carriers (rock, slag, cement), if existing vessels could be loaded more deeply and larger vessel could be used.

Projections for cruise traffic and cargo movements indicate sustained growth. The costs of transporting commodities could be significantly reduced if larger, more fully loaded vessels could call at Port Canaveral. Additionally, the cost of vessel operations within the Port could be substantially reduced by the improved vessel maneuverability afforded by a wider channel. Navigational safety, especially surge impacts on moored cargo and naval vessels, would be substantially improved by a wider channel.

Alternatives Considered

This study identified and evaluated alternatives to solve the following problems and take advantage of the following opportunities: 1) reduce ship congestion at Port Canaveral; 2) accommodate recent and anticipated future growth in cargo and cruise vessel traffic; 3) improve the efficiency of operations and improve safety for cruise ships and cargo vessels currently operating within the Port complex; 4) allow for use of the Port by larger cruise ships and larger and more efficient cargo vessels; and 5) allow for development of additional terminals/berths without encroaching on the existing Federal channels and turning basins.

Potential improvements evaluated in this study include: the No Action Plan; non-structural alternatives; and structural alternatives such as deepening and widening of navigational channels, expansion of the turning basins, and expanded wideners at the port. All viable alternative plans were considered that had the potential to improve the efficiency of operations and reduce the costs to cargo shippers and cruise lines. The only viable alternatives identified in the analysis involved various combinations of channel deepening, widening, turning basin extensions, and expanded wideners that would allow larger vessels to operate more efficiently and safely within in the Federal navigation project.

The formulation of alternative plans carefully considered the optimization of channel widths and depths to maximize net average annual benefits and contributions to the NED account. This included identification of design vessels (cruise and cargo) and associated dredging requirements, identification of structural and non-structural improvements, and estimation of incremental costs and benefits. The plan formulation process also considered the characteristics and quality of dredged material and requirements for disposal. All non-Federal ancillary facilities that are required to deliver project benefits were identified, costs estimated, and are included as associated costs in the alternative evaluation and economic analysis. All plans were evaluated using the System of Accounts framework established in the Principles and Guidelines (P&G 1983) promulgated by the Water Resources Council. The final alternatives were evaluated based on comparison to the No Action Plan, in order to identify the plan that maximized net economic benefits to the nation. Physical conditions at the Port constrained the array of

alternatives that were evaluated such that the most economical plan analyzed may be a smaller scale plan than the NED Plan. Environmental impacts were identified and evaluated to determine conformity with environmental laws, policies, and other guidelines. Finally, as previously mentioned, the views of the public were solicited and considered in the alternative formulation and evaluation process.

The Recommended Plan

The recommended plan, which is the most economical plan analyzed consists of widening the main ship channel from the harbor entrance inland to the West Turning Basin and West Access Channel, from its current authorized width of 400 feet to 500 feet. In addition to widening, deepening of the existing Federal project and expansion of turning basins is recommended in the following reaches:

- Outer Reach, Cut 1A: deepen from -44' to -46' for a length of 11,000';
- Outer Reach, Cut1B: deepen from -44' to -46' depth for a length of 5,500';
- Outer Reach, Cut 1: deepen from -44' to -46' for the 5,300' long portion of Cut 1 that is seaward of buoys 7/8 (Station 0+00 to Station 53+00). The remainder of Cut 1 from buoys 7/8 to the apex of the channel turn, a length of 7,200', would also be deepened from -44' to -46';
- US Navy Turn Widener: deepen from -44' to -46' X 7.7 acres (triangular shaped area) bounded by outer and middle reaches to the north and northeast and the civil turn widener to the southwest;
- Civil Turn Widener: deepen from -41' to -46' X 15.6 acres (irregular shaped area) bounded to the north and northeast by the middle reach and the US Navy turn widener;
- New Turn Widener: deepen to -46' X 23.1 acres (irregular shaped area) bounded to the north and northeast by the civil turn widener and Cut 1 of the outer reach. To maintain the sediment trap's design capacity, it is proposed that the trap be deepened consistent with the new channel depth, and slightly expanded to the south;
- Middle Reach: deepen from -44' to -46' for a length of 5,658' and widen from 400' to 500' for a length of 2,282'. The middle reach extends from the apex of the channel turn westward to the western boundary of the Trident access channel;
- Inner Reach, Cut 2 and Cut 3: deepen from -40' to -44' and widen from 400' to 500' for a length of 3,344';
- Trident Access Channel and Trident Basin: With exclusive use by US Navy, the Trident Access channel connects the middle reach to the Trident basin. Existing dimensions are -44' project depth throughout an irregularly shaped area to remain as is, except at the southern boundary of the existing Trident Access channel, where the new 100' north side channel widener will consume a portion of the Trident Access Channel;
- Middle Turning Basin: expand and deepen to encompass 68.9 acres to a project depth of -43' and a turning circle diameter of 1422'. The existing -39' federal project provides a turning circle diameter of 1200';

- West Access Channel (east of Station 260+00): deepen from -39' to -43' and widen from 400' to 500' for a length of 1,840'; and

- West Turning Basin and West Access Channel (west of Station 260+00): expand the existing federally authorized turning circle from 1,400' diameter at a depth of -31' to 1,725' X 141 acres at a depth of -35'. The existing West Turning circle was deepened and is maintained to -35' by the Canaveral Port Authority. As part of the proposed expansion and shifting of the turning circle, the federally authorized depth will be increased to -35'.

The recommended plan for commercial navigation is economically feasible based upon a 50-year project life at the current FY 2013 price levels and Federal discount rate of 3.75 percent. The total average annual benefits are $5,393,000, total average annual costs are $2,647,000, which result in total net annual benefits of $2,747,000, and a benefit-cost ratio of 2.0 to 1.

Plan Implementation

In accordance with the provisions of Federal laws and policies, the Federal share of the project first cost is estimated to be $28,652,000. The estimated non-Federal share of the recommended plan is $15,862,000, including lands, easements, rights-of-way, disposal areas, and associated non-Federal costs. Incremental annual maintenance costs are estimated to be $633,000 annually. In accordance with Section 101(b)(1) of WRDA 1986, as amended (33 U.S.C. 2211(b)(1))), the non-Federal sponsor will be responsible for an amount equal to 50 percent of the excess of the cost of operation and maintenance of the project over the cost of which would be incurred for operation and maintenance for the depth in excess of 45 feet. The excess annual cost attributable to operation and maintenance for the depth in excess of 45 feet is $364,000, with the non-Federal sponsor responsible for $182,000. Therefore the Federal share of the incremental annual maintenance cost is estimated to be $451,000. Maintenance of any non-Federal ancillary facilities is a 100% non-Federal responsibility.

While the feasibility study was being conducted, a new fleet of larger cruise ships arrived at Port Canaveral. The dimensions of these vessels exceeded the design limits of the existing Federal navigation project (as predicted by the feasibility study) so, at the request of the cruise lines and Canaveral Pilots, CPA made the decision to advance construction of a portion of the planned improvements to the project to accommodate this new fleet of larger vessels, rather than turn them away. Navigation improvements in the West Turning Basin were constructed by the CPA in advance of completing the feasibility study in order to maintain safe navigation within the harbor for the newer, larger cruise ships that were entering the Port Canaveral fleet within the last several years.

The construction costs of these completed components ($13,775,063) are not included as a project cost in this report, because a prior agreement or authorization for these improvements to the existing Federal project was not yet in place between the Corps of Engineers and the non-Federal sponsor, the Canaveral Port Authority. However, as has been the case for a number of previous Federal navigation projects, the CPA intends to seek post-facto credit for those costs as part of the specific Congressional authorization for construction of the project improvements recommended in this report. The proposed project, including the costs of the advanced

construction of navigation improvements, remains economically justified and the recommended plan does not change if the expended costs of this completed element are included. The required environmental documentation and coordination was also conducted by CPA prior to construction of these navigation improvements.

This Section 203 Study report includes an Integrated Final Environmental Assessment prepared in accordance with the requirements of the National Environmental Policy Act. This report is being submitted by the Canaveral Port Authority to the Assistant Secretary of the Army (Civil Works) for approval, processing of the NEPA document, and submission to Congress for authorization of construction. Upon approval and authorization, the study will proceed to preconstruction, engineering and design (PED), and construction by the Corps of Engineers. The schedule to proceed with construction is estimated to be as early at 2013, subject to Congressional authorization and appropriations, and the project base year is estimated to be 2014.

Environmental Considerations

This report includes an integrated Final Environmental Assessment, which will be processed by the U.S. Army Corps of Engineers as a Final Environmental Assessment, and was prepared in accordance with the requirements of the National Environmental Policy Act. This Final Environmental Assessment presents the assessment and evaluation of impacts to environmental resources and other attributes in accordance with Federal and State laws, ordinances, regulations, statutes, and other guidelines. The selected plan will result in minor, short-term adverse impacts related to temporary disruptions to the marine algal community, sea turtle feeding habitat, a temporary increase in turbidity, and temporary transportation disruptions during construction. The selected plan has been found to be in conformance with Federal, State, and local statutes and policies.

Agency and Public Coordination

Coordination with the public and with Federal, State, and local agencies (Section 8: Public Involvement, Review and Consultation) was conducted to aid in the formulation and evaluation of the Recommended Plan. Public and agency views including informal comments received to date from representatives of the 45th Space Wing, Weather Squadron, Cape Canaveral Air Force Station U.S. Environmental Protection Agency, Seminole Tribe of Florida, U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Coast Guard, Florida Department of Environmental Protection, and Florida Fish and Wildlife Conservation Commission, which have indicated no opposition or major issues with the proposed action.

TABLE OF CONTENTS

1. INTRODUCTION 1-1
1.1 Project and Study Authority 1-1
1.2 Study Purpose and Scope 1-2
1.3 Location and General Description of the Study Area 1-4
1.4 Existing Federal Project 1-8
1.5 Planning Process and Report Organization 1-9
2. BASELINE CONDITIONS / AFFECTED ENVIRONMENT* 2-1
2.1 General 2-1
2.1.1 Temperature and Precipitation 2-1
2.1.2 Geologic Setting 2-1
2.1.3 Water Levels 2-2
2.1.4 Tidal Currents 2-3
2.1.5 Water Quality 2-4
2.1.6 Wind and Wave Climate 2-5
2.1.7 Landside Access 2-7
2.2 Navigation Features 2-8
2.2.1 Channels and Turning Basins 2-11
2.2.2 Dredging History 2-17
2.3 Terminal Facilities 2-20
2.3.1 South Side Cargo Terminal Facilities 2-23
2.3.2 North Side Cargo Terminal Facilities 2-24
2.3.3 Cruise Terminal Facilities 2-27
2.4 Existing Economic Conditions 2-28
2.4.1 Socio-Economics 2-28
2.4.2 Port Hinterland 2-28
2.5 Port Canaveral Operations 2-29
2.5.1 Florida's Cruise Ship Industry 2-29
2.5.2 Port Canaveral's Cruise Ship Industry 2-32
2.5.3 Port Canaveral Cruise Ship Operations 2-35
2.5.4 Port Canaveral Historical Cargo Volumes 2-38
2.5.5 Existing Cargo Traffic Characterization 2-40
2.5.6 Existing Cargo Fleet 2-43

2.5.7 Existing Cargo Fleet Operations and Tidal Advantage 2-44
2.6 Environmental and Cultural Resources 2-47
2.6.1 Sediments 2-47
2.6.2 Vegetation 2-49
2.6.3 Wildlife Resources 2-49
2.6.4 Wetlands 2-49
2.6.5 Marine Resources 2-51
2.6.6 Essential Fish Habitat (EFH) 2-55
2.6.7 Protected Species 2-58
2.6.8 Coastal Barrier Resources 2-72
2.6.9 Cultural Resources 2-72
3. WITHOUT-PROJECT CONDITIONS 3-1
3.1 Navigation Features 3-1
3.1.1 Canaveral Ocean Dredged Material Disposal Site 3-1
3.1.2 Channel Conditions 3-1
3.2 Terminal Facilities 3-2
3.2.1 Cargo Terminals 3-2
3.2.2 Cruise Terminals 3-2
3.3 Economic Conditions 3-3
3.4 Port Operations 3-5
3.4.1 Commodity Projections 3-5
3.4.2 Cargo Fleet Forecast 3-9
3.4.3 Cruise Ship Forecast and Operations 3-10
3.5 Environmental and Cultural Resources 3-12
3.5.1 Potential Rule Change to Atlantic Right Whale Regulations 3-14
3.5.2 Gopher Tortoise Status 3-14
4. PROBLEMS, OPPORTUNITIES AND CONSTRAINTS 4-1
4.1 Problems 4-1
4.1.1 Problem 1: Cruise Ship Size Limitations 4-1
4.1.2 Problem 2: Cargo Vessel Size Limitations 4-4
4.1.3 Problem 3: Surge Effects and Safety 4-6
4.1.4 Problem 4: Future Berth Congestion 4-9
4.1.5 Problem 5: Limitations on New Cargo and Cruise Terminals 4-9

4.2 Opportunities 4-9
4.3 Federal Objective 4-10
4.3.1 Other Planning Objectives 4-10
4.4 Constraints 4-11
5. FORMULATION AND EVALUATION OF ALTERNATIVE PLANS* 5-1
5.1 Plan Formulation Rationale 5-1
5.1.1 System of Accounts Framework 5-2
5.2 Plan Formulation Criteria 5-2
5.3 Management Measures 5-5
5.3.1 Planning Elements 5-5
5.4 Preliminary Alternative Plans 5-11
5.4.1 Alternatives Eliminated from Detailed Analysis 5-14
6. PLAN SELECTION 6-1
6.1 Integration of Environmental Operating Principles 6-1
6.2 Detailed Alternative Plan Description 6-2
6.2.1 Without-project Condition Channel Description 6-2
6.2.2 Alternative With-project Condition Channel Descriptions 6-2
6.2.3 Identification of Alternative Plan Increments 6-2
6.3 Alternative Plans Costs 6-9
6.3.1 Construction and Investment Costs 6-9
6.3.2 Costs of Previously Completed Work 6-14
6.3.3 Operations and Maintenance Costs 6-15
6.3.4 Total Average Annual Equivalent Costs 6-15
6.4 With-Project Benefits 6-17
6.4.1 Surge Modeling Results – With Project Conditions 6-18
6.4.2 Channel Widening Benefits 6-18
6.4.3 Channel Deepening Benefits 6-24
6.5 Net Benefits of Alternative Plans 6-31
6.6 Summary of Accounts and Plan Comparison 6-33
6.7 Recommended Plan 6-46
6.7.1 Description of the Recommended Plan 6-46
6.7.2 Recommended Plan Construction 6-51
6.7.3 Dredged & Upland Material Management Plan 6-53
6.7.4 Recommended Plan Operations and Maintenance 6-55

6.7.5 Recommended Plan Real Estate Considerations 6-56
6.7.6 Summary of Accounts 6-56
6.8 Risk and Uncertainty 6-57
6.9 Implementation Requirements 6-61
6.9.1 Division of Responsibilities 6-61
6.9.2 Cost Sharing 6-62
6.9.3 Special Consideration: Credit for Previously Completed Work 6-66
6.9.4 Financial Analysis of Non-Federal Sponsor's Capabilities 6-67
7. ENVIRONMENTAL CONSEQUENCES* 7-1
7.1 Environmental Evaluation Methodology 7-1
7.2 Effects on Significant Resources 7-1
7.2.1 General 7-1
7.2.2 Sediments (see 2.6.1) 7-2
7.2.3 Vegetation (see 2.6.2) 7-3
7.2.4 Wildlife Resources 7-4
7.2.5 Wetlands (see 2.6.4) 7-4
7.2.6 Marine Resources (see 2.6.5) 7-5
7.2.7 Essential Fish Habitat (see 2.6.6) 7-6
7.2.8 Protected Species (see 2.6.7) 7-7
7.2.9 Cultural Resources (see 2.6.17) 7-12
7.2.10 Socio-Economic Resources 7-13
7.2.11 Aesthetics 7-13
7.2.12 Recreation 7-14
7.2.13 Coastal Barrier Resources 7-14
7.2.14 Water Quality 7-15
7.2.15 Hazardous, Toxic, and Radioactive Waste 7-15
7.2.16 Air Quality 7-16
7.2.17 Noise 7-17
7.2.18 Traffic 7-18
7.2.19 Navigation 7-18
7.2.20 Energy Requirements and Conservation 7-20
7.2.21 Natural or Depletable Resources 7-20
7.2.22 Scientific Resources 7-20

7.2.23 Native Americans 7-20
7.2.24 Reuse and Conservation Potential 7-20
7.2.25 Cumulative Impacts 7-20
7.2.26 Irreversible and Irretrievable Commitment of Resources 7-26
7.2.27 Unavoidable Adverse Environmental Effects 7-26
7.2.28 Local Short-Term Uses and Maintenance/Enhancement Of Long-Term Productivity 7-26
7.2.29 Indirect Effects 7-26
7.2.30 Compatibility with Federal, State, and Local Objectives 7-26
7.2.31 Conflicts and Controversy 7-26
7.2.32 Uncertain, Unique, or Unknown Risks 7-26
7.2.33 Precedent and Principle for Future Actions 7-26
7.2.34 Environmental Commitments 7-26
7.2.35 Compliance with Environmental Requirements 7-27
7.3 Measures to Avoid, Minimize and Mitigate Environmental Effects 7-31
7.4 Occupational Health and Safety (32 CFR 989.27) 7-34
8. PUBLIC INVOLVEMENT, REVIEW AND CONSULTATION* 8-1
8.1 Public Involvement Program 8-1
8.2 Additional Required Coordination 8-1
8.3 Scoping and Draft EA 8-2
8.4 Agency and Public Coordination 8-2
8.5 List of Statement Recipients 8-3
9. RECOMMENDATIONS 9-1
10. LISTS OF PREPARERS AND REVIEWERS 10-1
11. REFERENCES 11-1

LIST OF TABLES

Table 1-1 Port Canaveral Channel Dimensions 1-8
Table 2-1 Water Levels (ft.) – Trident Pier, Trident Basin 2-2
Table 2-2 Wave Predictions – Entrance to Canaveral Harbor 2-7
Table 2-3 Port Canaveral Existing Channel Dimensions 2-11
Table 2-4 New Work Dredging History 2-18

Table 2-5 Corps of Engineers Maintenance Dredging History 2-19
Table 2-6 Port Canaveral Cargo Category by Berth 2-21
Table 2-7 Port Canaveral South Side Cargo Terminal Facilities Summary 2-24
Table 2-8 Seaport Canaveral (Vitol, S.A., Inc) Terminal Storage Capability 2-25
Table 2-9 Port Canaveral North Side Cargo Terminal Facilities Summary 2-26
Table 2-10 Port Canaveral Cruise Terminal Summary 2-27
Table 2-11 Projected Growth for City of Orlando 2004 - 2030 2-28
Table 2-12 North American Multi-Day Cruise Passengers by Departure Port (000's) 2-30
Table 2-13 North American Cruise Passengers By Destination (000's) 2-31
Table 2-14 Port Canaveral Cruise Ship Revenue Passengers 2-33
Table 2-15 Comparative Normal Capacity Utilization (2004 – 2011) 2-34
Table 2-16 Port Canaveral Cruise Ship Capacity Utilization (2003 – 2011) 2-35
Table 2-17 Port Canaveral Historical Wind-Related Cruise Ship Tug Assist Occurrences 2-38
Table 2-18 Port Canaveral Historical Total Annual Tonnage (short tons) 2-39
Table 2-19 Port Canaveral Total Annual Tonnage Long Term Growth Rates 2-40
Table 2-20 Port Canaveral Commodity Tonnage FY 2001 – FY 2009 (Short Tons) 2-42
Table 2-21 Large Bulk Cargo Vessel Call Characteristics - 2006 2-44
Table 2-22 Port Canaveral Deep Draft Vessel Arrival Drafts 2002 - 2006 2-45
Table 2-23 Seaport Canaveral Point-to-Point Vessel Sailing Drafts Aug 2010 – July 2011 2-46
Table 2-24 Port Canaveral Dredging Operations Using the ODMDS 2-48
Table 2-25 Managed Species Identified by the South Atlantic Fishery Management Council That Are Known to Occur in Brevard County, Florida 2-56
Table 2-26 Sea Turtle Nesting Data for Brevard County, 1988-2010 2-61
Table 2-27 Observation Data for Port Canaveral Sea Turtle Census August 2005 and September 2006 2-64
Table 2-28 Canaveral Lock Manatee Sightings: 2003 - June 2012 2-66
Table 3-1 Six-County Regional Population Projections (2010 – 2035) 3-4
Table 3-2 Fuel Consumption Projections in Millions of Barrels per Day (2010 – 2035) 3-5
Table 3-3 Base Case Commodity Forecast – Selected Years (Tons) 3-9
Table 3-4 Base Case Without-Project Condition Cargo Vessel Calls for Selected Years 3-10

Table 3-5 Present and Future Large Cruise Ships and Classes 3-12

Table 4-1 Largest Cargo Vessels to Call at Port Canaveral in 2006 4-4

Table 5-1 Planning Element Screening 5-6

Table 5-2 Objectives-Measures Matrix 5-7

Table 5-3 Existing Channel Depth and Draft Requirements (feet below MLLW) 5-13

Table 5-4 Preliminary Plan Screening 5-13

Table 5-5 Alternative Plan Channel Depths and Widths (feet below MLLW) 5-15

Table 6-1 Channel Depth Design Requirements for Unrestricted Operating Draft of 39.5 feet (feet below MLLW) 6-9

Table 6-2 Widening Alternatives: Construction First Costs* 6-11

Table 6-3 Construction Costs: Channel Deepening Alternatives* 6-12

Table 6-4 Construction Costs: Widening Plan 1 (450 feet) and Channel Deepening 6-13

Table 6-5 Construction Costs: Widening Plan 2 (500 feet) and Channel Deepening 6-14

Table 6-6 Cost of Work Completed By CPA 6-15

Table 6-7 Average Annual Equivalent (AAEQ) Project Costs: Channel Widening 6-16

Table 6-8 Average Annual Equivalent (AAEQ) Project Costs: Channel Deepening 6-16

Table 6-9 Average Annual Equivalent (AAEQ) Project Costs: Widening Plan 1 (450 feet) and Channel Deepening 6-16

Table 6-10 Average Annual Equivalent (AAEQ) Project Costs: Widening Plan 2 (500 feet) and Channel Deepening 6-17

Table 6-11 Operations Matrix: Impact of Widening Plan 1(Number of Tugs) 6-20

Table 6-12 Operations Matrix: Impact of Widening Plan 2 6-21

Table 6-13 Alternative Widening Plan Annual Benefits – Tug Assistance Reductions: 2020 6-22

Table 6-14 Alternative Channel Widening Plan Annual Benefits – Larger Tankers: 2020 6-23

Table 6-15 Total Annual Channel Widening Benefits 6-24

Table 6-16 Large Cargo Vessel Characteristics 6-26

Table 6-17 Without and With-project Operating Drafts and Tons per Call 6-28

Table 6-18 Projected Benefiting Cargo Vessel Calls: 2020 6-29

Table 6-19 Average Annual Equivalent Transportation Cost Savings: Deepening Alternatives 6-30

Table 6-20 Total Project AAEQ Benefits: Widening and Deepening Plan Combinations 6-31

Table 6-21 Cost – Benefit Analysis: Channel Widening Only 6-31

Table 6-22 Cost – Benefit Analysis: Channel Deepening Only 6-32

Table 6-23 Cost – Benefit Analysis: Widening Plan 1 (450 feet) and Channel Deepening 6-32

Table 6-24 Cost – Benefit Analysis: Widening Plan 2 (500 feet) and Channel Deepening 6-32

Table 6-25 Contributions to Planning Objectives: Individual Plans 6-34

Table 6-26 Contributions to Planning Objectives: Combined Plans (Widening Plan 1 [450 feet] and Deepening) 6-38

Table 6-27 Contributions to Planning Objectives: Combined Plans (Widening Plan 2 [500 feet] and Deepening) 6-42

Table 6-28 Port Canaveral Economic Impacts 6-57

Table 6-29 Cost – Benefit Analysis: Low Forecast Scenario 6-59

Table 6-30 Cost – Benefit Analysis: High Forecast Scenario 6-59

Table 6-31 Cost – Benefit Analysis: Alternative Seaport Canaveral Forecasts 6-60

Table 6-32 Port Canaveral Commodity Forecast Uncertainty Ranking 6-61

Table 6-33 Cost Share Zones 6-62

Table 6-34 Project Cost Sharing Summary (FY 2013 Price Levels) 6-63

Table 6-35 Project Cost Sharing Details (FY 2013 Price Levels) 6-64

Table 6-36 Cost Sharing Explanations 6-65

Table 6-37 Fully Funded Costs 6-66

Table 7-1: 2002 Countywide Emissions for Brevard County (Tons Per Year) 7-17

Table 7-2 Volume of Dredged Material Placed in the Canaveral ODMDS (1974-2005) 7-22

Table 7-3 Federal Permits Issued 7-24

Table 7-4 State Permits Issued 7-25

LIST OF FIGURES AND CHARTS

Figure 1-1 Port Canaveral Location Map 1-5

Figure 1-2 Port Canaveral Existing Navigation Project Features 1-6

Figure 1-3 Port Canaveral Major Facilities 1-7

Chart 2-1 Percent Frequency Occurrence, All and Daily Peak Surface Winds 2-6
Chart 2-2 Cumulative Percent Exceedance, All and Daily Peak Surface Winds 2-6
Figure 2-1 Port Canaveral Location Map 2-9
Figure 2-2 Port Canaveral Existing Navigation Project Features 2-10
Figure 2-3 "Pilot's Dredging" Areas Sheet 1 of 2 2-12
Figure 2-3 (continued) "Pilot's Dredging" Areas Sheet 2 of 2 2-13
Figure 2-4 Port Canaveral Navigation Features West of Trident Basin 2-15
Figure 2-5 Port Canaveral Navigation Features East of Trident Basin 2-16
Figure 2-6 Port Canaveral Major Facilities 2-22
Figure 2-7 Seaport Canaveral Fuel Terminal 2-26
Chart 2-3 Port Canaveral Deep Draft Vessel Arrival Drafts (2002-2006) 2-45
Chart 2-4 Seaport Canaveral Point-to-Point Vessel Sailing Drafts August 2010 – July 2011 2-46
Chart 2-5 Seaport Canaveral Point-to-Point Vessel Length Overall August 2010 – July 2011 2-47
Figure 2-8 FLUCCS Map 2-50
Figure 2-9 Seagrass Occurrence Map 2-53
Figure 2-10 Algae Covered Rip-Rap 2-54
Figure 2-11 Sea Turtle Nesting 2-60
Figure 2-12 Sea Turtle Sighting Transects 2-63
Figure 2-13 Southeastern Beach Mouse – Suitable Habitat 2-68
Figure 2-14 Scrub Jay Groups 2-70
Figure 2-15 Bald Eagle Nest Locations 2-71
Figure 2-16 Gopher Tortoise Borrows and Habitat 2-73
Figure 2-17 Coastal Barrier Resources System (CBRA) 2-74
Figure 2-18 Cultural Resources Sites 2-75
Figure 6-1 Alternative Plans: Sheet 1 6-5
Figure 6-2 Alternative Plans: Sheet 2 6-6
Figure 6-3 Alternative Plans: Sheet 3 6-7
Figure 6-4 Recommended Plan: West of Trident Basin 6-49

Figure 6-5 Recommended Plan: East of Trident Basin 6-50

Figure 6-6 Recommended Plan: Construction Schedule 6-52

LIST OF ATTACHMENTS

ATTACHMENT 1: Sponsor's Letter of Intent

ATTACHMENT 2: Non-Federal Sponsor's Self Certification of Financial Capability for Decision Documents

LIST OF APPENDICES

Engineering Appendix

Environmental Appendix

Real Estate Appendix

Economics Appendix

PORT CANAVERAL, FLORIDA

INTEGRATED SECTION 203 NAVIGATION STUDY REPORT & FINAL ENVIRONMENTAL ASSESSMENT

1. INTRODUCTION

1.1 Project and Study Authority

The existing Port Canaveral, Florida project was authorized for "national security and the stabilization of employment" by the Rivers and Harbors Acts of 2 March 1945[2] and 23 October 1962[3], and Sections 101[4] and 117[5] of PL 102-580 dated 31 October 1992. The project is actively operated and maintained by the U.S. Army Corps of Engineers, Jacksonville District.

This study of potential navigation improvements at Port Canaveral, Florida has been prepared by the Canaveral Port Authority (CPA) under the authority granted by Section 203 of Water Resources Development Act (WRDA) of 1986 (P.L. 99-662).

---

[2] Public Law 14-79th Congress, Chapter 19-1st Session, S. 35, "Sec.2. The following works of improvement of rivers, harbors, and other waterways are hereby adopted and authorized in the interest of national security and the stabilization of employment, and shall be prosecuted as speedily as may be consistent with budgetary requirements, under the direction of the Secretary of War and supervision of the Chief of Engineers, in accordance with the plans in the respective reports hereinafter designated and subject to the conditions set forth therein...Canaveral Harbor, Florida; House Document Numbered 367, Seventy-seventh Congress"

[3] Public Law 87-874, 87th Congress, H.R. 13273, "Title 1-Rivers and Harbors, Sec. 101. That the following works of improvement of rivers and harbors and other waterways for navigation, flood control, and other purposes are hereby adopted and authorized to be prosecuted under the direction of the Secretary of the Army and supervision of the Chief of Engineers, in accordance with the plans and subject to the conditions recommended by the Chief of Engineers in the respective reports hereinafter designated: *Provided,* That the provisions of section 1 of the River and Harbor Act approved March 2, 1945 (Public Law Numbered 14, Seventy-ninth Congress, first session), shall govern with respect to projects authorized in this title; and the procedures therein set forth with respect to plans, proposals, or reports for works of improvement for navigation or flood control and for irrigation and purposes incidental thereto, shall apply as if herein set forth in full:...Canaveral Harbor, Florida: Senate Document Numbered 115, Eighty-seventh Congress, at an estimated cost of $605,000;"

4 Public Law 102-580 October 31, 1992, 102d Congress "TITLE I --WATER RESOURCES PROJECTS, SEC. 101. PROJECT AUTHORIZATIONS. Except as provided in this section, the following projects for water resources development and conservation and other purposes are authorized to be carried out by the Secretary substantially in accordance with the plans, and subject to the conditions, recommended in the respective reports designated in this section: ... (7) CANAVERAL HARBOR, FLORIDA.--The project for navigation, Canaveral Harbor, Florida: Report of the Chief of Engineers, dated July 24, 1991, as modified by the letter of the Secretary dated October 10, 1991, at a total cost of $11,780,000, with an estimated Federal cost of $6,100,000 and an estimated non- Federal cost of $5,680,000."

[5] *SEC. 117. DEAUTHORIZATION OF A PORTION OF THE CANAVERAL HARBOR, FLORIDA, PROJECT. Section 1080 of the Intermodel Surface Transportation Efficiency Act of 1991 (105 Stat. 2020) is amended by inserting "thence north 00-18-51 west, a distance of 764.43 feet;" after "551.30 feet;".*

Section 203 of WRDA 86 states:

SEC 203. STUDIES OF PROJECTS BY NON-FEDERAL INTERESTS.
PUBLIC LAW 99-662, NOV. 17, 1986. 33 USC 2231.

(a) SUBMISSION TO SECRETARY - A non-Federal interest may on its own undertake a feasibility study of a proposed harbor or inland harbor project and submit it to the Secretary. To assist non-Federal interests, the Secretary shall, as soon as practicable, promulgate guidelines for studies of harbors or inland harbors to provide sufficient information for the formulation of studies.[6]

(b) REVIEW BY SECRETARY - The Secretary shall review each study submitted under subsection (a) for the purpose of determining whether or not such study and the process under which such study was developed comply with Federal laws and regulations applicable to feasibility studies of navigation project for harbors or inland harbors.

(c) SUBMISSION TO CONGRESS - Not later than 180 days after receiving any study submitted under subsection (a), the Secretary shall transmit to the Congress, in writing, the results of such review and any recommendations the Secretary may have concerning the project described in such plan and design.

(d) CREDIT AND REIMBURSEMENT - If a project for which a study has been submitted under subsection (a) is authorized by any provision of Federal law enacted after the date of such submission, the Secretary shall credit toward the non-Federal share of the cost of construction of such project an amount equal to the portion of the cost of developing such study that would be the responsibility of the United States if such study were developed by the Secretary.

The United States Army Corps of Engineers (USACE) is the lead agency under the National Environmental policy Act of 1969 (NEPA).

1.2 Study Purpose and Scope

The Canaveral Port Authority (CPA) was created by a Special Act of the Florida state legislature in 1953 (the year the Port was dedicated), and is an independent governmental agency of the State of Florida that operates the Port. The CPA is also the non-Federal sponsor of the Federal navigation project at Port Canaveral.

The Canaveral Port Authority has conducted this Section 203 study to determine the feasibility of improvements to the Federal navigation project at Port Canaveral. Potential improvements include deepening and widening of navigational channels, expansion of the West Turning Basin, and expanded wideners at the port. The purpose of these potential improvements is to efficiently accommodate larger cruise ships and cargo vessels which are already using or projected to use the port in the very near future. These proposed improvements will also increase the efficiency and safety of cargo and naval vessel operations by reducing the current disruptions to cargo and naval operations from the surge effects of operating these extremely large cruise ships under high wind conditions in the narrow federal channel. This study identifies and evaluates alternatives that will:

[6] Guidelines for implementation of Section 203 (WRDA 86) studies were prepared by the Corps and are contained in ER 1165-2-122, Studies of Harbor or Inland Harbor Projects by Non-Federal Interests, 26 August 1991. This guidance was used in the development of the Port Canaveral Section 203 Study

1) reduce congestion at Port Canaveral;
2) accommodate recent and anticipated future growth in cargo and cruise vessel traffic;
3) improve the efficiency and safety of operations for cruise ships, cargo vessels, and naval vessels within the Port complex;
4) allow for use of the Port by larger cruise ships and larger and more efficient cargo vessels; and
5) allow for development of additional terminals/berths without encroaching on the existing Federal channels and turning basins.

In February of 2002, the Jacksonville District, U.S. Army Corps of Engineers prepared an Initial Appraisal Study under the authority of Section 107 of the River and Harbor Act of 1960, as amended. Section 107 provides the U.S. Army Corps of Engineers authority to develop and construct small[7] navigation projects. The Initial Appraisal Report concluded that there was a Federal interest in conducting a feasibility study to evaluate expanding and deepening the West Turning Basin. However, funds were not available for the Corps of Engineers to initiate the feasibility phase of the Section 107 study at that time. Subsequently, concerns by CPA regarding the adequacy of the width of the Main Access Channel and wideners led to a desire to also evaluate project widening as another potential improvement. It was determined that widening in addition to expanding the West Turning Basin would result in a project that exceeded the cost limits of the Section 107 authority, requiring a new congressionally authorized feasibility study under the Corps' General Investigations Authority. Because no new project authorization bills had passed since the time of the Section 107 Initial Appraisal, Port Canaveral chose to conduct their own feasibility study under the authority of Section 203 of WRDA 1986.

Since the last major Canaveral Harbor navigation capacity improvements were completed by the Corps of Engineers in 1995, Port Canaveral has experienced significant growth in cargo volume, cruise traffic, and the size and frequency of vessels calling at the port. Over the intervening years, the Canaveral Port Authority has made major investments in landside infrastructure to accommodate burgeoning growth at the Port and the region that it serves. At the present time, Port Canaveral is the second busiest cruise port in the U.S., and has recently experienced record levels of commodity tonnage.

Port congestion and inadequate channel capacity have become major issues, providing the impetus for CPA to conduct this Section 203 study. Pursuant to Section 203 of WRDA 1986, this study is intended to determine the feasibility and extent of Federal and non-Federal participation in improving Port Canaveral, consistent with the Federal objective of maximizing contributions to National Economic Development (NED), and consistent with protecting the nation's environment.

[7] Section 107 Projects are limited to a maximum of $4,000,000 in Federal project costs. In addition to the per project limit, total Federal expenditures for construction and Operate, Maintain, Repair, Replace, and Rehabilitate (OMRR&R) under the Section 107 authority are limited to the greater of $4,500,000 or 2.25 times the Federal costs of the project, including costs for the feasibility through the construction phases.

1.3 Location and General Description of the Study Area[8]

Port Canaveral is located on the east coast of Florida in Brevard County, directly south of the John F. Kennedy Space Center, and approximately five to six miles north of Cocoa Beach. The Port is located about 155 miles south of Jacksonville Harbor, FL, about 198 miles north of Miami Harbor, 170 miles north of Port Everglades, 130 miles north of the Port of Palm Beach, and 50 miles east of Orlando, FL. The Port occupies both sides of the Canaveral Barge Canal and the Inner Reach of the deepwater entrance channel. A location map is provided on Figure 1-1 and a map showing the major channel and basins is provided on Figure 1-2.

The City of Cape Canaveral, just south of the Port, is located on the north end of the offshore barrier island following the Florida coast line and is connected to the mainland by Florida State Road (SR) 528 Martin Andersen Beachline Expressway extending across the Banana and Indian Rivers.

The deepwater entrance to the Port is via a dredged channel approaching from the southeast, then in an east-west direction across the entrance to the east and middle basins on the north side of the channel. The deep draft channel then continues westerly for approximately 3,570 feet, terminating at the entrance to the west basin on the north side of the channel. The shallow draft Barge Canal runs from the western end of the West Access Channel in a westerly direction to the Canaveral Locks, operated by the US Army Corps of Engineers. The north side of the Barge Canal and the south side of the existing 400' deep draft channel share a common boundary from middle to west basins. The Canaveral Barge Canal continues through the lock, across the Banana River, and through Merritt Island to connect with the Atlantic Intracoastal Waterway running north-south in the Indian River.

The Port is a multiple-use facility composed of cruise ship berths, cargo berths, U.S. Navy, U.S. Coast Guard, and Military Sealift Command (MSC) berths. The Canaveral Port Authority is the owner of all cruise terminal and cargo berth facilities, some of which are leased to tenants on a term basis. Commercial waterfront facilities (described in detail in Section 2) are located along the south side of the main channel, along the north side of the channel west of the middle basin, and along the sides of the middle and west Basins. Approaching from the Atlantic Ocean, the eastern most basin (also referred to as the Trident Basin) is used by U.S. Navy vessels. The middle basin is jointly used by commercial, U.S. Navy and MSC vessels; and the west basin is used by commercial traffic, cruise ships, and home to the U.S. Coast Guard Station, Port Canaveral, Seventh District, Jacksonville Sector. The berths situated on the Inner Reach of the entrance channel are used primarily by cruise ships, cargo ships and tankers. The primary U.S. Navy facilities at Port Canaveral consist of the Trident Wharf on the east side of the East (Trident) Basin, the Poseidon Wharf on the southeast side of the Middle Basin, and the Military Traffic Management Command (MTMC) Wharf on the north side of the Middle Basin. Figure 1-3 presents the major port facilities.

[8] Source: Ports of Miami, Port Everglades, Palm Beach, and Port Canaveral, Florida, Port Series No. 16, Revised 1999, U.S. Army Corps of Engineers

Figure 1-1
Port Canaveral Location Map

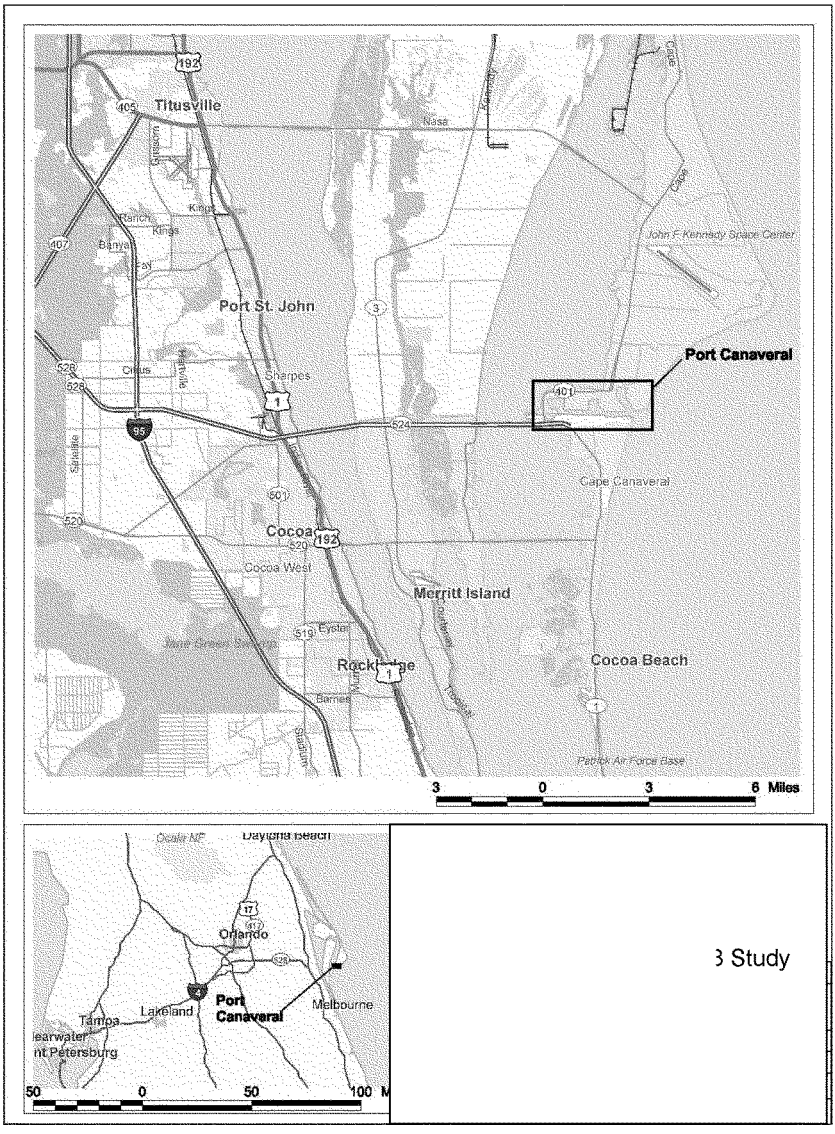


Figure 1-2
Port Canaveral Existing Navigation Project Features

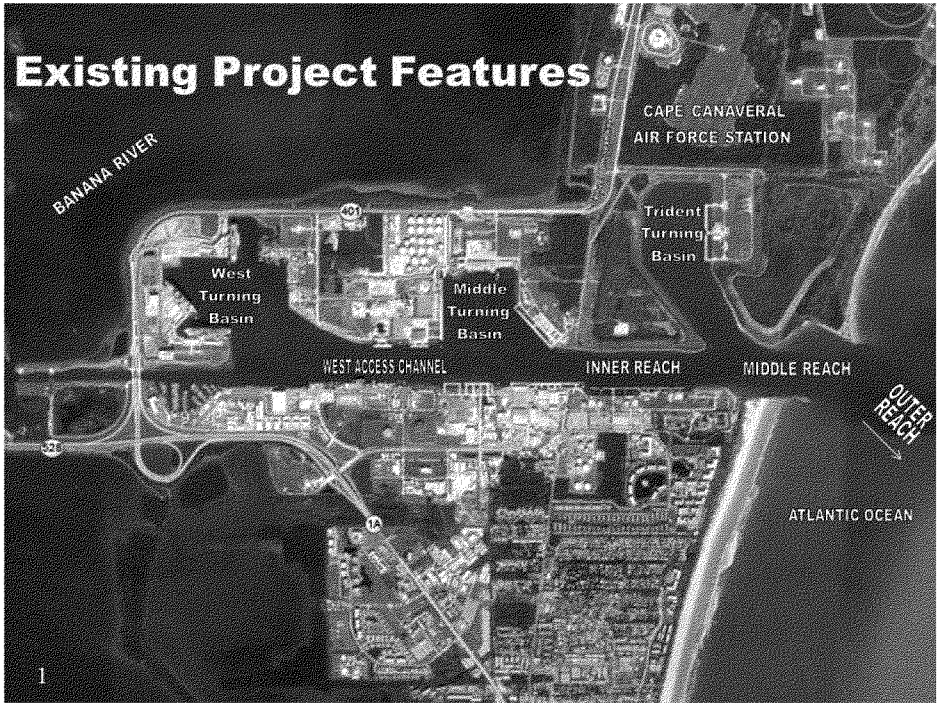
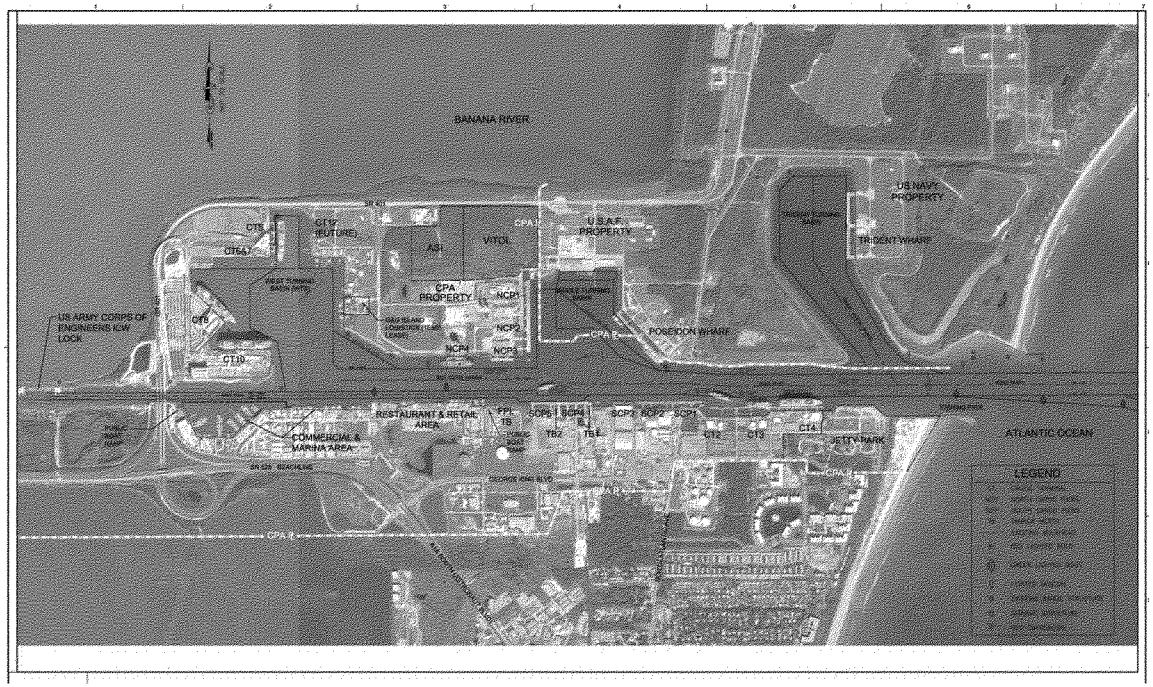


Figure 1-3
Port Canaveral Major Facilities



1.4 Existing Federal Project

The existing Federal project at Port Canaveral was authorized by the Rivers and Harbors Acts of 2 March 1945 and 23 October 1962, and Sections 101, and 117 of the Water Resources Development Act (WRDA) of 30 October 1992. The Federal navigation project consists of the outer, middle, and inner reaches, the west access channel, and three turning basins. The project terminates at the Barge Canal (see Figure 1-2 and Table 1-1).

Table 1-1
Port Canaveral Channel Dimensions

(Project depths in Federally Authorized feet MLLW, lengths and width in linear feet)

Project Feature	Cut and Centerline Station Start / End (ft)	Length	Width[1]	Depth
Outer Reach	Cut 1A, 0+00 to 110+00 Cut 1B 0+00 to 55+00 Cut 1, 0+00 to 125+00	29,000	400	-44[2]
Middle Reach	Cut 2, 125+00 to 181+70	5,658	400	-44[2]
Inner Reach	Cut2, 181+70 to 207+00 Cut 3, 207+00 to 215+00	3,344	400	-40
Middle Turning Basin	M.T.B., 215+00 to 241+70	2,260	NA	-39
West Access Channel (east of Station 260+00)	W.A.C., 241+60 to 260+00 Cut A, 0+00 to 18+40	1,840	400	-39
West Access Channel (west of Station 260+00)	W.A.C., 260+00 to 277+30 Cut A, 18+40 to 36+70	1,730	400	-31 (CPA maintains to -35)
Barge Canal[3]	Cut 1 to Canaveral Lock, 141+60 to 227+70	8,610±	125	-12

Notes: [1] CPA maintains additional channel width in some limited areas (see Figures 2-3 & 2-4)
[2] US Navy Project to 44 feet, Civil Works Project authorized to 41 feet
[3] Barge Canal length from start of West Access Channel to Canaveral Locks

The three turning basins have the following dimensions:

- Trident Turning Basin: Approximately 1,600 feet wide by 1,800 feet long basin with an access channel that tapers in width from 650 feet at the north end, to 400 feet at the south end, -41 foot depth. The access channel has an authorized depth of -44 feet.
- Middle Turning Basin: Approximately 2,260 feet long basin (including channel), 1,800 feet wide at the north end, 2,600 feet wide at the south end, -35 foot depth east and north portion, -39 feet west and south portion, 1,200 foot diameter turning circle located in the south west corner.

- West Turning Basin: Trapezoidal basin, 2,750 feet wide at the widest point in the north, 1,400 feet wide at the narrowest point near the existing corner cut off, 1,650 feet long between Cruise Terminals 5 and 10, -31 feet federal project depth, -35 feet CPA maintained depth, 1,400 foot diameter turning circle in the NE quadrant. At the north side is the Cruise Terminal 5 Basin, 650 feet wide by 800 feet long, -35 foot depth.

The US Navy first requested that Congress assess the navigation potential at Port Canaveral in the late 1800s. The most recent survey report completed by the Corps of Engineers and reported to Congress was the October 1991 Navigation Study, Canaveral Harbor, Florida, Final Feasibility Report and Environmental Assessment (EA). This report was the basis for the WRDA 1992 authorization and the navigation project improvements completed in 1995.

The last major improvement to the Federal project at Port Canaveral that increased port capacity was the deepening and widening that was authorized in WRDA 1992 and completed in 1995. Since that time, other Federal improvements have been made to increase project efficiency and decrease maintenance costs, such as improvement and extension of the north entrance jetty in 2005, south jetty improvement in 1993, 1995, and 2000, and the on-going sand by-pass project which initiated its third bypass event in November 2007 (previous bypasses were completed in 1995 and 1998). In addition, the CPA constructed a south entrance jetty sediment trap in 2007 to intercept sand shoaling from the south, as may occur during southerly non-tropical/tropical storm and/or hurricane events. The south jetty sediment trap compliments the north jetty extension in reducing shoaling at the entrance to the harbor.

1.5 Planning Process and Report Organization

The planning process employed by the CPA on the Port Canaveral Section 203 Study has followed the Corps of Engineers' six step planning process as described in the Corps' Planning Guidance Notebook (ER 1105-2-100, dated 22 April 2000). These steps include:

1) specify water resources problems and opportunities;
2) inventory, forecast, and analyze the water and related land resource conditions within the study area;
3) formulate alternative plans which address the identified problems and take advantage of the opportunities;
4) evaluate the effect of alternative plans;
5) compare alternative plans; and
6) select the recommended plan.

The Principles and Guidelines[9] (P&G) adopted by the Water Resources Council guide the formulation and evaluation of Federal water resource projects. P&G requires that the plan recommended for Federal action will be the alternative plan with the greatest net economic benefit consistent with protecting the nation's environment [the National Economic Development (NED) plan], unless the Secretary of Army grants an exception to this rule.

[9] The Water Resources Council's P&G (February 3, 1983) are comprised of two parts: The Economic and Environmental *Principles* for Water and Related Land Resources Implementation Studies and The Economic and Environmental *Guidelines* for Water and Related Land Resources Implementation Studies.

Planning for the Port Canaveral Section 203 Study has been a dynamic process resulting in multiple iterations of the six-step planning process. Through iterations of the six-step planning process, the study has been refined and has resulted in a recommendation for Federal action that is consistent with the Principles and Guidelines and ER 1105-2-100. The remainder of this report documents the results of the six step planning process.

The report is also organized similarly to a Corps of Engineers Integrated Feasibility Report and Environmental Assessment, in order to facilitate review and processing by the Assistant Secretary of the Army (Civil Works). As stated in ER 1165-2-122, *"upon [the Secretary's] determination that the information submitted [in this Section 203 study report] is adequate and the proposal is otherwise acceptable without additional studies or public involvement, the ASA(CW) will direct his representative to circulate a draft EIS or EA to other agencies, organizations, and the public for review and comment and the final filed with the Environmental Protection Agency (EPA) or a Finding of No Significant Impact (FONSI) will be made available to the public."*

The remainder of the Section 203 Study report is organized as follows, with NEPA specific sections noted with an asterisk:

Section 2 – Baseline Conditions / Affected Environment*

Section 3 – Without-Project Conditions

Section 4 – Problems, Opportunities, and Constraints

Section 5 – Formulation and Evaluation of Alternative Plans

Section 6 – Plan Selection

Section 7 – Environmental Consequences*

Section 8 – Public Involvement, Review and Consultation

Section 9 – Recommendations

Section 10 – List of Preparers and Reviewers*

Section 11 – References

Engineering Appendix

Environmental Appendix

Real Estate Appendix

Economics Appendix

Quality Control Appendix

2. BASELINE CONDITIONS / AFFECTED ENVIRONMENT*

This section of the Feasibility Study presents existing physical, environmental, and economic conditions in the study area. Physical conditions include climate and physical infrastructure. Environmental conditions include upland, wetland, and marine ecosystems. Economic conditions include general socio-economic conditions, Port Canaveral operations, and port-related activities.

2.1 General

2.1.1 Temperature and Precipitation

The National Climate Data Center at the National Oceanographic and Atmospheric Administration (NOAA) has calculated normal temperatures and precipitation levels for nearby Orlando, Florida based on 30 years of data from 1971 – 2000. The normal daily maximum temperature ranges from 71.8° F in January to 92.2° F in August. The annual average normal daily high temperature is 83.2° F. Normal daily minimum temperatures range from 49.9° F in January to 73.0° F in August. The annual average normal daily low temperature is 62.4°F. Normal monthly precipitation ranges from 2.31 inches in December to 7.35 inches in June. Average annual precipitation is 48.35 inches.

2.1.2 Geologic Setting

Canaveral Harbor is located within the Brevard County barrier island system between the Atlantic Ocean and the Banana River in the Coastal Lowlands physiographic unit. The regional geology for the Quaternary and upper Tertiary Systems range in age from Recent to Pleistocene to Miocene Age sediments. Undifferentiated Recent to Pleistocene Age sediments cover the entire Brevard County. They consist of unconsolidated quartz sands with beds of sandy coquina. These sediments occur at land surface and range in thickness from 20 feet in the St. Johns River valley to over 100 feet in depth in the coastal ridge area. These sediments lie conformably with the sediments of the Upper Miocene/Pliocene sediments. The Miocene/Pliocene sediments are composed of unconsolidated beds of quartz sands, shells, clay, and calcareous clay. The Upper Miocene/Pliocene sediments vary in thickness (20 – 90 feet) throughout Brevard County, with an overall trend to thicken to the southeast.

The Hawthorne Formation of Miocene Age lies unconformably below the Upper Miocene/Pliocene sediments that underlie all of Brevard County. The sediments of the Hawthorne Formation are composed of greenish/gray; calcareous clay; sandy phosphatic limestone; black and brown phosphorite; and light green to white phosphatic radiolarian clay. Its formational contact may occur at depths of approximately 50 to 100 feet below land surface and may be as thin as 10 feet in the north, thickening to approximately 220 feet in the south.

Areas within Port Canaveral have been dredged several times and dredged material was used to form portions of the Port. A cohesionless layer of clay and silt commonly found in this area is held in suspension at the bottoms of the channels and basins. This layer varies in thickness and becomes denser with depth.

2.1.3 Water Levels

Water levels at Canaveral Harbor are mainly the result of semi-diurnal tidal fluctuations in the Atlantic Ocean. Tidal elevation data for Canaveral Harbor are shown in Table 2-1 based on a tide station located at the Trident Pier in the Trident Basin. This tide station, established by NOAA, continuously records water levels and has been in operation since 1994. All datum elevations are referenced to Mean Lower Low Water (MLLW). The lowest and highest observed water levels have been included to provide an indication of the historical extreme water levels.

Table 2-1
Water Levels (ft.) – Trident Pier, Trident Basin

Highest Observed Water Level (09/16/2001)	6.25
Mean Higher High Water (MHHW)	3.97
Mean High Water (MHW)	3.62
Mean Sea Level (MSL)	1.90
Mean Tide Level (MTL)	1.89
NGVD 1929	1.80
Mean Low Water (MLW)	0.16
Mean Lower Low Water (MLLW)	0.00
Lowest Observed Water Level (02/08/2001)	-1.50

2.1.3.1 Sea Level Rise

Guidance for incorporating the direct and indirect physical effects of projected future sea-level change in USACE projects is provided in the Engineering Circular EC 1165-2-211 titled Water Resource Policies and Authorities Incorporating Sea-Level Change Considerations in Civil Works Programs (USACE 2009). EC 1165-2-211 has an expiration date of July 1, 2011 and is slated to be updated and replaced by a new guidance document, EC 1165-2-212. However, at this point, EC 1165-2-212 has not been formally issued and is still under review. Therefore, EC 1165-2-211 is considered to be the current guidance document for the Port Canaveral widening and deepening project.

The Corps guidance states that consideration should be given to how sensitive and adaptable proposed alternatives are to climate change and other related global changes. Because of the variability and uncertainty in projected future sea-levels, alternatives should be evaluated using low, intermediate, and high rates of future sea-level change for both "with" and "without" project conditions in order to bound the likely future conditions.

The estimated potential sea-level change at Port Canaveral over the period 2014 to 2064 based on guidelines presented in EC 1165-2-211 are presented below.

Low estimates of rate of sea-level change are based on extrapolation of historic rates of sea-level change. Intermediate and high rates include potential future acceleration of sea-level rise based on scenarios represented by modified NRC Curves I and III, respectively, from updates to NRC (1987).

Mean sea-level trends are available for a number of tidal stations along the Florida Atlantic coast from NOAA. The standard error for the calculated trends is related to the period of record for the individual stations. The uncertainty can become large compared to the calculated trend values for smaller periods of record and, therefore, EC 1165-2-211 indicates that the stations used for calculating sea-level trends should have a minimum duration of 40 years of data.

Engineering Appendix Table 25 presents sea-level trends for the three stations along the Florida Atlantic coast both north and south of Port Canaveral obtained from the NOAA website (http://tidesandcurrents.noaa.gov/sltrends/).

The nearest station, Daytona Beach Shores, contains a record that spans 48 years, but with significant gaps (on the order of 20 years of missing data) and therefore, has more uncertainty than the other two stations. For comparison, the next closest station, Mayport, located approximately 145 miles north of the Port has a continuous 78 year record. Miami Beach, located approximately 185 miles south of the Port has a 50 year record with a single gap in the record of about 5 years. EC 1165-2-211 directs to consider the next closest gauge if the period of record of the closest gauge is not greater than 40 years. The sea-level trend of +2.4 mm/year calculated for the Mayport station was used for this analysis to represent the regional sea-level change due to the period of record of the station and apparent relative uniformity of the trends between the three stations.

Engineering Appendix Figure 15 shows results of low, intermediate, and high relative sea-level projections based on methods from EC 1165-2-211. Engineering Appendix Table 26 presents the results of calculations from the project completion in 2014 through 2064 in five year increments. These show sea-level change estimates over a 50-year life of the project ranging from 0.120 meters (0.39 ft) for the low rate of change scenario, to 0.245 m (0.80 ft) for the intermediate rate scenario, and 0.653 m (2.14 ft) for the high rate scenario.

2.1.4 Tidal Currents

In support of the Section 203 study, a hydrodynamic model of Canaveral Harbor has been developed to evaluate the potential effects of project feature alternatives. Data used to calibrate the model were collected in August and September 2005. Details regarding the data collection and hydrodynamic modeling of existing conditions are found in a separate technical memorandum authored by CH2M HILL entitled "Port Canaveral Hydrodynamic Model Calibration", dated June 2007 (Engineering Appendix-Attachment F).

The results of the existing conditions modeling suggest maximum 90th percentile and maximum average current speeds at the west end of the middle reach of 0.58 and 0.28 feet per second (fps) or 0.34 and 0.16 knots, respectively. Current speeds further decrease moving westward to the west basin. The Canaveral Locks connecting the Banana River with Canaveral Harbor largely limit tidal current effects within the harbor. Outside the harbor entrance jetties (north and south), a nominal longshore wind-driven current on the order of 0.3 knots is typically reported by the pilots. No channel cross current or yawing forces associated with currents exists within the harbor.

2.1.5 Water Quality

Water quality in the port is dependent, in part, on water exchange with the ocean, allowing the water in the harbor to be flushed with ocean water. Water exchange and flushing is greatest in the main channel near the mouth of the harbor and reduces further from the mouth, with the least amount of exchange occurring near the locks to the Banana River and in the back portions of the West Turning Basin, the Middle Turning Basin, and the Trident Turning Basin.

Monthly water quality sampling has been performed continuously by Canaveral Port Authority (CPA) since September 1992. Based on the *Port Canaveral Harbor Water Quality Monitoring 2011 Annual Report,* Port Canaveral Harbor generally met requirements of its designation as a Class III predominantly marine water body, per 62-302 Florida Administrative Code (FAC). Class III marine waters are designated for recreation, propagation and maintenance of a healthy, well balanced population of fish and wildlife.

CPA's water quality monitoring program assists the Authority in addressing concerns by the public as to the quality of the Port's water and identifies any potential issues that may exist. Monthly sampling is conducted at ten locations: four sampling stations are located in the main channel from near the locks out to the mouth of the harbor; one sampling station is located in each of the three turning basins, and three stations are located along the beach from Port Canaveral Harbor inlet to Cocoa Beach. In addition to harbor water testing, the Port Authority monitors, on average, nine freshwater outfalls under the National Pollutant Discharge Elimination System (NPDES).

Analysis of the samples from the seven sampling stations in 2011 provides the following results:

- The average dissolved oxygen (DO) values at all stations were well within the State standard for dissolved oxygen in marine waters of 4.0 parts per million (ppm). As with previous years, DO values decreased at all stations during the warm weather from July through October. Violations of State standards for DO were recorded at all stations during September in 2011. Biochemical Oxygen Demand (BODO and Total Organic Carbon (TOC) continue to be well within acceptable limits ;
- Both nitrogen and phosphorus were well within acceptable ranges throughout the Port. Values increased near the locks;
- Chlorophyll-a values increased in 2011 with 25% of the samples exceeding the TMDL of 11 ppm. This may be a result of the influence of the Banana River Lagoon where chlorophyll values were extremely high in the summer months. Values of less than 11 parts per billion (ppb) are considered acceptable by the State);
- Although there were no turbidity violations in the Port during 2011, the total suspended solids values continue to be high throughout the year;
- There were no violations of fecal coliform in 2011;
- There were violations of State standards for copper, iron, and mercury recorded during 2011 but values were all below the State standards in December and usually below detection limits;
- No exceedances for oil and grease have occurred in the harbor in the past year

2.1.6 Wind and Wave Climate

The wind and wave climate at Canaveral Harbor influence the transit conditions for vessel traffic at Port Canaveral. The wind particularly influences cruise ship transits due to the very large freeboard area of these vessels. Several of the larger cruise ships have air drafts exceeding 200 feet. Swell and wind-driven waves from southerly to southeasterly directions affect the navigation of inbound displacement vessel traffic outside of the jetties. Outbound transits are not normally affected by waves beyond the jetties because vessel speed can be increased as needed.

The Canaveral Pilots consider limiting vessel transits when wind speeds range from 15 to 20 knots for tanker and bulk carrier traffic and 25 to 30 knots for cruise traffic. Cargo vessel traffic is always accompanied by tug assist. The Pilots indicate that when winds exceed 15 to 20 knots from south to southeast directions, the wind and associated wave conditions in the Outer Reach are rough enough that the tugs are generally unable to make-up to the displacement vessels for navigation assistance inbound. The cruise vessel traffic, historically without tug assist, will generally transit the channels in winds of up to 30 knots and waves outside the jetties are not a factor based on the large channel water depth-to-vessel draft ratio. Tug assist is required for the newer largest cruise vessels in winds above 25 knots. A maximum design wind speed of 30 knots for cruise vessel transit and 20 knots for displacement vessel transit was selected to govern the assessment of navigation improvements at Port Canaveral for this study.

Analysis of site specific wind data can be used to establish the probability of occurrence of various wind speeds. Historical wind data for the National Aeronautics and Space Administration (NASA) Shuttle Landing Facility was readily available for the period March 1978 through April 2003. This data is collected at the standard measurement height of 10m. The record of data provided by the 45th Space Wing, Weather Squadron, Cape Canaveral Air Force Station, does not normally include high winds associated with tornados, tropical storms, or hurricanes as the equipment is generally secured to prevent damage. This site, at the Kennedy Space Center, is approximately 13 miles north of Port Canaveral and is largely unobstructed by land or buildings. This data is considered to be suitable to characterize the distribution and magnitude of winds at Port Canaveral. A detailed analysis of wind impacts on Port operations may be found in the Engineering Appendix and Economics Appendix.

Charts 2-1 and 2-2 present the percent frequency of occurrence and cumulative percent exceedance for all recorded hourly observed surface winds as well as the daily peak winds for the record period at the NASA Shuttle Landing Facility. The daily peak winds are obtained by considering only the peak wind recorded for each day during the record period, so analysis of this data represents a very conservative distribution of peak winds. The number of observations used in this data set is not reported. The data set considering all recorded surface wind data contains 215,719 observations over the record period. The cumulative exceedance plot for this 26-year period shows that less than 1% of all surface winds are 20 knots or greater. When only the daily peak winds are considered, then 10% of these winds are 30 knots or greater and 50% are 20 knots or greater.

Chart 2-1
Percent Frequency Occurrence, All and Daily Peak Surface Winds

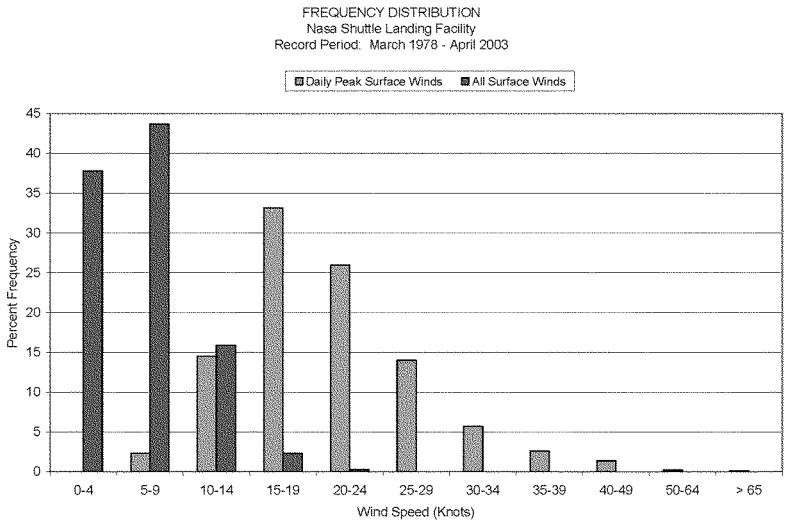
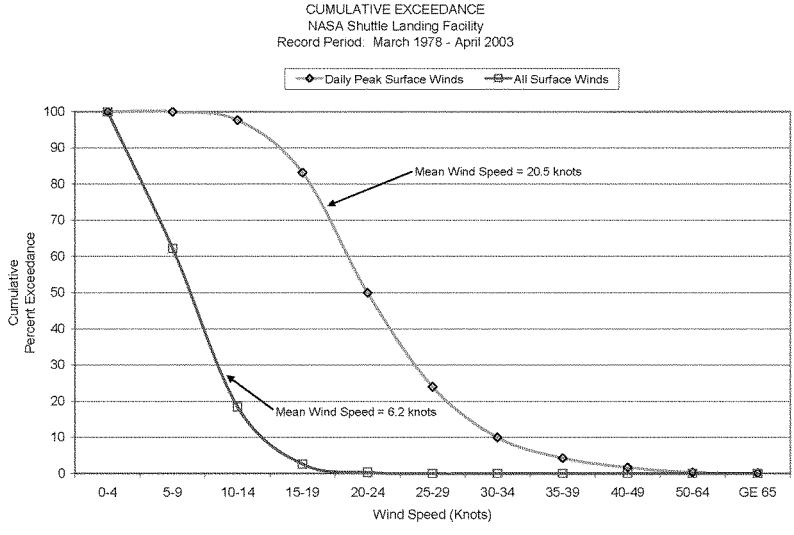


Chart 2-2
Cumulative Percent Exceedance, All and Daily Peak Surface Winds



The entrance from Port Canaveral offers some protection from wind-driven waves from deep water from the north through east directions due to the Cape Canaveral land mass to the north and the Southeast Shoal approximately 8 to 10 nautical miles east of the harbor.

Wave climate for the entrance channel was forecast for wind speeds ranging from 15 to 20 knots for tanker and bulk carrier traffic and 25 to 30 knots for cruise traffic. The wave conditions at the entrance to the harbor are duration-limited, so the wave growth in terms of height will be limited by the length of time the wind blows. Table 2-2 summarizes the wave parameter predictions for the Canaveral Harbor entrance. These parameters were used in the simulation-based navigation analyses conducted to determine alternative channel dimensions. Parameters estimated included: spectral wave height (Hmo), peak spectral period (Tp), and wave length (L) for durations of 1, 2, and 3 hours and for wind speeds of 15, 20, 25, and 30 knots based on linear wave theory for an average water depth of 45 feet.

Table 2-2
Wave Predictions – Entrance to Canaveral Harbor

Duration-Limited Wind Speed (knots)												
Duration of Wind (hrs)	15			20			25			30		
	Hmo (ft)	Tp (sec)	L (ft)	Hmo (ft)	Tp (sec)	L (ft)	Hmo (ft)	Tp (sec)	L (ft)	Hmo (ft)	Tp (sec)	L (ft)
3	1.8	3.0	46	2.8	3.7	70	4.1	4.3	94	5.5	5.0	125
2	1.4	2.5	32	2.1	3.1	49	3.0	3.7	70	4.1	4.2	90
1	0.8	1.9	19	1.3	2.3	27	1.9	2.8	40	2.5	3.2	52

2.1.7 Landside Access

State Road (SR) 528 terminates at the Port Canaveral interchange. This limited access highway connects to I-95 in Cocoa, and to I-4, the Florida Turnpike, and SR 417 (Central Florida Greenway) in Orlando. SR 528 connects to George J. King Boulevard, which provides access to all south side port facilities. SR 401 branches off from SR 528 to provide access to all north side port facilities before continuing on to the Cape Canaveral Air Force Station. Additional access to the south side of the Port is provided by A1A and North Atlantic Avenue, a two lane local street within the City of Cape Canaveral that has access from A1A, a four lane state road which turns into SR 528. There is no direct rail access in Port Canaveral. The nearest rail spur is in the City of Cocoa, 11 miles west via SR 528 with access to Florida East Coast Railway lines which extend along a 351-mile corridor between Jacksonville and Miami.

The Florida Department of Transportation (FDOT) is currently widening State Road 528 (Beachline Expressway) which runs between Orlando and Port Canaveral. Currently the road is a four lane (two lanes in each direction) toll road designed in 1960. A Project Development and Environment (PD&E) study was completed by the Florida Department of Transportation in August 2006 recommending a six lane widening project as the selected alternative. In May

2007, Florida's Turnpike Enterprise began Phase I of a project to widen the Beachline West. It encompasses the reconstruction of the mainline toll plaza located near Milepost 5, which is now complete. Ultimate roadway improvements will include four travel lanes in each direction, but due to construction costs, the improvements will be stage-constructed, with the interim improvements including three lanes in each direction. In June 2008, a project began to widen the Beachline from the Turnpike to McCoy Road. Improvements include widening the existing bridge structures at US 441, Landstreet Road, CSX Taft Yard, Orange Avenue and McCoy Road. A new bridge will also be constructed for the access ramp over CSX. The final phase, between Interstate 4 and the Turnpike, has been pushed out due to rising construction costs and expected traffic projections. That project is not included in the Turnpike's current five-year work program. A detailed traffic report may be found in the Engineering Appendix.

2.2 Navigation Features

Port Canaveral is located in Brevard County on the east coast of Florida, approximately five to six miles north of Cocoa Beach at Latitude: 28°24'26"N; Longitude: 80°30'49"W (see Figure 2-1, repeated from Section 1). The main port is orientated in an east – west direction, extending from the Atlantic coast to the Banana River. The port is bounded to the north by the Cape Canaveral Air Force Station and the Banana River, and bounded to the south by the City of Cape Canaveral. The harbor contains three turning basins (see Figure 2-2, repeated from Section 1). Starting from the east (ocean ward) they are: the Trident Turning Basin (TTB), the Middle Turning Basin (MTB), and the West Turning Basin (WTB). The basins are connected by a channel (Inner Reach and West Access Channel) that forms the south boundary of each basin. The Canaveral Pilots Association provides pilotage to vessels arriving and departing the port. The pilots typically board the arriving vessel in the vicinity of Approach Channel Buoys 7 and 8. The average pilotage time, from approach buoy to turning basin, is approximately one hour.

Within this channel, a federally maintained Barge Canal extends from the south side of the MTB, through the Banana River, across Merritt Island, and connects with the Intracoastal Waterway (ICWW) system in the Indian River. Where the Barge Canal enters the Banana River, a 600 foot long Corps of Engineers' lock (Canaveral Lock) separates the tidal harbor from the almost non-tidal lagoon system.

Figure 2-1
Port Canaveral Location Map

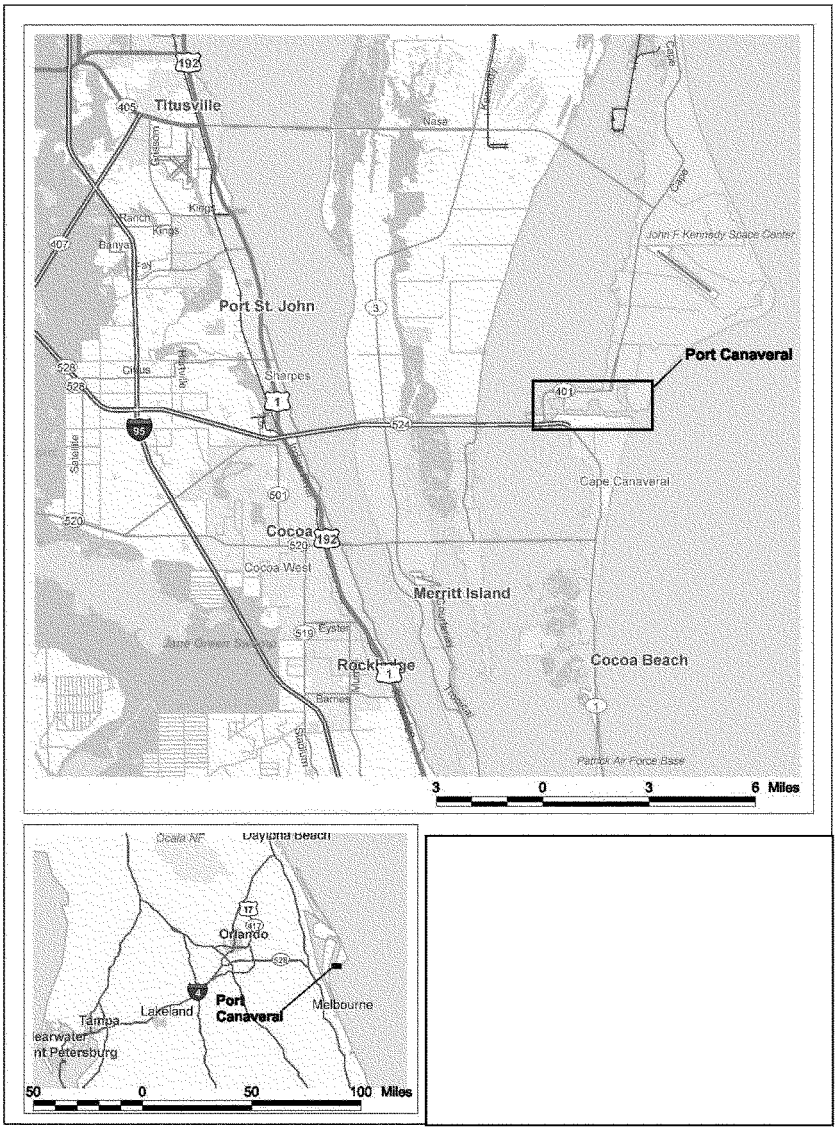
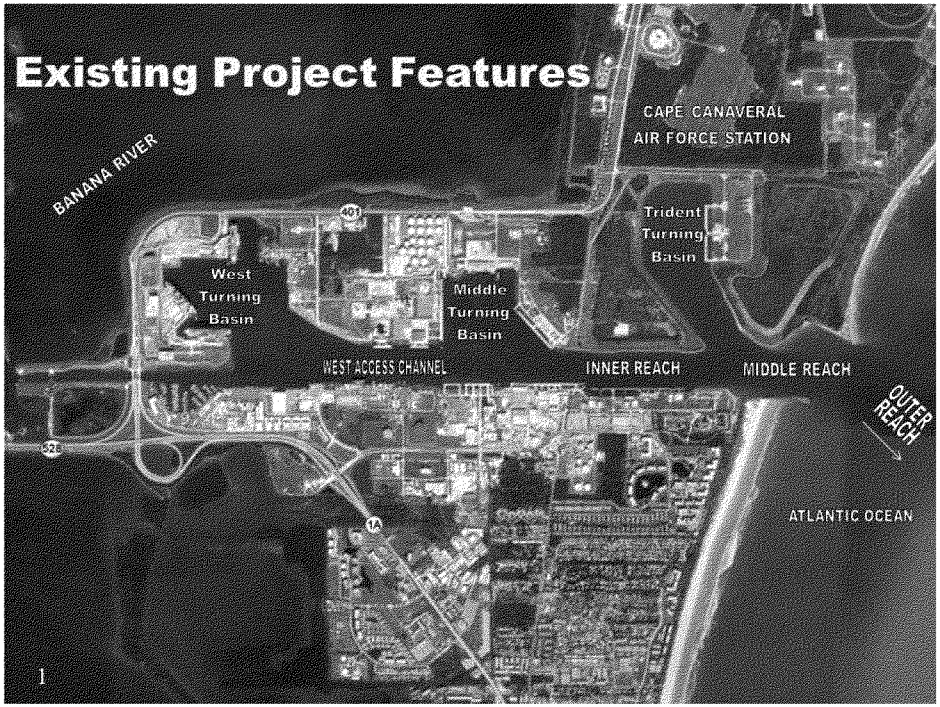


Figure 2-2
Port Canaveral Existing Navigation Project Features



2.2.1 Channels and Turning Basins

The Federal navigation project consists of the outer, middle, and inner reaches, the west access channel, and three turning basins (see Figure 2-2 and Table 2-3). The harbor is close to sea lanes with an average travel time from the sea buoy to the turning basins of approximately one hour.

Table 2-3
Port Canaveral Existing Channel Dimensions

(Federally Authorized project depths in feet MLLW, lengths and width in linear feet)

Project Feature	Cut and Centerline Station Start / End (ft.)	Length	Width[1]	Depth
Outer Reach	Cut 1A, 0+00 to 110+00 Cut 1B 0+00 to 55+00 Cut 1, 0+00 to 125+00	29,000	400	-44[2]
Middle Reach	Cut 2, 125+00 to 181+70	5,658	400	-44[2]
Inner Reach	Cut2, 181+70 to 207+00 Cut 3, 207+00 to 215+00	3,344	400	-40
Middle Turning Basin	M.T.B., 215+00 to 241+70	2,260	NA	-39
West Access Channel (east of Station 260+00)	W.A.C., 241+60 to 260+00 Cut A, 0+00 to 18+40	1,840	400	-39
West Access Channel (west of Station 260+00)	W.A.C., 260+00 to 277+30 Cut A, 18+40 to 36+70	1,730	400	-31 (CPA maintains to -35)
Barge Canal[3]	Cut 1 to Canaveral Lock, 141+60 to 227+70	8,610±	125	-12

Notes: [1] CPA maintains additional channel width in some limited areas (see Figures 2-3 & 2-4)
[2] US Navy Project authorized to 44 feet, Civil Works Project authorized to 41 feet
[3] Barge Canal length from start of West Access Channel to Canaveral Locks

The three turning basins have the following dimensions:

- Trident Turning Basin: Approximate 1600 feet wide by 1800 feet long basin with an access channel that tapers in width from 650 feet at the north end, to 400 feet at the south end, -41 foot depth.
- Middle Turning Basin: Approximate 2200 feet long basin (including channel), 1800 feet wide at the north end, 2600 feet wide at the south end, -35 foot depth east and north portion, -39 feet west and south portion, 1200 foot diameter turning circle located in the south west corner.
- West Turning Basin: Trapezoidal basin, 2750 feet wide at the widest point in the north, 1400 feet wide at the narrowest point near the existing corner cut off, 1650 feet long between Cruise Terminals 5 and 10, -31 feet Federal Project depth, deepened and maintained to -35 feet by CPA , 1400 foot diameter turning circle in the NE quadrant. At the north side is the Cruise Terminal 5 Basin, 650 feet wide by 800 feet long, -35 foot depth.

Figure 2-3
"Pilot's Dredging" Areas Sheet 1 of 2

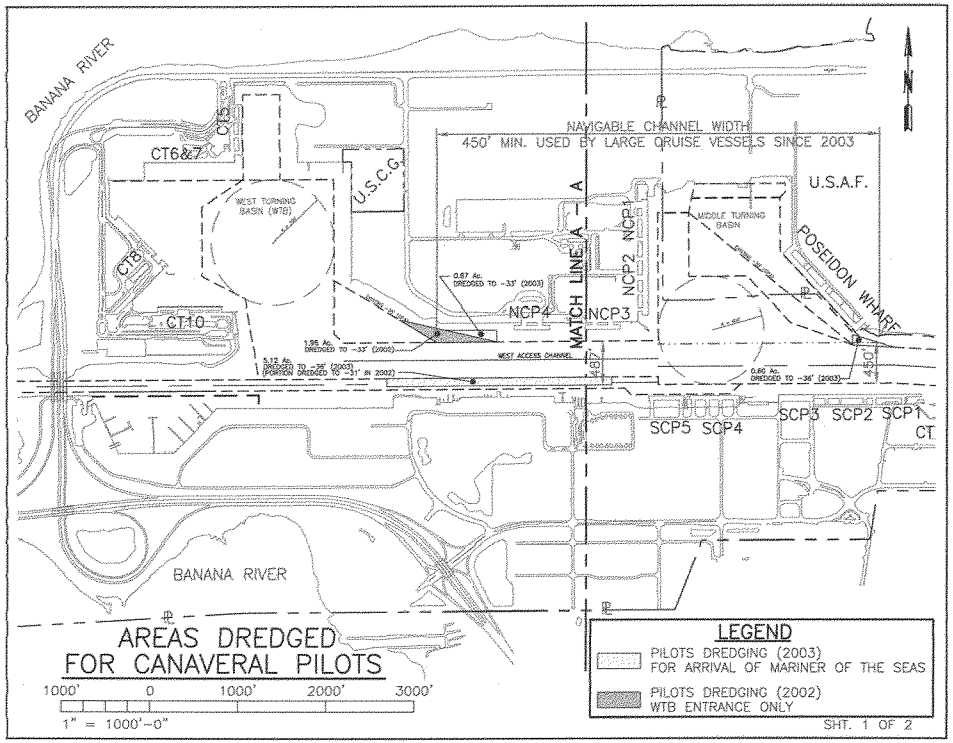
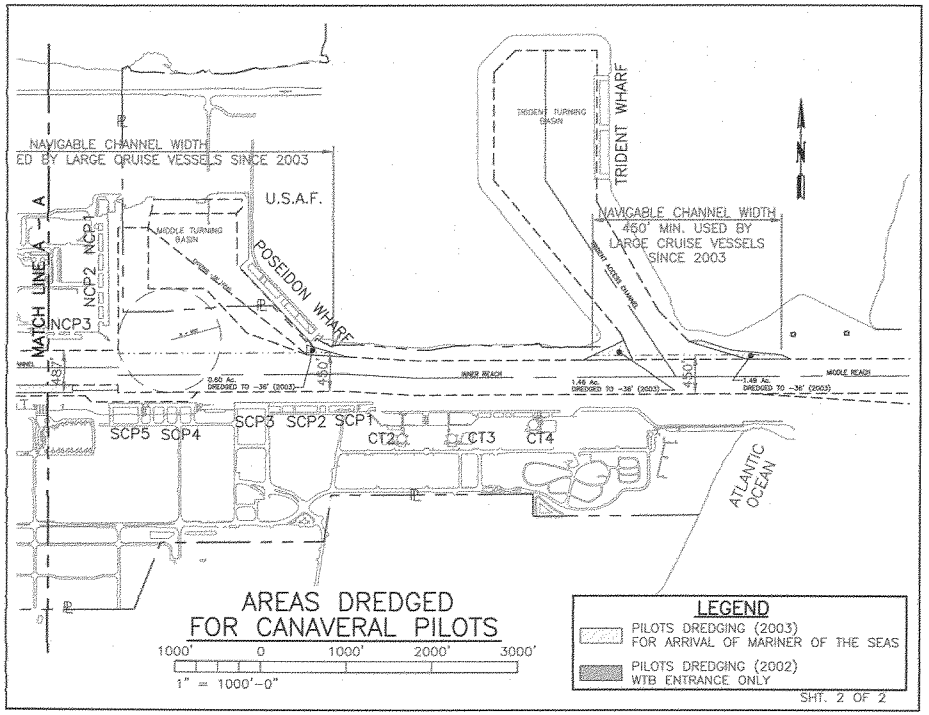


Figure 2-3 (continued)
"Pilot's Dredging" Areas Sheet 2 of 2



The channel and turning basin dimensions portray a tightly fitted seaport that heavily relies on pilot, multiple tug, and / or thruster assistance on all vessel maneuvers within the port. The channel is too narrow for turning a vessel, so all cargo, cruise, and naval vessels (with the exception of Trident submarine operations) use either the Middle Turning Basin or the West Turning Basin for maneuvering.

In order to accommodate regular access by Voyager Class and larger vessels, some areas beyond the existing authorized channel dimensions have been dredged and maintained by the CPA in order to extend the channel width beyond the 400-foot authorization at critical locations (Figure 2-3). This "Pilots Dredging", as these areas are known, provides a controlling depth of -33 ft to -36 ft to accommodate cruise ship transits. The effective width of the channel from the middle reach to the beginning of the West Access Channel is 450 feet. This area is also shown in Figure 2-5 in the gray cross-hatched area below (south of) the yellow and green segments of the West Access Channel between the Middle and West Basins, extending into the Barge Canal. As a result of the "Pilots Dredging", the effective width of portions of the West Access Channel is 487 feet. This dredging was originally conducted in 2002 and 2003 (Table 2-4).

In 2009, in preparation to homeport the newest & largest cruise vessels entering the world fleet, beginning with RCI's *Freedom of the Seas*, CPA executed the Interim Corner Cut Off (ICCO) new work dredging. This dredging project shifted the -35' CPA maintained dredge boundary further to the east and north. The ICCO new work dredging area is shown on Figure 2-5 in the gray dotted polygon extending northwest from the westward end of the green colored portion of the West Access Channel to the yellow cross-hatched West Basin turning circle. Phase 2 of the ICCO work was concluded in 2011 in order to temporarily accommodate the RCI *Freedom of the Seas*, the Carnival *Dream*, and the *Disney Dream* and *Disney Fantasy*. The CPA currently maintains a depth of -35' at 18.5 acres of navigation area that lie beyond the existing federal project limits at the entrance to west basin. The ICCO is intended to be an interim measure for cruise navigation, but is not anticipated to support access to the WTB in the full range of conditions encountered at Port Canaveral. The ICCO was originally intended to be a recommended feature of this Section 203 study. However, CPA had to dredge the ICCO in advance of Section 203 project authorization in order to accommodate these new cruise ships upon their arrival in 2009-2011. The ICCO dredging work is therefore included as a without-project condition in all alternative plan evaluations; however CPA recognizes that cost sharing credit will need to be specifically authorized by Congress for the ICCO, since it was constructed in advance of project authorization.

The grey cross-hatched right triangle between the ICCO and the yellow highlighted Federal channel is the portion of the WTB that was dredged by CPA to -35 feet in 1992 and maintained by them since that time.

Figure 2-4
Port Canaveral Navigation Features West of Trident Basin

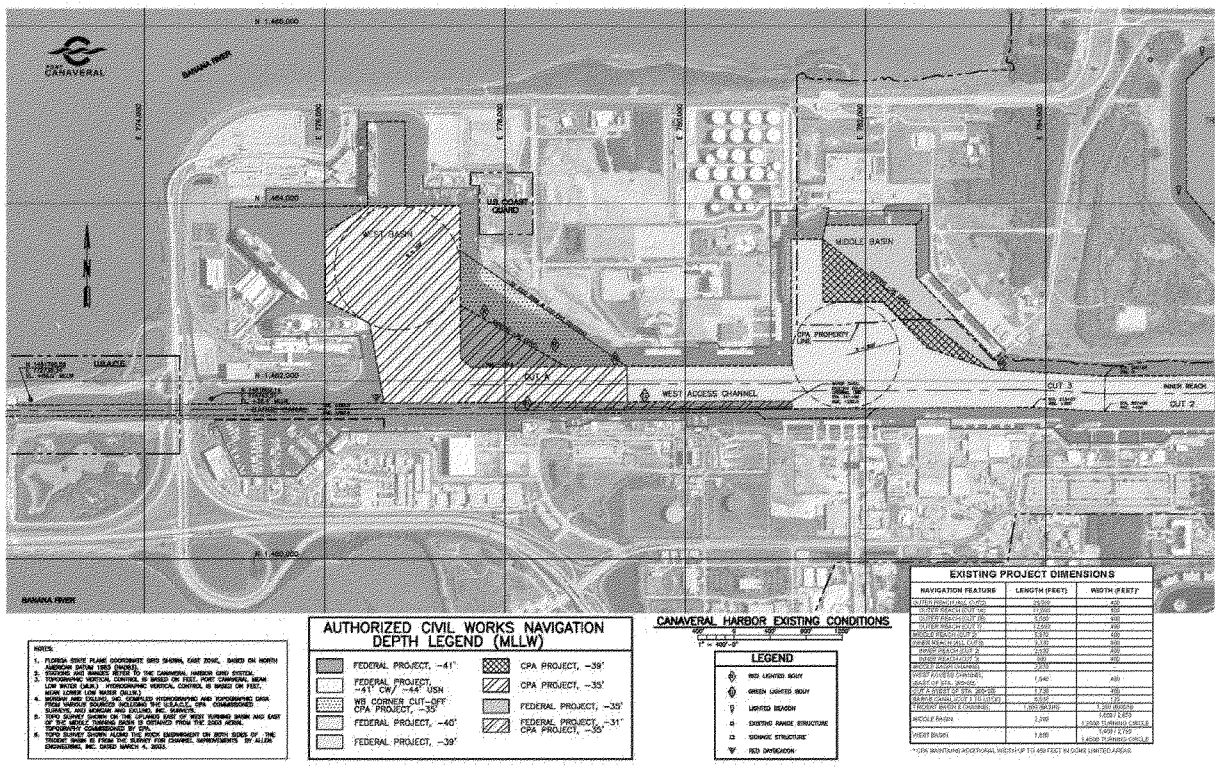


Figure 2-5
Port Canaveral Navigation Features East of Trident Basin

2.2.2 Dredging History

Sedimentation in the Federal navigation channel occurs due to alongshore transport into the harbor from the coast and redistribution of sediments inside the harbor. Sand and finer suspended sediments are transported into and deposited in the harbor during rising tides due to the influence of waves and tidal currents. Redistribution of sediments inside the harbor results in additional shoaling in the channel and occurs episodically due to storm events.

The Canaveral Harbor Federal Sand Bypass Project was authorized by the Rivers and Harbors Act of 1962 (Public Law 87-874). The Sand Bypass Project transfers the equivalent of 156,000 cubic yards/year of sand, from north to south across the harbor entrance, in approximately 6 year cycles (i.e., approximately 900,000 CY once every 6 years). The sand is dredged from the Cape Canaveral Air Station shoreline within approximately 8,200 feet north of the north jetty, from between the Mean High Water and -16 feet MLLW depth contours. The sand is placed in a berm along the City of Cape Canaveral shoreline within approximately 12,800-feet south of the south jetty and then moved and shaped using earthmoving equipment. The sand transfer is accomplished by a hydraulic dredge and temporary pipeline that are mobilized to the site for the purpose in approximate 6-year cycles. Other than select environmental monitoring requirements, this project is one-hundred percent federally funded.

The South Jetty Deposition Basin (sediment trap) located on the south side of the Middle Reach was recently designed and constructed by the CPA to help reduce the amount of maintenance dredging in this area from major storm events approaching from a southeasterly direction. In addition, the north and south harbor entrance jetties have been extended seaward and "tightened" with sand tubes and riprap placement to minimize sand transport. Most recently, shoaling and emergency dredging occurred due to closely spaced Hurricanes Frances and Jeanne in September 2004.

Dredged material taken from below -13 feet MLLW generally consists of silts and clays, which are not suitable for reuse. Material taken from below -13 feet MLLW is, however, suitable for offshore disposal, which is the least cost disposal alternative. This material is disposed in the U.S. Environmental Protection Agency (EPA) designated Canaveral Ocean Dredged Material Disposal Site (ODMDS). The Canaveral ODMDS is a 2 nautical mile by 2 nautical mile square, which lies in the Canaveral Bight on the shallow continental shelf. The Canaveral ODMDS is centered 4.5 nautical miles offshore of Cocoa Beach, Florida, and has a depth range of 14 meters (47 feet) to 17 meters (55 feet).

The three primary users of the Canaveral ODMDS are:

- U.S. Army Corps of Engineers (West and Middle Turning Basins, Entrance Channel (Cut 1), Inner Channel (Cuts 2 and 3), and the Barge Canal);
- U.S. Navy (Trident Access Channel and Turning Basin, Cut 1A, Entrance Channel Widener); and
- Canaveral Port Authority (West and Middle Turning Basins and Berthing Areas).

The most recent management plan for the ODMDS is the Site Management and Monitoring Plan (SMMP) dated February 2012, which replaced the previous SMMP that expired October 2011. The SMMP is a ten-year plan, jointly implemented by the Corps' Jacksonville District and USEPA's Region 4. The new February 2012 SMMP does not identify an annual placement

volume limit. Additionally, overall planning for the revised SMMP specifically accounts for all construction and maintenance dredging volumes associated with this project. The SMMP identifies a ten-year cap of 9.2 million cubic yards, which may be increased if an increase is supported by future modeling.

Sands are generally located at and above elevation -13 feet (MLLW). Although these sands are not typically suitable for direct placement on the beach, they can either be stockpiled on land for reuse as construction fill material, or placed in the Near Shore Berm to augment the sand-sharing system, provided they meet regulatory standards.

Table 2-4 presents Port Canaveral's new work dredging history, which displays volumes associated with Corps Civil Works channel dredging, Navy channel dredging, and CPA dredging.

Table 2-4
New Work Dredging History

Year	Location	Volume (CY)	Agent	Composition
1974	Entrance Ch[1]. & Trident Basin	645,198	Navy	Sandy Silt
1975	Entrance Ch. & Trident Basin	2,196,470	Navy	Sandy Silt
1976	Entrance Channel	1,343,121	Corps	Sandy Silt
1986	Entrance Channel	63,370	Corps	Silty Sand
1993	West Turning Basin SE Corner	400,000	CPA	Clay
1994	Entrance Channel	454,000	Corps	Silty Sand
1994	Middle Turning Basin	1,039,000	Corps	Silty Sand
1994	West Turning Basin CT10	86,000	CPA	Silty Sand
1996	West Turning Basin CT8	212,000	CPA	Silty Sand
2002	West Turning Basin Entrance	89,000	CPA	Silts & Clays
2003	Inner Reach & West Access Ch.	132,000	CPA	Silts & Clays
2007	Canaveral Harbor South Jetty Sediment Trap	368,160	CPA	Silts & Clays

Source: CPA
1 Entrance Channel consists of the Outer Reach and portion of the Middle Reach outside of the jetties

As mentioned, maintenance dredging in the harbor is conducted by the Corps, the Navy, and the CPA. Navy maintenance dredging occurs in the Entrance Channel, in the Trident Access Channel, and in the Trident Basin. Since 1974, the Navy has conducted maintenance dredging

ten (10) times, with an average volume of 266,000 CY per maintenance dredging cycle. CPA maintenance dredging is generally conducted in the berths and in the West Turning Basin. The CPA maintains the West Turning Basin to a depth of -35 feet MLLW, four feet deeper than the federally authorized depth of the West Turning Basin of -31 feet MLLW. Since 1988, the CPA has conducted maintenance dredging in eight different years, with an average volume of 51,600 CY per dredging year. By far, the largest amount of maintenance dredging is conducted by the Corps. Since 1976, the Corps has conducted maintenance dredging 24 times, with an average volume of 660,500 CY per dredging year. Table 2-5 presents the Corps' maintenance dredging history at Port Canaveral.

Table 2-5
Corps of Engineers Maintenance Dredging History

Year	Location	Volume (CY)	Agent	Composition
1976	Entrance Channel	341,888	Corps	Sandy Silt
1977	Entrance Channel	48,017	Corps	Sandy Silt
1978	Entrance Channel	282,517	Corps	Sandy Silt
1980	Entrance Channel	1,402,547	Corps	Sandy Silt
1981	Entrance Channel	257,326	Corps	Sandy Silt
1983	Entrance Channel	929,555	Corps	Sandy Silt
1985	Entrance Channel	2,958,827	Corps	Silty Sand
1986	Entrance Channel	351,535	Corps	Silty Sand & Silt
1988	Entrance Channel	1,642,938	Corps	Silt
1989	Entrance Channel	203,000	Corps	Silt
1990	Entrance Channel	173,772	Corps	Silt
1991	Middle Turning Basin (MTB)	497,380	Corps	Silt
1992	Entrance Channel & MTB	550,000	Corps	Silt
1993	Entrance Channel	1,878,460	Corps	Silt
1994	Entrance Channel	98,820	Corps	Silt
1995	Entrance Channel	243,180	Corps	Silt
1996	Entrance Channel	245,274	Corps	Sandy Silt
1997	Entrance Channel	773,999	Corps	Sandy Silt
1998	Entrance Channel	688,839	Corps	Sandy Silt
2000	Entrance Channel	300,320	Corps	Silt
2002	Entrance Channel	410,000	Corps	Silts & Clays
2004	Entrance Channel	202,624	Corps	Silts & Clays
2005	Entrance Channel	417,997	Corps	Silts & Clays
2006	Entrance Channel & MTB	952,705	Corps	Silts & Clays
	Average Volume	660,500		

Source: CPA
1 Entrance Channel consists of the Outer Reach and portion of the Middle Reach outside of the jetties

2.3 Terminal Facilities

Port Canaveral terminal facilities can be generally grouped into four categories: dry bulk cargo, liquid bulk cargo, cruise, and naval. Naval facilities exist along the east side of the middle turning basin and at the Trident turning basin, although naval vessels do layover at cargo berths occasionally. Naval use of the port's facilities have an insignificant impact on overall port operations and therefore are not addressed in detail in this analysis. Ancillary benefits of navigation improvements at Port Canaveral, which accrue to the Navy mission, are presented in this report. Commercial industries that occur along the Port's waterfront, such as marinas, restaurants, and small commercial fishing enterprises are not addressed in detail. Figure 2-6 presents the major port facilities.

A Florida Power and Light (FPL) barge berth is located on the south side of the West Access Channel. The barges take fuel from the on-site FPL fuel storage tank (filled by tankers berthed at Tanker Berth 2) through the barge canal to FPL facilities on the Indian River. FPL barge traffic does not have a significant impact on Port Canaveral operations.

The types of cargo that can be handled at each of the Port's berths are listed in Table 2-6. Containers are typically handled at a temporary 300-foot berth at the north cargo area, but may also be handled at North Cargo Pier (NCP) 2 and South Cargo Piers (SCP) 3 & 5. The listing of south side tanker berths 1 & 2 may be somewhat misleading because the designation "tanker berth" indicates the presence of a fuel manifold for offloading tankers. The tanker berths are not physically separate berths, but are shared with SCP 4 & 5 on the south side. SCP 3 also has a fuel manifold that is often used to load bunker oil onto barges for delivery to cruise ships in the West Turning Basin. Fuel barges may also be loaded at tanker berths (TB) 1 & 2. The new Seaport Canaveral Terminal will unload tankers at NCP 1 & 2. Roll-on/Roll-off capabilities exist at NCP 1 and Cruise Terminal (CT) 2 (formerly used by Premier Cruise Line).

Table 2-6
Port Canaveral Cargo Category by Berth

South Side Berths	Dry Cargo	Liquid Bulk	Cruise
SCP1	Yes	No	No
SCP2	Yes	No	No
SCP3	Yes	Yes	No
SCP4	Yes	No	No
SCP5	Yes	No	No
TB1	N/A	Yes	N/A
TB2	N/A	Yes	N/A
CT2	No	No	Yes
CT3	No	No	Yes
CT4	No	No	Yes
North Side Berths	**Dry Cargo**	**Liquid Bulk**	**Cruise**
NCP1	Yes	Yes	No
NCP2	Yes	Yes	No
NCP3	Yes	No	No
NCP4	Yes	No	No
CT5	No	No	Yes
CT6	No	No	Yes
CT8	No	No	Yes
CT 9/10	No	No	Yes

Note: SCP = South Cargo Pier, TB = Tanker Berth, NCP = North Cargo Pier, CT = Cruise Terminal. Source: CPA

Figure 2-6
Port Canaveral Major Facilities

2.3.1 South Side Cargo Terminal Facilities

The south side of the Inner Reach features nearly continuous cruise and cargo wharfs from the entrance to the Trident turning basin to the west side of the Middle Turning Basin. Three cruise terminal berths (CT2, CT3, and CT4) are located at the east end of the southern berths. Five cargo berths (SCP1-5) and two tanker berths (TB1 and TB2) extend westward from the termination of the cruise terminal berths. From the western end of the south cargo berths westward to the SR401 bridge, the bulkhead wall is leased to commercial fishing, restaurant, small vessel and marina operators.

Use of SCP1 is limited by the narrow pier apron along the eastern end of the berth and by the narrowness of the channel at that point. The Canaveral Pilots Association limits the size and placement of vessels at SCP1 because of the potential need to "crab" (i.e., sail at an angle that increases a vessel's effective beam) cruise ships through this reach under windy conditions. SCP1, SCP2 and SCP3 share a continuous pier that is 1,614 feet long. SCP4 and SCP5 are not continuous. Cement and aggregates are both offloaded at SCP4 due to the location of offloading equipment. An overhead conveyor system is available to transport aggregates from the SCP4, over and across George King Boulevard, to the Ambassador Services, Inc. storage facility. Ambassador Services, Inc. is one of the major shipping agent and stevedore service providers at the port.

TB1 is the primary tanker berth used by Transmontaigne for multiple petroleum products and SCP3 is a secondary berth for tankers. Transmontaigne operates a tank farm off CPA property near the port's south cargo facilities. The tank farm includes 730,000-barrel storage capacity for gasoline, diesel, asphalt, and bunker fuel. TB2 is used by RRI Energy, Inc. and FPL. Historical deliveries to TB2 for FPL have recently been terminated, as the Cape Canaveral Power Plant is currently undergoing modernization as a gas-fired plant. It is important to note that tug/barge combinations are frequently used to deliver petroleum products to Port Canaveral. These tug/barge combinations are often greater than 600 feet long and are no different from tankers in their use of berth facilities. Smaller barges are used to deliver fuel to the plants located on the Indian River. Table 2-7 summarizes Port Canaveral's south side cargo terminal facilities. Additionally, vessels are also offloaded using mobile harbor cranes, ship's gear, and other mobile equipment.

Table 2-7
Port Canaveral South Side Cargo Terminal Facilities Summary

Berth	Length (ft)	Unloading Facilities	Storage facilities
SCP1	655	None	Warehouses (dry, cool, and freezer)
SCP2	660	None	Warehouses (dry, cool, and freezer)
SCP3	400	Petroleum Products Manifold	Warehouses (dry, cool, and freezer)
SCP4	560	Mobile conveyor system[1] Mobile cement unloader	Open Storage Cement silos
SCP5	400	None	Open Storage
TB-1	NA	Petroleum Products Manifold	Off-site tank farm
TB-2	NA	Petroleum Products Manifold	On-Site 325,000 barrel & 268,000 barrel storage tanks

Note: [1] Conveyor system transports materials off CPA property to an open storage facility. Source: CPA

2.3.2 North Side Cargo Terminal Facilities

Cargo berths on the north side of Port Canaveral are located along the western edge of the Middle Turning Basin, along the adjacent north side of the west access channel, and along the corner cut off at the West Turning Basin. The largest single cargo facility on the north side is the Seaport Canaveral Terminal. Seaport Canaveral is a 2.84 million barrel fuel storage and terminal facility. Vitol, S.A., Inc. has a 30-year lease agreement with the CPA for 36 acres of land in the north cargo area. The company is operating at Port Canaveral as Seaport Canaveral LLC. The lease agreement includes two 10-year extension options. Vitol, S.A., Inc. is an international fuel trading company previously operating fuel terminals in seven countries. Seaport Canaveral (Figure 2-7) makes the United States the eighth country in their system. Table 2-8 presents the Seaport Canaveral product storage capabilities as submitted in Vitol's permit applications.

Table 2-8
Seaport Canaveral (Vitol, S.A., Inc) Terminal Storage Capability

Product	Number of Tanks	Storage Capacity (bbls)
Marine Diesel Oil	3	150,000
#6 Fuel Oil	2	300,000
Ethanol	2	110,000
Diesel	4	600,000
Jet Fuel	2	300,000
Regular Gasoline	5	750,000
Premium Gasoline	3	450,000
Blend Components	3	180,000
Completed Construction Sub-Total	**24**	**2,840,000**
Future Tanks	7	950,000
Full Build Out Total	**31**	**3,790,000**

Source: CPA

Facility operations at Seaport Canaveral began in February 2010. Oil tankers and barges use a new petroleum product hook-up system at berths NCP1/NCP2.

From February 2010 through July 2011, Seaport Canaveral has used three types of vessels:

- tug/barge combinations, which may be a long as 600 feet and operate with arrival drafts up to 30 feet;
- multi-point service vessels, which are tankers typically in the 400 to 500-foot range with arrival drafts of 32 feet and less, and
- Point-to-point service vessels which are tankers typically 600 feet long with design drafts averaging 39.2 feet and operate at the port with arrival drafts from 34 to 36 feet.

Only the point-to-point tankers are depth constrained at Port Canaveral.

Most roll-on/roll-off activity has taken place at NCP1. Vessels berthed at NCP2 often extend beyond the southern limit of the pier, but this practice is limited by the proximity to the channel. NCP4, although not a dedicated berth, is used typically by vessels bringing cement to the adjacent Cemex (formerly Rinker) silos. Salt has always been offloaded at NCP1 and slag has always been offloaded at NCP2 due to the close proximity of the facilities to these berths. A temporary 300-foot berth, which mostly is used for containers, is the only cargo berth located in the West Turning Basin. Table 2-9 summarizes the existing condition of Port Canaveral's north side cargo terminal facilities.

Figure 2-7
Seaport Canaveral Fuel Terminal

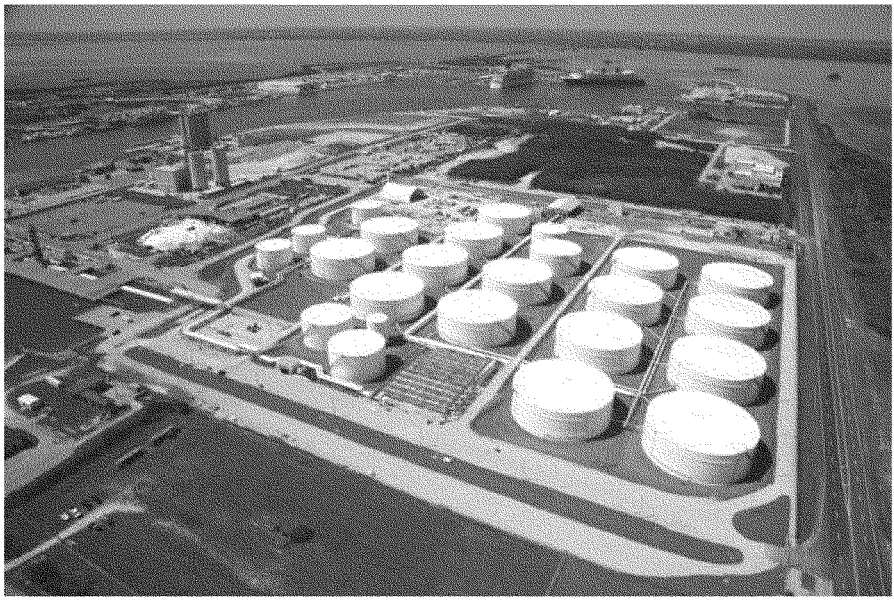


Table 2-9
Port Canaveral North Side Cargo Terminal Facilities Summary

Berth	Length (ft)	Unloading Facilities	Storage facilities
NCP1	645	Mobile Conveyor Mobile Hoppers Petroleum Products Manifold	Paved container yard Open and paved storage On-site 2.8 million barrel storage facility
NCP2	645	Mobile Conveyor Mobile Hoppers Petroleum Products Manifold	Slag silo Open Storage On-site 2.8 million barrel storage facility
NCP3	400	None	Dry storage warehouse Paved open storage
NCP4	400	Rail mounted auger cement unloader	Cement silos
NCP5	750	Berth construction to be completed 2013	To be determined
NCP6	750	Berth construction to be completed 2013	To be determined

2.3.3 Cruise Terminal Facilities

Port Canaveral's cruise terminals are located at the eastern end of the Port's south side and in the West Turning Basin. Along the port's south side, CT2, 3, and 4 were the first cruise terminals to be developed at Port Canaveral. The newer cruise terminals (CT5, CT8, and CT9/10), which service the large multi-day cruise ships, are located in the West Turning Basin. Currently the *Carnival Sensation* uses CT5 and the *Carnival Dream,* which replaced the *Carnival Glory*, began using CT9/10 in mid-November 2009. The *Disney Magic, Disney Wonder* and *Disney Dream* share CT8. CT9/10 is also shared by Royal Caribbean International's (RCI) *Monarch of the Seas* and the *Freedom of the Seas*. The *Norwegian Spirit* also berths at CT9/10 during her seasonal homeport use of Port Canaveral. Port-of-call vessels typically use CT5 or small port-of-call vessels may use CT3 or CT4.

A new cruise terminal (CT6) to be located at the northwestern end of the West Turning Basin, is currently under construction and scheduled for completion in summer 2012. Port Canaveral has begun construction on a new $60 million terminal, which will be able to handle the largest cruise ships at sea. The Cruise Terminal 6 complex is the biggest project at Port Canaveral since 1995, when it constructed facilities to accommodate the then-new Disney Cruise Line. Construction has already begun on the pier portion of the project and it should be completed by July 2012. The complex will have a 2,500-person processing area and a 1,100-seat waiting area, and will be able to simultaneously load and unload passengers. It also includes a new pier, gangway and parking garage with a covered walkway to the terminal.

Recently completed construction activities for Port Canaveral's cruise terminal facilities include an additional mooring dolphin and pier expansion at CT10 to accommodate RCI's Freedom Class vessels. Near-term construction plans for Port Canaveral's cruise terminal facilities include expansion of the berth and terminal at CT8 to accommodate the new, larger Disney vessels. Table 2-10 summarizes Port Canaveral's cruise terminal facilities.

Table 2-10
Port Canaveral Cruise Terminal Summary

South Side				
Berth	Length (ft)	Maximum Vessel Length (ft)	Terminal Size (sq ft) Ticketing/Luggage	Passenger Capacity
CT2	468	440	8,000/16,500	1,800
CT3	694	782	8,000/16,500	1,800
CT4	882	782	9,000/20,700	1,800
North Side				
Berth	Length (ft)	Maximum Vessel Length (ft)	Terminal Size (sq ft) Ticketing/Luggage	Passenger Capacity
CT5	565	960	61,000/19,000	3,000
CT8	795	1,115	70,000/14,900	4,000
CT9/10	725	1,100	89,000/17,500	3,500

2.4 Existing Economic Conditions

2.4.1 Socio-Economics

The 2010 population of Brevard County (543,346) indicates 14.1% growth over the 2000 population of 476,230. The annual average population growth rate has been 1.6% since 1990. The median household income in the county in 2009 is $45,683, which is an average annual increase of 2.0% since 1989. Approximately 12% of the population was living below the poverty level in 2009. More than 76% of households are owner occupied. The labor force was 268,149 in 2010, an increase from 252,338 in 2005. However, the unemployment rate in Brevard County has increased markedly, from 3.7% in 2005 to 11.5% in 2010.

Neighboring Orange County, which includes the City of Orlando, has experienced a population increase of 27.8% (from 896,354 to 1,145,956) between 2000 and 2010, with an average annual growth rate of nearly 2.5%. Growth in central Florida has been occurring and is projected to continue to occur at a faster rate than the Florida state average. Research conducted for the Orlando Growth Management Plan (City of Orlando Planning and Development, 01 Feb 2005) projects Orange County annual population growth to be 2.06% annually between 2000 and 2030. The table presented below (Table 2-11) is a compilation of growth projections for Orlando. These growth projections provide strong indication of continued growth in construction and petroleum related products and other commodities moving through Port Canaveral.

Table 2-11
Projected Growth for City of Orlando 2004 - 2030

Item	Units	2004	2030	Increase	% Increase
Single Family	units	35,275	48,359	13,084	37.1%
Multi Family	units	67,078	97,072	29,994	44.7%
Office Space	sq. ft.	31,294,507	54,048,319	22,753,812	72.7%
Retail Space	sq. ft.	27,549,806	40,563,707	13,013,901	47.2%
Industrial Space	sq. ft.	35,183,626	53,888,668	18,705,042	53.2%
Hospital Space	sq. ft.	5,018,761	7,382,021	2,363,260	47.1%
Gov/Civic Space	sq. ft.	16,096,413	26,019,805	9,923,392	61.7%
Total	sq. ft.	115,143,113	181,902,520	66,759,407	57.9%
Hotel Rooms	rooms	19,604	36,252	16,648	84.9%
Employment	employees	223,038	361,941	138,903	62.3%

Source: Orlando Growth Management Plan, 01Feb05

2.4.2 Port Hinterland

The cargo terminals at Port Canaveral service one of the fastest growing regions in the country. US Census Bureau population growth projections for 2000 – 2010 show that Florida was the third fastest growing state with an annual population growth rate (1.88%) that is double the national average (0.94%). Some commodities handled at Port Canaveral are distributed throughout the state and farther, such as newsprint and food products (personal communication

Jeff Allen, formerly of Mid-Florida Freezer). A significant proportion of construction related materials are concentrated in the central Florida region, which is roughly defined as the area from Daytona Beach (Volusia County) south to Ft. Pierce (St. Lucie County) extending west to Orlando (Orange County). Delivery of as much as 50% of aggregate material is concentrated in the Orlando region, with the remainder going to central and south Florida (personal communication Brian Hubert, President, Ambassador Services, Inc.). There are no major aggregate material import terminals on the east coast of Florida, other than Jacksonville and Port Canaveral. The cement terminals at Port Canaveral predominantly service the central Florida region, with south eastern Florida being serviced from terminals in Port Everglades. A large proportion of building materials (60%) goes to The Home Depot and Lowe's distribution centers in central and southeastern Florida (City of Frostproof; Polk County and Pompano Beach; Broward County).

2.5 Port Canaveral Operations

2.5.1 Florida's Cruise Ship Industry

Florida's east coast ports are by far the nation's (and the world's) busiest cruise ports. Table 2-12 presents the volume of North American multi-day cruise passengers by departure port for 2003 – 2010. In 2010, Port Canaveral cruise passengers accounted for 12.2% of all North American cruise passengers (MARAD, 2011), ranking it as the 3rd busiest cruise port with more than twice as many passengers as the 4th busiest cruise port, New York. The market dominance of east coast Florida cruise ports is due to the Caribbean's prominence and allure as a cruise destination and Florida's proximity to it. Caribbean cruise destinations, including the Bahamas and Bermuda, accounted for more than 72% of all North American passenger volume in 2010 (Table 2-13). It is important to note that total multi-day cruise passenger counts and Port Canaveral Passenger counts have remained steady despite the recent economic recession and continued economic difficulties.

Table 2-12
North American Multi-Day Cruise Passengers by Departure Port (000's)

Port	2003	2004	2005	2006	2007	2008	2009	2010
Miami	1,867	1,683	1,771	1,890	1,890	2,099	2,044	2,151
Ft. Lauderdale	1,100	1,237	1,199	1,145	1,289	1,187	1,277	1,759
Port Canaveral	1,114	1,230	1,234	1,396	1,298	1,226	1,189	1,299
New York	432	548	370	536	575	435	403	556
San Juan	579	677	581	555	534	521	507	522
Seattle	165	291	337	382	386	435	430	469
Galveston	377	433	531	616	529	403	386	429
Tampa	419	399	408	461	368	393	401	425
Long Beach	171	401	363	380	370	365	415	414
Los Angeles	516	434	615	583	624	607	412	374
Total (all ports)	**8,349**	**9,418**	**9,747**	**9,971**	**10,289**	**9,915**	**9,858**	**10,609**

Source: MARAD, 2009 and 2011

Table 2-13
North American Cruise Passengers By Destination (000's)

Destination	2003	2004	2005	2006	2007	2008	2009	2010
Western Caribbean	2,924	3,094	3,142	3,151	3,107	2,817	2,828	3,264
Bahamas	1,292	1,431	1,390	1,541	1,442	1,448	1,741	1,970
Eastern Caribbean	1,037	1,215	1,315	1,386	1,409	1,407	1,249	1,661
Mexico (Pacific)	731	964	1,130	1,075	1,215	1,265	1,095	875
Alaska	776	880	930	939	1,014	1,015	1,011	872
Southern Caribbean	749	895	788	749	805	859	801	815
Hawaii	222	232	307	402	495	251	193	188
Bermuda	212	195	226	234	211	224	264	269
Canada/New England	173	214	179	165	189	231	226	265
Transatlantic	76	96	146	138	162	168	158	157
Trans-Panama Canal	95	108	112	91	117	102	146	166
Pacific Coast	25	48	56	60	59	58	63	44
South America	12	10	7	18	14	14	35	19
South Pacific/Far East	7	8	9	12	19	27	29	25
Nowhere	17	29	9	9	31	29	18	17
Total	**8,349**	**9,418**	**9,747**	**9,971**	**10,289**	**9,915**	**9,858**	**10,609**
Caribbean Sub Total	4,710	5,204	5,245	5,286	5,321	5,083	4,879	5,742
Percent of Total	56.4%	55.3%	53.8%	53.0%	51.7%	51.3%	49.5%	54.1%
Caribbean/Bahamas/ Bermuda Sub Total	6,215	6,830	6,861	7,061	6,774	6,755	6,620	7,712
Percent of Total	74.4%	72.5%	70.4%	70.8%	67.8%	68.1%	67.2%	72.7%

Source: MARAD, 2007 and 2011

There are 30 new cruise ships scheduled for delivery into the North American market between 2008 and 2012 (Cruise Industry News Annual Report, 2008). Seventeen of these new vessels are larger than 110,000 gross registered tons with passenger capacities of approximately 3,000 or more. The largest of the new vessels [RCI's Oasis (previously Genesis) Class] has a beam in

excess of 154 feet and a length overall of nearly 1,200 feet. Four of the largest new vessel classes are the:

- Disney Cruise Lines (two ships at 128,000 tons, 1,115 feet length overall (LOA), and 2,500 passengers);
- Royal Caribbean International Freedom Class (three ships at 158,000 tons, 1,112 feet length overall (LOA), and 3,600 passengers);
- Norwegian Cruise Lines Project F3 Class (one ship at 150,000 tons, 1,068 feet LOA, and 4,200 passengers); and
- Royal Caribbean International Oasis Class (two ships at 220,000 tons, 1,118 feet LOA, and 5,400 passengers)

Of the 30 new cruise ships scheduled for delivery into the North American fleet between 2008 and 2012, 16 are destined for service in the Caribbean (eight of which are also slated to share service in the European market), eight are slated for world-wide service, and six do not have a service destination identified.

2.5.2 Port Canaveral's Cruise Ship Industry

Port Canaveral has historically been a preferred port for the largest, newest cruise ships and, along with Miami and Port Everglades, a first homeport for the largest new vessels entering the world fleet. In 2003, Royal Caribbean International placed one of its newest Voyager Class vessels (*Mariner of the Seas*) at Port Canaveral. Disney Cruise Line placed its first two vessels (*Disney Wonder* and *Disney Magic*) at Port Canaveral directly from the ship yard. Royal Caribbean International replaced the *Mariner of the Seas* at Port Canaveral, with the new, larger Freedom Class vessel (the *Freedom of the Seas*) in 2009. Similarly, in November 2009 Carnival Cruise Lines replaced the *Carnival Glory*, previously homeported at Port Canaveral, with the *Carnival Dream*, its newest, largest cruise ship. Most recently, in January 2011 Disney Cruise Lines placed its newest ship, the *Disney Dream* into service at Port Canaveral, replacing the *Disney Wonder*, which has now been redeployed to the West Coast. The *Disney Fantasy* (same dimensions as the *Disney Dream*) has been homeported at Port Canaveral since it entered service in March 2012.

The cruise ships[10] homeported at Port Canaveral in 2011 include:

- *Carnival Dream* (3,646 normal capacity; 4,631 maximum capacity[11])
- *Carnival Sensation* (2,052 norm; 2,634 max);
- *Disney Magic* (1,754 norm; 2,713 max);
- *Disney Dream* (2,500 norm; 4,000 max);
- *RCI Monarch of the Seas* (2,345 norm; 2,744 max); and
- *RCI Freedom of the Seas* (3,634 norm; 4,375 max).

[10] Only multi-day cruise ships are included. Gaming vessels have also historically offered partial day cruises from Port Canaveral.

[11] Normal capacity is based on two occupants per stateroom, maximum capacity includes total number of berths – source MARAD Cruise Passenger Statistics Data

In addition, the port is also a port-of-call for other cruise ships, which in 2011 included: *Carnival Pride, Norwegian Sun, Norwegian Gem, Norwegian Jewel,* Royal Caribbean *Enchantment of the Seas,* and others. In the CPA fiscal year 2011 (01 Oct 2010 - 30 Sept 2011) the port was either the homeport or a port of call for 587 multi-day voyages. There are currently 579 homeport or a port of call multi-day voyages scheduled for Port Canaveral in 2012, including the new *Disney Fantasy,* which entered service and was homeported at Port Canaveral in March 2012. The number of calls includes typical 7-day and 4/5-day cruise itineraries for homeported vessels, port-of-call arrivals, and other scheduled itineraries.

Port Canaveral has experienced a 4.1% average annual growth in multi-day cruise passengers between 2000 and 2011, which includes the effects of the recent economic downturn. Day trip cruise (gaming vessel) passenger volumes grew between 2000 and 2004, but have fallen since then. Table 2-14 presents Port Canaveral revenue passenger volumes for fiscal years 2000 – 2011.

Table 2-14
Port Canaveral Cruise Ship Revenue Passengers

Fiscal Year	Multi-Day	Day Trip	Total
2000	1,995,619	1,793,002	3,788,621
2001	1,798,366	1,795,058	3,593,424
2002	1,951,196	1,873,044	3,824,240
2003	2,168,450	1,941,020	4,109,470
2004	2,631,320	1,954,910	4,586,230
2005	2,529,743	1,859,108	4,388,851
2006	2,782,712	1,759,344	4,542,056
2007	2,718,416	1,557,506	4,275,922
2008	2,484,504	1,089,456	3,573,960
2009	2,468,439	782,336	3,250,775
2010	2,722,751	80,200	2,802,951
2011	3,100,199	44,469	3,144,668

Source: CPA

Another important reason for Port Canaveral's highly competitive position in the cruise ship industry is the port's high vessel utilization rate, making it an extremely attractive and profitable homeport for the cruise industry. Cruise ship utilization is measured in two ways. A vessel's normal capacity is the comparison between the actual number of passengers and the vessel's capacity assuming two passengers per room. The vessel's maximum capacity compares the

actual number of passengers to the total number of berths on-board the vessel, recognizing that many rooms, especially those occupied by families, house more than 2 persons per trip. Port Canaveral consistently displays higher utilization rates than the 1st and 2nd ranked ports, Miami or Port Everglades (Table 2-15). CPA attributes the port's high utilization rates to a higher proportion of families with children traveling together, and to the many nearby landside family attractions, such as Walt Disney World, Universal Studios, Sea World, and the Kennedy Space Center.

Table 2-15
Comparative Normal Capacity Utilization (2004 – 2011)

	Port Canaveral	Miami	Port Everglades
2004	122.6%	110.1%	100.8%
2005	123.5%	110.9%	102.5%
2006	121.9%	110.6%	103.7%
2007	122.2%	110.7%	104.2%
2008	123.4%	110.7%	104.2%
2009	123.3%	111.7%	103.6%
2010	120.3%	111.4%	104.7%
2011*	122.3%	110.8%	104.9%

Source: MARAD 2011; *2011 data for 01Jan11 through 30June2011

Cruise ship utilization has consistently been high at Port Canaveral and has not been appreciably reduced during the economic downturn experienced in 2007 and 2008. It is important to note that the addition of the *Mariner of the Seas* to Port Canaveral's homeport fleet in 2004 did not reduce vessel utilization on the *Sovereign of the Seas* (Table 2-16). The immediately high utilization rate at Port Canaveral for the *Mariner of the Seas* and the *Freedom of the Seas* indicates that shifting the vessel from Miami to Port Canaveral did not reduce its utilization rate at Port Canaveral.

Table 2-16
Port Canaveral Cruise Ship Capacity Utilization (2003 – 2011)

Average Passengers Per Call

	Normal Capacity	2005	2006	2007	2008	2009	2010	2011*
Sovereign of the Seas	2,276	2,553	2,557	2,574	2,591	---	---	---
Mariner of the Seas	3,114	3,486	3,489	3,476	3,466	---	---	---
Freedom of the Seas	3,634	---	---	---	---	4,088	4,005	3,905
Disney Dream	2,500	---	---	---	---	---	---	3,649
Disney Magic	1,754	2,610	2,575	2,571	2,544	2,533	2,545	2,628
Disney Wonder	1,754	2,651	2,540	2,622	2,618	2,627	2,624	
Carnival Dream	3,646	---	---	---	---	---	4,212	4,346
Carnival Glory	2,758	3,331	3,331	3,291	3,341	3,323	---	---

Normal Capacity Utilization

	Normal Capacity	2005	2006	2007	2008	2009	2010	2011*
Sovereign of the Seas	2,276	112%	112%	113%	114%	---	---	---
Mariner of the Seas	3,114	112%	112%	112%	111%	---	---	---
Freedom of the Seas	3,634	---	---	---	---	112%	110%	107%
Disney Dream	2,500	---	---	---	---	---	---	146%
Disney Magic	1,754	149%	147%	147%	145%	144%	145%	150%
Disney Wonder	1,754	151%	145%	149%	149%	150%	150%	---
Carnival Dream	3,646	---	---	---	---	---	116%	119%
Carnival Glory	2,758	121%	121%	119%	121%	120%	---	---

*Data for 01 Jan through 30 June 2011; Source: MARAD 2011

2.5.3 Port Canaveral Cruise Ship Operations

This section discusses the operations of the large multi-day cruise ships which use Port Canaveral. These vessels are all berthed in the West Basin. Day-trip cruise ships, which are substantially smaller than multi-day cruise ships, operate out of cruise berths on the south shore of the port. The day-trip cruise ships are not constrained by existing channel conditions.

Operational constraints on the large multi-day cruise ships berthed in the West Basin are explained in the following paragraphs.

Large cruise ship operations in the port are constrained by existing channel width and by the close proximity to moored cargo ships, naval vessels, and the day-trip ships that berth at the south side cruise terminals. The Port Canaveral Pilots will only allow small day-trip size cruise ships to moor at the south side cruise terminals because of the narrow channel. The narrowness of the channel and the close proximity to moored vessels results in a "surge effect" when large cruise ships transit the channel at speeds in excess of 6 knots, which may occur during windy conditions (cross-winds greater than 15 knots). These surge effects have caused incidents of parted lines, minor vessel connection damage, and some personnel injuries over the years.

Port Canaveral's standard operating procedures require loading and unloading of cargo vessels to cease during the transit of large cruise ships during high wind conditions (cross-winds greater than 25 knots). The standard operating procedure also recommends that mooring lines be attended during large cruise ship transits. Port Canaveral operations personnel, port tenants, and the Canaveral Pilots Association all work to minimize the effects associated with surges, however minor delays in vessel loading and unloading along the south side docks still regularly occur. In addition, tugs are used to keep moored vessels alongside the piers to offset surge effects, which pull vessels away from their moorings (see Section 1-9 Canaveral Harbor Surge Effects and Modeling of the Engineering Appendix). Tugs are typically used at North Cargo Piers 1, 2, and 4, at the Poseidon Wharf, and in the Trident Basin.

Cruise ships currently transit Port Canaveral channels twice daily on regular schedules—inbound to the West Turning Basin from early to mid-a.m. hours and outbound from the West Turning Basin during approximately mid-p.m. hours. Often, as many as three cruise ships arrive or depart in 20 minute intervals on the port's busy days. Port Canaveral's largest homeport vessels, as well as various regularly scheduled port-of-call vessels, sail to and from the West Turning Basin in winds of up to 35 knots. These large vessels must travel at relatively slow speeds to minimize surge at critical locations in the west access and inner channels but are greatly affected by channel cross-winds at those speeds due to the vessel's large amount of sail area.

Cruise ships typically do not use assisting tugboats because they are maneuvered through the use of rudder, conventional fixed or azimuthing pod propeller, and bow and stern thrusters. However, tug assist is required under windy conditions. The larger ships have three or four thrusters forward and three or four thrusters aft. Those ships without stern thrusters generally have two or three azimuthing and/or fixed position pods aft. The fixed pod is on the centerline of the ship at the stern. Azimuthing pods are on either side of the centerline at the stern. The pods are positioned to optimize underway propulsion and have an override maneuvering power mode for use in port. However, the Disney ships currently homeported at Port Canaveral have traditional propulsion systems.

The size of cruise ships and cargo vessels entering Port Canaveral is currently constrained by the federally authorized 400-foot channel width. The narrow channel constrains the maximum length and beam of cruise and cargo vessels that can use the port and affects the operation of cruise and cargo vessels using the port. Wind conditions during large cruise ship transits and proximity to moored vessels along the Port's main channel compound the operational impacts imposed by the channel's narrow width. Safe navigation inside the harbor with minimal surge effects to moored vessels requires a balance between vessel speed and good ship handling

capability to manage the yaw of the vessel or "crab angle" as it moves through the waterway under the influence of moderate to high wind conditions.

A vessel's "crab angle", also known as drift angle, is defined as the difference between a ship's heading and the actual course made good. Cruise ships transiting the channels at Port Canaveral are susceptible to "crabbing" because of their large superstructure which acts as a sail in the wind and the moderate speeds which must be maintained so as to avoid surge impacts on moored vessels and to maintain braking control of the vessel. The wider the "crab angle", the larger the effective beam of the vessel as it moves through the channel.

The effective beam is a critical parameter for very large cruise ships such as the *Mariner of the Seas*, which has a length of 1,021 feet and a beam of 127 feet. For two vessels traveling with the same "crab angle" the longer vessel would have the larger effective beam. The extreme length of the *Mariner of the Seas* means that the vessel's effective beam approaches the limits of acceptable safe passage through the current configuration of Port Canaveral's channels.

The *Mariner of the Seas* effective beam was discussed in a letter from the Canaveral Pilots Association to CPA in December 2002. This letter was written in anticipation of the arrival of *Mariner of the Seas* in 2003 and the need for dredging of certain locations within the harbor, but outside and adjacent to the existing authorized 400-foot channel boundaries. The pilots requested these key areas of dredging to improve the safety of navigation for this new larger cruise ship.

A Port Canaveral Berth Access Simulation Study was conducted in May 2003 to evaluate *Mariner of the Seas* navigation through Port Canaveral in various configurations including the existing channel, the existing channel plus areas requested to be dredged by the pilots adjacent to but outside the authorized channel, and then for a 500-foot channel width. The Canaveral Pilots and RCCL ship captains participated in the simulations at the Simulation, Training, Assessment & Research (STAR) Center, located in Dania Beach, FL.

The simulation was based on the 400-foot channel width as it existed in 2003. Voyager Class vessel speeds were on the order of 6 to 10 knots between the Port entrance and the Navy's Poseidon Wharf in the MTB. Between the Poseidon Wharf and the entrance to the WTB, ship speeds were generally 6 knots or less. The study reported that for Voyager Class vessel speed of 6 knots, crab angles of 2.5 to 3 degrees were observed for 15-knot cross winds. The crab angle increased to approximately 4.5 degrees for 25-knot cross winds. Also noted were minimal clearances to berthed vessels that likely would have resulted in undesirable surge effects on those moored ships and associated operations. For the configuration that included the dredge areas requested by the pilots and for 30-knot cross winds, crab angles of 7 to 8 degrees were observed for transit speeds of 6 knots or less. For 30-knot winds, a more comfortable vessel speed of 6.2 knots limited the crab angle to about 6 degrees.

Prior to the arrival of the Voyager Class vessel, *Mariner of the Seas*, in 2003, and at the request of the Canaveral Harbor Pilots (also with confirmation by simulations at the STAR Center), CPA executed dredging at five locations adjacent to, but outside the federally authorized channel that were considered to be key navigation areas and/or restricted channel areas critical to the safe navigation of this cruise vessel. Those dredge areas effectively provided 50 feet of additional channel width north of the channel at either end of the Inner Reach and 80 feet of additional channel width south of the channel along both cuts of the West Access Channel. In essence, since November 2003, with the pilot's recommended dredging, the channel width at certain key

areas is effectively on the order of 450 feet. CPA dredging outside the federally authorized channel is included in the without-project condition.

The arrival of the *Freedom of the Seas* in 2009, which is nearly 100 feet longer than *Mariner of the Seas*, required the CPA to again dredge beyond the limits of the federal channel based on requests from the Canaveral Pilots Association and confirmed by simulations at the STAR Center. This additional dredging included expanding the southeast corner of the present entrance to the West Turning Basin to enable access by a Freedom Class vessel. CPA's widening of the West Turning Basin entrance, referred to as the Interim Corner Cut-Off (ICCO), was completed in 2011. The navigation effects of CPA dredging outside the federally authorized channel at the entrance to the West Turning Basin are included in the without-project condition.

Despite the narrow channel conditions at Port Canaveral, cruise ship arrival and departure delays are not common because of the importance of schedules to passengers and potential expenses to the cruise lines. Normal high wind conditions (20 - 35 miles per hour) may induce excessive "crabbing" as the vessel transits Port Canaveral's narrow channel. Normal high wind conditions typically do not delay cruise ship arrivals and departures because the cruise lines will use tug assist to transit the channel under normal high wind conditions. Wind direction, as well as speed, influences the Pilot's decision to use tug assist. Winds that are abeam of the vessel as it transits through the Port, i.e., winds from northerly and southerly directions, have a greater impact on the vessel's sail area and are more likely to result in tug assist. Tug assist typically consists of one or two tugs, depending on the strength and direction of the wind and other factors, such as vessel size, propulsion equipment, and size of vessels at cargo berths. Table 2-17 presents annual summations of the number of wind-related occurrences of tug assistance for cruise ships. Tug assist occurrences due to equipment failure or berth shifting are not included in the summation calculations. Discussions with representatives of the Canaveral Pilots Association indicate that tug assistance has continued and may be exacerbated by the arrival of the new larger cruise ships at Port Canaveral.[12]

Table 2-17
Port Canaveral Historical Wind-Related Cruise Ship Tug Assist Occurrences

	2006	2007	2008	2009
One Tug	10	20	7	16
Two Tugs	4	7	4	1
Total	**14**	**27**	**11**	**17**

Source: Port Canaveral Pilots

2.5.4 Port Canaveral Historical Cargo Volumes

Bulk cargo has been moving through Port Canaveral since its opening in 1955. During the early years of the port, petroleum products emerged as the dominant commodity. Construction materials such as cement and food goods such as orange juice and citrus were also major commodities. Over time, construction materials and petroleum products remained the largest

[12] Personal communication with Ben Borgie, Canaveral Pilots Association

commodities at the port, by volume. Table 2-18 presents historical tonnage volumes at the port since 1982.

Table 2-18
Port Canaveral Historical Total Annual Tonnage (short tons)

Fiscal Year	Total Tonnage	Fiscal Year	Total Tonnage
1982	2,036,007	1997	2,862,036
1983	2,027,979	1998	3,234,148
1984	2,206,558	1999	3,410,448
1985	2,156,186	2000	3,490,242
1986	2,322,729	2001	3,596,664
1987	2,102,427	2002	3,160,064
1988	2,291,477	2003	3,867,724
1989	2,468,168	2004	4,083,528
1990	2,314,933	2005	4,467,088
1991	2,521,901	2006	4,553,756
1992	2,285,888	2007	3,572,206
1993	2,722,268	2008	2,395,779
1994	3,232,476	2009	2,626,795
1995	2,647,861	2010	3,218,144
1996	2,940,868	2011	4,547,724

Source: CPA
Note: data is for fiscal years (01 Oct – 30 Sep), excludes potable water

Port Canaveral has experienced a steady and slightly accelerating growth trend in bulk cargo during the years from 1986 through 2006. The port's total FY 2006 tonnage was nearly double its FY 1986 total tonnage. In the ten years from FY 1996 through FY 2006, total tonnage increased by 55%. Table 2-19 presents long term average annual growth rates for Port Canaveral's total tonnage calculated through FY 2011. The recent economic downturn had a dramatic impact on cargo tonnage at Port Canaveral, especially in FY 2008 - 2009, however total tonnage had completely rebounded by 2011 to pre-recession 2006 levels, due in large part to Seaport Canaveral liquid bulk activity. Historically, the majority of dry bulk cargo commodities at Port Canaveral had been building and construction materials. These commodities have been especially hard hit by the downturn in residential and commercial construction in southeastern and central Florida, which began in 2007. Recovery of this sector of the economy is expected to

be a necessary precondition to recovery in Port Canaveral construction-related commodity tonnage to pre-downturn levels. Continued growth in new fuel terminal operations at Seaport Canaveral and resumption of residential, commercial, and municipal infrastructure construction have increased total tonnage to pre-downturn levels, and are projected to increase total without-project condition commodity tonnage at Port Canaveral to significantly greater than historical levels.

Table 2-19
Port Canaveral Total Annual Tonnage Long Term Growth Rates

Fiscal Years	Average Annual Growth Rate	Fiscal Years	Average Annual Growth Rate
1972 – 2010	2.71%	1992 – 2011	3.41%
1982 - 2011	2.81%	2002 - 2011	3.53%

Source: CPA

2.5.5 Existing Cargo Traffic Characterization

The growth experienced in central and south Florida population and housing through mid-2007 drove the growth and dominance of construction and energy related commodities at Port Canaveral. The amount of construction-related materials (stone products, cement, lumber, and slag) at Port Canaveral increased from 29% of total tonnage in 2000 to more than 58% of all tonnage in 2006[13]. Construction and energy related commodities combined for 88% of all goods moving through Port Canaveral in 2006 and 91% in 2011. Seaport Canaveral operations, which began in 2010, brought 857,207 tons of petroleum products through the port in 2010 and 2,490,926 tons in 2011. Table 2-20 presents a summary of commodities handled at Port Canaveral between 2001 and 2011.

During 2001 – 2006, although the port demonstrated an overall growth in cargo, only one commodity type, lumber, experienced constant growth from year to year (slag has only been imported to Port Canaveral since 2003). In 2011, only three major commodities: petroleum products, aggregate stone, and limestone, are above their 2006 tonnages. One of Port Canaveral's advantages, apart from proximity to Central Florida, is that it has the real estate – the physical space – available for large volume storage of liquid bulk and dry bulk commodities, such as stone products and petroleum products. The availability of physical space to store commodities is a major reason why two new dry bulk facilities are currently under construction at the Port.

The recent downturn in real estate and housing construction experienced throughout the nation has severely impacted construction-related commodity tonnage at Port Canaveral. For fiscal year 2011 construction-related commodity tonnage is down by 73% from 2006, although total tonnage is nearly equivalent. However, the impact to construction commodities has not been uniform. Cement import tonnage has fallen from 1.3 million tons in 2006 to zero tonnage during

[13] Data reported in Port Canaveral fiscal years (01Oct – 30Sep)

the past three years. Imported cement is used to augment domestic supply to meet the national demand. In 2006, the national consumption of cement was 127.7 million tons, of which 25% was met through imports. In 2010, national consumption has fallen to 69.5 million tons and the percentage of consumption met by imports had fallen to 9% (USGS Mineral Commodity Summaries, Jan. 2011). Alternatively, imports of stone commodities at the port (aggregate, granite, and limestone) in 2011 are 38% higher than the 2006 level of imports.

Port tenants are flexible in their ability to accommodate shifts in cargo volumes and types. For example, in response to reductions in lumber imports, warehouse construction on the north side cargo area has been deferred temporarily and the area has been paved over to accommodate car and truck imports and exports. Fiscal year 2011 tonnage for cars and trucks is greater than fiscal year 2006 tonnage by 26%.

Non-Seaport Canaveral petroleum deliveries have fallen by 33% from 2006 to 2011, largely because Florida Power and Light has totally ceased deliveries. The Cape Canaveral Power Plant is currently undergoing conversion to a gas-fired facility.

Table 2-20
Port Canaveral Commodity Tonnage FY 2001 – FY 2009 (Short Tons)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Petroleum	2,060,158	1,491,295	1,867,608	1,598,098	1,587,742	1,359,576	1,251,171	920,585	990,594	1,892,632	3,399,958
Cement	781,754	774,581	950,864	1,036,173	1,098,129	1,292,208	536,471	34,667	0		
Steel Scrap	24,594	13	0	0	0	0	0	0	0		
Salt	166,336	189,908	169,333	193,058	201,050	198,000	192,000	204,100	210,900	192,050	227,708
Newsprint	217,394	179,008	190,914	178,915	104,663	106,952	105,689	71,381	65,377	42,404	0
Juice Con.	47,566	55,973	53,531	56,206	49,550	50,883	50,739	39,427	46,448	37,539	50,972
Juice	86,535	57,456	40,355	64,111	70,206	59,655	34,264	42,580	66,432	41,191	35,492
Lumber	22,551	156,650	180,518	269,845	445,231	582,541	211,805	113,601	30,733	9,297	7,533
Plywood	0	0	11,394	18,845	30,599	17,435	0	0	0	0	0
Citrus	60,296	40,415	44,289	53,044	0	0	11,921	15,007	8,512	16,261	10,159
Fertilizer	0	0	0	0	24,590	0	0	0	0	9,320	55,914
Agg. Stone	34,513	101,221	205,878	350,662	308,750	246,236	306,769	147,170	672,191	545,684	300,701
Rebars	37,523	25,887	2,225	7,593	0	5,931	0	0	0	0	0
Limestone	0	0	0	0	144,515	97,864	476,177	433,468	263,373	65,694	175,732
Pumice	0	44,813	85,964	49,017	0	51,758	28,687	0	8,818	0	0
Sand	7,278	24,406	5,200	6,000	0	0	58,779	4,417	25,000	0	0
Slag	0	0	0	184,108	297,497	398,432	207,458	227,705	137,169	296,064	235,856
Cars	7,040	7,072	6,108	6,232	10,264	10,147	15,428	19,147	9,763	6,057	4,638
Trucks	352	424	1,310	4,023	8,937	8,352	9,059	12,777	11,352	18,405	18,599
Other	11,702	10,942	52,233	7,598	85,365	67,786	75,789	109,747	80,133	45,546	24,462
Total	**3,565,592**	**3,160,064**	**3,867,724**	**4,083,528**	**4,467,088**	**4,553,756**	**3,572,206**	**2,395,779**	**2,626,795**	**3,218,144**	**4,547,724**

Notes: Source – Canaveral Port Authority
Excludes potable water and bunkering fuel; Agg. Stone includes rock aggregate and granite

2.5.6 Existing Cargo Fleet

The cargo fleet calling at Port Canaveral can be characterized by the type of service the carrier is providing. Cargo services at Port Canaveral are generally either point-to-point services, which deliver a full vessel load, or multi-point services, which call at multiple ports delivering a partial load to each port. Lumber and Transmontaigne's petroleum products are examples of multi-point services, which typically deliver partial loads. Lumber vessels arriving from the Baltic region and call at New London, CT, Wilmington, NC, and Savannah, GA before reaching Port Canaveral. Transmontaigne-bound tankers typically call at Port Everglades prior to calling at Port Canaveral. Seaport Canaveral receives a mix of multi-point and point-to-point deliveries. Seaport Canaveral's multi-point deliveries are typically on smaller vessels with drafts less than 30 feet, which would not benefits from channel improvements. Multi-point services usually arrive at Port Canaveral with sailing drafts which are unconstrained by existing channel depths. In 2006 – 2008, cement imports, which previously were nearly always point-to-point deliveries, have included multi-point deliveries. This switch to multi-point cement deliveries was due to the reduced demand for cement during the economic downturn.

Point-to-point services typically arrive at Port Canaveral more fully loaded and offload the entire cargo at the port. Cargo vessels on point-to-point services arrive at Port Canaveral with the deepest drafts of all vessels using the port. Examples of point-to-point service dry bulk cargo include cement, slag, limestone, and rock products (aggregate and granite). Tables 2-21 through 2-24provide details for the deepest draft point-to-point dry bulk cargo vessels calls from January 2006[14] through September 2009. Seaport Canaveral also receives point-to-point liquid bulk deliveries and generates point-to-point liquid bulk shipments to other ports. Table 2-23 presents Seaport Canaveral point-to-point vessel calls for the 12 months between August 2010 and July 2011. It is important to note that point-to-point vessel calls at Seaport Canaveral are projected to benefit from channel improvements, but multi-port vessel calls at Seaport Canaveral are not projected to benefit from channel improvements.

[14] There is a gap in available data as the result of a change in data reporting at the port

Table 2-21
Large Bulk Cargo Vessel Call Characteristics - 2006

Cargo	Average LOA	Berth	Average Arrival Draft	Number of Calls	Average Tons Per Call
Agg Rock	526 ft	SCP4	30.6 ft	8	30,183
Agg Rock	700 ft	SCP4	38.7 ft	3	57,046
Cement	589 ft	NCP4	33.3 ft	6	34,117
Cement	609 ft	NCP4	33.5 ft	15	39,295
Cement	634 ft	NCP4	34.5 ft	4	23,155
Cement	565 ft	SCP5	30.4 ft	5	18,888
Cement	609 ft	SCP5	32.7 ft	9	20,428
Cement	627 ft	SCP5	28.8 ft	3	29,166
Granite	597 ft	SCP4	36.0 ft	1	37,529
Limestone	753 ft	SCP4	39.5 ft	1	60,335
Slag	599 ft	NCP2	34.8 ft	8	41,882

Source: CPA

2.5.7 Existing Cargo Fleet Operations and Tidal Advantage

Large bulk cargo vessels calling at Port Canaveral must operate under a combination of constraints that affect the vessel's potential use of tidal advantage, including channel depth and channel transit schedules. The deepest operating draft approved by the Canaveral Pilots Association is 39.5 feet, which requires special coordination so that the vessel arrives at peak high water. Any vessel arriving with a sailing draft of 36 feet or deeper must coordinate arrival with the rising tide, i.e., use tidal advantage. The channel transit schedule constraint is based on the priority given to cruise ship and submarine transits. When cruise ships and submarines are arriving or departing the port, all other vessel traffic must stand-by. Daily cruise ship morning arrival and evening departure times can effectively close the port to cargo vessel transits for an hour or more. Historically, some vessels awaiting tidal advantage have missed the tidal window because it occurred concurrently with cruise ship or submarine transits. Therefore, using tidal advantage at Port Canaveral includes the additional risk of missing a tidal cycle (and potentially two tidal cycles) due to conflicts with transits by cruise ships or submarines.

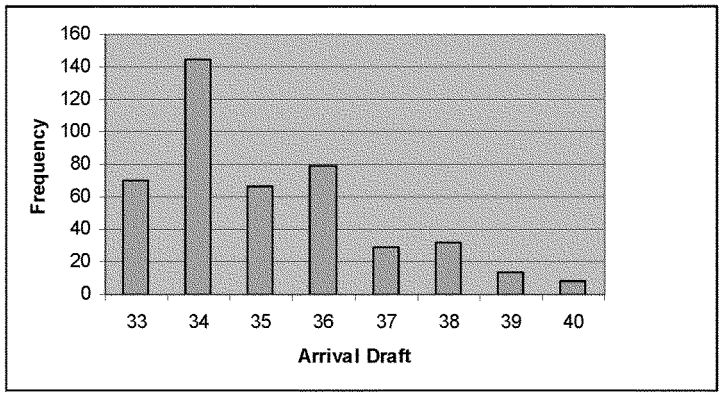
Vessel arrival draft data for the years prior to the recent economic recession (Table 2-22 and Chart 2-3) indicate that vessels were typically loaded to avoid reliance on a rising tide, which is consistent with discussions with the pilots and port personnel. Although most large cargo vessels are typically loaded to avoid channel depth constraints and the additional operational difficulties that would follow, some vessels and cargo types do consistently use tidal advantage. For example, dry bulk carriers delivering aggregates, slag, and cement - which are high volume, low value commodities that are stockpiled at the port - consistently arrive at Port Canaveral with drafts that require tidal advantage (Tables 2-21 through 2-24). These vessels typically take a few days to unload and their cargo may spend days or weeks stockpiled at the terminal facility prior to delivery to an end-user.

Table 2-22
Port Canaveral Deep Draft Vessel Arrival Drafts 2002 - 2006

Arrival Draft	2002	2003	2004	2005	2006	Total
33	12	13	17	16	12	70
34	31	29	39	24	22	145
35	9	6	18	16	17	66
36	4	15	13	30	17	79
37	2	3	2	13	9	29
38	4	6	5	7	10	32
39	4	3	3	2	2	14
40	0	0	0	4	4	8

Source: USACE, Waterborne Commerce Statistics 2002 - 2006

Chart 2-3
Port Canaveral Deep Draft Vessel Arrival Drafts (2002-2006)



Source: USACE Waterborne Commerce Statistics 2002 - 2006

Large vessel point-to-point calls at Seaport Canaveral typically avoid requiring tidal advantage (Chart 2-4) because Seaport Canaveral's vessel operations are closely coordinated with landside infrastructure availability, landside transport, and end-user delivery schedules. Between February 2010, when Seaport Canaveral began operations, and mid-July 2011 only two vessels have arrived with drafts deeper than 36.0 feet: one at 36.8 feet (Aug 2010) and one at 38.5 feet (Jun 2010). Avoidance of needing tidal advantage not only affects the vessels operating draft, but also affects the overall size of the vessel. Seaport Canaveral vessels tend to be in a narrow size range (Table 2-23 and Chart 2-5) because this is the vessel size that can efficiently operate within the operating draft constraint. Under improved conditions including a deeper channel, efficient vessel size would increase as the operating draft increases. Regardless of potential channel improvements, large vessel point-to-point calls at Seaport Canaveral will continue to avoid requiring tidal advantage due to the additional operational additional risk of missing a tidal cycle (and potentially two tidal cycles) due to transits by cruise ships or submarines.

Table 2-23
Seaport Canaveral Point-to-Point Vessel Sailing Drafts Aug 2010 – July 2011

Date	Vessel	LOA	Origin	Tonnage Inbound	Tonnage Outbound	Sailing Draft
13-Aug-10	Piltene	640	Latvia	47,162		32
23-Aug-10	Haruna Express	590	Canada	50,408		36.8
11-Dec-10	Atlantic Grace	601	US	46,709		35
19-Jan-11	Politisa Lady	599	Venezuela	40,285		32
31-Jan-11	Athiri	752	India	66,497		32
10-Feb-11	Citron	600	Algeria	53,388		35
14-Feb-11	Oriental Ruby	620	Venezuela	40,244	39,490	35
24-Feb-11	Cartagena	601	Netherlands	40,246	40,345	34
27-Feb-11	Arendal	601	Venezuela	40,276		34
5-Mar-11	Lichtenstein	601	Canada		41,111	34
9-Mar-11	Box	601	US	40,310		35
2-Apr-11	Ajax	614	Venezuela	40,238	40,245	35
29-Apr-11	United Ambassador	750	Canada	50,211		35
2-May-11	Kate Maersk	601	Venezuela	40,213	39,472	35
6-May-11	Nordic Hanne	600	Venezuela	36,351	40,203	34.6
21-May-11	Marvea	578	Aruba	34,649		35
22-May-11	Amphitrite	600	Venezuela	40,299		31
9-Jun-11	Nordic Hanne	600	Venezuela	40,392		34.6
29-Jun-11	Nordic Agnetha	602	Venezuela	40,250	39,361	34
3-Jul-11	Eskden	600	Venezuela	40,223	307	33
13-Jul-11	Overseas Kythnos	600	United Kingdom	51,394		34.5
23-Jul-11	Mount Hope	597	US	40,223	38,122	26.3
25-Jul-11	Atlantic Queen	601	Aruba	34,002		35.6

Source: CPA

Chart 2-4
Seaport Canaveral Point-to-Point Vessel Sailing Drafts August 2010 – July 2011

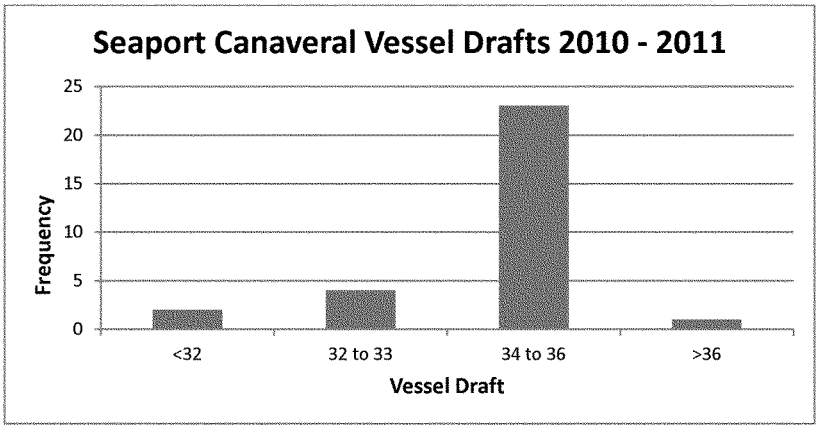
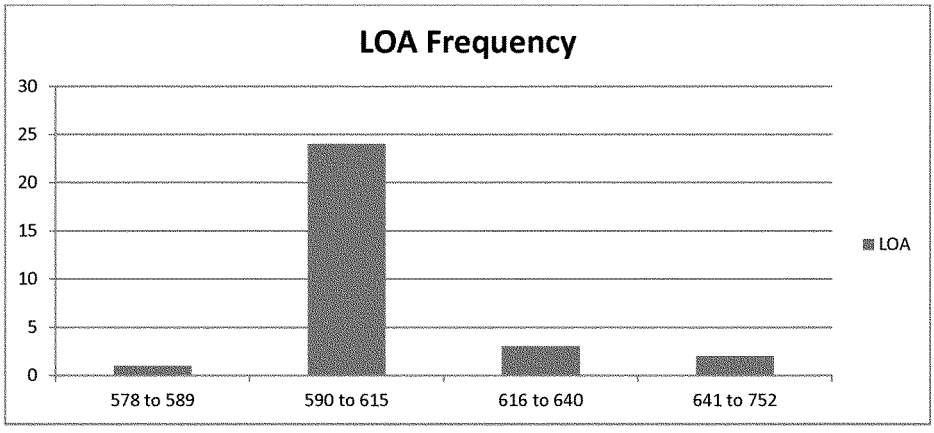


Chart 2-5
Seaport Canaveral Point-to-Point Vessel Length Overall August 2010 – July 2011



2.6 Environmental and Cultural Resources

The following sections describe the existing environmental and cultural resources within the potential influence of the project. Potential project impacts to environmental and cultural resources may be found in Section 7 Environmental Consequences. Although the immediate project area only includes the harbor and adjacent uplands including a portion of the Cape Canaveral Air Force Station (CCAFS), selected resources that could be affected by project activities extend outside of these physical boundaries. The analysis of these resources was, therefore, expanded to include broader geographic areas necessary to provide a baseline for development and comparison of future with and without project conditions.

2.6.1 Sediments

Sediments within the Port have been extensively characterized in recent years. A recent study was conducted in 2009 and 2010 to support placement of material associated with maintenance dredging of the Harbor in the ODMDS (Anamar 2010). The December 2009 sampling event included the following sample locations: the WTB; WAC; MTB; and CPA Cut1, Cut2, Cut2B, and Cut3. The March 2010 sampling event included the Sand Trap and the Trident Basin. Twenty-eight subsamples from six dredging units in Canaveral Harbor were collected in December 2009 and nineteen subsamples from four dredging units where collected in March 2010. Both sampling events included two subsamples from offshore reference stations, water samples from the ODMDS, and site water for elutriate generation.

Samples collected had gravel, percent sand (coarse, medium, and fine) ranged from 0.4% to 57.3%, and silt/clay ranged from 42.6% to 99.6%. Sand trap sediment subsamples were not

homogenized into a composite sample. Sand Trap subsamples did not contain gravel, percent sand ranged from 89.5% to 92.9%, and silt/clay ranged from 7.1% to 10.5%.

Copper was detected above the Threshold Effects Level (TEL) but below the Effects Range-Low (ERL) in most of the samples, but no other metals were detected above the TEL or ERL. TOC concentrations ranged from 0.828 mg/kg to 2.41 mg/kg. Total HEM concentrations ranged from non-detect (ND) to 470 mg/kg. Total Organotins ranged from 3.0 mg/kg to 17.24 mg/kg. Most PAHs analyzed for were detected above the MRL or in J-flagged amounts in all samples. No sample result was greater than the TEL or ERL. . No sample had an EPA Region 4 total PCB value or a NOAA total PCB value greater than the TEL or ERL.

Elutriate and toxicity studies were conducted along with ADDAMS model simulations on the sediments targeted for maintenance dredging. It was determined that the sediments were suitable for offshore disposal.

The Port typically disposes of dredged material from new work and maintenance dredging at the ODMDS (Table 2-24). There is no indication that future dredged material would not be suitable for the ODMDS. A Section 103 Evaluation is currently being conducted and will be completed for approval by the USEPA for placement in the ODMDS.

Table 2-24
Port Canaveral Dredging Operations Using the ODMDS

New Work Projects	USACE Permit		Sampling	ODMDS Approval	
	Issuance	Expiration	Year	Authorization	Expiration
CT 6&7 Pier Construction	09/05/01	11/10/08	2004	11/10/05	11/10/08
Corner Cut Off (except -33 to -43)	09/05/01	11/10/08	2004	11/10/05	11/10/08
Corner Cut Off (-33 to -43)	09/05/01	11/10/08	2004	11/10/05	11/10/08
L-Shaped Area (WTB)	09/05/01	11/10/08	2004	11/10/05	11/10/08
Maintenance Projects	**USACE Permit**		**Sampling**	**ODMDS Approval**	
	Issuance	**Expiration**	**Year**	**Authorization**	**Expiration**
Non-Federal portions of WTB, MTB, others	09/28/01	09/08	2004	10/13/05	10/13/08
Federal portions of main channel, WTB, MTB	---	---	2006	5/03/06	5/03/09

Source: CPA

2.6.2 Vegetation

Natural upland communities within the Port boundaries are limited (Figure 2-6). There are a few isolated areas containing mixed hardwoods and conifers (Florida Land Use and Cover, Classification System (FLUCCS) 4340 including slash pine (*Pinus elliottii*), scrub oaks (*Quercus spp.*), Australian pine (*Casurina equisetifolia*), Brazilian pepper (*Schinus terebenthifolius*), and cabbage palm (*Sabal palmetto*) within the Port. Areas of herbaceous rangeland (FLUCCS 3100) and shrub brushland (FLUCCS 3200) are more common and may be occasionally inundated by water, but not enough to lead to hydric soils. They contain typical coastal grasses, sedges, rushes, and herbaceous species such as *Panicum* spp., natal grasses, clovers, and wire grass (*Aristida stricta*). Saw palmetto (*Serenoa repens*) is also found scattered throughout this vegetative community. There are no threatened or endangered plant species in the boundaries of the Port.

Undeveloped upland communities within the immediate project area include shrub and brushland and spoil areas (7430), which occur on CCAFS between the MTB and TTB. Vegetation within the shrub and brushland community between the MTB and TTB has been altered over the years, and presently includes bahiagrass and coastal grasses. The spoil area cover includes bare, sandy areas, with sporadic vegetation including wax myrtle (*Morella cerifera*) and prickly pear cactus (*Opuntia stricta*). There are no threatened or endangered plant species in either of these communities within the Port.

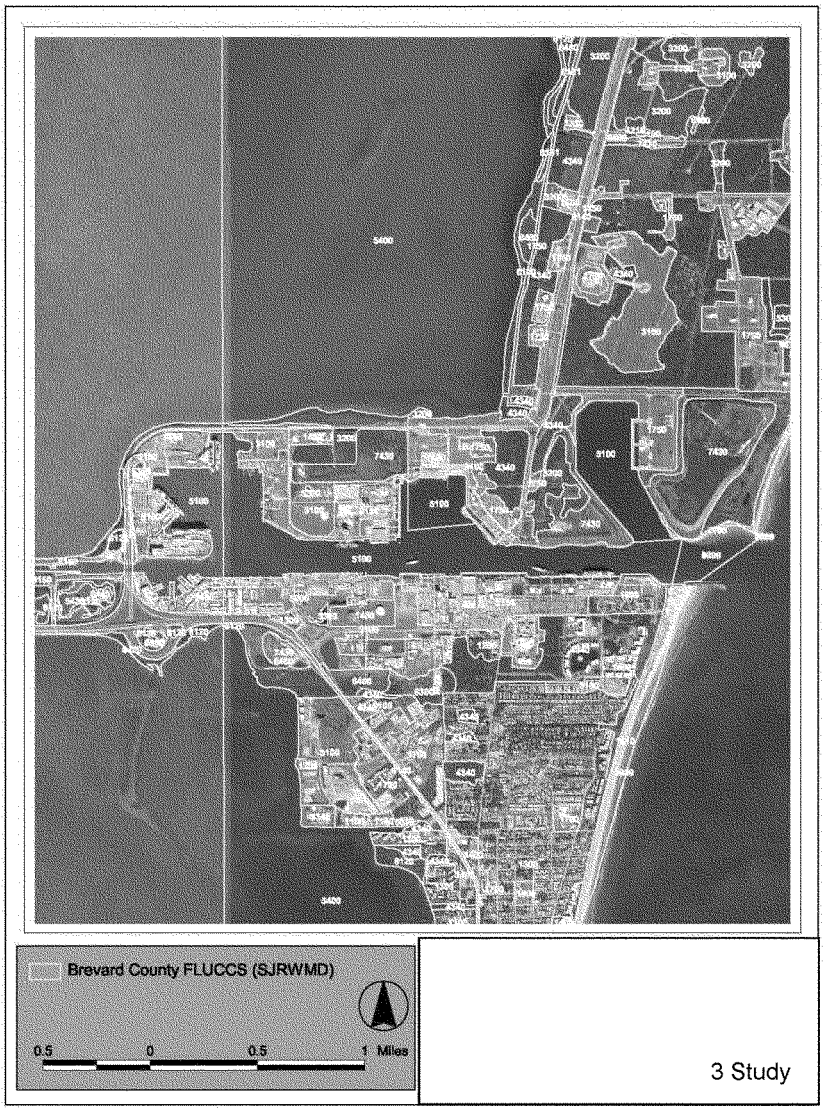
2.6.3 Wildlife Resources

Wildlife found within Port boundaries are typical species found in heavily developed Florida coastline communities. Mammals include raccoons (*Procyon lotor*), domestic and feral cats (*Felis cattus*), and mice (*Mus musculus*). Migratory bird species including warblers and sparrows typically roost in forested areas along the coast, particularly near open water. Protected (listed) wildlife resources are discussed in detail in Section 2.6.8.

2.6.4 Wetlands

Wetland habitats within the Port are limited primarily to the western perimeter adjacent to the Banana River, away from Port operations. These wetlands are either mangrove swamps vegetated with white and black mangroves and Brazilian pepper, or saltwater marsh habitat vegetated with cordgrass (*Spartina alternifolia*), needlerush (*Juncus roemerianus*), saltgrass (*Distichlis spicata*), and other salt-tolerant species. Treeless hydric savannah habitat occurs south of the Port facilities and is dominated by wiregrass and cutthroat grass (*Paspalum abscissum*). The immediate upland study area was surveyed for wetlands (Dial Cordy, 2006) and no wetlands were found within or adjacent to the study area.

Figure 2-8
FLUCCS Map



2.6.5 Marine Resources

2.6.5.1 Beach and Dune Habitat

Beach and dune habitat do not occur within the immediate project vicinity, but do occur along the ocean east and northeast and southwest of the project area. The high-energy beach is a challenging environment for animal and plant life. Species diversity is typically low, although species adapted to sandy beaches may be highly abundant. Typical beach fauna includes the mole crab (*Emerita talpoida*), surf clam (*Donax variabilis*) and ghost crab (*Ocypode quadrata*). These and other beach infauna provide forage for a wide variety of shorebirds such as plovers (*Charadrius spp.*), willets (*Catoptrophorous semipalmatus*), and ruddy turnstones *(Arenaria interpres*). Drift algae and sargassum stranded on the beach may support large numbers of insects and other invertebrate life. As elevation increases, conditions become less severe for the establishment of plant life. Tendrils of various plants extend down the beach, notably the beach morning glory (*Ipomoea pes-capre*). As the dune crest is approached, other salt tolerant plants are found such as sea oats (*Uniola paniculata*), sea rocket (*Cakile sp.)* and beach elder (*Iva imbricate*). Sparsely vegetated beaches are preferred nesting habitat for the least tern (*Sterna antillarum*), which is listed as a threatened species by the Florida Fish and Wildlife Conservation Commission. The sea oat zone high on the dune provides habitat for another threatened species, the southeastern beach mouse (*Peromyscus polionotus niveiventris*), which occurs northeast of the project area on the CCAFS. Beaches in Brevard County also provide nesting habitat for sea turtles, which are discussed further in Section 2.6.8. The Port has an active ongoing beach and sand dune protection and restoration program that dates back to the mid-1990s.

2.6.5.2 Hardbottom

There is no hardbottom habitat located within the project area. The closest hardbottom area was previously identified by Continental Shelf Associates (1989) and consisted of a well-developed line of rock outcroppings (more than 12 miles south of the port entrance channel) running approximately 10 miles from Patrick Air Force Base (R-59) south to Paradise Beach Park (R-110). The rock had low relief at the northern and southern ends, with well-defined ledges of 2-3 feet of vertical relief in the middle between R-78 and R-93 (USACE 1996). The rock outcrops are comprised of lithified coquina rock of the Pleistocene Anastasia Formation (Continental Shelf Associates 1989). The coquina rock provides a substrate for the sabellariid polychaete worm *Phragmatopoma lapidosa*. These sabellariid worm reefs provide important functions of dissipating and absorbing wave energy, thus, giving the shoreline some protection against erosion, and providing habitat for marine organisms. In the nearshore area off Brevard County, worm rock ranges from large, dense patches to small, isolated patches along the sides of rock ledges. It was estimated that worm rock composes approximately 5-10 percent of the 32 acres of rock outcrop in the nearshore area of Brevard County. The rock and worm rock reefs provide habitat for a number of crustaceans, fish, macroalgae, sponges, and other invertebrates. In addition, they can serve as an important staging and foraging area for juvenile sea turtles prior to entering their important foraging habitats in the inshore estuaries and lagoons.

2.6.5.3 Unvegetated Sand Bottom

Unvegetated sand bottom occurs along most of the nearshore area and throughout the harbor. Sediments within the harbor are comprised mainly of sand or silt/clay, with small amounts of gravel. Substrate in the nearshore area is predominately comprised of medium to fine grain

sands. The infaunal benthic community associated with the sand bottom habitat is dominated by a variety of polychaete annelids, bivalves, gastropods, and crustaceans. The coarser to fine sand habitat typically supports a more diverse benthic community than the finer sand with high silt/clay content. No benthic community studies have been performed within the Port based on review of available records.

2.6.5.4 Seagrass

No seagrass has been identified within the harbor or entrance channel, and it is unlikely that it occurs. The water depths and sediment conditions within the Harbor are not conducive for seagrass growth. The seagrass maps prepared by FDEP/FMRI included the areas within the Port, and no seagrass was identified. The areas along the shorelines and bulkheads were observed by divers during the sea turtle studies and no seagrasses were observed at that time. The waters far outside of the Port to the west, in the Banana River State Aquatic Preserve, support large and small, isolated areas of seagrass adjacent to upland islands and other physical structures (Figure 2-7).

2.6.5.5 Algal Communities within the Port

The algal community growing on granite boulder riprap along the channel walls of the Port provides excellent foraging habitat for juvenile sea turtles (see Section 2.6.8). Riprap occurs on the northern boundary of the Port, the south side berthing areas, and the north and south jetties [the northern area is along Air Force property (Figure 2-8)]. The 980 meters of riprap located between the middle and east turning basins and the inside perimeter of the Trident submarine basin, in particular, are heavily used for foraging by juvenile green turtles (Dial Cordy 2007; Ehrhart and Redfoot 1994; Ehrhart and Redfoot 2002; and Ehrhart and Redfoot 2005)

A survey of the algal community associated with the entire length and depth of 980 meters of riprap located between the MTB and ETB was performed in August 2005 and February 2006 (Dial Cordy 2007). Algae collected along the 980 meters along north side of the channel entrance was identified only to the family level due to the large amount of material and high diversity, with eight families represented during the summer sampling and 10 during the winter.

Figure 2-9
Seagrass Occurrence Map

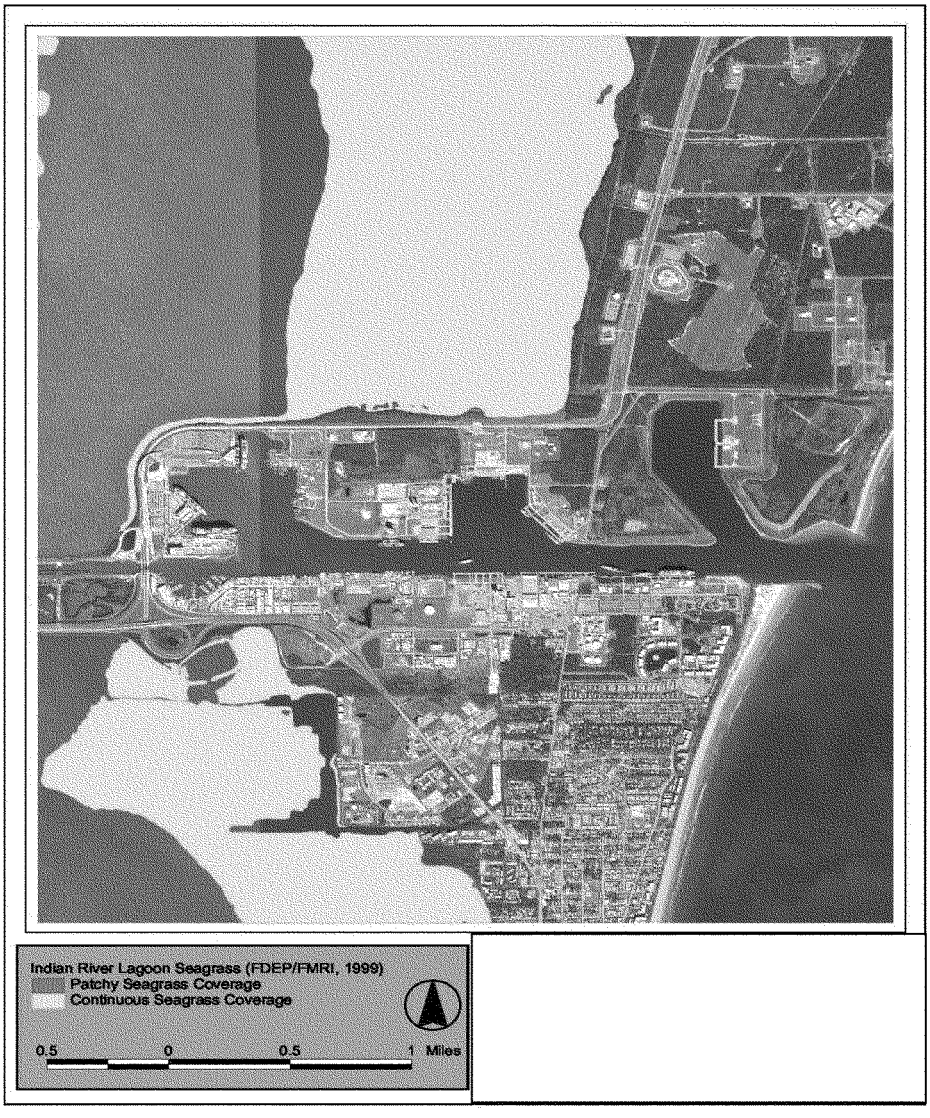


Figure 2-10
Algae Covered Rip-Rap

Algal species of the families Rhodomeleaceae and Ulvaceae were present during the winter that were not present during the summer sampling event. Ehrhart and Redfoot's (1997) analysis of algal species located in the adjacent Trident submarine basin yielded a number of species that most likely are also represented at the current survey site including *Gelidium americanum, Hypnea cervicornis, Polysiphonia subtilissima, Solieria filiformis, Ulva lactuca, Centroceras clavulatum, Cladophora catenata, Amphiroa rigida var. antillana,* and *Enteromorpha compressa.*

There is no documentation of reef fish foraging on the riprap in this area (Section 2.6.6 Essential Fish Habitat). However, it is likely based on observations while performing the algal study, that these riprap features do provide at least some temporary shelter and foraging for demersal species common to the nearshore hardbottom habitat located along the beaches in Brevard County.

2.6.6 Essential Fish Habitat (EFH)

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act of 1976 and the 1996 Sustainable Fisheries Act, an Essential Fish Habitat (EFH) assessment is necessary for this project. An EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." *Waters* include aquatic areas and their associated physical, chemical, and biological properties that are used by fishes and may include areas historically used by fishes. *Substrate* includes sediment, hardbottom, structures underlying the waters, and any associated biological communities. *Necessary* means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem. *Spawning, breeding, feeding, or growth to maturity* covers all habitat types used by a species throughout its life cycle. Only species managed under a Federal Fishery Management Plan (FMP) are covered (50 CFR, Part 600). The act requires federal agencies, including the Corps of Engineers, to consult on activities that may adversely influence EFH designated in the FMPs. The activities may have direct (e.g., physical disruption) or indirect (e.g., loss of prey species) effects on EFH and may be site-specific or habitat-wide. The adverse result(s) must be evaluated individually and cumulatively.

The South Atlantic Fisheries Management Council (SAFMC 1998) has designated sargassum, water column, unvegetated bottom, and live/hardbottom habitat within the area as EFH. The nearshore hardbottom and offshore reef habitats of Central Florida have also been designated as Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPC) (SAFMC 1998). As many as 60 corals can occur off the coast of Florida (SAFMC 1998) and all fall under the protection of the management plan. As previously stated, the nearest hardbottom habitat occurs over 12 miles south of the study area; however, the occurrence of man-made rock structure within the Port provides habitat for some managed species and their prey.

Managed species that commonly inhabit the nearshore and offshore waters near the harbor include pink shrimp (*Penaeus duorarum*) and spiny lobster (*Panularis argus*). Members of the 73 species Snapper-Grouper Complex include sailors choice (*Haemulon parra*), gray snapper (*Lutjanus griseus*), mahogany snapper (*Lutjanus mahogoni*), and porkfish (*Anisotremus virginicus*). These species utilize the inshore habitats of Indian River Lagoon as juveniles and sub-adults and as adults utilize the hardbottom and reef communities offshore. Other important species that utilize the inshore and nearshore areas of Brevard County include the red drum (*Sciaenops ocellatus*) and the snook (*Centropomis undecimalis*). In the offshore habitats, the

number of species within the Snapper-Grouper Complex that may be encountered increases. Coastal migratory pelagic species also commonly utilize the offshore area adjacent to the study area, but not within the Port. The king mackerel (*Scomberomorus cavalla*) and the Spanish mackerel (*Scomberomorus maculatus*) are the most common.

Thirty-seven of these fish species are listed under the Affected Fishery Management Plans and Fish Stocks of the Comprehensive EFH Amendment (SAFMC 1998). Consequently, the project area has been designated as EFH for these fishes, brown shrimp, white shrimp, pink shrimp, and spiny lobster (Table 2-25). Six coastal migratory pelagic fish species have been included owing to their distribution patterns along the Florida coast. In addition, the nearshore bottom and offshore reef habitats of South Florida have also been designated as Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPC) (SAFMC 1998).

The species addressed in this section consist of fishes and invertebrates of both recreational and commercial importance that are managed under the Magnuson-Stevens Fishery Conservation and Management Act (PL94-265). Information on life histories of managed species identified for this assessment is provided in Dial Cordy (2007b).

Table 2-25
Managed Species Identified by the South Atlantic Fishery Management Council That Are Known to Occur in Brevard County, Florida

Common Name	Taxa
Balistidae	
Gray Triggerfish	*Balistes capriscus*
Queen Triggerfish	*Balistes vetula*
Ocean Triggerfish	*Canthidermis sufflamen*
Carangidae	
Yellow Jack	*Caranx bartholomaei*
Blue Runner	*Caranx crysos*
Crevalle Jack	*Caranx hippos*
Bar Jack	*Caranx rubber*
Greater Amberjack	*Seriola dumerili*
Coryphaenidae	
Dolphin [1]	*Coryphaena hippurus*
Ephippidae	
Spadefish	*Chaetodipterus faber*
Haemulidae	
Black Margate	*Anisotremus surinamensis*
Porkfish	*Anisotremus virginicus*
Margate	*Haemulon album*

Table 2-25
Managed Species Identified by the South Atlantic Fishery Management Council That Are Known to Occur in Brevard County, Florida

Common Name	Taxa
Tomtate	*Haemulon aurolineatum*
Smallmouth Grunt	*Haemulon chrysargyreum*
French Grunt	*Haemulon flavolineatum*
Spanish Grunt	*Haemulon macrostomum*
Cottonwick	*Haemulon melanurum*
Sailors Choice	*Haemulon parra*
White Grunt	*Haemulon plumieri*
Blue Stripe Grunt	*Haemulon sciurus*
Labridae	
Puddingwife	*Halichoeres radiatus*
Hogfish	*Lachnolaimus maximus*
Lutjanidae	
Mutton Snapper	*Lutjanus analis*
Schoolmaster	*Lutjanus apodus*
Gray Snapper	*Lutjanus griseus*
Dog Snapper	*Lutjanus jocu*
Mahogany Snapper	*Lutjanus mahogoni*
Lane Snapper	*Lutjanus synagris*
Yellowtail Snapper	*Ocyurus chrysurus*
Rachycentridae	
Cobia [1]	*Rachycentron canadum*
Scombridae	
Little Tunny [1]	*Euthynnus alletteratus*
King Mackerel [1]	*Scomberomorus cavalla*
Spanish Mackerel [1]	*Scomberomorus maculates*
Cero [1]	*Scomberomorus regalis*
Serranidae	
Black Sea Bass	*Centropristis striata*
Rock Hind	*Epinephelus adscensionis*
Goliath Grouper	*Epinephelus itajara*

Table 2-25
Managed Species Identified by the South Atlantic Fishery Management Council That Are Known to Occur in Brevard County, Florida

Common Name	Taxa
Red Grouper	*Epinephelus morio*
Black Grouper	*Mycteroperca bonaci*
Gag	*Mycteroperca microlepis*
Sparidae	
Sheepshead	*Archosargus probatocephalus*
Jolthead Porgy	*Calamus arctifrons*
Invertebrates	
Brown Shrimp	*Farfantepenaeus aztecus*
Pink Shrimp	*Farfantepenaeus duorarum*
White Shrimp	*Litopenaeus setiferus*
Spiny Lobster	*Panulirus argus*

[1] Coastal Migratory Pelagic Fish Species

2.6.7 Protected Species

The Florida Natural Areas Inventory (FNAI) Species Summary for Brevard County was obtained to review the listed fauna that could potentially occur within this geographic region. In addition to the FNAI, existing reports from CCAFS and Port Canaveral were reviewed for potential protected species that may occur within the study area. Four terrestrial species were identified that could potentially occur within upland portions of the study area. These species include the gopher tortoise (*Gopherus polyphemus*), Florida scrub jay (*Aphelocoma coerulescens*), eastern indigo snake (*Drymarchon corais couperi*), and the southeastern beach mouse (*Peromyscus polionotus niviventris*). These species are known to occur only on the CCAFS property, north of CCAFS, or on Merritt Island, and are not known to occur on Port Canaveral property within the project area. The bald eagle (*Haliaeetus leucocephalus*) may also occur in the area but was delisted in 2007. This species is still protected under the Bald and Golden Eagle Protection Act. In addition to the terrestrial species, three sea turtle species were identified as potentially utilizing the nearby beach habitat for nesting. These species include the loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*), and green sea turtles (*Chelonia mydas*). Algal communities within the Port and the Trident Basin serve as a source of nutrition for juvenile green sea turtles. The beaches and spoil areas may also be utilized by nesting and foraging shorebirds including the least tern (*Sterna antillarum*) (threatened) and piping plover (*Charadrius melodus)* (threatened). The nearshore and inshore waters within the study area are frequented by protected marine mammals including the West Indian manatee (*Trichechus manatus*). The North Atlantic right whale (*Eubalaena glacialis*), while not found within the confines of the Port, has been occasionally found in the Atlantic Ocean off the coast of Brevard County.

2.6.7.1 Sea Turtles

Five species of sea turtle are found in the waters offshore of Brevard County, and of these, three have been documented as nesting on County beaches (Figure 2-9). It is important to note however, that there are no sea turtles nesting in the project area at Port Canaveral. The loggerhead (*Caretta caretta*) is responsible for the vast majority of the nesting, although data suggest increasing numbers of green (*Chelonia mydas*) and leatherback turtles (*Dermochelys coriacea*) nesting statewide. The green sea turtle and leatherback sea turtle are both listed under the U.S. Endangered Species Act, 1973 and Chapter 370, Florida Statutes (F.S.). The loggerhead turtle is listed as a threatened species. The hawksbill turtle (*Eretmochelys mydas*) and Kemp's Ridley turtle (*Lepidochelys kempii*) are two additional sea turtle species that could potentially be found in the area but are not known to nest on Brevard County beaches.

Sea turtles use the habitats offshore of Brevard County to different degrees during different stages of their life cycle. During the summer months hatchlings utilize this habitat as a corridor to deeper waters farther off the coast. Juvenile and sub-adult turtles use the offshore habitats as a foraging area and to travel to inshore areas, while adult turtles are present year round with seasonally high abundances during the breeding season.

Juvenile green sea turtles have been known to forage in the Trident Basin and in the Port since the early 1990s where the algal communities associated with granite riprap boulders serve as one of their primary sources of food and is likely what attracts them into the Port (Ehrhart and Redfoot 2007; Dial Cordy 2007; Ehrhart and Redfoot 1994; Erhart and Redfoot 1997).

2.6.7.2 Loggerhead Sea Turtle

Loggerheads nest in the southeastern U.S. from April through September, with peak nesting occurring in June and July (National Marine Fisheries Service [NMFS] and United States Fish and Wildlife Service [USFWS], 1991a). The highest density of loggerhead nesting occurs from Canaveral National Seashore in Volusia County south to John U. Lloyd State Recreation Area in Broward County. Nesting may reach densities of over 600 nests per kilometer. Nesting along the northern beaches is substantially lower than nesting in the southern portions of the County. Between 1988 and 2010, County-wide loggerhead nesting ranged from a low of 13,181 in 1988 to a high of 34,596 in 1998 (Table 2-26). There were 25,741 documented loggerhead nests in 2010.

Hatchlings emerge primarily at night and swim offshore in a "frenzy" until they arrive at offshore weed and debris lines (Carr 1986) (Wyneken and Salmon 1992). Post hatchling turtles from the Florida coast enter currents of the North Atlantic Gyre, eventually returning to the western Atlantic coastal waters (Bowen, et al. 1993). Adult loggerhead turtles in South Florida utilize foraging grounds in the Caribbean basin, the Gulf of Mexico, and along the U.S. east coast (Meylan, et al. 1983). Abundances of adult loggerhead turtles in Florida waters increase during the nesting season (Magnuson, et al., 1990). Loggerhead turtles do not typically forage in the harbor at Port Canaveral but can occasionally be found swimming in the harbor.

Figure 2-11
Sea Turtle Nesting

Table 2-26
Sea Turtle Nesting Data for Brevard County, 1988-2010

Year	Beach Length (km)	Green Turtle Nests	Leatherback Turtle Nests	Loggerhead Turtle Nests
1988	77.9	134	0	13,181
1989	97.4	246	1	19,589
1990	98.3	841	0	27,673
1991	98.5	214	3	28,279
1992	101.0	1,232	2	25,555
1993	100.1	116	1	20,600
1994	102.8	1,720	5	28,029
1995	103.4	171	4	31,653
1996	105.2	1,351	16	28,742
1997	110.0	259	11	25,221
1998	108.0	2,764	30	34,596
1999	108.0	125	43	34,134
2000	108.0	3,907	22	32,910
2001	115.2	193	61	26,198
2002	115.2	4,316	18	23,492
2003	115.2	705	68	22,994
2004	103.2	1,494	25	15,678
2005	115.2	4,878	68	19,339
2006	-	2051	16	18,089
2007	-	5743	105	14,829
2008	-	4169	33	21,242
2009	-	1697	70	17,194
2010	-	5940	77	25,741

2.6.7.3 Green Sea Turtle

Green turtle nesting occurs along southeastern Florida beaches from Volusia County through Broward County, but at much lower densities than loggerheads (Meylan, et al. 1995). Densities range from 1-5 per kilometer on most beaches, with higher densities of 13-30 nests per kilometer on the beaches within the major nesting zone in south Brevard County and Palm Beach County (Erhart and Witherington 1986). Brevard County accounts for approximately 40 percent of green turtle nesting in Florida. Green turtle nesting data for Brevard County are shown in Table 2-26. In 2010, green turtle nesting reached a record (1988-2010) high of 5,940 nests. Clutch sizes for green turtle nests may range from 75-200 eggs per nest, with approximately 136 hatchlings per nest (USFWS 2007). In a high nesting year such as 2010, over 500,000 green turtle hatchings will occur on Brevard County beaches.

Green turtles show a similar life history pattern as loggerheads, but they leave the pelagic phase and enter developmental habitats at a considerably smaller size, about 20-25 cm carapace length (Magnuson, et al. 1990). Typical developmental habitats are shallow, protected waters where seagrass is prevalent (Carr, et al. 1978), but green turtles are commonly found in reef habitats where algae is present (Ehrhart, et al. 1996) (Coyne 1994). In Florida, these turtles feed primarily on a diet of seagrasses such as *Halodule wrightii*, *Syringodium filiforme*, and red and green algae (Lutz and Musick 1997). The seasonal abundances of algal species offshore may limit the offshore foraging areas in the winter months. Nelson (1988) noted a great seasonal

reduction in algal species richness (56 summer vs. 16 winter) on the nearshore reefs at Sebastian Inlet. The Indian River Lagoon is an important foraging area for juvenile green turtles, and other offshore and inshore areas also provide foraging opportunities.

Green turtles nesting in Florida have a minimum size of 83.2 cm carapace length, but they appear to leave Florida developmental habitats by about 60-65 cm carapace length (Witherington and Ehrhart 1989), perhaps migrating to the southeastern Caribbean. Brevard County contains two significant developmental habitats for green turtles, the Indian River Lagoon and the nearshore reef system, both of which are not within the Port study area. (Ehrhart, et al. 1996). Dietary needs of juvenile turtles along with seasonal abundances of seagrasses and algae within the area may be factors influencing the habitat use of juvenile turtles within the area. As adults, offshore habitat utilization would be greatest during the nesting period.

Green turtles are found in a variety of habitats in the waters in and adjacent to Brevard County depending on their developmental stage (Redfoot 1997). After hatching, they utilize the pelagic habitat where they spend the next two to three years of their lives (Frazer and Ehrhart 1985; Carr 1987) and subsequently take up residence as juveniles and subadults in coastal lagoons, estuaries, and near-shore reefs (Redfoot 1997). They eventually migrate to foraging habitats and to nesting beaches to reproduce.

Sea turtle surveys were conducted by the Inwater Research Group Inc. (IRG) on August 27-29, 2005 and February 11-13, 2006 using methodology developed by IRG and accepted by the Florida Department of Environmental Protection (FDEP) and the National Marine Fisheries Service (Dial Cordy 2007). The methodology entailed subjecting each survey site to repetitive censusing, using observers in an elevated tower on a small boat. This technique allows for the calculation of observations per transect kilometer (an index of turtle abundance which can be used to directly compare different sites within a single area or sites over time). Data recorded for each sighting included turtle species and size, whether the turtle was observed on the surface or underwater, proximity to the transect line, and activity (i.e., foraging, swimming, etc.) Locations of the turtles were recorded using GPS.

Five specific sites of probable sea turtle utilization within the Port were surveyed (Figure 2-10). Site 1 was the 988 meter riprap rock habitat along the north side of the entrance channel between the middle and east turning basins. Site 2 was the 266-meter riprap area on the south side of the channel at Jetty Park. Site 3 was the 98-meter stretch of riprap on the south side of the channel

Figure 2-12
Sea Turtle Sighting Transects

in the vicinity of marker 19. Site 4 was the 258 meter riprap shoreline on the north side of the channel just west of the west turning basin. Site 5 consisted of a 3,490 meter transect down the middle of the main channel.

Sea turtles, mostly all Green turtles, were mainly observed along transect 1, which paralleled the riprap shoreline between the MTB and TTB. In the fall 2005, 200 individuals were observed along the 980 meter transect on 30 repetitions (Table 2-27). Nine individuals were observed along transect 2 on the southside of the channel on 27 repetitions. Five turtles were observed along transect 3 (31 repetitions), and 3 turtles were observed along transect 5 (3 repetitions). No turtles were observed during 31 repetitions along transect 4. In the spring 2006, 111 turtles were observed along transect 1 (36 repetitions), and six turtles were observed along transect 2 (38 repetitions) (Table 2-27). No other turtles were observed. During the June 2007 survey, turtles were observed along both the North Jetty and the South Jetty, with eight turtles being observed along the North Jetty and 25 turtles observed along the South Jetty (Table 2-27).

Table 2-27
Observation Data for Port Canaveral Sea Turtle Census
August 2005 and September 2006

Transect	Length (meters)	No. of Repetitions	Total Turtles Observed	Turtles (observations) per kilometer
August 2005				
1	980	30	200	6.80
2	266	27	9	1.25
3	98	31	5	1.64
4	258	31	0	0
5	3490	3	3	0.29
February 2006				
1	980	36	111	3.21
2	266	38	6	0.593
3	98	18	0	0
4	258	23	0	0
5	3490	4	0	0
June 2007				
North Jetty	740	28	8	0.39
South Jetty	590	36	25	1.18

Areas within and adjacent to the Trident Turning Basin (including the shoreline between MTB and TTB) have been extensively studied by researchers from the University of Central Florida (UCF) (Ehrhart 1995; Ehrhart 1996; Redfoot 1996; Redfoot 1997; Redfoot 2000; Nelson 1994). These studies have shown a persistent and distinct assemblage of juvenile green turtles inhabiting the area of the Trident Turning basin. This assemblage is characterized by a distinctly smaller average size than is typical of other central Florida developmental habitats. While there is likely to be some exchange between this assemblage and other developmental habitats, we are not aware of any extensive areas of suitable habitat immediately adjacent to Port Canaveral, and turtles may remain resident in the Port for considerable lengths of time. Some turtles in the UCF studies have been caught over 20 times over a period of up to 12 years (Personal communication, D. Bagley, 2007).

2.6.7.4 Leatherback Sea Turtle

Leatherback turtles occur worldwide in pelagic waters from the tropics to near the Arctic and Antarctic Circles. Nesting is primarily on the Pacific coast of Mexico and the Caribbean coast of South America, with some continental U.S. nesting in Florida. The majority of leatherback nesting activity is located within St. Lucie, Martin, and Palm Beach counties (Meylan, et al. 1995). Nesting data provided by FWC, however, show at least some nesting occurring in Brevard County, with 77 leatherback nests documented in 2010. Leatherback turtles seldom use the inshore waters of Brevard County and only are known to frequent the area during nesting periods.

2.6.7.5 West Indian Manatee

The West Indian manatee (*Trichechus manatus*) is protected under the both the Endangered Species Act and the Marine Mammal Protection Act and is also listed as protected under Florida State law. The manatee is generally restricted in range to the Georgia coast southward around the Florida peninsula. Manatees frequently inhabit shallow areas where seagrasses are present and are commonly found in protected lagoons and freshwater systems. Manatees occasionally use open ocean passages to travel between favored habitats (Hartman 1979). Manatees migrate seasonally, particularly on the east coast of Florida. During the summer months manatees utilize habitats all along the coast. During winter, when water temperatures drop, manatees use warm water refuges such as springs or warm water discharges at power plants.

Brevard County is one of the most utilized areas in Florida by manatees due to the presence of a warm water refuge and abundant foraging opportunities. Within Brevard County, manatees frequently use waters within or near the study area including the Banana River and Intracoastal Waterway, especially during the spring and fall.

Brevard County also has one of the highest manatee mortality rates in the state and the proportion of fatalities caused by watercraft is average when compared to the rest of the state. Between 1974 and 2007, 1191 manatee deaths have been reported from Brevard County, 265 of which were watercraft-related deaths (approximately 22%) (FWRI 2007). A total of 43 (3.8%) of the deaths were reported as occurring within Port Canaveral, the Port Canaveral Barge Canal, and the Port Canaveral inlet, with 15 being attributed to collisions with watercraft.

Port Canaveral has had a Manatee Protection Plan for the harbor in place since 1996. It was one of the first ports to voluntarily institute such a plan. In 2003, the Brevard County Board of County Commissioners approved a Manatee Protection Plan to identify and implement measures to provide protection for the manatee.

The Corps of Engineers operates a lock facility at the western end of Canaveral Harbor that allows vessel traffic to access the Banana River through the Port, as well as manatees. The lock also reduces tidal-current velocities in Canaveral Harbor, prevents entry of hurricane tides into the Banana River, and prevents salt water intrusion into the Banana River. Corps of Engineers manatee sighting data within the lock facility since 2003 (Table 2-28), shows that the facility is heavily used by manatees, with lulls often, though not always, occurring during the cold winter months of December, January, and February (USACE, unpublished data). The locks are equipped with manatee detection devices to eliminate the potential of manatee mortality as the gates are closed. Seven of the deaths were due to entrapment in gate/lock facilities at the Port Canaveral locks (the most recent occurring in 1999), prior to the installation of the detection devices.

Table 2-28
Canaveral Lock Manatee Sightings: 2003 - June 2012

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
January	1	24	10	42	447	110	No data	40	Lock closed	322
February	15	54	10	143	26	108	No data	42	Lock closed	805
March	277	57	39	315	794	412	234	58	Lock closed	350
April	500	308	331	597	1277	1057	722	316	1009	561
May	571	616	598	920	1156	1073	690	1300	1032	840
June	411	658	388	1031	753	1145	1075	732	1321	751
July	544	657	446	844	1198	653	1511	818	1356	NA
August	626	578	596	0	1329	807	1424	821	1138	NA
September	452	188	544	0	807	759	1272	627	962	NA
October	610	414	0	687	958	914	1516	701	720	NA
November	324	177	0	320	912	858	1219	503	475	NA
December	101	79	0	405	849	716	586	197	1015	NA

Source : USACE

2.6.7.6 Right Whale

The North Atlantic right whale has been listed as endangered under the Endangered Species Act (ESA) since 1972. The western stock of the North Atlantic right whale population ranges from wintering and calving grounds in the coastal waters of the southeastern United States to summer feeding and nursery grounds in New England waters and northward to the Bay of Fundy and the Scotian Shelf. Aerial surveys have been conducted near Port Canaveral since 2001. The western North Atlantic population size was estimated to be 291 individuals in 1998 (NMFS 2005).

The North Atlantic right whale is primarily found in coastal or shelf waters. Five areas of "high use" were identified in the Recovery Plan and include coastal Florida and Georgia, from the Sebastian Inlet, Florida to the Altamaha River, Georgia, which includes the nearshore waters off Port Canaveral. This area was designated as critical habitat in 1994. Known wintering occurs along the southeastern U.S. coast, where calving occurs from December through March.

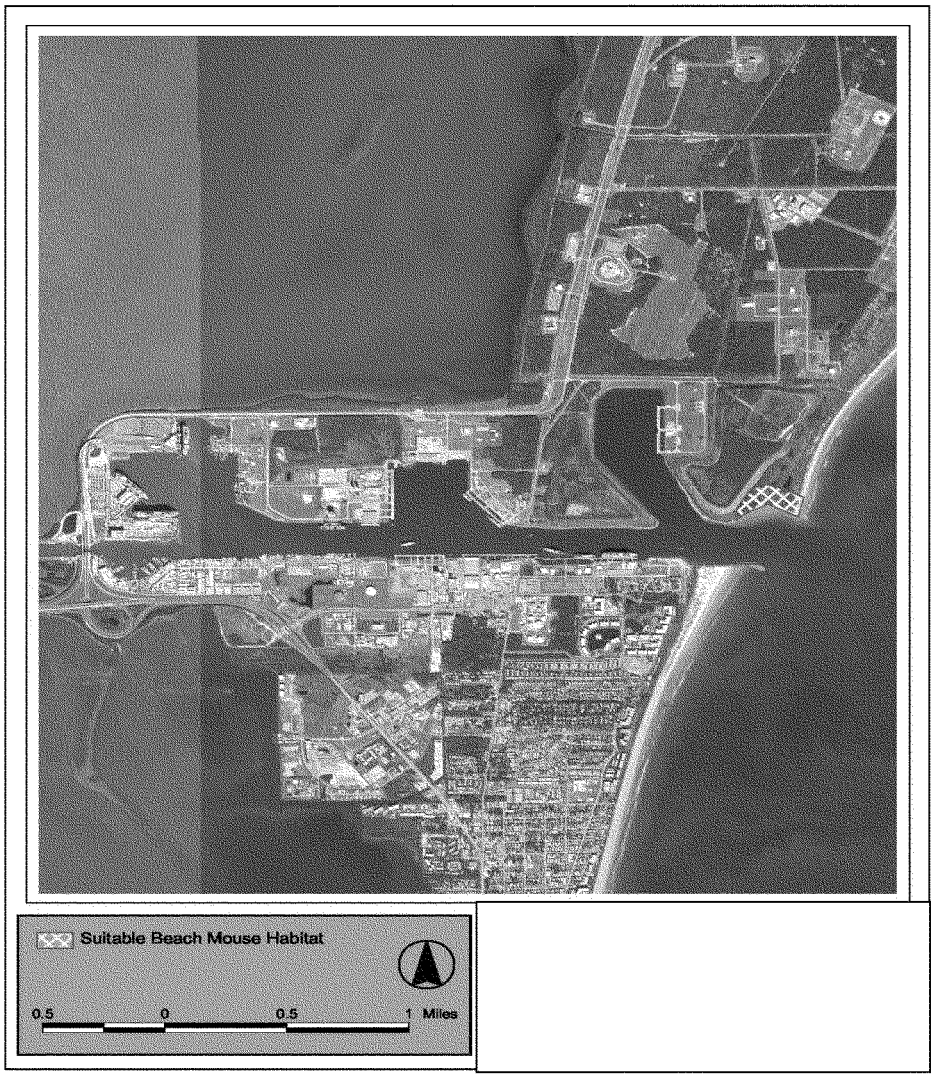
Ship collisions and fishing gear entanglements are the most common anthropogenic causes of mortality in the western North Atlantic right whale. Of the 45 confirmed deaths of right whales between 1970 and 1999, 16 are known to have been caused by ship strikes and two additional collisions were determined to be possibly fatal (Knowlton and Kraus 2001). In the period between 1999 and 2003, 18 verified right whale mortalities occurred, of which five were due to ship strikes (Cole, *et al* 2005). Other potential threats include habitat degradation, noise, contamination, underwater bombing activities, climate and ecosystem change, and commercial exploitation (NMFS 2005).

The Port has participated and supported the Right Whale Monitoring Program for many years. Since 1994, five incidents have been reported where vessels have come within close proximity to North Atlantic right whales, but none of them resulted in injury or death. There have been three reported whale-vessel incidents involving five different vessels directly off Port Canaveral.

2.6.7.7 Southeastern Beach Mouse

The southeastern beach mouse (*Peromyscus polionotus neveiventris*) is listed as a threatened species at both the Federal and State levels. Beach mice primarily use coastal dune communities comprised of sea oats (*Uniola paniculata*) for habitat. Grasslands and open sandy areas in the fore-dune area may also be utilized (Humphrey 1992). This subspecies was originally endemic to coastal dunes along the Florida coast from Ponce Inlet in Volusia County to Hollywood Beach, Broward County. Decline in beach mouse populations has been attributed to loss of habitat due to coastal development and beach erosion. The nearest southeastern beach mouse population is on CCAFS east of the Trident Turning Basin and north of Port Canaveral (Figure 2-13; Dynamac 2002). The upland habitat between the MTB and TTB is not suitable for the southeastern beach mouse, and they have not been found within the immediate study area.

Figure 2-13
Southeastern Beach Mouse – Suitable Habitat



2.6.7.8 Scrub Jay

The scrub jay (*Aphelocoma coerulescens*) is listed as threatened at both the State and Federal levels. The scrub jay is endemic to Florida's xeric oak scrub and scrubby pine habitat, maintaining territories approximately 22 acres in size. The nearest known populations of scrub jays are located over one-half mile northeast of the harbor along the coast of the CCAFS (Figure 2-14; FNAI/FSU 2007). A one-day survey for scrub jays was performed on the small upland area between the MTB and TTB using approved FFWC and USFWS survey methodology. No scrub jays were observed (Dial Cordy 2006b).

2.6.7.9 Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is no longer listed by either the State and Federal levels, although it is still protected under the Bald and Golden Eagle Protection Act. The breeding range of the bald eagle is associated with aquatic habitats (coastal areas, river, lakes, and reservoirs) with forested shorelines or cliffs in North America. Throughout their range, they select large, super-canopy roost trees that are open and accessible, mostly conifers. They winter primarily in coastal estuaries and river systems.

No bald eagle nests are located within the study area, and no appropriate habitat for nesting was observed during the recent investigation by Dial Cordy and Associates. According to the FWC bald eagle website, the nearest known bald eagle nest locations are west of the Banana River Aquatic Preserve (Figure 2-15).

2.6.7.10 Least Tern

The least tern (*Sterna antillarum*) is a small member of the gull family (Laridae). The least tern is listed by Florida as a threatened species and is protected federally under the Migratory Bird Treaty Act. Least terns breed along the east coast of the United States from Massachusetts to Florida, with the Florida populations returning each year in April. The breeding season lasts through the summer. Least terns traditionally choose open sandy substrates to form breeding colonies. Least terns forage along coastal areas feeding on small fishes, as well as some crustaceans and insects. Within Brevard County, least terns are known to nest on sandbars and spoil areas along the coast. Least terns are not known to nest within the project study area.

2.6.7.11 Piping Plover

The piping plover (*Charadrius melodus*) is a state and federally listed threatened species. Piping plovers are a migratory shore bird that also is protected under the Migratory Bird Treaty Act. Piping plovers migrate to the Florida coast in September and are found through March (USFWS 1995). Piping plovers nest on open sand, gravel, or shell-covered beaches above the high tide line and are often found on the accreting ends of barrier islands and along coastal inlets (USFWS 1995). Foraging areas include intertidal beaches, mudflats, sandflats, lagoons, and salt marshes, where they feed on invertebrates such as marine worms, insect larvae, crustaceans, and mollusks. Within Brevard County piping plovers have been observed along the beach areas within the County, but have not been observed nesting within the project study area.

2.6.7.12 Gopher Tortoise and Eastern Indigo Snake

The gopher tortoise (*Gopherus polyphemus*) is listed as a species of special concern (SSC) by the State, but is proposed for re-classification as threatened. It is a large, terrestrial turtle and utilizes

Figure 2-14
Scrub Jay Groups

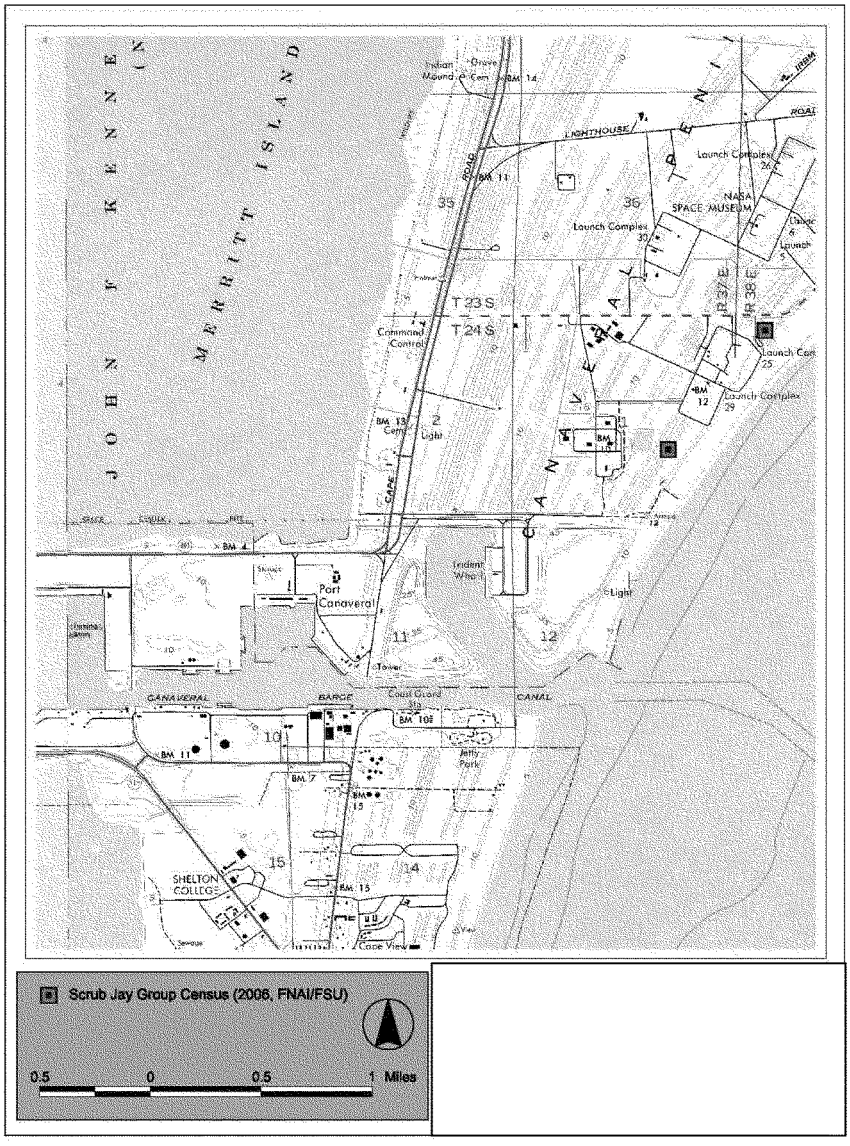
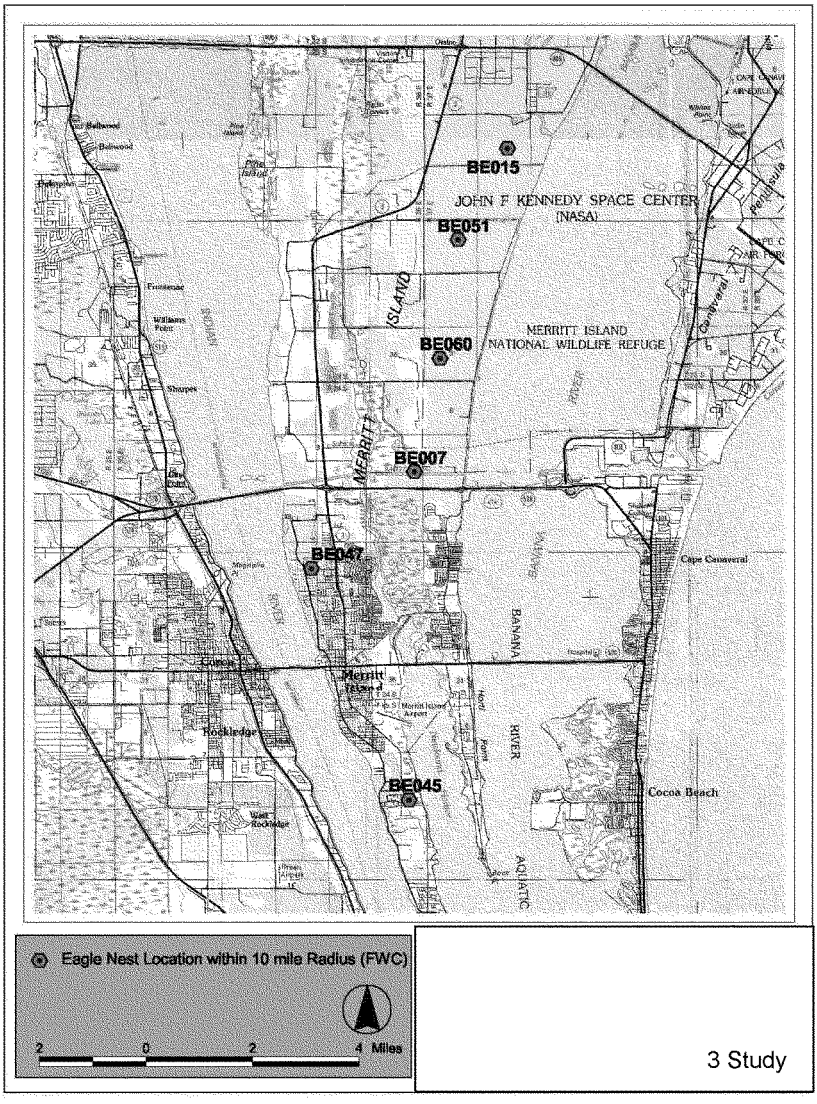


Figure 2-15
Bald Eagle Nest Locations



mainly sandy, well-drained habitat including dunes, scrub, and pine flatwoods, although the gopher tortoise has been noted to occupy poorly drained habitat in Brevard County.

Habitat within the study area suitable for gopher tortoise utilization is limited to areas north of the harbor within the CCAFS property. A recent survey conducted by Dial Cordy and Associates (Dial Cordy 2006) identified burrows on the CCAFS between the MTB and TTB (Figure 2-16). CCAFS is currently working with the Corps to utilize the upland site between the middle and east turning basins for dredged material disposal (Personal communication, Angy Chambers, CCAFS 2007). This would result in the CCAFS relocating all gopher tortoises on the site to another location approved by the Florida Fish and Wildlife Conservation Commission (FWC) during the relocation permitting process. The eastern indigo snake has been classified as a threatened species by the Florida Game and Fresh Water Fish Commission since 1971 and by the U.S. Fish and Wildlife Service since 1978. Eastern indigo snakes have not been previously identified on the site, and it is highly unlikely that eastern indigo snakes occur in this area (Personal communication; Angy Chambers, CCAFS 2007).

2.6.8 Coastal Barrier Resources

Congress passed the Coastal Barrier Resources Act (CBRA) in 1982 to address problems caused by coastal barrier development. This Act defined a list of undeveloped coastal barriers along the Atlantic and Gulf coasts. Designated coastal barrier resources have been identified within the project study area but not within the proposed work area as shown in Figure 2-17. COBRA resources within the study area include the Canaveral National Seashore, the Merritt Island National Wildlife Refuge, and the Banana River State Aquatic Preserve.

2.6.9 Cultural Resources

The Cape Canaveral Air Force Station (CCAFS) is located just north of Canaveral Harbor. The CCAFS is listed as a National Historic Landmark (NHL) for its vital contribution to the nation's space program (Figure 2-18). The significant structures within this designation include various launch complexes and the Mission Control Center (PBS&J 2006). In addition, one archaeological site (Site 8BR1641) was previously recorded adjacent to, but outside of, the project area. Site 8BR1641 is located on a sandy ridge paralleling the old Banana River shoreline. Investigations identified the presence of gray midden soils containing shell and ceramics. No designated cultural resources are known to occur within the project study area based on records search and site reconnaissance within the Port (PBS&J 2006). The 2006 PBS&J assessment covered all of the proposed navigation improvement areas (shown in Figure 2-17 in yellow) west from the relict shoreline along the Atlantic (now the entrance to the Harbor).

The Harbor is completely artificial and was dredged in the 1960s, the potential (should any exist) for prehistoric/historic submerged resources would be limited to the relict shoreline along the Atlantic Coast, which is outside of the project area. The Florida Department of State Division of Historical Resources was consulted and did not require an underwater investigation prior to the department's concurrence that the project would not impact historic or cultural resources. However, CPA conducted an underwater archaeology assessment in December 2007, which confirmed that no submerged historic or cultural resources would be impacted by the project (Environmental Appendix: Submerged Cultural Resource Survey, Mid-Atlantic Technology, February 2008).

Figure 2-16
Gopher Tortoise Borrows and Habitat

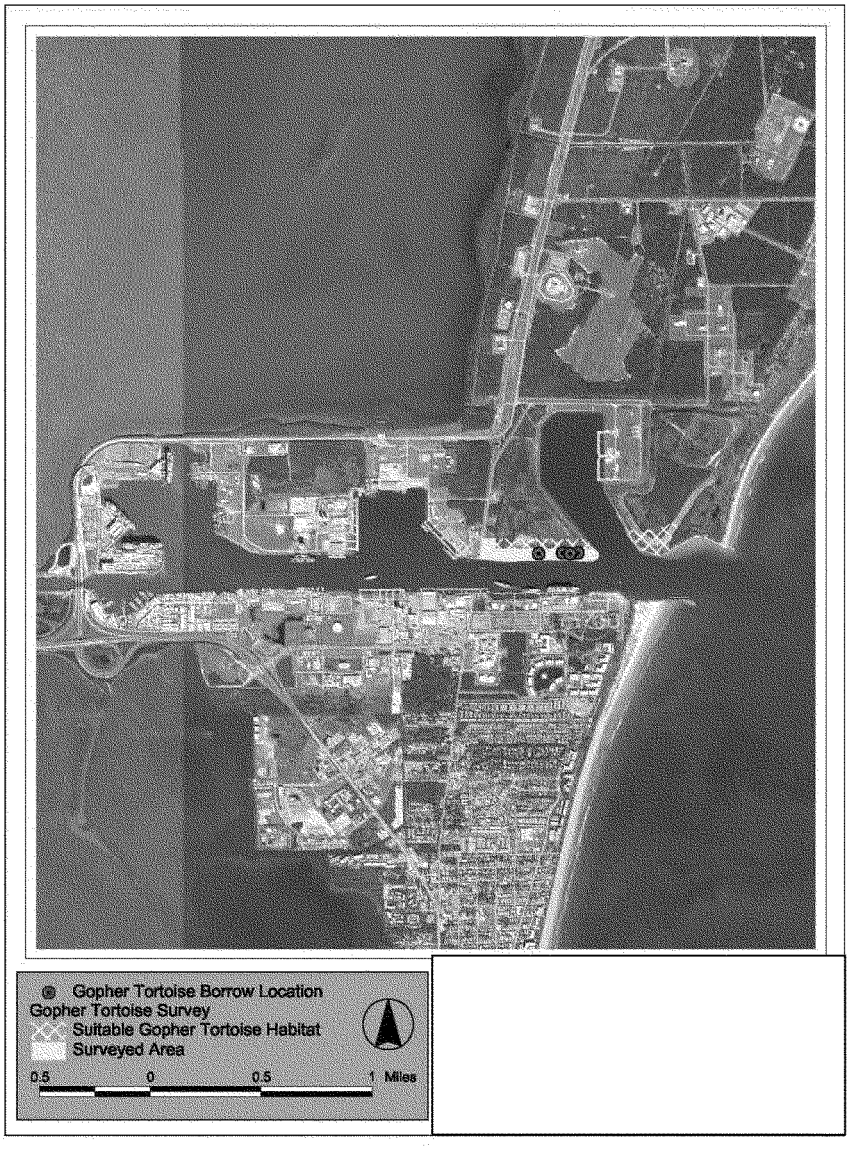


Figure 2-17
Coastal Barrier Resources System (CBRA)

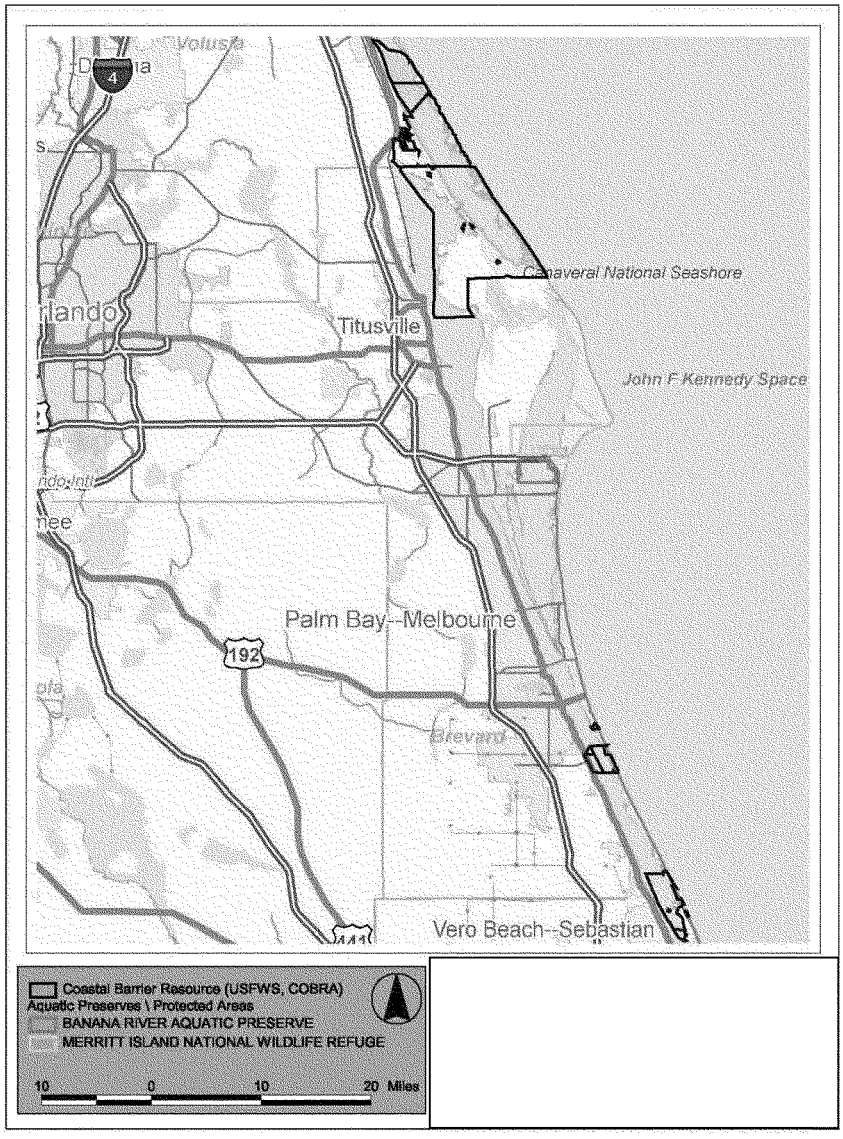


Figure 2-18
Cultural Resources Sites

3. WITHOUT-PROJECT CONDITIONS

Most general conditions relating to climate, winds, waves, and current are expected to be similar to existing conditions. Water quality conditions will continue to be monitored and any necessary corrective actions would be taken. One major change to general conditions will be the projected widening of State Road 528 (Beachline Expressway) which runs between Orlando and Port Canaveral. Currently the road is a four lane (two lanes in each direction) toll road designed in 1960. A Project Development and Environment (PD&E) study was completed by the Florida Department of Transportation in August 2006 recommending a six lane widening project as the selected alternative. In May 2007, Florida's Turnpike Enterprise began Phase I of a project to widen the Beachline West. It encompasses the reconstruction of the mainline toll plaza located near Milepost 5, which is now complete. Ultimate roadway improvements will include four travel lanes in each direction, but due to construction costs, the improvements will be stage-constructed, with the interim improvements including three lanes in each direction. In June 2008, a project began to widen the Beachline from the Turnpike to McCoy Road. Improvements include widening the existing bridge structures at US 441, Landstreet Road, CSX Taft Yard, Orange Avenue and McCoy Road. A new bridge will also be constructed for the access ramp over CSX. The final phase, between Interstate 4 and the Turnpike, has been pushed out due to rising construction costs and expected traffic projections. That project is not included in the Turnpike's current five-year work program.

3.1 Navigation Features

3.1.1 Canaveral Ocean Dredged Material Disposal Site

Under without-project conditions, maintenance dredging is projected to continue with volumes similar to recent historical volumes. Material samples from more than 300 borings indicate that project and future maintenance material will be similar in quality to recent historical dredged material and therefore suitable for disposal at the Canaveral ODMDS. Long-term monitoring of the ODMDS will continue as outlined in the Canaveral ODMDS Site Management and Monitoring Plan (SMMP). Offshore disposal at the Canaveral ODMDS will continue to be the long term disposal plan for port users (CPA, USACE, USN) and is the most cost-effective disposal alternative, consistent with engineering and environmental criteria. Disposal alternatives for dredged material, other than the ODMDS, consist of very expensive and restrictive upland placement alternatives. Use of the Canaveral ODMDS is not expected to cause significant adverse impacts to Essential Fish Habitat. The disposal site is clear of any coral, coral reef, live / hard bottom or artificial reef habitat. The disposal site's revised SMMP (February 2012) specifically includes this project's proposed new work dredged material and has a ten-year capacity of 9.2 million cubic yards. The revised SMMP does not identify an annual capacity limit. The ODMDS is sufficient for placement of both maintenance and new project dredging (Table 29, Engineering Appendix), and this project requires no changes to the Canaveral ODMDS SMMP.

3.1.2 Channel Conditions

Royal Caribbean International (RCI) homeported a new Freedom Class vessel at Port Canaveral in 2009, the *Freedom of the Seas*. The Freedom Class is an additional 91 feet longer than the previous Voyager Class vessel, *Mariner of the Seas*, which was homeported at Port Canaveral

prior to the arrival of the *Freedom of the Seas*. Other dimensions are similar to the Voyager Class. As discussed in Section 2.5.3 Existing Port Canaveral Cruise Ship Operations, limited additional dredging outside of authorized project limits was conducted in order for the *Mariner of the Seas* (Voyager Class) to operate safely within Port Canaveral.

Prior to bringing a Freedom Class vessel to Port Canaveral, additional limited dredging beyond existing authorized channel and turning basin dimensions, as recommended by the Pilots and RCI, was conducted. This additional dredging included expanding the southeast corner of the present entrance to the West Turning Basin to enable access by a Freedom Class vessel. The immediate widening of the West Turning Basin entrance is referred to as the Interim Corner Cut-Off. The Pilots stated their willingness to transit a Freedom Class vessel through Port Canaveral if these interim modifications to the Federal navigation channel were made, but only under the condition that further improvements (including full length channel widening) would be forthcoming. The Pilots have stated that interim channel modifications are not a long term solution to the restrictions on navigation of a Freedom Class vessel at Port Canaveral. Additional discussion of without-project condition vessel operations is contained in Section 3.4 Port Operations.

3.2 Terminal Facilities

3.2.1 Cargo Terminals

Recently completed construction projects include extending SCP4 and widening SCP1. Ongoing construction includes building North Cargo Berths 5 and 6, which are projected to be in operation in 2013. The largest difference between existing and without-project conditions for Port Canaveral's cargo terminal facilities will be the completion of Seaport Canaveral's (formerly Vitol) 36 acre, 2.8 million barrel petroleum product storage facility. This fuel terminal is located on the port's North Cargo Area adjacent to the Middle Turning Basin (North Cargo Piers 1-2). Initial construction, which was completed in December 2009, includes 24 storage tanks with a combined capacity of 2.8 million barrels. Initial construction cost was $45 million. Seaport Canaveral Terminal capacity is more than three times the existing capacity at Transmontaigne's facility (formerly Coastal Fuels). Seaport Canaveral has delivery contracts in place and the first delivery occurred in February 2010. As of September 2011, 3.3 million tons of petroleum products have been delivered to the facility. The facility currently has 24 storage tanks with a capacity of 2.84 million barrels and a six lane truck rack. At full build-out, whenever that might occur, Seaport Canaveral will have 31 storage tanks with a capacity of 3.79 million barrels. Additional development at the facility may also include a pipeline to the Orlando International Airport and potentially a biodiesel production plant. Full build-out, jet fuel pipeline, and the biodiesel plant are all potential developments at Seaport Canaveral, which have not been included as elements that affect project benefits because of their speculative nature.

3.2.2 Cruise Terminals

Under without-project conditions, the Canaveral Port Authority undertook a $32 million effort in 2010 to upgrade and expand Cruise Terminal (CT) 8 to accommodate the new, larger Disney vessels. The first of these new, larger vessels, the *Disney Dream*, entered service at Port Canaveral in January 2011. The second of two new Disney cruise ships, the *Disney Fantasy*,

began sailing from Port Canaveral in March 2012. These vessels are 128,000 Gross Registered Tonnage (GRT), with a draft of 27 feet, length overall of 1,115 feet, and a beam at the waterline of 121 feet. The older Disney ships are 83,000 GRT (with 965 feet LOA, 106 feet beam, and 25 feet draft), so the new vessels are considerably longer and wider, although they will still employ traditional propulsion systems. Completed modifications to CT 8 to accommodate the new larger Disney cruise ships include berth extension and additional mooring features without compromising the safety of navigation for cruise vessel traffic to and from adjacent CT 10. The passenger terminal was also substantially upgraded, and additional plans are being drawn up better accommodate up to 4,000 passengers.

CT 10 was modified in 2009 to accommodate RCI's new Freedom Class vessel. Prior to modifications CT 10 was capable of berthing a vessel with a maximum length of 1,020 feet. The new Freedom Class vessels are 1,112 feet LOA. Completed modifications to CT 10 include the construction of a mooring dolphin to the east of the existing pier and additional pier extension, which satisfy the requirements of the larger vessel. The passenger terminal was also enlarged to accommodate up to 3,500 passengers.

3.3 Economic Conditions

Even throughout the recent severe economic downturn, the population of the six-county region encompassing the project area continued to grow at a significant rate. For example, the population of Brevard County grew 14.1% from 2000 to 2010 (see Section 2.2.4). Under a medium growth scenario generated by the Bureau of Economic and Business Research (BEBR)[15] at the University of Florida, the six-county port hinterland region is projected to increase population by 43% (1.4 million people) between 2010 and 2035, an average annual growth rate of 1.45%. This projected regional population growth is proportionately greater than projected statewide growth, which is projected to increase by 33%, an average annual rate of 1.1%. Table 3-1 presents the BEBR population growth estimates for the port's six-county hinterland region.

[15] BEBR, 2010

Table 3-1
Six-County Regional Population Projections (2010 – 2035)

County	2010	2035	Population Increase	Percent Increase	Average Annual Growth Rate
Brevard	554,900	727,200	172,300	31.1%	1.1%
Lake	293,500	487,700	194,200	66.2%	2.1%
Orange	1,111,000	1,623,200	512,200	46.1%	1.5%
Osceola	273,300	506,400	233,100	85.3%	2.5%
Seminole	423,700	548,900	125,200	29.5%	1.0%
Volusia	506,500	636,600	130,100	25.7%	0.9%
Region Total	3,162,900	4,530,000	1,367,100	43.2%	1.45%
Florida	18,773,400	24,970,700	6,197,300	33.0%	1.15%

Source: Bureau of Economic and Business Research, University of Florida; Publication 156; March 2010

In addition to the projected population growth within the port's hinterland, operation of the Seaport Canaveral fuel terminal will expand the area historically serviced by the existing fuel terminal at Port Canaveral. Transmontaigne cannot expand or substantially change its operation due to permit and zoning constraints within the City of Cape Canaveral. Transmontaigne's facility is off port property and surrounded by residential development, drastically limiting its growth potential. Seaport Canaveral's business plan and physical plant design do not suffer from the same limitations and are aimed at expanding the existing hinterland for fuel beyond the area serviced by Transmontaigne to include the Orlando area and the Orlando International Airport.

The Florida 2006 Energy Plan states that 90% of the state's waterborne deliveries of fuel oil are handled by three principal ports: Tampa, Jacksonville, and Port Everglades. On Florida's east coast, there is only a very small volume handled at Fort Pierce, apart from Jacksonville, Port Everglades, and Port Canaveral. The hurricane seasons of 2004 and 2005 demonstrated severe disruptions of fuel distribution within Florida, which prompted the state to assess its need for expanded distribution and storage infrastructure improvements and contingency planning. The Florida 2006 Energy Plan's first recommendation for transportation fuels was to "facilitate diverse petroleum supply and distribution mechanisms into and within Florida". The new Seaport Canaveral Terminal adds capacity at a strategic location in central Florida, because of its proximity to Orlando and its mid-coast location between major delivery ports at Jacksonville and Port Everglades.

The Annual Energy Outlook 2011 projects (Table 3-2) that the South Atlantic region will increase its share of the nation's gasoline consumption from 39.6% in 2010 to 44.3% in 2035. Similarly, the South Atlantic region's distillate fuel consumption is expected to increase from 32.7% to 35.1% of national consumption. Overall, gasoline consumption in the South Atlantic region is projected to increase by 15.4% during 2010 through 2035, an annual rate of 0.6%. Distillate fuel consumption in the South Atlantic region is projected to increase by 40.2% from 2010 through 2035, an annual rate of 1.4%. The South Atlantic region's ethanol consumption in gasoline is projected to increase by 86.3% over the same period, an annual growth rate of 2.5%.

National ethanol net imports are projected to increase by a factor of more than 300 from less than 1,000 barrels per day in 2010 to more than 250,000 barrels per day by 2035.

Table 3-2
Fuel Consumption Projections in Millions of Barrels per Day (2010 – 2035)

Fuel	2010	2035	Consumption Increase	Percentage Increase	Average Annual Growth Rate
National					
Gasoline	9.02	9.31	0.29	3.2%	0.1%
Distillate	3.73	4.87	1.14	30.6%	1.1%
Ethanol Imports	0.0008	0.2562	0.2554	32,534%	---
South Atlantic					
Gasoline	3.57	4.12	0.55	15.4%	0.6%
Distillate	1.22	1.71	0.49	40.2%	1.4%
Ethanol in Gasoline	0.248	0.462	0.214	86.3%	2.5%

Source: Annual Energy Outlook 2011; South Atlantic Supplemental Regional Table (Table 5)

3.4 Port Operations

3.4.1 Commodity Projections

The without-project condition commodity forecast for Port Canaveral is based on recent historical commodity volumes and growth at the port, projected demographic and economic growth in the port's hinterland (see Section 3.3 Economic Conditions), and on existing port development. As discussed in Section 2.4, growth in overall commodity tonnage at Port Canaveral has been growing steadily over the past 40 years, although volumes of specific commodities have fluctuated significantly. Commodities with the most consistent historical growth have been construction-related commodities such as lumber, cement, and stone products and petroleum products (see Sections 2.4.1 and 2.4.2).

The effects of the recent recession were first seen in a total tonnage reduction from 2006 to 2007. By 2008, total tonnage had been reduced to 53% of 2006 levels. Since 2008, total tonnage at Port Canaveral has risen, though not yet to pre-recession levels. Total tonnage for 2009 was 9.64% greater than total 2008 tonnage, and 2010 total tonnage was 22.5% greater than total 2009 tonnage. By 2011, the Port's total tonnage was 99.9% of 2006 tonnage (Table 2-19). The effects of the recession have not impacted all commodities equally. Tonnage for lumber and cement has substantially reduced, but petroleum products and stone products have increased. Overall, residual tonnage impacts due to the recession are expected to be short-lived.

The commodity forecast used in this analysis focuses only on the four categories of bulk commodities that are carried on vessels large enough to potentially benefit from navigation improvements at Port Canaveral: fuel, rock, slag, and cement. Other commodities handled at Port Canaveral, such as lumber, salt, food products, etc., will continue to be carried on vessels

which are too small to require navigation improvements at Port Canaveral. Therefore, these other commodity groups are excluded from further analysis.

Rock (aggregate, limestone, and granite) forecasts were provided by the CPA based on term sheets for the two major bulk handling firms operating at the port. The term sheet is a planning document used by both the operator and the CPA to allocate resources and terminal area. The term sheet provides a revenue stream estimate for the CPA and is used to establish minimum guarantee fees. As a consequence of the guarantee fees, the projections contained in the term sheets are both conservative and as accurate as possible. The term sheets for both firms provide commodity projections from 2011 through 2035. In this analysis, there is no further growth projected for these commodities beyond growth identified in the term sheets, due to forecast uncertainty.

Port Canaveral is uniquely situated as the only deep water port on Florida's central east coast with the ability to handle and store the amount of rock products identified in the term sheets. The commercial importance of Port Canaveral's location, as explained by the operators, is that continued infrastructure development along the Orlando/Interstate 4 corridor requires more rock products than can be supplied through existing and historical local sources. The fixed location of rail infrastructure and the inability to develop potential sources within the Everglades due to land use constraints increase the need for imported rock products. At the same time, vessels carrying international rock products are increasing in size, lowering per unit transportation costs and increasing their cost competitiveness in the central Florida market. For example CSL, one of the world's major bulk carriers which calls regularly at Port Canaveral, will have a new fleet of Panamax bulk vessels in service by 2012 with draft capabilities of 44 feet.

Seaport Canaveral began operation in February 2010. From February 2010 through September 2011, Seaport Canaveral has handled 3.3 million tons of petroleum products. A detailed analysis of individual point-to-point shipments from the twelve month period from August 2010 through July 2011 was used to inform the Seaport Canaveral forecast (Table 2-25). The Transmontaigne facility, which also handles petroleum products, operates in a very different way than the Seaport Canaveral facility, due to its use as one of three Transmontaigne east Florida facilities which share deliveries and coordinate operations. The Transmontaigne facility, which cannot expand due to its proximity to residential development, does not provide a reference for future operations at Seaport Canaveral.

In early 2010, a short-term (2011 – 2013) forecast for Seaport Canaveral, based on current contracts, was provided by the terminal operator. This forecast, which projected an approximate 50% utilization of the Seaport Canaveral facility, included the recessionary impact of existing and near-term economic conditions. Actual Seaport Canaveral tonnage for point-to-point vessels during the 12 month period from August 2010 through July 2011 was 1,272,625 tons, which is 15.87% larger than the projection provided in 2010 (1,098, 334 tons). The actual 1,272,625 tons was used in place of the 2011 forecast and the remaining two short-term forecast years (1.4 million tons in 2012 and 1.9 million tons in 2013) were increased by 15.87% to 1.65 million tons in 2012 and 2.21 million tons in 2013. The long-term forecast (2014 – 2064) is based on the South Atlantic annual growth rates for gasoline (0.6%) and distillate fuel (1.4%) consumption, as presented in the Annual Energy Outlook 2011. These growth rates are proportionally applied to the short-term 2013 forecast (2.21 million tons; 1.78 million tons gasoline and 0.44 million tons distillate fuel) to generate the long-term (2014 – 2064) forecast..

The cement forecast is based on observed recent growth and includes the substantial impact that the recent recession had on cement imports. Domestic cement production is historically supplemented with imported cement. During the period from 1997 through 2007, cement imports, on average, accounted for 20.6% (23.6 million tons) of national cement consumption[16]. In 2009, cement import tonnage had fallen to 6.2 million tons and domestic consumption had fallen to a level equivalent to consumption in 1991. There have been no cement imports to Port Canaveral in 2009 – 2011. Nonetheless, the two cement terminal facilities at Port Canaveral, even though they have recently been idle, are being constantly maintained in operating condition on a monthly basis by Continental Cement (south side terminal) and CEMEX (north side terminal). These terminals have not been closed and the cement industry projects a strong recovery in cement imports due to pent up demand, environmental regulations restricting domestic cement production, and the permanent closure of domestic cement production plants that have not weathered the current economic downturn.

The Portland Cement Association (PCA) produced an analysis of projected future industry characteristics in 2011 titled "Overview Impact of Existing and Proposed Regulatory Standards on Domestic Cement Capacity". The PCA analysis projects domestic cement consumption, production, and imports through 2025 under two regulatory scenarios. One regulatory scenario includes the effects of five currently enacted environmental regulations and two proposed regulations (the with-current emissions policy condition). The second regulatory scenario excludes these existing and proposed regulatory standards (the without-current emissions policy condition). The implications of these two policy scenarios is that imports are expected to increase more rapidly as a percentage of total cement usage under current emissions policy due to regulatory impacts on the level and cost of domestic production.

Under the with-current emissions policy scenario, the most likely condition for USACE planning purposes, U.S. cement consumption is projected by the PCA to increase from observed 2010 levels (68.9 million tons) to 170.8 million tons in 2025, an annual growth rate of 6.2%. Cement imports under the with-current emissions policy scenario are projected to increase from observed 2010 levels (5.9 million tons) to 82.0 million tons in 2025, an annual growth rate of 19.2%. This reflects an increasing share of imports versus domestic production over this period.

Even under the without-current emissions policy scenario, which favors domestic production over imports, the PCA projects that cement imports are projected to grow at an annual rate of 15.0%, achieving 48.0 million tons in 2025. Under the without-current emissions policy scenario, the PCA projects that cement imports at the national level will more than double between 2010 and 2015. One important contributing factor to the PCA import projections under both policy scenarios is that domestic production is expected to level off beginning in 2015. Under the without-current emissions policy scenario, domestic production levels off at a greater tonnage than under the with-current emissions policy scenario.

The cement forecast uses the Port's 2007 level of imports (536,000 tons) as the cement tonnage projected to be achieved in 2015, which represents a much slower return of consumption levels than projected by the Portland Cement Association. This 2007 level of imports is 42% of the peak level (1.3 million tons) achieved in 2006. The projected growth rate for cement imports through Port Canaveral is based on the observed relationship between historical population

[16] USGS Cement Statistics, last modification: December 13, 2010

growth in the port's six-county hinterland and growth in cement imports. This relationship is based on the assumption that increases in population require increases in infrastructure, such as buildings and roads, which are cement intensive structures. During the years from 2000 to 2006, the six-county population grew at an average annual rate of 2.96% and cement imports at Port Canaveral increased at a rate of 5.73%. BEBR population projections indicate an average annual population increase of 1.45% from 2010 through 2035 for the six-county region. Based on the observed proportional relationship between population growth and cement imports during the years from 2000 through 2006, the projected average annual increase in cement imports for a 1.45% population growth rate would be 2.81% [(1.45%/2.96) * 5.73% = 2.81%].

Note that the cement import tonnage growth assumptions used in this analysis (no resumption of cement imports at Port Canaveral until 2015 with a subsequent growth rate of 2.8% thereafter) are considerably lower than the cement industry's projections. The impact of alternative cement forecasts on project benefits are assessed in Section 6.8 Risk and Uncertainty.

Ground granulated blast furnace slag is a by-product of iron and steel production that is an input into concrete production and a substitute for Portland cement. Unground blast furnace slag is the import commodity, which is typically ground at and distributed from marine terminal facilities such as the Hanson plant and terminal at Port Canaveral. The forecast for slag is based on observed 2011 tonnage. The annual growth rate for slag is the same growth rate used for cement. The slag facility at Port Canaveral does not have the consistent historical use, due to ownership changes, that would allow for a separate growth rate to be developed in a manner similar to the cement growth rate.

Fly ash, which is a residual product of coal combustion, is also a substitute for Portland cement and an alternative product to slag. Fly ash and slag compete as low cost replacements for Portland cement in concrete production. The USGS reports[17] that USEPA regulations, which reclassify fly ash as a hazardous waste, will likely result in increased sales and market share of slag as a substitute for fly ash as an input into concrete production. The USGS states that long-term growth in the supply of slag is likely to rely primarily on imports because of environmental restrictions on domestic production[18]. A sensitivity analysis for the slag forecast is presented in Section 6.8 Risk and Uncertainty.

Domestic slag consumption has not fallen as much as domestic cement consumption has fallen during the recent recession. This is because the market share of slag as an input to concrete production has been increasing relative to Portland cement as more concrete design specifications are written to include slag as a component of concrete mix. The net reliance on imported slag, as compared to domestically produced slag, has also increased from 2006 to 2010 from 8% to 10% of domestic consumption. The slag facility at Port Canaveral has an annual capacity of 600,000 tons, which is projected to be achieved in this forecast by 2045. Projected growth for slag is discontinued after 2045. Slag is the only commodity at Port Canaveral that reaches a capacity constraint before the end of the evaluation period.

The forecasted commodity tonnages for each of the potentially benefitting commodities are presented in Table 3-3. One important perspective on these forecasts is that they do not include

[17] U S Geological Survey, Mineral Commodities Summaries, Iron and Steel Slag, January 2011.
[18] US Geological Survey, Mineral Commodities Summary, Iron and Steel Slag, January 2011

the effects of potential future development at the Port. Because its cruise business has not been negatively affected by the recent economic downturn, the port has had the financial resources to continue to improve and expand its infrastructure even during the recessionary period, increasing its competitiveness relative to other ports for new business once the recessionary period is over. For example, the forecasts do not include any new commodity shipments through North Cargo Berths 5, 6 & 8, which are currently under development by Port Canaveral and should be completed within the next several years. The CPA is aggressively looking for opportunities to increase trade opportunities, such as containerized shipping; and has undeveloped, or under-developed real estate available for future port expansion. Additionally, these forecasts do not attempt to account for any future effects of the Panama Canal Expansion on Port trade.

Table 3-3
Base Case Commodity Forecast – Selected Years (Tons)

	2011	2020	2030	2040	2050	2060
Aggregate	400,000	800,000	800,000	800,000	800,000	800,000
Cement	---	616,178	812,881	1,072,376	1,414,710	1,414,710
Limestone	600,000	960,000	960,000	960,000	960,000	960,000
Granite	400,000	640,000	640,000	640,000	640,000	640,000
Slag	235,856	302,646	399,260	526,715	604,973	604,973
Gasoline[1]	874,905	1,851,168	1,965,285	2,086,438	2,215,059	2,351,609
Distillate Fuel[1]	223,429	479,947	551,534	633,800	728,336	836,973

Note: 2011 data based on observed FY 2011 tonnage reported by CPA
[1] Includes only Seaport Canaveral point-to-point tonnage

3.4.2 Cargo Fleet Forecast

Channel depths at Port Canaveral will be the same under existing and without-project conditions. Large bulk carriers and tankers are constrained by existing channel depths as described in Section 2.4.3, and will continue to be constrained under without-project conditions. Vessels operating under this constraint include vessels carrying stone products (aggregate, limestone, and granite), cement, slag, and petroleum products.

The vessels of the future without-project fleet are based on the vessels observed at the port in 2006, 2007 and 2008, with the exception of Seaport Canaveral Terminal tankers, which are instead based on Seaport Canaveral point-to-point vessels which arrived during August 2010 – July 2011. The number of future vessel calls for each commodity is based on the project commodity level divided by the average delivered tonnage per vessel call observed in 2006. Future without-project fleet operations at the port are expected to exhibit the same characteristics and patterns which were observed in 2006. For example, cement vessels delivered both full and partial loads in 2006, and are projected to deliver similar sized loads under without-project conditions. The distribution of cargo to vessels of different sizes is also based on the observed 2006 distribution. For example granite and limestone vessels were sorted into two categories

based on average Length overall (LOA) and arrival draft. Based on this categorization, 38% of granite and limestone was delivered on vessels with an average LOA of 597 feet and an arrival draft of 36.0 feet, and 62% was delivered on vessels with an average LOA of 753 feet and an arrival draft of 39.5 feet. These proportions and vessel sizes are used in the without-project condition fleet projections. Table 3-4 presents the projected number of vessel calls for the commodities that would potentially benefit from navigation improvements at Port Canaveral.

Table 3-4
Base Case Without-Project Condition Cargo Vessel Calls for Selected Years

	2020	2030	2040	2050	2060
Aggregate	5	5	5	5	5
Cement	10	14	20	26	35
Limestone	16	16	16	16	16
Granite	16	16	16	16	16
Slag	7	9	12	14	14
Gasoline[1]	44	47	50	53	56
Distillate Fuel[1]	11	13	15	17	20

[1] Includes only Seaport Canaveral point-to-point vessels

3.4.3 Cruise Ship Forecast and Operations

The overall industry demand for cruise ship services is projected to exhibit strong growth in the near-term. The Cruise Lines Industry Association (CLIA) estimates that 16.4 million people experienced multi-day cruises in 2011 (CLIA, 2012). Of the 30 new cruise ships currently scheduled for delivery into the North American fleet between 2008 and 2012, 16 are destined for service in the Caribbean, and 8 are slated for world-wide service. All but three of these new vessels are larger than 110,000 gross registered tons with passenger capacities of approximately 2,500 or more. The largest new vessel classes, RCI's Freedom Class, RCI's Oasis Class, the two new Disney vessels, and the Norwegian Cruise Lines Epic (previously Project F3) Class, all have vessels scheduled to be deployed in Caribbean service, as does Carnival's new Dream Class vessels, which are similar in size to RCI's Voyager Class.

The demand for cruise ship services at Port Canaveral is projected to remain strong. The consistently high cruise ship utilization levels at Port Canaveral (Table 2-21) have not been reduced during the recent economic downturn. Discussions with port personnel indicate that cruise lines are marketing their cruise packages as a relatively low cost family vacation and that more passengers are driving to the port in order to reduce total vacation costs. The most recent cruise ship utilization data available for the port indicates that overall multi-day cruise ship utilization levels for 2010 and the first half of 2011 are relatively unchanged from utilization levels during 2005 through 2009.

Cruise ship operations at Port Canaveral under without-project conditions will be very similar to operations under existing conditions, which includes the interim channel modifications that allow temporary use of the channel by the *Freedom of the Seas*. As of January 2011, Port Canaveral is the home port for three new vessels: RCI's *Freedom of the Seas, The Disney Dream* and Carnival Cruise Line's *Carnival Dream* (Table 2-15). In March 2012, the second new Disney vessel, *The Disney Fantasy* was homeported at Port Canaveral and one of the smaller Disney vessels currently homeported at Port Canaveral is projected to be re-deployed.

The *Freedom of the Seas* is the largest cruise ship projected to use Canaveral Harbor's Federal channel system in the near-term (Table 3-5). Under without-project conditions, regularly scheduled use of Port Canaveral by the *Freedom of the Seas* is projected to be restricted by wind conditions. The Port Canaveral Pilots consider the Freedom Class vessels to be too large for regularly scheduled unassisted passage through Port Canaveral's existing channels, based on the vessel's length and effective beam under normal high wind conditions. The Interim Corner Cutoff modification to the West Turning Basin was conducted to provide a temporary solution to allow these vessels to call at the Port until a permanent improvement to the navigation project can be implemented. Until that time, the Freedom Class vessels exceed design constraints of the Federal navigation channel and will require tug assist under normal high wind conditions.

The new Disney cruise ships, which are deployed from Port Canaveral, are narrower, but longer than the Freedom Class vessels. The Port Canaveral Pilots project that these vessels will be operated under more restrictive wind condition criteria than the previous Disney fleet because, although they are larger than the existing Disney vessels, they will have traditional propulsion equipment. The new Disney vessels also are projected to require tug assist under normal high wind conditions. The new Norwegian F3 Class vessel, *Epic*, is projected to use Port Canaveral as a port of call.

RCI has been in contact with the CPA concerning Oasis Class vessels using Port Canaveral as a potential port of call and as a port of refuge during emergency conditions. Under without-project conditions, including interim channel modifications, Oasis Class vessels are too large to operate in Canaveral Harbor's Federal channels on a regularly scheduled basis. Simulation-based evaluations conducted for the Oasis Class indicate an Oasis Class vessel could potentially operate in Port Canaveral in a limited fashion under with-project conditions, however; Oasis Class vessels are not projected to use Port Canaveral and the benefits calculations do not include any benefits related to Oasis Class vessels.

Table 3-5
Present and Future Large Cruise Ships and Classes

Cruise Ship or Class	Design Draft (ft)	Length Overall (ft)	Beam at Waterline (ft)	Disp. At Design Draft (m. tons)	Side Wind Sail Area	GRT
Disney *Dream & Fantasy* Homeport 2011 & 2012	27	1,115	121	62,414	132,181	128,000
CCL *Dream* Homeport 2009	27	1,004	122	58,262	126,404	130,000
RCI Voyager Class Homeport 2003 - 2009	28	1,021	127	62,716	119,523	138,000
NCL *Epic* Port of Call	29	1,081	133	73,761	144,959	150,000
Cunard *Queen Mary 2* Potential Port of Call	33	1,131	135	79,827	139,716	150,000
RCI *Freedom of the Seas* Homeport 2009	28	1,112	127	71,019	140,092	158,000
RCI Oasis Class Potential Port of Call	30	1,187	154	106,000	168,664	220,000

Other Florida ports also have structural constraints that preclude calls by the larger vessels. New, larger cruise ships have air drafts in excess of 200 feet. Freedom Class vessels have an air draft of 210 feet, as do Voyager Class vessels. Oasis Class vessels have an air draft of 230 feet. Cruise ship activity at the ports of Tampa and Jacksonville are constrained by bridge heights:

- Tampa: Sunshine Skyway Bridge 175 feet vertical clearance (Tampa Bay Pilots Port Guide, 2004); and
- Jacksonville: Dames Point Bridge 169 feet vertical clearance (St. Johns Bar Pilots Association, www.jaxpilots.com).

Other alternative ports for Caribbean cruise destinations include Charleston, SC, Galveston, TX and San Juan, PR. However, each of these ports has constraints which would not allow the largest new cruise ships to be homeported there. Charleston is limited by berth space availability - the largest cruise ships cannot fit into Charleston's limited berth space (300 linear feet plus 150 feet provided by a mooring dolphin), although adjacent cargo berth space is occasionally used. Galveston's passenger volumes have shown strong growth since 2003 (from 377,000 in 2003 to 616,000 passengers in 2006) but remain less than half of Port Canaveral's levels. Continued strong passenger growth at Galveston is constrained by berth availability: only 2 cruise ship berths comprising 2,000 linear feet. San Juan is a limited alternative because of significantly higher air travel costs.

3.5 Environmental and Cultural Resources

Undeveloped upland habitat within Port Canaveral consists primarily of historic spoil disposal sites and disturbed shrub/brushland. Under the future without-project condition, much of the upland communities within the Port will be developed. There are currently a number of proposed projects such as a hotel and conference center, Canaveral Cove Phase II, and the Seaport Canaveral fuel tank farm that would be constructed on much of the undeveloped (or

underdeveloped) lands within the Port. Wetland habitats within the study area are limited primarily to the western perimeter adjacent to the Banana River, which is outside of the study area for this project. These wetlands are either mangrove swamps vegetated with white and black mangroves and Brazilian pepper, or saltmarsh habitat. Treeless hydric savannah occurs south of the port facilities. Some wetland impacts could occur under the without project condition, particularly with development of the hotel and conference center in the southeast portion of the area adjacent to the Banana River, outside the harbor area.

Wildlife found within Port boundaries include raccoons, domestic and feral cats, and mice. Migratory bird species including warblers and sparrows typically roost in forested areas along the coast, particularly near to open water. Future development under the future without-project condition is not likely to have any significant effect on wildlife.

Five terrestrial protected species were identified that could potentially occur within uplands in the vicinity of the Port including the gopher tortoise, Florida scrub jay, eastern indigo snake, bald eagle, and the southeastern beach mouse. These species are known to occur only on the Cape Canaveral Air Force Station (CCAFS) property, north of CCAFS, or on Merritt Island, and are not known to occur on Port Canaveral property. Gopher tortoises occur in the uplands between the MTB and TTB, and the CCAFS is currently working with the Corps to utilize the upland site between the MTB and TTB for dredged material disposal (Personal communication, Angy Chambers, CCAFS 2007). This would result in the CCAFS relocating all gopher tortoises on the site to another location. Indigo snakes have not been previously identified on the site, and it is highly unlikely that indigo snakes occur in this area (Personal communication, Angy Chambers, CCAFS 2007).

Three sea turtle species were identified as potentially utilizing terrestrial beach habitats along Brevard County beaches, including those adjacent to the Port. These species include the loggerhead, leatherback, and green sea turtles. The beaches and spoil areas may also be utilized by nesting and foraging shorebirds including the least tern and piping plover. The nearshore and inshore waters within the vicinity are frequented by protected marine mammals including the West Indian manatee, and the North Atlantic right whale is known to occur in the waters offshore of Brevard County. The without project condition is not likely to result in any significant changes to marine species from the current (existing) condition.

The harbor in Port Canaveral is utilized by marine species, particularly sea turtles and manatees. The harbor serves as an access point for the West Indian manatee to traverse to the Atlantic coastal waters and the Banana River, which provides foraging and sanctuary for the species. Juvenile green turtles in particular forage on algal communities found on riprap boulders within the Port and will likely continue to do so under the without-project condition. The riprap located between the MTB and TTB, in particular, appears to be used for foraging as is much of the area within the Trident submarine basin. Other areas within the harbor also support substantial algal communities, including riprap along both the North and South jetties. Potential impacts to manatees and foraging sea turtles due to future without-project maintenance dredging are addressed through monitoring and reporting during dredging operations. No seagrass or hardbottom habitat occurs within the harbor or entrance channel. These resources would likely not be affected under the without-project condition.

Surface water resources within the study area consist of marine and estuarine systems. The inshore waters of the harbor are classified by the State of Florida as Class III Waters. Aquatic

preserves are designated as Class II waters, and include the Banana River Aquatic Preserve (classified as an Outstanding Florida Water) and the Merritt Island National Wildlife Refuge. The Port's water quality monitoring program assists the Authority in addressing concerns by the public about the quality of the Port's water and beach areas and identifies any potential issues that exist. In addition to harbor water testing, the Port Authority monitors stormwater runoff under the NPDES. The Port monitors discharge from nine representative outfalls of the 42 freshwater outfalls entering the Harbor. Under the without-project condition, water quality is expected to remain in the same good condition as it is currently (section 2.1.5 Water Quality).

Brevard County is not classified by FDEP as an attainment/maintenance area for any criteria pollutants. Ambient air quality along the Brevard County coastline is relatively good due to the presence of either on or off shore breezes. Current development trends, however, would result in more traffic, which would result in additional air emissions. Under the without project condition, it is not likely that Brevard County's air quality classification would differ from the current attainment status.

The CCAFS located just north of Canaveral Harbor is listed as a National Historic Landmark (NHL) for its vital contribution to the nation's space program. The significant structures within this designation include various launch complexes and the Mission Control Center (PBS&J 2006). In addition, one archaeological site was previously recorded adjacent to the project study area. Site 8BR1641 is located on a sandy ridge paralleling the old Banana River shoreline. Investigations identified the presence of gray midden soils containing shell and ceramics. These resources are protected under current regulations and are not expected to be disturbed under the without-project condition.

3.5.1 Potential Rule Change to Atlantic Right Whale Regulations

In 2004, new regulations were proposed by the Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) to reduce North Atlantic right whale ship strikes (FR 69(105)30857-61, June 1, 2004). The following is a summary of measures proposed for southeastern United States. The proposed regulations would 1) establish designated shipping routes with the greatest possibility of reducing the risk of ship strikes; 2) set seasonal speed restrictions within the designated lanes unless it is determined that no whales are present (criteria to be determined later), and 3) coordination with vessel operators (i.e., large recreational vessels, tugs, barges, etc.) that primarily transit along the coast locally and between ports, to use the designated traffic lanes, avoid the area, or impose a uniform speed restriction. These proposed regulations are not projected to have a major effect on cargo and cruise vessels operating at Port Canaveral, which operate in offshore ocean shipping lanes.

3.5.2 Gopher Tortoise Status

The State of Florida recently reclassified the gopher tortoise to "threatened" from "species of special concern" under state law. The Gopher Tortoise Management Plan (September 2007) describes the proposed permitting system, which includes new thresholds for specific permits, monetary contributions for gopher tortoise mitigation, and allows for emergency take without relocation only under special conditions.

4. PROBLEMS, OPPORTUNITIES AND CONSTRAINTS

This section of the Section 203 Study Report:

1. defines the water resource problems (i.e., negative conditions) that were addressed in the study;
2. identifies the opportunities (i.e., desirable future outcomes) that were identified during the study to resolve the problems and improve water resources conditions in the study area;
3. establishes the planning objectives (i.e., desired results) that were used to guide plan formulation; and
4. identifies the constraints (i.e., conditions to avoid, things that cannot be changed) which limited the development and selection of alternative plans.

4.1 Problems

Five major problems have been identified based on the analysis of existing and without-project conditions at Port Canaveral. These problems are summarized below and discussed in the following paragraphs. The five major problems are:

1. Channel and turning basin dimensions at Port Canaveral limit the size of cruise ships that are able to call at the Port and impact large cruise ship operations within the Port.
2. Channel dimensions and depths at Port Canaveral limit the size and efficient utilization and movement of cargo vessels that call at the Port.
3. Surges occur at cargo and Navy piers due to the passage of large cruise ships through the narrow ship channel. Surge effects cause damages to cargo and Naval vessels, such as parted lines and minor connection damage, personnel injuries, and result in cargo ships having to stop loading and unloading activities while the cruise ships pass.
4. Congestion at cargo berths is expected (future without project conditions) to result in vessel delays and additional transportation costs.
5. Channel and turning basin dimensions are restricting the port's ability to develop new cargo and cruise terminals needed to accommodate growing demand and larger vessels.

4.1.1 Problem 1: Cruise Ship Size Limitations

Current and future cruise ships calling and expected to call at Port Canaveral are constrained by channel widths and the dimensions of the West Turning Basin.

4.1.1.1 Channel Widths

The existing channels and turning basins were sized for much smaller vessels than are currently calling at Port Canaveral. The navigation project improvements authorized in 1992 (WRDA 1992) and completed in 1995 justified widening and deepening the project based on a composite design vessel (a 67,000 Dead Weight Tonnage (DWT) tanker and a 45,000 DWT bulk cement carrier) with an average length of 750 feet, a beam of 100 feet, and maximum draft of 40 feet. Cruise ships calling at the Port at that time were not large enough to be constrained by channel dimensions.

Since the time of the 1992 authorization, the cruise ships calling at Port Canaveral have increased substantially in Gross Registered Tonnage (GRT), length, beam, draft, and passenger capacity. As the second busiest cruise port in the world serving the world's largest cruise destination (the Caribbean), Port Canaveral attracts among the largest cruise vessels currently afloat.

The largest cruise vessel currently homeported at Port Canaveral is the Royal Caribbean International (RCI) Freedom Class vessel, *Freedom of the Seas*. The *Freedom of the Seas* has the following dimensions: 160,000 GRT; length 1,112 feet; beam 127 feet; draft 28 feet; and passenger capacity 3,634. This vessel replaced the *Mariner of the Seas* at Port Canaveral, a Voyager Class a 138,000 GRT vessel, with a length of 1,020 feet, a beam of 127 feet (at the waterline), a draft of 29 feet, and a capacity of 3,114 passengers.

There are currently two Freedom Class vessels in the RCI fleet, *Liberty of the Seas* and *Freedom of the Seas*. The *Liberty of the Seas* is currently homeported in Miami.

The *Mariner of the Seas*, the smaller Voyager Class vessel, had difficulty during adverse weather conditions navigating the current 400 foot wide channel, maneuvering the channel bends, and operating within the 1,400 foot West Turning Basin. Given its larger size, the Freedom Class faces even greater difficulties. The wind and wave climate at Canaveral Harbor influence the transit conditions for cruise vessel traffic (Engineering Appendix: Section 1.3 Site Environmental Conditions). The wind, in particular, influences cruise ship transits due to the very large freeboard area of these vessels. Safe navigation inside the harbor requires a balance between vessel speed and good ship handling capability to manage the yaw of the vessel or "crab angle" as it moves through the waterway under the influence of moderate to high wind conditions.

A vessel's "crab angle" is defined as the difference between the ship heading and the actual course made good, sometimes also called the "drift angle". Cruise ships transiting the channels at Port Canaveral are susceptible to "crabbing" because their large superstructure acts as a sail in the wind and moderate speeds must be maintained to avoid surge impacts on moored vessels and to maintain braking control of the vessel. The wider the "crab angle", the larger the effective beam of the vessel.

The first ship in the next generation of RCI cruise ships, the Oasis Class *Oasis of the Seas* is homeported in Port Everglades and began service in November 2009. The Oasis Class is now the world's largest cruise ships. The Oasis Class vessels have a capacity of at least 5,400 passengers, weigh approximately 220,000 GRT, and will have a length of 1,186 feet, beam of 154.2 feet, and draft 2 feet deeper than the Freedom Class (approximately 30 feet). The first two Oasis Class vessels deployed out of Ft. Lauderdale. Port Canaveral currently does not have sufficient channel dimensions to be a homeport for an Oasis Class vessel. This projected deployment schedule is consistent with passenger demand for cruise ship services which is focused on east Florida ports (56% of all U.S. passenger departures in 2006) and Caribbean destinations (71% of all U.S. passenger destinations in 2006).

As explained in Section 3.4, the Canaveral Pilots Association considers the Oasis Class vessels to be too large for regularly scheduled passage through Port Canaveral's channels under without-project conditions, based on the vessel's length and effective beam under normal high wind conditions. The newest, largest cruise ships are designed with propulsion systems intended to allow them to transit ports without tug assists. However, under high wind conditions and

considering the narrow channels and turns at Port Canaveral, these vessels will require tug assist to conduct channel transits.

The existing authorized channel width (400 feet) is only 2.6 times the beam of the Oasis Class vessel (and 3.1 times the beam of the Freedom Class vessel), which is substantially below international and USACE channel width design guidelines[19]. Corps channel width design guidelines range from 3.5 to 4.0 times design ship width, with consideration of various environmental and operational factors. The overall vessel length (LOA) of the Oasis Class vessel (1,186 feet) is an additional 74 feet longer than the Freedom Class. This increase in beam and length over the Freedom Class will preclude the Oasis Class from transiting through Port Canaveral's channels under without project future conditions.

4.1.1.2 Turning Basins

As previously stated, the dimensions of the West Turning Basin (WTB) are inadequate for existing vessels homeported at Port Canaveral and cannot safely accommodate future cruise ships projected to call at Port Canaveral. The WTB is currently 1,400 feet in diameter, authorized to -31 feet, and maintained at -35 feet by the CPA. Corps design guidelines for turning basins are contained in EM 1110-2-1613 (excerpt below).

> *9-2. Turning Basins. c. Size. (1) The size of the turning basin should provide a minimum turning diameter of at least 1.2 times the length of the design ship where prevailing currents are 0.5 knot or less. Recent ERDC/WES simulator studies have shown that turning basins should provide minimum turning diameters of 1.5 times the length of the design setup where tidal currents are less than 1.5 knots. The turning basin should be elongated along the prevailing current direction when currents are greater than 1.5 knots and designed according to tests conducted on a ship simulator.* ***Turning operations with*** tankers in ballast condition or ***other ships with high sail areas and design wind speeds of greater than 25 knots will require a special design study using a ship simulator*** *[emphasis added].*

The WTB diameter is considered by the Pilots to be inadequate for the Freedom Class vessels (1.26 times vessel LOA). The minimum acceptable WTB diameter for the Freedom Class vessel, as determined in STAR Center simulations conducted on the *Freedom of the Seas* in 2009, was 1,675 feet. The design cruise ship *(Freedom of the Seas)* is well powered and highly maneuverable. However, the wind sail area of these classes of ultra-large cruise ships is extremely significant and results in large applied forces in the moderate to high (30 knot) design winds experienced at Port Canaveral. Therefore, in consideration of safety and vessel operations under high wind conditions, the minimum effective WTB diameter is 1,725 feet (1.55 times LOA).

The West Turning Basin authorized dimensions are 1,400 feet by -31 feet and it is maintained at -35 feet by CPA. The authorized depth of -31 feet was justified based on the maximum operating draft of the smaller cargo and cruise vessels using the west basin at the time of the 1992 authorization. Currently, RCI's Voyager and Freedom class cruise ships, and similarly sized CCL and Disney cruise ships are nearly 300 feet longer than the 1992 design vessel and have operating drafts of 28 to 30 feet. These vessels also cannot use tidal advantage because of

[19] EM 1110-2-1613, 31 May 06, Hydraulic Design of Deep-Draft Navigation Projects, Table 8-2

their rigid sailing schedules. In addition, the azimuth steering equipment of these ultra-large modern cruise ships, which allow them to navigate into Ports without tug assist, also require adequate clearance (typically 1-2 meters) between the vessel and channel bottom to function properly. For these reasons, the authorized dimensions of the WTB are not considered adequate for safe navigation of the current cruise ship fleet. Alternatives to increase the diameter and depth of the WTB are evaluated in this report in order to meet the needs of the current cruise ship fleet.

4.1.2 Problem 2: Cargo Vessel Size Limitations

Current and future cargo vessels calling at Port Canaveral are constrained by channel and turning basin depths.

The existing channels and turning basins at Port Canaveral were sized for smaller cargo vessels than those currently calling at Port Canaveral. The design vessel used for the 1992 deepening and widening project was a composite design vessel (a 67,000 DWT tanker and a 45,000 DWT bulk cement carrier) with an average length of 750 feet, a beam of 100 feet, and maximum operating draft of 40 feet.

The largest cargo vessels currently calling at Port Canaveral (and those projected to call in the without-project condition), are vessels carrying stone products, slag, cement, and petroleum products. Table 4-1 presents the largest cargo vessels which called at Port Canaveral in 2006. The two dry bulk vessels, the *Gdynia* (65,738 DWT, 738' LOA, 105.6' beam, 42.4' design draft) and the *Bernardo Quintana A* (67,044 DWT, 753' LOA, 105.6' beam, 43.3' design draft) each arrived at Port Canaveral depth limited, with a 39.5-foot operating draft. The only other vessel to arrive with a 39.5-foot operating draft in 2006 was the tanker *Falcon* (dimensions unknown), which delivered power plant fuel oil.

Table 4-1
Largest Cargo Vessels to Call at Port Canaveral in 2006

Ship	Maximum Draft (ft)	Length Overall (ft)	Beam at Waterline (ft)	Deadweight Tonnage (m. tons)
Gdynia (Dry Bulk-Aggregate)	42.4	738	105.6	65,738
Bernardo Quintana A (Dry Bulk-Limestone)	43.3	753	105.6	67,044
Bregen (Liquid Bulk-Gasoline)	44.7	797	105.6	68,159

The tanker, *Bregen* (68,159 DWT, 797' LOA, 105.6' beam, 44.7' design draft), delivered fuel oil to Transmontaigne, arriving with only a 26-foot sailing draft. Vessels delivering fuel oil to Transmontaigne often arrive at drafts less than the port's operating maximum draft and also less than the vessel's maximum operating draft. These vessels arrive less than fully loaded because Port Canaveral is one of several ports called on by these vessels and they often arrive at Port

Canaveral partially offloaded after already having delivered fuel oil to other ports during their in-bound voyage.

Under without-project conditions, the commodities projected to demonstrate the most growth, with the exception of lumber, are the same commodities which use the largest cargo vessels calling at the port: i.e., stone products, cement, slag, and petroleum products (see Sections 3.4.1 and 3.4.2). Bulk vessels carrying these commodities to Port Canaveral generally range in size from 60,000 Dead Weight Tons (DWT) to 80,000 DWT. A statistical description of dimensions for vessels ranging from 60,000 DWT and 80,000 DWT is presented in the Economics Appendix (Table 4-2). Tankers projected to call at Seaport Canaveral Terminal will be the largest cargo vessels calling at the Port, with sizes up to 100,000 DWT or more. A statistical analysis of vessel dimensions in the appropriate DWT range, as opposed to the dimensions of a specific vessel, is presented because, based on the historic record of cargo vessel calls at the Port, no single specific large bulk vessel is likely to make regular repeated calls at Port Canaveral. A discussion of the characteristics of the world fleet in the appropriate DWT range is a better representation of the characteristics of vessels that are likely to use the Port under future without and with project conditions.

The maximum operational draft at Port Canaveral, as stated in the *Port Canaveral Operational Guidelines*, is currently 39.5 feet. Vessels arriving with an operating draft of 39.5 feet must time their arrival at the port with high water. Vessels arriving with operational drafts greater than 36 feet must arrive with a rising tide. The effects of channel depth constraints on cargo vessels at Port Canaveral were presented previously in Sections 2.5.6 and 2.5.7. These sections present data which show that large cargo vessels typically arrive at the port with operating drafts just less than the 36-foot restriction imposed by the port's operational guidelines.

Projected operating drafts for the future large cargo vessel fleet calling at Port Canaveral are expected to be depth constrained in the same manner as under existing conditions, including point-to-point petroleum product vessels calling at the Seaport Canaveral fuel terminal. The point-to-point vessels calling at Seaport Canaveral Terminal are projected to avoid the need for tidal advantage in the same manner as observed under existing conditions. The tug/barges and multi-port delivery vessels arriving at Seaport Canaveral Terminal do not require tidal advantage and are not anticipated to benefit from any project improvements.

Large cargo vessels in the fleet currently calling at the Port, and large cargo vessels projected to use the Port in the future without-project condition cannot load to their most efficient potential due to channel depth constraints. As shown in Table 4-1, the design drafts of the majority of these vessels are in excess of the channel constraint and the vessels could be filled more deeply if not for the Port's channel restrictions. Because of the 39.5 foot channel restriction, these vessels must light-load in order to transit the navigation channel. Channel depth constraints directly impact Port Canaveral cargo terminal operators and carriers. Port Canaveral's cargo terminal facilities are capable of handling larger vessel loads for each of the following impacted commodities: stone products, cement, slag, and petroleum products. The channel depth constraint reduces the effectiveness and efficiency of cargo terminal operations by restricting the size of individual vessel loads, which causes equipment to be underutilized. Carriers are similarly operating at less than optimum efficiency when vessels are light-loaded and more trips are required to deliver the same quantity of cargo.

4.1.3 Problem 3: Surge Effects and Safety

Under existing and without-project conditions, cruise ships transiting the channel in normal high wind conditions (i.e., winds in excess of 15 knots) generate water surges due to the speeds required to maintain headway and reduce crab angles to provide safe bank clearance in the 400 foot wide channel. These surges result from the piston-effect of the Post-Panamax width vessels transiting the narrow channel, which pushes water into (and then pulls water out of) the Trident Basin and Middle Turning Basin and also pulls vessels away from the multi-use berths adjacent to the channel, primarily the Trident Basin, NCP 3 & 4 and CT 3[20]. These surges have caused damage to cargo and naval vessels, damage to connecting equipment, and have caused serious injuries. The port's standard operating procedures include distribution of a Surge Warning Letter to all port users, which recommends appropriate attention to mooring lines and cessation of loading and unloading activities during cruise ship passage under moderate and more severe wind conditions. Surge effects are caused, in part, by the existing narrow channel dimensions and would be reduced by increasing channel dimensions.

Surge effects directly impact port tenants who must stop loading and unloading activities during cruise ship transits. Cessation of loading and unloading activities causes inefficiencies at the dock and adds to the total time that the vessel must spend in port. Surge effects may be offset by the placement of a tug, which pushes the vessel against the dock as the cruise ship passes through the channel, however this also contributes to the overall cargo cost. Under existing and historical conditions, the use of an assisting tug to offset surge forces has occurred only infrequently. Under future without-project conditions, which include substantially larger cruise ships and tankers moored at the vulnerable piers NCP 1 & 2, tug assist is projected to occur more frequently.

An analysis of vessel-induced surge was commissioned in 2011 by the Canaveral Port Authority (CPA). The Naval Ordnance Test Unit (NOTU), a United States Air Force 45th Space Wing (USAF 45 SW) tenant on the Cape Canaveral Air Force Station (CCAFS) and the USAF 45 SW (the Mission Partners) requested the study to demonstrate that the recommended project and the present and foreseeable future ship traffic will not adversely impact current or future NOTU and CCAFS port operations within the Trident and Middle Basins. NOTU accommodates various classes of US and UK Navy submarines at Trident wharf located on the eastern side of the Trident Basin. NOTU and the Military Sealift Command (MSC) accommodate various military ships at Poseidon wharf located on the southeastern side of Middle Basin. The Boeing Evolved Expendable Launch Vehicle (EELV) berth and the AF wharf are located at the north end of Middle Basin. The EELV berth supports the Delta IV rocket launch program at CCAFS. The AF wharf is used for a variety of small scale ship and barge operations.

NOTU has experienced surge effects on vessels moored at both the Poseidon and Trident wharves when outbound cruise ships, departing from West Basin, are required to increase transit speed under the occasional occurrence of high quartering or cross-wind conditions. Under the existing navigation project conditions, operational mitigation measures have been employed for several years to manage the surge effects. Those measures include increased coordination and notification of conditions between the Canaveral Harbor Pilots and NOTU Port Operations,

[20] Passing ship forces on vessels moored parallel to the channel and perpendicular to the channel are discussed in greater detail in the Engineering Appendix.

diligent tending of moored vessel lines in preparation for transit, and use of tugs to restrain vessel movements at the wharves. USAF 45 SW and NOTU expressed the need for a surge study to demonstrate that the recommended navigation channel widening and deepening plan will result in no additional impact on current and future port operations. The CCAFS and NOTU collectively identified a number of facilities and operations of concern that were incorporated into the surge modeling.

4.1.3.1 Surge Effects Modeling

Large cruise ships transiting the Canaveral Harbor main channel cause motions and forces on moored vessels at berths along the main channel or at berths within the east and middle basins. Transiting vessels pass moored vessels in the main channel in a parallel configuration and in the basins in perpendicular or oblique orientation. These motions and forces are typically referred to as surge or passing effects. Over the last decade and on a limited number of occasions, passing effects have caused mooring lines to part or failed facility fixtures, damaged shore side connections and personnel gangways, and injured shipboard personnel.

Passing effects are more problematic in complex or confined waterway configurations such as Canaveral Harbor and its east-west main channel, which is constrained by the Canaveral Locks system and three dead-end basins oriented in the north-south direction and positioned north of the main channel. Recent modeling and research suggests that in addition to the passing ship-moored ship interaction due to the flow effects surrounding a transiting vessel, the free surface effects associated with long period (low-frequency) waves that may be generated even by slow moving ships in channels and harbors with restricted water depths, sloping banks, and bulkheads, can significantly contribute to moored vessel motions and forces.

Physical and numerical modeling on this subject for both open water and more confined boundary conditions has been advanced in this decade. In 2005 and 2007, the Ocean Engineering Program within the U.S. Naval Academy accomplished a series of parallel and perpendicular passing model test cases in open water conditions, where the free surface effects would not be present. Since 2004, the Department of Marine and Transport Technology, Delft University of Technology in the Netherlands has developed and enhanced numerical modeling of both the primary flow potential method for ships moored in open water conditions and most recently a model based on potential flow but to also include the free surface effects where harbor boundary conditions create discontinuities in the flow field. Most recently, Coast & Harbor Engineering developed numerical modeling tools for vessel hydrodynamics and loading on berthed vessels that address the complete range of vessel-generated hydrodynamic (surge) effects. These proprietary numerical models with various levels of validation represent the state of the art for passing ship-moored ship analysis. The Navy's model test data and empirical force formulations that are in the public domain provide a means of estimating the passing ship effects on moored ships as limited to open water conditions, which does not represent the situation at Port Canaveral.

The free surface effects, which are long period water level fluctuations, arise from the excitation and interaction of the water motions associated with the flow field moving with the passing ship by the surrounding harbor geometry. Port Canaveral's constrained geometry, the size of the largest cruise ships operating within Port Canaveral's constrained geometry, and the speed cruise ships need to maintain during channel transits all work to increase the magnitude and severity of

dynamic motions and forces that may be experienced by moored ships in basins adjacent to channels.

With the start of Seaport Canaveral's tanker operations in Port Canaveral's Middle Basin at north cargo piers 1 & 2, there is a growing awareness of and intolerance to injury, disruption of operations, and environmental impacts that accidental disconnections could generate as a result of certain passing ship conditions. It is anticipated that the increase in large cruise ship passing traffic events will increase the incidence of passing effects on moored tankers with potentially detrimental consequences. In fact, a moored vessel at NCP 2 recently experienced surge effects that parted lines as a result of consecutive outbound cruise ship traffic. The surge effects were experienced some 13 minutes following the passing departure of the Freedom of the Seas.

Coast & Harbor Engineering performed the numerical modeling in accordance with a rigorous modeling plan coordinated and endorsed by the Mission Partners to evaluate several combinations of berthed vessel scenarios at commercial and military berths under without-project and with-project channel dimensions. The berthed vessels included detailed three-dimensional hull definitions for commercial and military surface ships and submarines. The passing vessel scenarios included the consecutive outbound transit of the *Carnival Fantasy*, the *Freedom of the Seas*, and the *Disney Dream* in a timed sequence, from the West Basin, a typical Saturday late afternoon departure scenario. The passing vessel conditions considered prescribed track, speed, and leeway carried relative to the existing conditions and recommended plan channel centerlines as fully coordinated with the Canaveral Pilots. Attachment F to the Engineering Appendix contains the existing conditions and recommended plan modeling domain drawings.

4.1.3.2 Surge Modeling Presentation and Results

The dynamic surge effects within the harbor, at key locations and berths, and passing ship forces for select berthed vessel scenarios were demonstrated in a presentation at the CPA on September 20, 2011, and delivered to the CPA, the Mission Partners, the Canaveral Pilots, the U.S. Coast Guard, and the Canaveral Harbor Section 203 Project Team. The presentation compared the modeled impacts under "without-project" and "with-project" channel dimensions.

Key findings shared during the presentation include:

- The numerical modeling reproduced the primary surge effects as observed by the Canaveral Pilots and associated with the present channel (existing conditions) as follows:
- Significant and consistent surge effects at SCP4 due to the limited separation between the passing and berthed vessel (parallel passing case);
- Surge effects at Trident Wharf for passing speeds of 7.5 knots or greater—very large distance between the passing and berthed vessel (perpendicular passing case);
- Delayed surge effects at NCP2 occurring some 10 to 15 minutes following the departure of one or more cruise ships; and
- Water level retreat and wave breaking at the north jetty area just east of the Trident Access Channel.

Surge modeling results under with project conditions are discussed in Section 6.4.1.1.

4.1.4 Problem 4: Future Berth Congestion

Berth congestion resulting in vessel delays will become a problem in the future without-project condition. Port facilities are already highly utilized and under without-project conditions will become increasingly congested. The mid-range commodity growth scenario predicts berth usage as high as 80% for the north cargo berths shared by Seaport Canaveral tankers, salt, slag, and lumber products. The frequency and duration of tanker calls at NCP 1 and 2 will likely cause some traffic to shift to other berths as available. South cargo berths are currently shared by petroleum products, stone products, cement, perishable items, newsprint and lumber. Congestion at cargo berths reduces the effectiveness and efficiency of cargo vessels and landside facilities. Vessel delays due to berth congestion have historically occurred sporadically at the multi-purpose berths along the south cargo piers. Projected growth in commodity movements, especially at NCP 1 and 2 when Seaport Canaveral's operation commences, at Port Canaveral will result in a larger number of cargo vessels that will have to wait offshore for a berth to become available.

4.1.5 Problem 5: Limitations on New Cargo and Cruise Terminals

Channel and turning basin dimensions are restricting the port's ability to develop new cargo and cruise terminals needed to accommodate growing demand. Because existing large vessels are operating at or above channel design dimensions, there is little or no opportunity to develop new berths and terminals to accommodate future growth in cargo and cruise services. Given the current levels of growth, the Port will need to develop new landside facilities and infrastructure to keep pace with demand. However, inadequately sized channels and turning basins are already beginning to impinge on vessel handling facilities which lie immediately adjacent to the navigation channel and turning basins. Absent expansion of the channels and turning basins, there are limited opportunities to develop new facilities.

4.2 Opportunities

There are opportunities for Port Canaveral to more effectively and efficiently meet the demand for the cruise and cargo services it provides. Opportunities for improvement include:

1. improve the efficiency of large cruise ship operations within the Port and accommodate larger cruise ships at the Port;
2. allow existing cargo vessels to be loaded more efficiently;
3. allow larger cargo vessels to be used that can deliver more cargo at lower unit cost;
4. increase the efficiency and safety of cargo and naval vessel operations by reducing surge effects on existing vessels and piers; and
5. accommodate development of more efficient berths and terminals.

Widening and deepening navigation channels, the West Turning Basin, and wideners would increase the efficiency of cargo vessels and cruise ships using the Port, as well as allow the use

of larger more efficient vessels[21]. This will result in significant transportation cost savings when compared to the expected future without-project condition, especially as navigation traffic and congestion increases in the future. The plan formulation section of this analysis presents a detailed quantitative assessment of the benefits resulting from alternative plans which take advantage of these opportunities.

4.3 Federal Objective

The federal objective in formulating alternative plans is based largely on contributions to NED. Contributions to NED are increases in the net value of the national output of goods and services expressed in monetary units. Contributions to NED are the direct net economic benefits that accrue in the planning area and in the rest of the Nation. NED benefits for deep draft navigation projects are transportation cost savings that typically result from general navigation features, such as channels, dredged material disposal facilities, turning basins, etc. Transportation cost savings are calculated as reductions in the cost of transporting goods from their ultimate origin to their ultimate destination. Cargo vessel-related transportation cost savings typically result from more efficient use of the existing cargo fleet and from the use of larger, more efficient cargo vessels in the future. Cargo vessel-related transportation cost savings are the basic type of economic benefits typically used for navigation project justification and cost-sharing purposes.

Additionally, Federal law and Corps of Engineers guidance identifies cruise ship-related benefits as commercial navigation benefits for project justification and cost sharing purposes. Section 230 of the Water Resources Development Act of 1996 specifically directs that benefits generated by cruise ships are categorized as commercial navigation benefits. Planning Guidance Letter #97-06 (07Jul97) provides specific implementation guidance for Section 230 of WRDA 1996. PGL #97-06 states that the benefits generated by cruise ships are to be based on more efficient ship operations and increased tourism or enhanced tourism experience. In addition, PGL #97-06 states that cruise ship related benefits are to be considered commercial navigation benefits for project justification and cost sharing purposes. The Navigation chapter of the Corps' Policy Digest, EP 1165-2-1 (30Jul99), restates the implementation guidance contained in PGL #97-06 in Section 12-4-c.

4.3.1 Other Planning Objectives

In addition to the Federal objective, other project specific planning objectives have been identified, which guided the plan formulation process in this analysis. Based on the problems posed by the combination of channel and berth constraints, continued population and economic growth in the port's hinterland, and ongoing port facility development, as detailed in Section 4 Problems and Opportunities, the following planning objectives have been established to assist in the development of management measures and evaluation of alternative plans:

- Objective 1: Reduce the requirement for tug assists to cruise ships and docked cargo vessels under high wind conditions from 2014 to 2064 (base year plus 50 years)

[21] Channel widening and deepening also provides a benefit to naval operations by reducing the period of tide-restricted access to the Trident Basin. The monetary value of this project benefit has not been calculated in the economic analysis.

- Objective 2: Allow for deeper and more efficient loading of bulk vessels at Port Canaveral from 2014 to 2064
- Objective 3: Allow for more efficient operations through use of longer and deeper draft bulk vessels at Port Canaveral from 2014 to 2064
- Objective 4: Reduce damages to berthed vessels from surge effects of vessel transit through the Port Canaveral main channel from 2014 to 2064; and
- Objective 5: Support national defense requirements and needs, which include coordination with military tenants of the port and reduction of surge effects on the port's military infrastructure from 2014 to 2064.

4.4 Constraints

The principal constraint on the formulation of alternatives for navigation improvements at Port Canaveral is avoidance of significant impacts to protected species located at or near Port Canaveral, including the:

- West Indian Manatee;
- Right Whale;
- Least Tern;
- Florida Scrub Jay;
- Southeastern Beach Mouse;
- Gopher Tortoise; and
- a variety of Sea Turtles, including Loggerhead, Leatherback, Green, Hawksbill and Kemp's Ridley.

Of the species listed above, it should be noted that only the West Indian Manatee, Gopher Tortoise, and Sea Turtles are located within the Port boundaries. The other species are located outside the Port, but within the region (Section 2.6.7 Protected Species).

Two resources constraints on the formulation of alternative plans include avoidance of:

- impacts of the existing land and waterfront uses (docks, wharves, terminals) at Port Canaveral on the range of alternatives under consideration;
- impacts on adjacent shoreline erosion.

Much of the Port's current terminal and berth configuration cannot be altered to any considerable degree without incurring unacceptable service disruptions and extremely significant expense to relocate or replace those facilities that the project is intended to serve. Therefore, the non-Federal sponsor, the Canaveral Port Authority, has requested that channel widening alternatives considered be limited to no greater that a 500 foot channel, under the Categorical Exemption to the NED Plan provision of ER 1105-2-100 (Paragraph 3-2.b.(10)). Similarly, the Canaveral Port Authority has requested that channel deepening alternatives considered be limited to no greater that a -44 foot deep channel.

5. FORMULATION AND EVALUATION OF ALTERNATIVE PLANS*

This section of the report presents the planning process that was used to formulate alternative plans, describes the development of alternative plans, and provides an overview of the preliminary screening of alternative plans. Based on the problems, opportunities, and constraints identified in the analysis, the development of alternative plans followed the standard planning model, which includes:

- Establishment of plan formulation rationale;
- Identification and screening of potential solutions, including non-structural solutions; and
- Detailed assessment and evaluation of alternative plans.

Corps of Engineers project planning follows the six-step process first described in the Principles and Guidelines (1983), which is the basis for Federal agency water resources planning, and further elaborated in the Planning Guidance Notebook, ER 1105-2-100 (April 2000). Although presented in series, these steps are applied in an iterative process, which focuses emphasis on succeeding steps. Steps in the plan formulation process include:

1. The specific problems and opportunities to be addressed in the study are identified, and the causes of the problems are discussed and documented. Planning goals are set, objectives are established, and constraints are identified.

2. Existing and future without-project conditions are identified, analyzed and forecast. The existing condition resources, problems, and opportunities critical to plan formulation, impact assessment, and evaluation are characterized and documented.

3. The study team formulates alternative plans that address the planning objectives. A range of alternative plans are identified at the beginning of the planning process and screened and refined in subsequent iterations throughout the planning process.

4. Alternative project plans are evaluated for effectiveness, efficiency, completeness, and acceptability. The impacts of alternative plans will be evaluated using the system of accounts framework (NED, EQ, RED, OSE) specified in the Principles and Guidelines and ER 1105-2-100.

5. Alternative plans will be compared. Contributions to National Economic Development (NED) will be used to prioritize and rank alternatives. The public involvement program will be used to obtain public input to the alternative identification and evaluation process.

6. A plan will be selected for recommendation, and a justification for plan selection will be prepared.

5.1 Plan Formulation Rationale

The Planning Guidance Notebook (ER 1105-2-100, dated 22 April 2000) states that "water and related land resources project plans shall be formulated to alleviate problems and take advantage of opportunities in ways that contribute to study planning objectives and, consequently, to the Federal objective" (page 2-1). Plan formulation has been conducted for this Section 203

Feasibility Study with a focus on achieving the Federal objective of water and related land resources project planning, which is to contribute to National Economic Development (NED) consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Plan formulation also considers all effects, beneficial or adverse, to each of the four evaluation accounts identified in the Principles and Guidelines (1983), which are National Economic Development, Environmental Quality, Regional Economic Development, and Other Social Effects.

5.1.1 System of Accounts Framework

The four evaluation accounts were established by the Principles and Guidelines to facilitate evaluation and display of effects of alternative plans. EC 1105-2-409, Planning in a Collaborative Environment (31 May 2005) also reemphasized the use of the four accounts in conducting Corps water resource feasibility studies as a means of ensuring that Federal water resources projects are planned and implemented in a collaborative manner with other Federal, state and local programs. In order to be consistent with Corps planning and environmental operating principles, and to ensure maximum participation in the planning process, this approach was also employed for the Section 203 study. As is the case for a Corps developed feasibility study, the National Economic Development (NED) account (described in detail below) is required and formed the primary basis of plan formulation, evaluation, and selection of the recommended plan for the Port Canaveral Section 203 study. Other information that is required by law or that will have a material bearing on the decision making process has been included in the other three accounts to organize information on effects. Briefly, the categories of effect considered under each of the four accounts include the following:

(a) The National Economic Development (NED) account displays changes in the economic value of the national output of goods and services.

(b) The Environmental Quality (EQ) account displays non-monetary effects on significant natural and cultural resources.

(c) The Regional Economic Development (RED) account registers changes in the distribution of regional economic activity that result from each alternative plan. Evaluations of regional effects focus on plan induced changes in regional income, employment, output and population.

(d) The Other Social Effects (OSE) account registers plan effects from perspectives that are relevant to the planning process, but are not reflected in the other three accounts. Examples of effects categorized under the OSE account include: urban and community impacts; life, health, and safety factors; displacement; long-term productivity; and energy requirements and energy conservation.

5.2 Plan Formulation Criteria

Management measures and alternative plans were developed to address the problems of constrained cargo vessel size, constrained cruise ship vessel size, and berth congestion at the port. Each alternative plan is formulated in consideration of four general criteria, as identified in the Principles and Guidelines (1983): completeness, efficiency, effectiveness, and acceptability.

Completeness is the extent to which the alternative plans provide and account for all investments, or other actions, necessary to ensure the realization of the planning objectives,

including actions by other Federal and non-Federal entities. **Efficiency** is the extent to which an alternative plan is the most reasonable, least cost means of achieving the objectives. **Effectiveness** is the extent to which the alternatives plans contribute to achieving the planning objectives. **Acceptability** is the extent to which the alternative plans are acceptable in terms of applicable laws, regulations, and public policies. Appropriate mitigation of any unavoidable adverse effects shall be an integral component of each alternative plan.

Identification of project-specific planning criteria used in Corps of Engineers project planning is guided by the Principles and Guidelines (1983), the Planning Guidance Notebook, ER 1105-2-100 (22 Apr 2000), and The National Environmental Policy Act (NEPA) of 1969, and Procedures for Implementing NEPA, ER 200-2-2 (4 Mar 1988). The following technical, economic, institutional, environmental, and social formulation and evaluation criteria have been identified for this study.

Technical Criteria

- The selected plan should be consistent with local, regional, and state goals for water resources development;
- Plans must be realistic and reflect state-of-the-art measures and analysis techniques;
- The optimal scale of project development should be identified by analyzing NED and engineering feasibility;
- The plan should accommodate vessels projected to call at Port Canaveral during the planning period, based on observed industry operations and reasonable forecasts;
- The plan should maintain existing vessel operability under various weather conditions; and
- The plan should be a product of proven elements and practices which will withstand projected weather and sea conditions, such as storms, floods, and waves.

Economic Criteria

- Each separable unit of improvement should be optimized to provide the maximum net benefits;
- The scope of the proposed development must be scaled to provide maximum net NED benefits. However, departure from the economically optimal (i.e., NED) project is possible in cases where the departure is justifiable and substantiated and an exception is granted from the Assistant Secretary of the Army (Civil Works); and
- There must be no more economical means, evaluated on a comparable basis, of accomplishing the same purpose that would be precluded from development if the Federal plan were undertaken. This limitation applies only to those alternative possibilities that would be physically displaced or economically precluded from development by the project.

Institutional Criteria

- Plans must be consistent with existing Federal, state, and local laws;

- Plans must be locally supported to the extent that non-Federal partner provides a letter of intent stating that it understands its responsibilities and obligations as set forth in the WRDA of 1986, as amended, and related policy;
- Prior to the Preconstruction Engineering and Design (PED) Phase, the non-Federal partner would enter into a written Design Agreement to cost share 25 percent of the costs of the Design Phase upfront. Ultimate cost sharing of design is the same percentage as for construction. Settlement is made at the time of construction, subsequent to execution of the Project Partnership Agreement (PPA); and
- Prior to the Construction Phase, the non-Federal partner would enter into a written PPA to provide all items of local cooperation satisfactory to the Secretary of the Army, as mandated by Section 221 of The Rivers and Harbors Act of 1970 (Public Law 91-611), as amended.

Environmental Criteria

- The plan should minimize the commitment of natural resources, whether they are marine bottom-lands, wetlands, other coastal zones, inland environments, or wildlife in these areas;
- The plan should avoid or minimize environmental impacts and maximize environmental quality in the project area to the extent practicable considering environmental, economic, and engineering criteria;
- A mitigation plan will be developed to fully mitigate any remaining unavoidable adverse consequences which may result from the Recommended Plan.
- The available sources of expertise should be used to identify environmental resources that might be endangered, damaged, or destroyed by plan implementation. These would include the USFWS, USEPA, NMFS, and appropriate state agencies, such as the Florida Department of Environmental Protection; and
- Measures should be incorporated into the Recommended Plan to protect, preserve, restore, or enhance environmental quality in the project area.

Social Criteria

- The plan should be capable of being integrated into local or regional planning for water and air pollution abatement, transportation, recreation, and land use;
- As much as possible, the plan should minimize noise, dust, odor, unsightliness, and potential health risks;
- The plan should meet existing public health and environmental control standards;
- The plan should not displace, devalue, or destroy important historical and cultural landmarks or sites; and
- Adverse impacts on area recreation resources should be avoided or minimized.

5.3 Management Measures

Management measures are the general categories of actions which are the basis for alternative plan development. The management measures used in this feasibility study were developed through discussions and interviews with Port Canaveral operations and management personnel, Canaveral Pilots Association members, and consultants working for the CPA. Management measures identified to address the navigation-related problems at Port Canaveral include operational (i.e., non-structural) measures, locally implemented structural measures, and structural modification of the Federally authorized channel.

Operational (i.e., non-structural) measures include modifications to vessel operating procedures, such as varying transit speeds, increasing vessel controllability, and restricting operations. Modifying aids to navigation are also considered as operational measures. Locally implemented structural measures include modifications to port infrastructure (berths, piers, mooring conditions) and terminals. Structural modifications to the Federally authorized channels include deepening and/or widening of channels and turning basins.

5.3.1 Planning Elements

A set of planning elements, were developed from the management measures identified in Section 5.3. These planning elements were assessed for potential inclusion in preliminary alternative plans based on the planning criteria identified in Section 5.2. Each planning element was considered for its potential as a stand-alone alternative and as an element used in coordination with other elements. Table 5-1 presents the results of the planning element screening conducted for this analysis. Table 5-2 shows the potential for each management measure to contribute to one or more of the study objectives identified in Section 5.1.3.

Table 5-1
Planning Element Screening

Measure #	Measure	Carried Forward	Excluded
	No Action	√	
	Operational Measures		
1	Reduce vessel speed		√
2	Increase vessel speed		√
3	Additional aids to navigation	√	
4	Additional tug assistance	√	
5	Turn cargo vessels in ballast		√
	Locally Implementable Measures		
6	Berth deepening	√	
7	Mooring conditions improvements		√
8	Relocate cargo terminals		√
9	Relocate cruise terminals		√
	Structural Modifications to Federal Channel		
10	Channel widening	√	
11	Channel deepening	√	

Table 5-2
Objectives-Measures Matrix

Measures		Objectives				
		1	2	3	4	5
1	Reduce vessel speed				X	X
2	Increase vessel speed					
3	Additional aids to navigation				X	
4	Additional tug assistance		X	X		
5	Turn cargo vessels in ballast					
6	Berth deepening		X	X		
7	Mooring conditions improvements	X				X
8	Relocate cargo terminals					
9	Relocate cruise terminals					
10	Channel widening	X	X	X	X	X
11	Channel deepening	X	X	X	X	X

Objective 1: Reduce the requirement for tug assists to cruise ships and docked cargo vessels under high wind conditions from 2014 to 2064 (base year plus 50 years)

Objective 2: Allow for deeper and more efficient loading of bulk vessels at Port Canaveral from 2014 to 2064

Objective 3: Allow for more efficient operations through use of longer and deeper draft bulk vessels at Port Canaveral from 2014 to 2064

Objective 4: Reduce damages to berthed vessels from surge effects of vessel transit through the Port Canaveral main channel from 2014 to 2064; and

Objective 5: Support national defense requirements and needs, which include coordination with military tenants of the port and reduction of surge effects on the port's military infrastructure from 2014 to 2064.

5.3.1.1 No Action

Under the no action alternative, none of the operational measures, locally implementable measures, or the structural modifications to the Federal channel would be conducted. The result

of the no action plan would be severely constrained vessel operations in Canaveral Harbor as described in Section 3: Without-Project Conditions. The no action alternative is the without-project condition, which is used as the base of comparison for all other alternative plans.

5.3.1.2 Operational Measures

Three operational measures were excluded from further analysis: reducing vessel speed, increasing vessel speed, and turning vessels in ballast.

Reducing vessel speed would be applicable to deeply laden cargo vessels because reducing vessel speed would also reduce the vessel's amount of squat, which in turn would reduce the vessel's effective draft. This planning element is not reasonably applicable because vessels are currently transiting the channel at the minimum speeds necessary to maintain adequate safe steerage. Reducing speeds even further would impact safe operation in the port.

Increasing the speed of a cruise ship as it transits the channel would reduce the vessel's crab angle and effective beam, thereby maximizing use of the available channel width. However, increasing cruise ship speed also has the negative effect of increasing surges at adjacent cargo piers and naval facilities, increasing the likelihood of vessel damage and requiring costly delays in vessel loading and unloading. The pilots already increase speed, when absolutely necessary, in order to transit the channel under high wind conditions. The use of increased speed on a regular basis would increase the frequency of unacceptable surge effects (parted lines, equipment damage, injury to personnel). Higher channel speeds would also require rapid vessel breaking upon entrance to the West Access Channel and West Turning Basin, creating additional surges.

Tug assistance for cruise ships and cargo vessels transiting the channel are currently part of port operations. However, cruise ships are equipped with powerful azimuth steering and thrusters, providing high maneuverability, and do not typically require tug assistance except under high wind conditions. Emergency situations arising at sea where power and/or steering control is compromised may require tug assistance to navigate into port and berth safely for repairs, but this is clearly the exception and a rare occurrence. The required use of tugs under high wind conditions is costly, although relatively infrequent.

Of most importance, the cruise lines typically navigate smaller cruise ships (1,000 feet LOA or less) within port and harbor channels and maneuver within basins and to and from berths under their own power, without tug assistance. The vessel pilots, captains and crew are trained to fully implement the propulsion features of a cruise vessel to provide the highest level of navigation safety. Only the largest cruise ships (LOA greater than 1,000 feet) require tug assistance under wind conditions of 25 knots or greater. The use of tug assist for large cruise ships under high wind conditions allows the vessel to maintain a safe speed at a reduced crab angle within the confines of the Port's narrow channel. Therefore, tug assist is carried forward as a without-project condition and as a component of alternative improvement plans.

Turning vessels in ballast requires that cargo vessels use the Middle Turning Basin only in light loaded or ballast conditions. This operational restriction, if effective, would reduce the controlling depth needed in the Middle Turning Basin. Under this operating restriction, deeply loaded in-bound vessels would proceed directly to the berth, unload their cargo, and then proceed to the Middle Turning Basin in a light or ballast condition in order to be turned around for the transit to sea. This operational restriction would be a feasible non-structural plan element if the Middle Turning Basin were functionally separable from the channel. However, due to the tight

configuration of Canaveral Harbor, as discussed in the Structural Modification to the Federal Channel section below, the Middle Turning Basin also provides access to NCP1 and NCP2. The controlling depth of the Middle Turning Basin needs to be consistent with the controlling depth of the channel in order to provide access to the cargo berths.

The one planning element derived from operational measures which may be effective at Port Canaveral is an improvement to aids to navigation. Currently, there is no outbound range which the pilots can use to center cruise ships in the channel when leaving the port. Construction of an outbound range would allow the pilots to take full advantage of available channel width by providing a navigation benchmark that currently doesn't exist. This planning element does not, by itself, eliminate the channel width constraint or allow larger cruise ships to use the channel. It is, however, highly desirable to the pilots and will be considered in combination with other planning elements. Coordination with the U.S. Coast Guard (Chief, Aids to Navigation and Waterways Branch, Seventh Coast Guard District) has been initiated to identify the appropriate characteristics of navigational aid improvements and to estimate the costs of potential improvements.

5.3.1.3 Locally Implementable Measures

Three locally implementable structural measures: relocating cargo terminal facilities, relocating cruise terminal facilities, and improving mooring conditions were evaluated and eliminated from more detailed analysis. There is no possible relocation of cruise or cargo terminals which would reduce channel constraints or their impacts. In general, the cargo facilities that require the deepest drafts are already closest to the sea. Currently, the facilities which need the least water depth, i.e., the cruise terminals in the West Turning Basin, are located furthest from open water at the inland end of the channel. The relatively shallow water at the West Turning Basin does not restrict cargo vessels whose docks are presently located ocean-ward along the ship channel and in the middle turning basin.

CPA has recently (2009) improved mooring conditions to accommodate Freedom Class vessels at Cruise Terminal 10. Freedom Class vessels are up to 100 feet longer than the Voyager Class vessels, which also use Terminal 10, and therefore required the construction of a new mooring dolphin. The new Disney Cruise line vessels are 1,115 feet long, which is more than 150 feet longer than the Disney vessels currently homeported at Port Canaveral. The Port is currently constructing necessary mooring facility/equipment changes to accommodate these vessels under without project conditions. These improvements to mooring conditions at the Cruise Terminals do not affect channel width constraints on Freedom Class and larger size vessels. No changes to mooring conditions would reduce constraints on the larger cruise vessels using the port. Therefore, because this measure is ineffective, it was not carried forward for further consideration.

The only locally implementable structural measure which is included for further analysis is berth deepening. Increased water depth at cargo berths would allow vessels to be loaded more deeply and would be required as a locally funded (i.e., ancillary) component of an alternative plan which includes channel deepening. Although a necessary component of a channel deepening plan, berth deepening alone is not a viable solution to channel depth constraints. The discussion in Section 2 concerning existing port operations indicates that vessels do not typically load beyond the depth that would require them wait for the tide (i.e., 36 foot draft or more). The reason vessels operating at the port are averse to relying on tidal advantage is the schedule uncertainties

resulting from cruise ship and naval transit priorities and safety zones, which preclude other vessels from using the channel when these vessels are entering or exiting the port. At certain times during the lunar cycle, it could be possible to miss two tide cycles in a row due to conflicts with regularly scheduled cruise ship operations. These systematic delays are usually unacceptable to carriers and their agents, and are the reason why most vessel operating drafts are truncated by shippers at the 34 – 36 foot range (Chart 2-3 Port Canaveral Deep-Draft Vessel Arrival Drafts (2002-2006).

5.3.1.4 Structural Modifications to Federal Channel

The two structural modifications to the Federal channel system: deepening and widening, were both included for more detailed analysis. These planning elements are technically feasible, institutionally and publicly acceptable, and may be implemented in conjunction with other planning elements. These two planning elements are the basis of the alternative plans described below.

The Economic and Environmental Principles for Water and Related Land Resources Implementation Studies (Principles and Guidelines, 1983), paragraph 5 states that: *"various alternative plans are to be formulated in a systematic manner to ensure that all reasonable alternatives are evaluated"*. In order to systematically assess structural modifications to the federal channel, major channel segments and features are identified according to their navigational function in the harbor. All of the cargo and cruise berths at Canaveral Harbor are configured along a single deep draft channel and two adjoining turning basins (Middle Turning Basin and West Turning Basin). The Navy submarine Trident Basin (Navy use only) also adjoins the single channel. The single deep draft channel provides access from the sea to the commercial berths situated along the north and south sides of the channel, and terminates at the cruise ship terminals in the West Turning Basin, where a shallower Barge Canal continues to the Intracoastal Waterway (ICWW) and to NASA at the Kennedy Space Center. Because the deep draft channel ends at the West Turning Basin, all deep draft vessels entering Canaveral Harbor must turn around to exit the harbor.

The Middle Turning Basin, which is located between the entrance from the sea and the West Turning Basin, is adjacent to the single deep draft channel (there is no separate access channel). Two commercial cargo berths, NCP 1 and NCP 2, are adjacent to the Middle Turning Basin. Because of the very close proximity of NCP 1 and NCP 2 to the Middle Turning Basin, the Middle Turning Basin is used as a navigation channel and as the turning basin for all cargo vessels. Similarly, the West Turning Basin is effectively the navigation channel linking the north cruise terminals with the single channel. All of the multi-day cruise vessels currently use the West Turning Basin for turning and access to the north cruise terminals.

The combination of a straight line channel configuration, a dead end terminus of the single deep draft channel, and the location of cargo and cruise berths adjacent to the channel and turning basins dictates the navigational function of channel segments and features. For planning purposes, the single deep draft channel can be divided into two segments. One segment goes from the sea to the cargo berths, terminating at NCP 4, just west of the Middle Turning Basin. This segment services deep draft cargo vessels and cruise ships, and is used by all vessels utilizing the Middle Turning Basin. The second channel segment continues from the western end of the cargo berths to the cruise terminals in the West Turning Basin. This segment services cruise ships and relatively shallow draft cargo vessels (drafts no deeper than -35 feet MLW).

The largest of the deep draft cargo vessels typically do not use this channel section or the West Turning Basin.

Although the Middle Turning Basin can be identified as an individual Canaveral Harbor navigation feature, it is functionally a component of the channel segment that services the north and south cargo piers and the south side cruise terminals. Cargo vessels which use NCP1 and NCP 2 use the Middle Turning Basin to access those berths. Additionally, all deep draft cargo vessels turn in the Middle Turning Basin. Similarly, the West Turning Basin can be identified as an individual Canaveral Harbor navigation feature. However, it is functionally a component of the channel segment that services the north side cruise terminals. All cruise ships using the north side cruise terminals use the West Turning Basin to access the terminals and all cruise ships using the north cruise terminals turn in the West Turning Basin.

In the development and evaluation of alternative plans for channel widening, which only affects large cruise ship navigation to and from the north side cruise terminals, the major channel segments and navigation features include:

- The entire length of the deep draft channel from the sea to the West Turning Basin; and
- The West Turning Basin.

In the development and evaluation of alternative plans for channel deepening the major channel segments and navigation features are divided into:

- The main channel westward from the sea to the cargo piers ending at NCP 4;
- The Middle Turning Basin, which provides access to NCP 1 and NCP 2, and which is used by all deep draft cargo vessels;
- The main channel westward from the end of the cargo piers (NCP 4) to the West Turning Basin, which provides access to the north side cruise terminals; and
- The West Turning Basin, which is used by all cruise ships serviced by the north side cruise terminals.

5.4 Preliminary Alternative Plans

None of the four planning elements carried forward to more detailed analysis are feasible as stand-alone alternative plans. As described in the previous section, berth deepening and improving aids to navigation, by themselves, do not fully address the navigational constraints and associated problems at Port Canaveral. Each of the structural measures to the federal channel requires a companion locally implemented planning element to fully address the navigational constraints and problems. Widening the channel, which would allow larger cruise ships to more safely and efficiently use the port's cruise terminals, requires improved aids to navigation to be fully effective. Similarly, channel deepening requires associated berth deepening so that channel deepening benefits can be realized.

Channel widening and channel deepening are separable planning elements. Channel widening would beneficially affect cruise ship operations, without affecting cargo operations. Channel deepening would only benefit cargo vessel operations in the near term, because cruise ships are not currently depth constrained at Port Canaveral. However, it is important to note that cruise ships are not currently depth constrained because the CPA maintains the West Turning Basin at a depth of -35 feet, even though the Federally authorized depth is -31 feet. In the early 1980's, the additional dredging to -35 feet was carried out by CPA concurrently with the federal project

construction of the WTB to -31 feet to accommodate the planned and anticipated cruise traffic at that time. In 2006 and for the first time since initial construction, the CPA conducted maintenance dredging at the WTB federal project area to the 35-foot project depth. The formulation of alternative plans therefore develops incremental widening with improved aids to navigation and incremental deepening with berth deepening as separate plans, and in combination.

Alternative plans for incremental channel widening of the existing 400 foot channel, with improved aids to navigation, were preliminarily formulated in 50-foot increments (450 feet, 500 feet). Each alternative width includes a similar outbound range constructed as an aid to navigation. Preliminary plans for incremental deepening were formulated in one foot increments from existing channel depths, which vary based on reach, as described in Section 2.2.1 Channels and Turning Basins. The common Corps of Engineers practice of evaluating one-foot depth increments beginning with two feet was followed (e.g. for a -40 foot channel the first evaluated increment is -42 feet, then in one foot increments thereafter through -44 feet).

Preliminary plans for channel deepening were further segmented incrementally according to functionally separable channel segments, as described in Section 5.3.1 Planning Elements. All deep draft cargo vessels use the channels from the sea to the West Access Channel (WAC) and the Middle Turning Basin (MTB). This reach was evaluated in one-foot depth increments.

Table 5-2 presents the existing authorized depth, operational restrictions, and maximum vessel draft (without tidal assistance) for each reach of the channel, from the sea to the West Turning Basin. Deep draft cargo vessels transit channel reaches from the Outer Reach Cut 1A/1B to the West Access Channel. Cruise ships using the north side cruise terminals transit channel reaches from the Outer Reach Cut 1A/1B to Cut A, which is in the West Turning Basin (west of Station 260+00). Note that all vessels with operating drafts deeper than 36 feet require tidal assistance.

Table 5-3
Existing Channel Depth and Draft Requirements (feet below MLLW)

Channel Section	Existing Authorized Depth	Wave Motions[22]	Squat[23]	Safety Clearance	Maximum Unrestricted Draft
Outer Reach Cut 1A/1B	44	1.4	2.9	2.5	37.2
Outer Reach Cut B7/B8	44	1.4	2.4	2.5	37.7
Middle Reach Cut 2A	44	1.4	2.3	2.5	37.8
Middle Reach Cut 2B	44	-	2.0	2.5	39.5
Inner Reach Cut 2 CT	40	-	1.5	2.5	36
Inner Reach Cut 3	40	-	1.1	2.5	36.4
Middle Turning Basin	39	-	-	2.5	36.5
West Access Channel (east of Station 260+00)	39	-	1.0	2.5	35.5
West Access Channel (west of Station 260+00)	31	-	0.5	2.5	28

Note: Maximum unrestricted draft is calculated as authorized depth - wave motion - squat - safety clearance

Table 5-3 presents the array of preliminary plans and the results of the preliminary screening process.

Table 5-4
Preliminary Plan Screening

	Carried Forward	Excluded
Widen Channel and Navigation Aids		
450 feet width	√	
500 feet width	√	
Deepen Channel to WAC/MTB w/berths*		
42 feet depth	√	
43 feet depth	√	
44 feet depth	√	
*Note that the first deepening increment is a two-foot increment		

[22] Squat is the reduction in underkeel clearance between a vessel at-rest and a vessel underway.
[23] Wave motion is a vessel's vertical motion response due to heave and pitch from wind-driven waves.

Preliminary plan assessment was supported by a simulation-based evaluation of channel widths conducted at the Simulation, Training, Assessment and Research (STAR) Center in Dania Beach, Florida. The STAR Center was selected as the simulation facility because it has the most experience in modeling, research, and evaluation for federal navigation improvement projects at Florida ports. The STAR Center has the only known mathematical model that represents the Oasis Class cruise vessel. The STAR Center also has a current and accurate high fidelity resolution geographic and hydrodynamic model of Port Canaveral. The STAR Center performed navigation simulations in 2003 in support of the arrival of Royal Caribbean's *Mariner of the Seas* at Port Canaveral.

The following list provides examples of STAR Center analyses conducted for Federal Navigation projects since 1997:

- Port Everglades 1997 with USACE/WES,
- Cape Fear 1998 with USACE/WES,
- Port Miami Deep Draft Access 2000 with USACE/WES,
- Palm Beach Study 2002 with USACE/Jacksonville District,
- Miami Berth Transit 2002 with USACE/WES,
- Port Canaveral Berth Access 2003 with Canaveral Port Authority,
- Baltimore Harbor 2004 with Maryland Port Administration,
- Blair Waterway 2005 with Port of Tacoma,
- Ybor Sparkman Channel 2005 with USACE/WES and Jacksonville District, and
- Key West Channel Evaluation 2007 with Port of Key West.

5.4.1 Alternatives Eliminated from Detailed Analysis

The CPA currently maintains the West Turning Basin at a depth of -35 feet to allow use of the basin by existing cruise ships. Deepening alternatives greater than -35 feet were excluded from further analysis because the cruise vessels and smaller cargo ships projected to use the West Turning Basin under future without-project conditions do not have sufficient draft to require depths greater than -35 feet. Therefore, no incremental benefits would accrue from deepening beyond -35 feet. Federal assumption of maintenance responsibility to a depth of -35 feet in the West Turning Basin is addressed in an addendum to this report.

Extending the channel width to 550 feet was also eliminated from detailed analysis because of consideration for existing land uses on both sides of the channel. Land to the south side of the channel is heavily developed for recreation, marinas, and restaurants and is not available. Land to the north side of the channel is Air Force property. Although typically vacant, minimization of use of these lands for navigation purposes is preferred, so as to minimize landside impacts. A channel extension to a width 550 feet was excluded from the analysis because of potential impacts and to minimize encroachment on Air Force property. Alternatives Carried Forward

The following alternative plans were carried forward for more detailed analysis:

- Channel widening to 450 feet (Widening Plan 1), from the sea to the West Turning Basin, and placement of an outbound range as an aid to navigation, repositioning of the existing inbound range, and extending an existing turn widener at the entrance from the sea;

- Channel widening to 500 feet (Widening Plan 2), from the sea to the West Turning Basin, and placement of an outbound range as an aid to navigation, repositioning of the existing inbound range, and extending an existing turn widener at the entrance from the sea; and
- Channel deepening from the sea to the West Access Channel and Middle Turning Basin, in three increments. The name of each increment is based on the channel depth at the Inner Reach, which is the first reach from the sea that is not affected by wave action. The without-project depth of the Inner reach is -40 feet. The first increment is a two-foot increment (-42 feet) and each successive increment is a one-foot increment (-43 feet and -44 feet). Each depth increment includes any necessary associated berth deepening (non-federal responsibility).

The Canaveral Port Authority is not interested in partnering in a project deeper than the -44-foot plan at this time, due to high associated costs (port infrastructure upgrades) which would be required by channel depths deeper than the -44-foot plan. Likewise, CPA is not interested in any widening alternatives greater than 500 feet (Widening Plan 2) because they would involve extensive and extremely expensive relocation and reconstruction of berthing facilities at the South Cargo Piers, as well as at NCP 1 & 2. As a result, Port Canaveral has requested a Categorical Exclusion under ER 1105-2-100 to not be required to analyze any plans wider than 500 feet or deeper than -44 feet.

Two widening plans and three deepening plans (Table 5-5) are evaluated incrementally and in combination. The detailed alternative plan evaluation is described in Section 6 Plan Selection. In addition to the plans listed above, the No Action alternative was evaluated as a viable option in accordance with 40 CFR 1502.14(d).

Table 5-5
Alternative Plan Channel Depths and Widths (feet below MLLW)

	Existing Authorized Depth	-42 feet	-43 feet	-44 feet
Outer Reach	41	44	45	46
Middle Reach	41	44	45	46
Inner Reach	40	42	43	44
Middle Turning Basin	39	41	42	43
West Access Channel	39	41	42	43
West Turning Basin	31*	35	35	35
	Existing Authorized Width		**Widen Plan 1**	**Widen Plan 2**
Channel Width	400 feet		450 feet	500 feet

*Maintained by CPA to -35 MLLW

6. PLAN SELECTION

This section presents the detailed alternative plan evaluation that was conducted to identify the recommended plan. The detailed alternative plan evaluation was prepared in accordance with Corps' guidance on formulation and evaluation of deep draft navigation projects as described in:

- The Planning Guidance Notebook, ER 1105-2-100 (22 April 2000);
- National Economic Development Procedures Manual: Deep Draft Navigation, IWR Report 91-R-13 (November 1991);
- Digest of Water Resource Policy and Authorities, EP 1165-2-1 (30 July 1999);
- Planning Guidance Letter #97-06, Cruise Ships and Benefits to Navigation (07 July 1997);
- Policy for Implementation and Integrated Application of the USACE Environmental Operating Principles and Doctrine, ER 200-1-5 (30 October 2003);
- Engineering and Design for Civil Works Projects, ER 1110-2-1150 (31 August 1999); and
- Planning in a Collaborative Environment, EC 1105-2-409 (31 May 2005).

6.1 Integration of Environmental Operating Principles

The proposed project integrated Environmental Operating Principles (EOP) as required under ER 200-1-5, dated 30 October 2003 and ER 1110-2-1150 31 August 1999 in affirming the Corps' commitment to include environmental considerations into the plan formulation and engineering design processes. These principles foster unity of purpose on environmental issues, reflect a new tone and direction for dialogue on environmental matters, and ensure that employees consider conservation, environmental preservation and restoration in all Corps activities.

As described in Section 4.3 Constraints, the principal constraint on the formulation for navigation improvements at Port Canaveral is the avoidance of significant impacts at or near Port Canaveral. Prior to developing project alternatives, environmental evaluations were conducted to define environmental resources that could be influenced by the project construction or operation. State and Federal natural resource agencies were contacted and consulted regarding potential impacts to these natural resources and potential measures that could be utilized to eliminate, reduce, or mitigate potential impacts. In addition, a public scoping meeting was conducted at Port Canaveral to elicit comments and suggestion from both the resource agencies and general public with regards to project design and plan formulation including elements for natural resource protection.

Channel widening and deepening has the potential to affect both manatees and sea turtles. Manatees and juvenile foraging sea turtles are protected species and are present in the harbor. Dredging methods and construction techniques were considered that would provide optimum protection to these species during the plan formulation process.

Construction techniques were selected that would protect resources within the project area such as manatees and sea turtles as well as preserving water quality. Consideration was given to include beneficial use of sediments and to conserve existing riprap material for reuse with the project to facilitate restoration of juvenile sea turtle foraging habitat. The Port has also adopted

new manatee protection measures at the recommendation of the U.S. Fish and Wildlife Service. Monitoring will be conducted during construction to ensure protection of the natural resources in the project area.

The predicted sea level rise will not produce any negative impacts on the existing port infrastructure during the current design life. Facilities developed in the future will be designed with Sea level rise impacts in mind. Sea level rise is not projected to affect project impacts on natural resources (see additional discussion in Section 6.8 Risk and Uncertainty).

6.2 Detailed Alternative Plan Description

6.2.1 Without-project Condition Channel Description

The without-project condition includes continuation of maintenance of the Federal navigation channel and also continued CPA dredging and maintenance of areas outside the current federally authorized channel. These CPA actions include:

- Maintenance of the West Turning Basin to a depth of -35;
- Spot dredging outside of the federally authorized channel in areas recommended by the Canaveral Pilots; and
- Maintenance of the area in the West Turning Basin outside of the federally authorized channel, which the CPA opened to navigation by constructing the Interim Corner Cut Off.

6.2.2 Alternative With-project Condition Channel Descriptions

The alternative plans carried forward for detailed analysis include:

- Channel widening in two 50-foot increments from 400 to 500 feet: Widening Plan 1 (450 feet) and Widening Plan 2 (500 feet). Both channel widening alternatives extend from the sea to the West Turning Basin and include placement of an outbound range as an aid to navigation, repositioning of the existing inbound range, and extending an existing turn widener at the entrance from the sea. The Canaveral Port Authority is not interested in partnering in a project wider than 500 feet at this time, due to high associated costs (port infrastructure upgrades) and severe impacts on CPA, Navy and Air Force facilities.
- Channel deepening from the sea to the West Access Channel and Middle Turning Basin, in three increments starting at -42 feet in the West Access Channel and Middle Turning Basin. The first increment is a two-foot increment (-42 feet) and each successive increment is a one-foot increment (-43 feet and -44 feet). Each depth increment includes associated berth deepening (non-federal responsibility). The Canaveral Port Authority is not interested in partnering in a project deeper than -44 feet at this time, due to associated costs (port infrastructure upgrades) which would be required by channel depths deeper than -44 feet.

6.2.3 Identification of Alternative Plan Increments

Widening Plans 1 and 2 (see Figures 6-1 through 6-3), which exclude any deepening below existing project depths, include the following components:

- Turn Widener:
    - Widening Plan 1 dimensions are -41' project depth X 11.14 acres (irregular shaped area) bounded to the north and northeast by the civil turn widener and Cut 1 of the outer reach;
    - Widening Plan 2 would provide dimensions of -41' project depth X 22.14 acres (irregular shaped area) bounded to the north and northeast by the civil turn widener and Cut 1 of the outer reach
- Middle Reach: The middle reach extends from the apex of the channel turn westward to the western boundary of the Trident access channel. Existing dimensions are -44' project depth X 400' wide X 5,658' long.
    - Widening Plan 1 would increase the project width from 400' to 450', providing a 50' widener of 2,282' in length along the north side of the channel for the portion of the middle reach that is inside of the north jetty. The eastern terminus of the 50' widener transitions from the existing to the new northern channel boundary over a plan distance of 500'
    - Widening Plan 2 would increase the project width to 500', providing a 100' widener of 2,282' in length along the north side of the channel for the portion of the middle reach that is inside of the north jetty. The eastern terminus of the 100' widener transitions from the existing to the new northern channel boundary over a plan distance of 500';
- Trident Access Channel: At the southern boundary of the existing Trident Access channel,
    - Widening Plan 1 will overlay 50' of the Trident Access Channel
    - Widening Plan 2 will overlay a total of 100' of the Trident Access Channel;
- Inner Reach, Cut 2 and Cut 3: Existing dimensions are -40' project depth X 400' wide X 3,344' long.
    - Widening Plan 1 would provide a 50' widening along the entire length of the reach on the north side of the channel. The rip-rap protected shoreline and berm between the Middle and Trident Basins will be relocated northward to accommodate the 50' northside channel widener;
    - Widening Plan 2 would increase the project width to 500', providing a 100' widening along the entire length of the reach on the north side of the channel. The rip-rap protected shoreline and berm between the Middle and Trident Basins will be relocated northward to accommodate the 100' northside channel widener
- West Access Channel (east of Station 260+00): Existing dimensions are -39' project depth X 400' wide X 1,840' long.
    - Widening Plan 1 provides 50' of widening along the entire length of the channel by redefining the northern channel boundary 12' north of the existing northern boundary, and widening the channel by 38' along the south side and into the barge canal

- Widening Plan 2 would increase the project width to 500', providing 100' of widening along the entire length of the channel by redefining the northern channel boundary 12' north of the existing northern boundary, and widening the channel by 88' along the south side and into the barge canal;

- West Turning Basin and West Access Channel (west of Station 260+00): The existing federally authorized turning basin located west of the West Access Channel (west of Station 260+00) encompasses 78.6 acres to an authorized project depth of -31' (federally maintained) and a current depth of -35' (increment dredged and maintained by the CPA). The existing federal project provides a turning circle diameter of 1400'. Since the mid-1980's and as recently as 2003, the CPA also maintains additional areas adjacent to the northeast shoreline at the entrance to the West Turning Basin to -35' at the request of the Canaveral Pilots for ease of cruise ship navigation access. In preparation to homeport the wave of new larger cruise vessels, CPA executed the Interim Corner Cut Off (ICCO) new work dredging from 2009-2011, shifting the -35' CPA maintained dredge boundary further to the northeast. The CPA maintains a depth of -35' at 18.5 acres of navigation area that lie beyond the existing federal project limits at the entrance to west basin. The ICCO is intended to be an interim measure for cruise navigation, and is not anticipated to support access in the full range of conditions encountered at Port Canaveral. The ICCO is currently being included as a without-project condition in all alternative plan evaluations.

- Channel Widening Plans 1 and 2 include identical expansion of the federal project limits in the northern and western portions of the West Turning Basin to enlarge the entrance to the west basin and provide a turning circle diameter of 1,725', which is 325' greater than the existing turning circle and 50 feet wider than the 1,675-foot circle generated by the ship simulation modeling. The reason for a 50-foot larger circle in the West Turning Basin (1.55 times vessel length rather than 1.5 times vessel length) is that the margin of safety was considered by the Canaveral Pilots Association to be too small for the 1,675-foot turning circle. The pilots included the very close proximity of vessels moored at NCP 3 and 4 and the very close proximity of small recreational vessels at the adjacent small craft marinas in their rationale for requiring a slightly larger turning circle than what was generated by the ship simulation modeling. The additional 50 feet will also reduce the potential impact of hydrodynamic forces on moored vessels and small craft as the cruise ship maneuvers within the confines of the turning circle. The turning circle and entrance widening will be created by dredging beyond the present federal and CPA project boundaries to the northeast and to the south within the barge canal. Approximately 18.5 acres of existing bank, shoreline, and uplands adjacent to the CPA -35' project boundary and 6.9 acres within the existing barge canal will be dredged to the currently maintained depth of -35' in order to complete the new turning circle.

Figure 6-1
Alternative Plans: Sheet 1

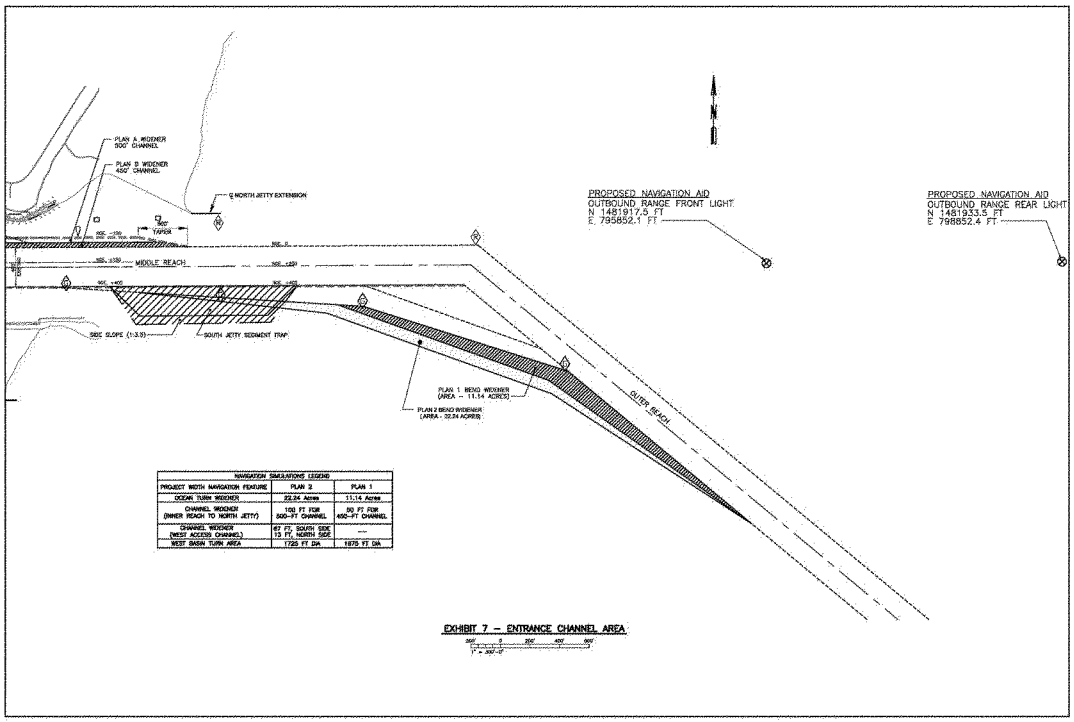


Figure 6-2
Alternative Plans: Sheet 2

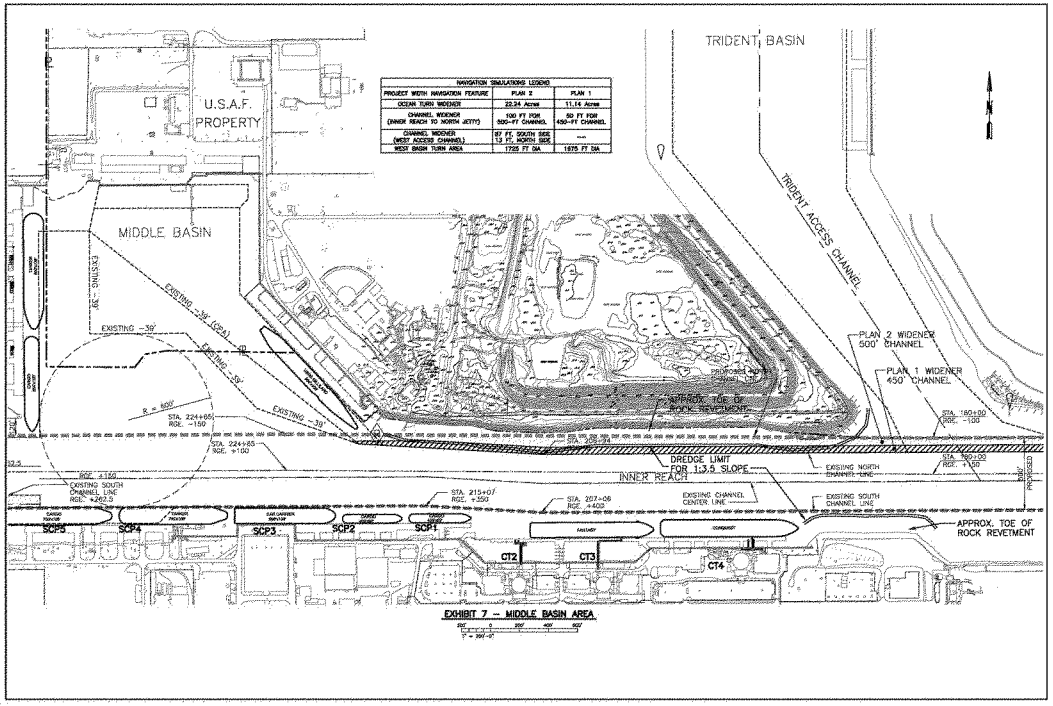
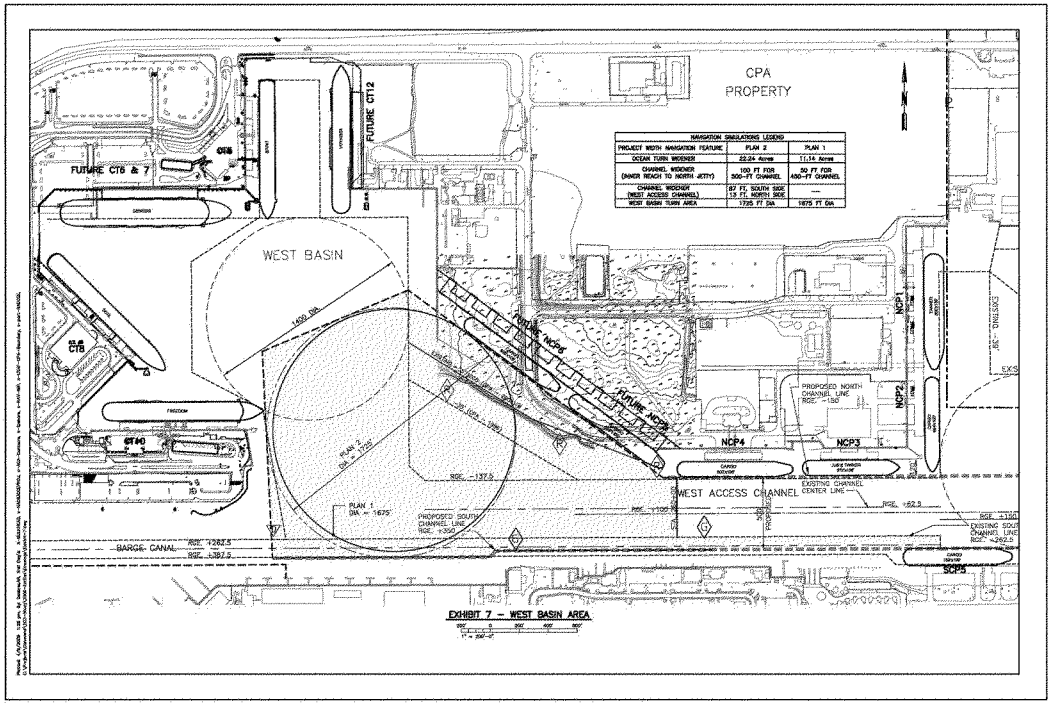


Figure 6-3
Alternative Plans: Sheet 3



Channel deepening increments are identified in the manner prescribed for Corps deep draft navigation feasibility studies, i.e., the first increment of deepening is a two-foot increment and successive increments are one-foot in additional depth. Existing channel depths and potential with-project depths vary among the multiple sections of the channel from the entrance-from-the-sea to each of the turning basins. The naming of channel deepening increments is based on the depth at the Inner Reach. Under this naming convention the first depth increment is named -42 feet (the without-project condition is -40 feet), the second increment is -43 feet, and the third increment is -44 feet. The CPA currently has no interest in channel depth increments greater than -44 feet. Design depths used in the alternatives analysis are based on a 60,000 – 80,000 DWT Bulk Carrier or Panamax Tanker with an operational draft in Port Canaveral of 39.5 feet, which is the projected maximum unrestricted operational draft according to CPA and the Canaveral Pilots Association. The design analysis assumes vessel transit at 0.0 MLLW tide height.

The water depths required in any section of the channel is the sum of wave motion, squat, and safety clearance. The West Access Channel and West Turning Basin are well within the harbor and therefore are subject to less squat and wave motion. Adequate clearance in this innermost channel section does require that the channel be a minimum of 3.5 feet deeper than the 39.5-foot sailing draft of the design vessel (i.e., -43 feet) in order to allow for proper operation of the directional propulsion systems of the cruise ships maneuvering and berthing in the WTB.

As the channel progresses towards the open ocean, channel depth requirements increase because the effects of squat and wave action are greater. At the Outer Reach of the Entrance Channel, which is the closest to the open ocean, the 39.5-foot design vessel sailing draft requires that the channel be 6.6 feet deeper than the vessel's sailing draft to provide adequate safety clearance during typical operations. Future vessels calling at Port Canaveral may arrive at operating drafts greater than 39.5 feet under advantageous tide conditions. Table 6-1 presents the design depth requirements for large cargo vessels arriving at Port Canaveral with an unrestricted operating draft of 39.5 feet. Figures 6-1 and 6-2 display the depths for each channel feature associated with an unrestricted operating draft of 39.5 feet.

Table 6-1
Channel Depth Design Requirements for Unrestricted Operating Draft of 39.5 feet (feet below MLLW)

Channel Section	Existing Authorized Depth	Wave Motions	Squat	Safety Clearance	Total Depth Requirement
Outer Reach Cut 1A/1B	44	1.4	2.9	2.5	46.3
Outer Reach Cut B7/B8	44	1.4	2.4	2.5	45.8
Middle Reach Cut 2A	44	1.4	2.3	2.5	45.7
Middle Reach Cut 2B	44	-	2.0	2.5	44.0
Inner Reach Cut 2 CT	40	-	1.5	2.5	43.5
Inner Reach Cut 3	40	-	1.1	2.5	43.1
Middle Turning Basin	39	-	-	2.5	42.0
West Access Channel	39	-	1.0	2.5	43.0

Note: Total depth requirement calculated as 39.5 ft sailing draft +wave motion +squat +safety clearance

6.3 Alternative Plans Costs

Potential project costs include construction costs, real estate costs, financial costs (interest during construction), engineering and design, supervision and administration, and operation and maintenance costs (Engineering Appendix: Section 10 Cost Estimates). Project economic costs also include any non-financial (i.e., non-cost shared) associated non-Federal costs, such as berth deepening, landside infrastructure, or other modifications that must be incurred in order for project benefits to be realized. A Cost Risk Analysis was conducted, which resulted in a project cost contingency of 20.97%. All project costs used in this analysis include 20.97% contingency. All costs are calculated using FY 2012 dollars, a 50-year project life, and all discounting is conducted at the current FY 2012 Federal discount rate (4.00%). The following sub-sections provide detailed cost information for the alternative plans.

6.3.1 Construction and Investment Costs

Project elements which compose the construction cost for the widening alternatives, including West Turning Basin improvements, include:

- Dredging and disposal or reuse: channel widening, turn widener, and turning basin extension;
- Upland excavation with materials disposal, and reuse: along north side of inner reach, western end of middle reach and at eastern end of West Turning Basin;
- Rip rap revetment: construct revetment re-using existing rip-rap material along north side of inner reach;

- Associated general item costs including mooring dolphin, submarine sail, fence, tower guy, warning sign; and Seawall construction to protect existing Air Force structures;
- Aids to Navigation: two inbound and two outbound range structures;
- Real estate economic costs[24]: upland area (8.0 acres) along north side of inner reach;
- Interest during construction: 14 month construction duration; and
- Engineering and design (E&D) and supervision and administration (S&A);

Note that construction costs for the Interim Corner Cut Off are not included as project costs since they were incurred by CPA in advance of a project partnership agreement.

In addition to the construction first costs listed above, a contingency factor of 20.97% was developed through a cost and schedule risk analysis as the appropriate level of contingency for this project (Engineering Appendix Attachment M: Cost and Schedule Risk Analysis). Interest during construction was calculated on a monthly basis to reflect the opportunity cost of funds allocated to the project. Table 6-2 presents first costs for the two widening alternatives.

[24] Note that real estate costs are included as an economic cost only - in a manner similar to interest during construction. There will be no financial real estate costs other than administrative costs associated with federal involvement in permitting and coordinating other real estate issues during PED.

Table 6-2
Widening Alternatives: Construction First Costs*

Cost Category	Widening Plan 1 (450 feet)	Widening Plan 2 (500 feet)
Real Estate	$822,623	$1,645,245
Upland Excavation	$2,186,521	$4,588,251
Revetment	$2,890,370	$2,890,370
Fence	$100,758	$100,758
Tower Guy	$17,267	$17,267
Warning Sign	$90,301	$90,301
Retaining Wall	$1,189,696	$1,189,696
Submarine Sail	$43,888	$43,888
Aids to Navigation	$1,975,000	$1,975,000
Mooring Dolphin	$190,000	$190,000
Dredging (w/disposal, mob, & de-mob)	$5,105,230	$7,679,180
S&A and E&D (7.5% each)[25]	$2,454,447	$2,814,707
Interest During Construction	$357,840	$518,637
Sub-Total	**$17,423,940**	**$23,743,299**
Contingency (20.97%)[26]	$3,653,800	$4,978,970
Total Widening Plan Construction Costs	**$21,077,740**	**$28,722,269**

*Widening to existing depths only – no channel deepening

Construction costs for the channel deepening alternatives include dredging and disposal costs and minor associated costs required for some berth deepening. Dredge material volumes and costs are based on existing conditions and reflect the various existing channel depths presented in

[25] Supervision and Administration for Real Estate is included in the S&A for LERR items. Engineering and Design costs were not applied to the real estate cost estimate.
[26] The appropriate contingency level was identified by the Cost and Schedule Risk Analysis (Engineering Appendix Attachment M: Cost and Schedule Risk Analysis Report

Table 5-1. There are no utility relocations associated with the channel deepening alternatives. Table 6-3 presents the construction costs for deepening the channel at the existing 400-foot authorized channel width (excludes any channel widening). Construction costs for combined widening and deepening alternatives are presented in Table 6-4 (Widening Plan 1 plus deepening alternatives) and Table 6-5 (Widening Plan 2 plus deepening alternatives).

Table 6-3
Construction Costs: Channel Deepening Alternatives*

Cost Category	-42 feet	-43 feet	-44 feet
Unrestricted Operating Draft	38 feet	39 feet	40 feet
Channel Dredging (w/disposal, mob, & de-mob)	$2,287,271	$5,891,577	$10,021,292
Berth Dredging	$126,750	$190,125	$253,500
S&A and E&D (7.5% each)	$343,091	$883,737	$1,503,194
Interest During Construction	$47,791	$74,072	$84,737
Sub-Total	**$2,804,903**	**$7,039,510**	**$11,862,723**
Contingency (20.97%)[27]	$588,188	$1,476,185	$2,487,613
Total Deepening Only Construction Costs	**$3,393,091**	**$8,515,695**	**$14,350,336**

*Excludes channel widening – deepening at existing widths only

[27] The appropriate contingency level was identified by the Cost and Schedule Risk Analysis (Engineering Appendix Attachment M: Cost and Schedule Risk Analysis Report

Table 6-4
Construction Costs: Widening Plan 1 (450 feet) and Channel Deepening

Cost Category	-42 feet	-43 feet	-44 feet
Unrestricted Operating Draft	38 feet	39 feet	40 feet
Real Estate	$822,623	$822,623	$822,623
Upland Excavation	$2,186,521	$2,186,521	$2,186,521
Revetment	$2,890,370	$2,890,370	$2,890,370
Fence	$100,758	$100,758	$100,758
Tower Guy	$17,267	$17,267	$17,267
Warning Sign	$90,301	$90,301	$90,301
Retaining Wall	$1,189,696	$1,189,696	$1,189,696
Submarine Sail	$43,888	$43,888	$43,888
Aids to Navigation	$1,975,000	$1,975,000	$1,975,000
Mooring Dolphin	$190,000	$190,000	$190,000
Dredging (w/disposal, mob, & de-mob)	$6,327,537	$10,274,373	$14,749,236
Berth Dredging	$126,750	$190,125	$253,500
S&A and E&D (7.5% each)	$2,074,942	$2,622,481	$3,242,001
Interest During Construction	$371,200	$434,170	$444,263
Sub-Total	**$18,406,852**	**$23,027,572**	**$28,195,424**
Contingency (20.97%)[28]	$3,859,917	$4,828,882	$5,912,580
Total Widening 1 Plus Deepening Plan Construction Costs	**$22,266,769**	**$27,856,454**	**$34,108,004**

[28] The appropriate contingency level was identified by the Cost and Schedule Risk Analysis (Engineering Appendix Attachment M: Cost and Schedule Risk Analysis Report

Table 6-5
Construction Costs: Widening Plan 2 (500 feet) and Channel Deepening

Cost Category	-42 feet	-43 feet	-44 feet
Unrestricted Operating Draft	38 feet	39 feet	40 feet
Real Estate	$1,645,245	$1,645,245	$1,645,245
Upland Excavation	$4,588,251	$4,588,251	$4,588,251
Revetment	$2,890,370	$2,890,370	$2,890,370
Fence	$100,758	$100,758	$100,758
Tower Guy	$17,267	$17,267	$17,267
Warning Sign	$90,301	$90,301	$90,301
Retaining Wall	$1,189,696	$1,189,696	$1,189,696
Submarine Sail	$43,888	$43,888	$43,888
Aids to Navigation	$1,975,000	$1,975,000	$1,975,000
Mooring Dolphin	$190,000	$190,000	$190,000
Berth Dredging	$126,750	$190,125	$253,500
Dredging (w/disposal, mob, & de-mob)	$9,590,087	$13,849,784	$18,637,509
S&A and E&D (7.5% each)	$3,120,355	$3,768,816	$4,496,481
Interest During Construction	$563,586	$617,672	$629,839
Sub-Total	**$26,131,554**	**$31,157,174**	**$36,748,105**
Contingency (20.97%)	$5,479,787	$6,533,659	$7,706,078
Total Widening 2 Plus Deepening Plan Construction Costs	**$31,611,341**	**$37,690,833**	**$44,454,182**

6.3.2 Costs of Previously Completed Work

Construction of the Interim Corner Cut Off (ICCO) included upland excavation, dredging, the re-construction of Grouper Road and the adjacent utility corridor. The work included 354,322 cubic yards of upland excavation and 507,253 cubic yards of dredging. All dredging was conducted at depths above -45 feet. The total cost of the ICCO, including engineering, design, supervision, and administration is $13,775,063 (Table 6-6). These costs are not included in project costs in this report because they were expended in advance of project authorization in order to meet the near term navigation needs of new vessels arriving at the Port since initiation of

the Section 203 study. The CPA will seek credit for these costs as part of the specific Congressional authorization for the proposed project improvements.

Table 6-6
Cost of Work Completed By CPA

Work Item	Cubic Yards	Cost
Upland Excavation	354,322	$5,556,188
Dredging	507,253	$7,309,700
Dredging & Upland SA & ED		$454,991
Grouper Road and Utility Re-construction		$399,188
Grouper Rd & Utility SA & ED		$54,996
Total ICCO Cost		$13,775,063

6.3.3 Operations and Maintenance Costs

Operation and maintenance costs generated by the project are defined as those incremental operations and maintenance costs that are in excess of the costs already required to operate and maintain the existing Federal project. The operations and maintenance costs of the alternative plans are based on increased maintenance dredging volumes due to the widening of the existing channels. Analysis of historical maintenance dredging patterns and the hydrodynamics analysis of without and with-project conditions indicate that very minor changes in hydraulic conditions due to channel deepening would result in no additional maintenance dredging volumes due to the deepening alternatives. Therefore, no appreciable additional operations and maintenance costs are allocated to the channel deepening alternatives.

The estimated annual volume of additional maintenance dredging material generated by the Widening 1 alternative is 52,125 cubic yards. The resulting additional Widening 1 alternative plan-related maintenance dredging cost is $467,561 ($8.97/CY) annually. The estimated annual volume of additional maintenance dredging material generated by the Widening 2 alternative is 69,500 cubic yards. The resulting additional Widening 2 alternative plan-related maintenance dredging cost is $623,415 ($8.97/CY) annually.

6.3.4 Total Average Annual Equivalent Costs

Tables 6-7 through 6-10 present the total Average Annual Equivalent (AAEQ) project costs for each alternative plan and the incremental AAEQ cost for each successive plan increment. For tables presenting combined widening and deepening project AAEQ cost information (Tables 6-9 and 6-10), the first project increment is channel widening. Channel widening is the appropriate first increment because channel widening is the only type of improvement that benefits both the cargo and cruise industries operating at the Port (Section 6.3 With-Project Benefits). The succeeding increments are channel deepening starting with a two-foot increment followed by successive one-foot increments, where necessary to achieve the required depths identified in Table 5-1 (rounded up to the nearest full foot). All average annual equivalent costs are calculated with the FY 2012 price levels and discount rate of 4.00% over a period of 50 years.

Table 6-7
Average Annual Equivalent (AAEQ) Project Costs: Channel Widening

Alternative Plan	Total First Costs	Total AAEQ First Costs	Incremental Annual Maintenance Costs	Total AAEQ Costs	Incremental AAEQ Costs
Widening Plan 1 (450 feet)	$21,077,740	$981,173	$467,561	$1,448,734	$1,448,734
Widening Plan 2 (500 feet)	$28,722,269	$1,337,027	$623,415	$1,960,442	$511,708

Note: FY 2012 Price Levels, FY 2012 discount rate = 4.00%, period 50 years

Table 6-8
Average Annual Equivalent (AAEQ) Project Costs: Channel Deepening

Alternative Plan	Total First Costs	Total AAEQ First Costs	Incremental Annual Maintenance Costs	Total AAEQ Costs	Incremental AAEQ Costs
-42-foot Plan	$3,393,091	$157,949	$0	$157,949	$157,884
-43-foot Plan	$8,515,695	$396,407	$0	$396,407	$238,458
-44-foot Plan	$14,350,336	$668,011	$0	$668,011	$271,604

Note: FY 2012 Price Levels, FY 2012 discount rate = 4.00%, period 50 years

Table 6-9
Average Annual Equivalent (AAEQ) Project Costs: Widening Plan 1 (450 feet) and Channel Deepening

Alternative Plan	Total First Costs	Total AAEQ First Costs	Annual Maintenance Costs	Total AAEQ Costs	Incremental AAEQ Costs
450-foot widening (W1) only	$21,077,740	$981,173	$467,561	$1,448,734	$1,448,734
W1 and -42-foot deepening	$22,266,769	$1,036,523	$467,561	$1,504,084	$55,350
W1 and -43-foot deepening	$27,856,454	$1,296,724	$467,561	$1,764,285	$260,201
W1 and -44-foot deepening	$34,108,004	$1,587,734	$467,561	$2,055,296	$291,011

Note: FY 2012 Price Levels, FY 2012 discount rate = 4.00%, period 50 years

Table 6-10
Average Annual Equivalent (AAEQ) Project Costs: Widening Plan 2 (500 feet) and Channel Deepening

Alternative Plan	Total First Costs	Total AAEQ First Costs	Annual Maintenance Costs	Total AAEQ Costs	Incremental AAEQ Costs
500-foot widening (W2) only	$28,722,269	$1,337,027	$623,415	$1,960,442	$1,960,442
W2 and -42-foot deepening	$31,611,341	$1,471,514	$623,415	$2,094,929	$134,487
W2 and -43-foot deepening	$37,690,833	$1,754,516	$623,415	$2,377,931	$283,002
W2 and -44-foot deepening	$44,454,182	$2,069,351	$623,415	$2,692,766	$314,835

Note: FY 2012 Price Levels, FY 2012 discount rate = 4.00%, period 50 years

6.4 With-Project Benefits

The NED Procedures Manual Deep Draft Navigation (IWR Report 91-R-13) presents three general examples of NED navigation project benefits, which are based on the conceptual basis for navigation benefits identified in the Principles and Guidelines (1983). The NED Procedures Manual states as an example of navigation benefits (page 11):

"Reduced cost of transportation through use of vessels (modal shift), through safer or more efficient operation of vessels and/or use of larger more efficient vessels (channel enlargement), and through use of new or alternative vessel routes (new channels or port shift)."

The with-project condition transportation cost savings calculated in this analysis fully coincide with this example presented in the NED Procedures Manual. With-project condition cargo vessel transportation cost savings are based on safer more efficient operation of cargo vessels and use of larger, more efficient cargo vessels. With-project condition cruise ship transportation cost savings are based on safer more efficient cruise ship operations at the port and on reduced cruise ship impacts to cargo operations within the port.

In addition to transportation cost savings generated by the project, the channel widening and deepening reduces surge effects in the Middle Turning Basin, Trident Basin, and at berths NCP3 & 4. The direct benefits to the Navy and Air Force vessels using the Middle and Trident Turning Basins due to reduced surge effect, such as damage reduction or line handling cost reductions, has not been quantified in monetary terms; however, the tug assist cost savings for Trident Basin vessels under with-project conditions has been included in the benefits calculations.

The following sub-sections describe the surge reduction and NED benefit estimation process. NED benefits are presented for with-project channel widening and channel deepening conditions. Channel widening, with associated aids to navigation and turning basin extension, generate cargo ship and cruise ship-related NED benefits. Channel deepening generates cargo ship-related NED benefits. There are no cruise ship related benefits from channel deepening.

6.4.1 Surge Modeling Results – With Project Conditions

The surge modeling investigation described in Section 4.1.3 also compared the surge effects of harbor widening and deepening to surge effects under existing conditions. The results of this comparison showed an overall reduction in surge effects with the project. These included:

- a reduction in peak water surface elevations throughout the harbor under with project conditions;
- a reduction in maximum peak to trough surge height under with project conditions;
- a slight modification in the timing of surge waves under with project conditions; and
- a general reduction in the forces and moments on the berthed vessels ranging from slight to fairly significant under with project conditions.

The surge modeling and analysis documentation report was presented to the Mission Partners for review and comment, who concurred in the results. The final revised report is included in the Engineering Appendix. The final report confirms that surge effects will be moderately reduced (and not at all increased) by channel widening and deepening. Enhanced operational safety for naval and cargo vessels are projected to result from the proposed navigation improvements. NED benefits related to operational safety for naval and cargo vessels have not been calculated in the analysis; however, NED benefits (cost savings) associated with reduction in surge effects are described and quantified below.

6.4.2 Channel Widening Benefits

Channel Widening Plans 1 & 2, including associated aids to navigation and turning basin extension components, are standalone alternative plans. The two channel widening alternative plans do not require a channel deepening component to generate transportation cost savings. A wider channel would beneficially affect cruise ship operations in the Port, reduce the incidence and severity of surge effects on moored cargo vessels during cruise ship passage through the Port, and would allow larger tankers to navigate the channel to and from the Seaport Canaveral Fuel Terminal and other cargo berths. Transportation cost savings would be generated by fewer incidences of tug assist during cruise ship passage through the Port, by fewer incidences of tug assist for cargo vessels in the Port, and by efficiencies gained through the use of larger (longer) tankers at the Seaport Canaveral Fuel Terminal.

There are two components to the beneficial effects of the alternative channel widening plans. One component is that a wider channel would allow longer (greater Length Overall [LOA]) tankers to call at Seaport Canaveral Fuel Terminal. At the request of Seaport Canaveral, the Canaveral Pilots Association has made determinations concerning maximum vessel LOA for Seaport Canaveral tankers. Under without-project conditions, the maximum LOA for Seaport Canaveral tankers is 800 feet. Under Channel Widening Plans 1 and 2, the maximum LOA for Seaport Canaveral tankers increases to 850 feet and 900 feet, respectively.

The second component of alternative widening plan beneficial effects is directly related to wind conditions at the Port. Under perfectly calm conditions (winds ranging from 0 to 5 knots) the existing channel is adequate for most vessel operations. As wind speeds increase, safe navigation within the channel becomes more challenging. At relatively high winds, additional tug assistance is required to maintain navigation within the channel or to provide stabilizing force to offset surge effects on vessels moored at vulnerable piers within the Port. Wind-related

beneficial effects on port operations projected to result from the alternative widening plans, which are assessed in this analysis include:

- Reduction in the frequency of tug assistance for the largest cruise ships under strong wind conditions;
- Reduction in the frequency of tug assistance for the largest Seaport Canaveral tankers (tankers 800 feet LOA and larger); and
- Reduction in the frequency of tug assistance to offset surge impacts for vessels moored in or at
    - Trident Basin (Navy vessels)
    - North Cargo Piers 1 and 2
    - North Cargo Piers 3 and 4.

6.4.2.1 Wind Analysis

An analysis of wind conditions at the Port was conducted to project the effects of winds on port operations. Wind speed, direction, and duration data were obtained from the following sources

- NASA Space Shuttle Landing Facility: March 1978 – August 2009
- Patrick Air Force Base: March 1945 – December 2004
- Trident Submarine Basin (NOAA Station TRDF1): April 2005 – December 2008, and
- NOAA Sea Buoy Station 41009: January 1988 – August 2008

Wind data recorded during cruise ship transit times (4 – 8 am and 3 – 7 pm) were sorted from the overall wind data and were exclusively used in the analysis. Wind data was adjusted for elevation differences between recording station and cruise ship instrumentation. Wind direction was also taken into account by reducing the effect of winds that are not directly abeam of a vessel transiting the channel within the Port (winds from due north or due south). Wind effectiveness ranges from 100% for winds from the north and south to 0% for winds coming directly from the east or west. The wind speeds used in this analysis represent an "effective wind speed" which discounts the effects of winds that are not directly abeam of the vessel during channel transit within the Port. This adjustment artificially reduces the effect of winds on vessels approaching the Port and in the turn at the entrance to the Port.

The lowest maximum wind speed for a continuous three hour period was calculated for cruise ship transit times (morning and afternoon) for Summer (April – October) and Winter (November – March) for NASA Space Shuttle Landing Facility and NOAA Sea Buoy Station 41009 wind records. These calculations were conducted in 5 knot increments: 10 to 15 knots, 15 to 20 knots, 20 to 25 knots, etc. The number of occurrences for each wind speed increment during cruise ship transit time periods was divided by the total number of cruise ship transit time periods to calculate the probability for each wind speed increment during cruise ship transit time periods. The probability for each wind speed increment was multiplied by the probability that a large cruise ship would transit the channel (50 days per year for weekly cruises and 100 days per year for bi-weekly cruises) to obtain a joint probability for each wind speed increment during a large cruise ship transit. The resulting joint probabilities are used to estimate the number of vessel

transits that would be affected by wind conditions (see Economics Appendix Section 5.3.1.1 Wind Analysis).

Similar calculations were conducted to obtain the joint probabilities of potential wind-related effects on other port operations. The joint probability for wind speed increments and large Seaport Canaveral tanker transits was calculated by multiplying the raw wind speed increment probability by the probability of the tanker transiting the channel. The joint probability for vessels moored at surge vulnerable piers was calculated by multiplying the joint probability for cruise ship transit by the probability that a vessel would be moored at the vulnerable pier (berth utilization rates). These berth utilization rates are based on the assumption that at least one vessel will be at the affected pier: North Cargo Piers 1 and 2 - 79%; North Cargo Piers 3 and 4 - 50%, Trident Basin – 10%.

6.4.2.2 Port Operations Analysis

An Operations Matrix was developed by the CPA's consulting engineers in consultation with the Canaveral Pilots Association and the operations personnel at the Canaveral Port Authority Tables 6-11 and 6-12). The Operations Matrix identifies the amount of tug assistance required under various wind speeds under without and with-project conditions. Other port operation activities which may be required under various wind conditions, such as relocation of cargo vessels from docks that are vulnerable to surge from passing vessels and lowering the maximum wind speed for entering and exiting the Port are less likely to be implemented and therefore are not addressed in the Operations Matrix. The beneficial effects of channel widening on these other port operation activities were not assessed in this analysis. The Operations Matrix was reviewed and approved by the Canaveral Pilots Association at one of their monthly membership meetings.

Table 6-11
Operations Matrix: Impact of Widening Plan 1(Number of Tugs)

	Sustained* Wind Speeds (Knots)					
	10-15	**15-20**	**20-25**	**25-30**	**30-35**	**35-40**
Cruise Ship Tug Assist						
Without-project	0	0	0	1	2	2
With-Project	0	0	0	0	1	2
Cargo Vessel Tug Assist NCP 1&2						
Without-project	0	0	0	1	1	1
With-Project	0	0	0	0	1	1
Cargo vessel Tug Assist NCP 3&4						
Without-project	0	0	1	1	1	1
With-Project	0	0	0	1	1	1
Trident Basin Tug Assist						
Without-project	0	0	0	1	1	1
With-Project	0	0	0	0	1	1
Largest Tanker Additional Tug						
Without-project	0	1	1	1	1	1
With-Project	0	0	1	1	1	1

* Lowest maximum wind speed during a consecutive three hour period

Table 6-12
Operations Matrix: Impact of Widening Plan 2
(Number of Tugs)

	Sustained* Wind Speeds (Knots)					
	10-15	**15-20**	**20-25**	**25-30**	**30-35**	**35-40**
Cruise Ship Tug Assist						
Without-project	0	0	0	1	2	2
With-Project	0	0	0	0	1	1
Cargo Vessel Tug Assist NCP 1&2						
Without-project	0	0	0	1	1	1
With-Project	0	0	0	0	0	1
Cargo vessel Tug Assist NCP 3&4						
Without-project	0	0	1	1	1	1
With-Project	0	0	0	0	1	1
Trident Basin Tug Assist						
Without-project	0	0	0	1	2	2
With-Project	0	0	0	0	1	1
Largest Tanker Additional Tug						
Without-project	0	1	1	1	1	1
With-Project	0	0	0	0	1	1

* Lowest maximum wind speed during a consecutive three hour period

6.4.2.3 Widening Plan Benefit Calculations – Tug Assistance Reductions

Alternative Widening Plan benefits (Table 6-13) were calculated using identical assumptions concerning cruise ship schedules, tug operations, and tug costs. Three of the world's largest cruise ships are projected to work out of Port Canaveral on a weekly schedule (*Freedom of the Seas, Carnival Dream, and Disney Dream*) and one (*Disney Fantasy*) is projected to work on a bi-weekly schedule. Cruise ship related benefits are calculated based on the operations of these four vessels only. The three weekly scheduled ships are projected to all arrive and depart on the same day (similar to existing weekly schedule operations). For the base case analysis, it is assumed that a single tug would be sufficient for each wind event. For example, under without-project conditions and a 25-30 knot wind event on a day when the three large cruise ships are entering or exiting the Port, the base case analysis assumes that the same tug would be able to service all three cruise ships at the cost of a single tug call plus stand-by charges for two of the cruise ships. Tug costs are based on the current rates charged by the two tug companies operating in the Port (see Economics Appendix Table 5-14 for sample calculation).

Table 6-13
Alternative Widening Plan Annual Benefits – Tug Assistance Reductions: 2020

	Tug Assist Events		Tug Assist Costs		
	Without Project	With Project	Without Project	With Project	Transportation Cost Savings
Channel Widening Plan 1 (450 feet)					
Seaport Canaveral Tankers	10	4	$49,125	$23,924	$25,201
Trident Basin (Navy vessel) Tug Assist	2	1	$20,418	$8,411	$12,007
North Cargo Piers 3 & 4 Tug Assist	17	8	$144,787	$70,628	$74,159
North Cargo Piers 1 & 2 Tug Assist	13	6	$111,592	$49,709	$61,883
Cruise Ship Tug Assist	24	10	$754,663	$310,883	$443,780
Total					**$617,030**
Channel Widening Plan 2 (500 feet)					
Seaport Canaveral Tankers	10	0.5	$49,125	$4,689	$44,436
Trident Basin (Navy vessel) Tug Assist	2	1	$20,418	$6,934	$13,484
North Cargo Piers 3 & 4 Tug Assist	17	4	$144,787	$31,462	$113,326
North Cargo Piers 1 & 2 Tug Assist	13	2	$111,592	$16,739	$94,853
Cruise Ship Tug Assist	24	8	$754,663	$256,301	$498,362
Total					**$764,461**

Alternative channel widening plans also allow the use of longer tankers at the Seaport Canaveral Terminal. The terminal operators have already engaged the Canaveral Pilots Association in discussions concerning the largest ships that can safely enter and exit the Port for diesel fuel and gasoline deliveries. The use of larger ships will allow Seaport Canaveral Terminal to import the same annual tonnage with fewer vessel trips (Table 6-14). The transportation cost savings are calculated as the avoided trip costs.

Avoided trip costs are calculated using most recent Corps of Engineers vessel operating costs for the appropriate vessel size and for an estimated trip one-way distance. Vessels are assumed to arrive at the Port's maximum unconstrained operating draft (36.0 feet) under without-project and alternative with-project conditions. Seaport Canaveral purchases spot cargoes rather than maintain multiple deliverable contracts with refineries. The terminal does not maintain time-charter relationships with carriers or long-term contracts with individual refiners. Under these "spot market" operations, vessels and import cargo may reasonably come from any one of the major petroleum product importers to the US.

Actual Seaport Canaveral point-to-point distance data mostly includes imports but also includes some domestic movements to Seaport Canaveral and some export movements which have been observed between February 2010 and July 2011. One-way travel distance per trip (2,014 miles) was calculated as a weighted average of the distances from the actual ports of origin or destination for all Seaport Canaveral point-to-point tanker calls observed between February 2010 and July 2011. The weights are based on the proportion of the origins or destinations total Seaport Canaveral point-to-point tanker tonnage for February 2010 through July 2011.

Table 6-14
Alternative Channel Widening Plan Annual Benefits – Larger Tankers: 2020

	Without Project (400 feet)	Widening Plan 1 (450 feet)	Widening Plan 2 (500 feet)
Vessel LOA	600 feet	850 feet	900 feet
Arrival Draft	36 feet	36 feet	36 feet
Tons per trip	41,323	57,852	74,381
Number of trips	55	39	30
Total Annual Cost	$8,639,226	$7,479,649	$6,708,974
Transportation Cost Savings	---	**$1,159,577**	**$1,930,252**

Total annual channel widening plan benefits are the sum of the benefits due to reduced tug assistance and avoided fuel import trips (Table 6-15). It is important to note that the without-project condition reflects the effects of the CPA's widening beyond the federal channel, which includes the Interim Corner Cut Off and channel notching as described in Section 3: Without-Project Conditions.

Table 6-15
Total Annual Channel Widening Benefits

	Total Benefits
Channel Widening Plan 1 (450 feet)	
Reduced Tug Assist	$606,126
Avoided Tanker Trips	$1,277,842
Total	**$1,883,968**
Channel Widening Plan 2 (500 feet)	
Reduced Tug Assist	$745,426
Avoided Tanker Trips	$2,084,322
Total	**$2,829,748**

6.4.3 Channel Deepening Benefits

With-project channel deepening benefits will result from cargo vessels arriving at Port Canaveral with deeper drafts and larger loads than under without-project conditions. Larger loads and deeper drafts allow vessels to operate more efficiently. This efficiency gain is calculated as the difference in operating costs for vessels delivering the projected commodity tonnage under without and with-project conditions. In the assessment of alternative plans, the annual projected tonnage is the same under without and with-project conditions, but the number of trips required and annual operating costs (ocean voyage costs plus landside costs) will decrease due to deeper with-project channel depths.

Identification of the commodities and vessel fleet that may be impacted by deeper channel depths is based on observed historical (fiscal years 2000 – 2009) and calendar year 2006 vessel operations and commodity data. Only six commodities (aggregates, cement, limestone, granite, slag, and fuel oil) are typically delivered in large enough quantities on cargo vessels of sufficient size to potentially take advantage of a deeper channel. For future fuel oil deliveries to the Seaport Canaveral Fuel Terminal, the projected fleet and projected volumes are based on Seaport Canaveral's operational projections as presented to the CPA and discussions with port planning and operations personnel.

Table 6-16 presents the calendar year 2006 vessel and load characteristics (with the exception of projected Seaport Canaveral Fuel Terminal vessel calls) used to project with-project condition drafts and loads. Vessel type classifications were used to differentiate between different size vessels carrying the same commodity, and to differentiate among vessels carrying the same commodity to different terminals at Port Canaveral (e.g., vessels carrying cement to north cargo pier (NCP) 4 and cement to south cargo pier (SCP) 5 are designated as different vessel types because cement vessels calling at NCP4 typically load more deeply and have different origins than cement vessels calling at SCP5). The allocation of commodity tonnage to each vessel type is based on the observed 2006 proportion of the commodity carried on that vessel type. For

example, a 60,000 DWT vessel delivering aggregate carried 41% (171,137) of the total 412,598 tons of aggregate delivered to Port Canaveral in calendar year 2006.

Vessel and load characteristics for vessels projected to call at the Seaport Canaveral Fuel Terminal are based on their first 18 months of operational data, discussions with CPA personnel and the projections provided to the CPA by Seaport Canaveral. Point-to-point calls at Seaport Canaveral accounted for 44% of all petroleum products moved through the facility from February 2010 through July 2011.

Under without-project conditions, Seaport Canaveral point-to-point fuel oil tanker length is based on observations presented in Section 2.5.7 Existing Cargo Fleet Operations and Tidal Advantage. Although 800 feet LOA is the longest cargo vessel the Canaveral Pilots will bring into the harbor, at the existing unconstrained operating draft (36 feet) large tankers are required to light load to the extent that they are less efficient than a smaller tanker, which can be more fully loaded when operating with a draft of 36 feet. Because Seaport Canaveral point-to-point tankers do not use tidal advantage, they are regularly 600 feet LOA, which allows more efficient operations under the without-project depth constraint. Under channel widening and deepening conditions, Seaport Canaveral point-to-point tankers are projected to increase in length and operate at deeper drafts, which allow the longer vessels to operate efficiently.

- without-channel widening conditions (800 feet LOA maximum);
- with-project Widening Plan 1 (850 feet LOA maximum); and
- with-project Widening Plan 2 (900 feet LOA maximum).

Vessel arrival draft is based on the without-project condition unrestricted maximum vessel operating draft (no tidal advantage required; 36.0 feet).

Table 6-16
Large Cargo Vessel Characteristics

	2006 Observed Averages				
Commodity	**DWT**	**Length**	**Arrival Draft**	**Tonnage per call**	**Percent of Commodity Total**
Aggregate	60,000	700	38.7	57,046	41%
Cement	35,000	589	33.3	34,117	16%
Cement	35,000	609	33.5	39,295	47%
Cement	40,000	634	34.5	23,155	7%
Limestone	35,000	597	36.0	37,529	38%
Granite	60,000	753	39.5	60,335	62%
Slag	35,000	599	34.8	41,882	100%
Fuel Oil w/o*	50,000	600	36.0	41,323	44%
Fuel Oil Wide Plan 1	70,000	850	36.0	57,852	44%
Fuel Oil Wide Plan 2	90,000	900	36.0	74,381	44%

Source: CPA data
*Note: Fuel oil vessels based on actual (without-project) and projected with-project Seaport Canaveral Terminal fleet characteristics

Table 6-17 presents the without and with-project condition operating drafts and tonnage per call for selected large cargo vessels. Operating drafts under future with-project conditions are estimated based on observed 2006 operating drafts. Large deep draft cargo vessels arriving at Port Canaveral typically arrive with loads just less than the 36-foot constraint in order to avoid tide and priority traffic delays (see discussion in Section 2.5.7 Existing Cargo Fleet Operations). In 2006, 51 vessels arrived with drafts between 33 and 36 feet and only 19 vessels arrived at drafts greater than 36 feet. Projected with-project operating drafts maintain the observed relationship between a vessel's arrival draft and the port's maximum unconstrained arrival draft. In this way the carrier's observed reliance on tidal advantage, or conversely, the carrier's observed reluctance to use the tide is projected in the alternative depth scenarios under with-project conditions. For example, in 2006 slag vessels arrived, on average, with an operating draft of 34.8 feet, which is 1.2 feet less than the 36-foot maximum unconstrained arrival draft. Under with-project conditions, slag vessels always maintain that 1.2–foot differential, so that under a two-foot deepening with-project condition the maximum unconstrained arrival draft increase to 38 feet and slag vessels are projected to arrive at 36.8 feet (38 – 1.2 = 36.8).

With-project unconstrained vessel operating drafts are truncated at 39.5 feet. Port terminal operators and the pilots have identified 39.5 feet as the required unconstrained maximum

operating draft for existing and future vessels. Currently, vessels arriving with drafts greater than 36 feet are constrained by channel depth conditions. Port terminal operators do not project that future vessels will regularly arrive at operating drafts greater than 39.5 feet, although occasional vessels may arrive with deeper drafts. The reason for this unconstrained maximum operating draft (39.5 feet) is that 40 feet of depth at the port's berths is considered approximately the maximum depth that can be achieved without the need for major reconstruction. A depth of 40 feet at the berth provides the minimum one-half foot of required underkeel clearance for vessels berthed with a draft of 39.5 feet. For these reasons, the deepest future unconstrained operating draft at the port would be no greater than 39.5 feet in accordance with the limitations of the port's existing berths and the dimensions of the projected fleet. No benefits are associated with channel depths greater than the design requirements identified in Table 5-3 Existing Channel Depth and Draft Requirements.

Channel deepening also extends the period of time when naval vessels can access the Trident Basin without the need for tidal advantage. Reducing the need for tidal advantage extends the unrestricted operational capability of naval vessels. NED benefits have not been calculated for this ancillary benefit to the US Navy.

Table 6-17
Without and With-project Operating Drafts and Tons per Call

		Operating Drafts			
Commodity	**DWT**	**Without Project (-40 feet)**	**-42 feet**	**-43 feet**	**-44 feet**
Aggregate	60,000	38.7	39.5	39.5	39.5
Cement	35,000	33.3	35.3	36.3	37.3
Cement	35,000	33.5	35.5	36.5	37.5
Cement	40,000	34.5	36.5	37.5	38.5
Limestone	35,000	36.0	38.0	39.0	39.5
Granite	60,000	39.5	39.5	39.5	39.5
Slag	35,000	34.8	36.8	37.8	38.8
Fuel Oil w/o	50,000	36.0	38.0	39.0	39.5
Fuel Oil Wide Plan 1	70,000	36.0	38.0	39.0	39.5
Fuel Oil Wide Plan 2	90,000	36.0	38.0	39.0	39.5
			Tons per Call		
Commodity	**DWT**	**Without Project (-40 feet)**	**-42 feet**	**-43 feet**	**-44 feet**
Aggregate	60,000	57,046	57,174	57,174	57,174
Cement	35,000	34,117	36,749	38,066	39,382
Cement	35,000	39,295	41,928	43,245	44,561
Cement	40,000	23,155	26,015	27,446	28,876
Limestone	35,000	37,529	40,162	41,478	42,136
Granite	60,000	60,335	60,335	60,335	60,335
Slag	35,000	41,882	44,515	45,832	47,148
Fuel Oil w/o	50,000	41,323	44,717	46,414	47,263
Fuel Oil Wide Plan 1	70,000	57,852	62,061	64,165	65,217
Fuel Oil Wide Plan 2	90,000	74,381	79,323	81,794	83,030

The number of projected cargo vessel calls for the mid-level (base case) commodity forecast is presented in Table 3-4. Only a sub-set of Port Canaveral commodities and vessels would benefit

from channel deepening as discussed above. Table 6-18 presents the total number of vessel calls for benefiting commodities for the mid-level (base case) commodity forecast at alternative plan depths without channel widening. Year 2020 is presented in the table as an example. Note that as the channel depth increases the number of vessel calls required to move an equivalent amount of cargo decreases.

Table 6-18
Projected Benefiting Cargo Vessel Calls: 2020

	Without Project (-40 feet)	-42 feet	-43 feet	-44 feet
Aggregate	5	5	5	5
Cement	10	9	9	9
Limestone	16	15	14	14
Granite	16	15	14	14
Slag	6	6	6	6
Gasoline[1]	44	41	39	39
Distillate Fuel[1]	11	10	10	10
Totals	**108**	**101**	**97**	**97**

[1] Seaport Canaveral point-to-point tankers only

Total and incremental average annual equivalent transportation costs for large cargo vessels under without and with-project conditions are presented in Table 6-19. Benefits are calculated with and without alternative widening plans in effect. Channel widening impacts deepening benefits because the projected tanker fleet (fuel oil vessels only) calling at Seaport Canaveral Terminal shifts to larger vessels under Widening Plans 1 and 2. Channel deepening benefits decline slightly with widening plans in effect because without-deepening project transportation costs are less due to the use of larger tankers resulting in fewer tanker calls. Projected benefits exhibit diminishing returns to channel deepening in that incremental benefits decline at successively deeper project depths.

Table 6-19
Average Annual Equivalent Transportation Cost Savings: Deepening Alternatives

Plan	Total Transportation Cost	Total Transportation Cost Savings	Incremental Cost Savings
Without Channel Widening			
Without-deepening	$26,708,104		
-42 feet	$25,074,989	$1,633,114	$1,633,114
-43 feet	$24,345,037	$2,363,067	$729,953
-44 feet	$23,767,018	$2,941,086	$578,019
With Widening Plan 1 (450 feet)			
Without-deepening	$25,430,262		
-42 feet	$23,976,241	$1,454,021	$1,454,021
-43 feet	$23,306,902	$2,123,360	$669,339
-44 feet	$22,755,178	$2,675,084	$551,724
With Widening Plan 2 (500 feet)			
Without-deepening	$24,623,781		
-42 feet	$23,231,700	$1,392,081	$1,392,081
-43 feet	$22,621,773	$2,002,008	$609,927
-44 feet	$22,092,217	$2,531,564	$529,556

Tables 6-15 and 6-19, above, separately present the benefits of alternative widening and deepening plans. Projects that employ widening and deepening plans would generate the cumulative benefits of both types of improvement. For example, a project that combines Widening Plan 1 (450-foot channel width) with a -42-foot channel depth would generate $1,883,968 in widening plan benefits (Table 6-15) and $1,454,021 in deepening plan benefits (Table 6-19) for a total project benefit of $3,337,989. Table 6-20 presents a matrix of total project benefits which would be generated by combining Widening Plan 1 (450 feet) or Widening Plan 2 (500 feet) with incremental deepening from -42 feet to -44 feet.

Table 6-20
Total Project AAEQ Benefits: Widening and Deepening Plan Combinations

	No Deepening	-42 feet	-43 feet	-44 feet
No Widening	-	$1,633,114	$2,363,067	$2,941,086
Widening Plan 1 (450 feet)	$1,883,968	$3,337,989	$4,007,328	$4,559,051
Widening Plan 2 (500 feet)	$2,829,748	$4,221,830	$4,831,756	$5,361,312

6.5 Net Benefits of Alternative Plans

The alternative plan net benefits presented in Tables 6-21 through 6-24 are calculated as the difference between the total annual average equivalent costs and benefits of each alternative. The incremental net benefits of the alternative plans are decreasing with successive plan increments, but remain positive overall, which indicates that the incremental benefits of each successive alternative are greater than the incremental costs. The plan with the greatest net benefits of all plans evaluated is Widening Plan 2 (500 feet) combined with -44 foot deepening. This is the recommended plan, consistent with CPA's request for a categorical exemption from the NED plan.

Table 6-21
Cost – Benefit Analysis: Channel Widening Only

Alternative Plan	Total AAEQ Costs	Total AAEQ Benefits	Total Net Benefits	Incremental Net Benefits	B/C Ratio
Widening Plan 1 (450 feet)	$1,448,734	$1,883,968	$435,233	$435,233	1.3
Widening Plan 2 (500 feet)	$1,960,442	$2,829,748	$869,306	$434,073	1.4

Note: Discount rate = 4.00%, period 50 years

Table 6-22
Cost – Benefit Analysis: Channel Deepening Only

Alternative Plan	Total AAEQ Costs	Total AAEQ Benefits	Total Net Benefits	Incremental Net Benefits	B/C Ratio
-42 feet	$157,949	$1,633,114	$1,475,165	$1,475,165	10.3
-43 feet	$396,407	$2,363,067	$1,966,660	$491,494	6.0
-44 feet	$668,011	$2,941,086	$2,273,075	$306,415	4.4

Note: Discount rate = 4.00%, period 50 years

Table 6-23
Cost – Benefit Analysis: Widening Plan 1 (450 feet) and Channel Deepening

Alternative Plan	Total AAEQ Costs	Total AAEQ Benefits	Total Net Benefits	Incremental Net Benefits	B/C Ratio
450-foot widening (W1) only	$1,448,734	$1,883,968	$435,233	$435,233	1.3
W1 and -42-foot deepening	$1,504,084	$3,337,988	$1,833,905	$1,398,671	2.2
W1 and -43-foot deepening	$1,764,285	$4,007,328	$2,243,043	$409,138	2.3
W1 and -44-foot deepening	$2,055,296	$4,559,051	$2,503,756	$260,713	2.2

Note: Discount rate = 4.00%, period 50 years

Table 6-24
Cost – Benefit Analysis: Widening Plan 2 (500 feet) and Channel Deepening

Alternative Plan	Total AAEQ Costs	Total AAEQ Benefits	Total Net Benefits	Incremental Net Benefits	B/C Ratio
500-foot widening (W2) only	$1,960,442	$2,829,748	$869,306	$869,306	1.4
W2 and -42-foot deepening	$2,094,929	$4,221,830	$2,126,900	$1,257,594	2.0
W2 and -43-foot deepening	$2,377,931	$4,831,756	$2,453,826	$326,925	2.0
W2 and -44-foot deepening	$2,692,766	$5,361,312	$2,668,546	$214,721	2.0

Note: Discount rate = 4.00%, period 50 years

Updating plan W2 and -44-foot deepening using the FY 2013 price level (based on EM 1110-2-1304 revised 31March11) and with the FY 2013 discount rate (3.75%) results in total average annual benefits of $5,393,000, total average annual costs of $2,647,000, total net annual benefits of $2,747,000, and a benefit-cost ratio of 2.0 to 1.

6.6 Summary of Accounts and Plan Comparison

Plan formulation has been conducted for this study with a focus on contributing to National Economic Development (NED) with consideration of all effects, beneficial or adverse, to each of the four evaluation accounts identified in the Principles and Guidelines (1983).

Plan selection is based on a weighting of the projected effects of each alternative on the four evaluation accounts. Qualitative and quantitative information has been reviewed for major project effects and for major potential effect categories. The alternatives were also compared and contrasted according to their achievement of the additional criteria of a) effectiveness; b) completeness; c) acceptability, and d) efficiency according to applicable Corps guidelines.

In addition to these four traditional criteria, information on achievement of project-specific opportunities and avoidance of project-specific constraints is also presented in System of Accounts format, for comparison at the same level of scrutiny of the information presented in other accounts.

The comparison of final alternatives includes future without-project conditions and future with-project conditions for each alternative plan, in a "System of Accounts" comparison format (Tables 6-25 – 6-27).

Table 6-25
Contributions to Planning Objectives: Individual Plans

Opportunities	No Action	Widening Plan 1 (450 feet)	Widening Plan 2 (500 feet)	-42 feet	-43 feet	-44 feet
Plan Description	Channel 400 feet wide; -39 feet deep in the Middle Turning Basin	Channel 450 feet wide; -40 feet deep in the Inner Reach	Channel 500 feet wide; -40 feet deep in the Inner Reach	Channel 400 feet wide; -42 feet deep in the Inner Reach	Channel 400 feet wide; -43 feet deep in the Inner Reach	Channel 400 feet wide; -44 feet deep in the Inner Reach
improve cruise ship operations efficiency	Under wind conditions large cruise ships require tug assistance	Minor improvement because fewer tug assist events are needed	Largest improvement because fewer tug assist events are need than under Wide 1	No change to cruise ship tug assistance	No change to cruise ship tug assistance	No change to cruise ship tug assistance
More efficient cargo vessel loading	Cargo vessels are depth constrained causing light loaded conditions	No change to vessel loading	No change to vessel loading	Vessels may load up to two feet deeper draft with minor efficiency improvements	Vessels may load up to three feet deeper draft with moderate efficiency improvements	Vessels may load up to four feet deeper draft with greatest efficiency improvement
Use of larger cargo vessels	Cargo vessel length is constrained to a maximum of 800 feet	Minor improvement; cargo vessel length is constrained to 850 feet	Largest improvement; cargo vessel length is constrained to 900 feet	No change in cargo vessel size	No change in cargo vessel size	No change in cargo vessel size
Increase safety by reducing surge effects	Transit speeds to maintain safe crab angle cause surge effects at cargo piers and Trident basin	Minor increase in safe crab angle allows slower transit speed with minor reduction in surge effects	Largest increase in safe crab angle allows slower transit speed with largest reduction in surge effects	Minor reduction in surge effects	Minor reduction in surge effects	Minor reduction in surge effects
Accommodate development of more efficient berths and terminals	Berth operations constrained by surge effects; cargo vessels must stop loading and unloading when large cruise ships pass by	Minor reduction in berth operation constraints	Largest reduction in berth operation constraints	Minor reduction in berth operation constraints	Minor reduction in berth operation constraints	Minor reduction in berth operation constraints

Constraints	No Action	Widening Plan 1 (450 feet)	Widening Plan 2 (500 feet)	-42 feet	-43 feet	-44 feet
Avoid Significant Impacts to West Indian Manatee	No additional effects; existing and future protection measures would be followed	No additional effects; manatee protection measures will be followed during construction	No additional effects; manatee protection measures will be followed during construction	No additional effects; manatee protection measures will be followed during construction	No additional effects; manatee protection measures will be followed during construction	No additional effects; manatee protection measures will be followed during construction
Avoid Significant Impacts to Right Whales	No additional effects; existing future protection measures would be followed	Minor reduction in impacts to Right Whales due to fewer tug assist events	Minor reduction in impacts to Right Whales due to fewer tug assist events	Minor reduction in impacts to Right Whales due to fewer cargo vessel calls	Minor reduction in impacts to Right Whales due to fewer cargo vessel calls	Minor reduction in impacts to Right Whales due to fewer cargo vessel calls
Avoid Significant Impacts to Least Terns	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area
Avoid Significant Impacts to Florida Scrub Jay	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area
Avoid Significant Impacts to Southeastern Beach Mouse	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area
Avoid Significant Impacts to Gopher Tortoise	No additional effects; existing future protection measures would be followed	No significant impacts projected; any Gopher Tortoises found within the project area would be relocated	No significant impacts projected; any Gopher Tortoises found within the project area would be relocated	No additional effects; species is not present in the dredging or placement area	No additional effects; species is not present in the dredging or placement area	No additional effects; species is not present in the dredging or placement area
Avoid Significant Impacts to Sea Turtles	No additional effects; existing future protection measures would be followed	Protection measures will be taken during rip-rap removal to avoid significant impacts	Protection measures will be taken during rip-rap removal to avoid significant impacts	Dredging blackout window not required; no significant impacts projected	Dredging blackout window not required; no significant impacts projected	Dredging blackout window not required; no significant impacts projected
Avoid significant impacts to existing terminal facilities and operations	Existing facilities will be maintained and operated at existing levels of efficiency	Widening on the north side of the channel avoids impacts to south cargo piers	Widening on the north side of the channel avoids impacts to south cargo piers	No significant impacts to existing terminal facilities and operations	No significant impacts to existing terminal facilities and operations	No significant impacts to existing terminal facilities and operations

Evaluation Criteria	No Action	Widening Plan 1 (450 feet)	Widening Plan 2 (500 feet)	-42 feet	-43 feet	-44 feet
Completeness	Planning objectives would not be realized	Assumes that trend towards larger more efficient vessels, as historically observed at Port Canaveral and elsewhere will continue	Assumes that trend towards larger more efficient vessels, as historically observed at Port Canaveral and elsewhere will continue	Assumes that trend towards larger more efficient vessels, as historically observed at Port Canaveral and elsewhere will continue	Assumes that trend towards larger more efficient vessels, as historically observed at Port Canaveral and elsewhere will continue	Assumes that trend towards larger more efficient vessels, as historically observed at Port Canaveral and elsewhere will continue
Efficiency	Inefficient use of port, terminal, and vessels resources	Minor improvement in efficient use of port, terminal, and vessels	Moderate improvement in efficient use of port, terminal, and vessels	Minor improvement in efficient use of port, terminal, and vessels	Moderate improvement in efficient use of port, terminal, and vessels	Higher improvement in efficient use of port, terminal, and vessels
Effectiveness	No contribution to achievement of objectives	Minor contribution to achievement of objectives	Moderate contribution to achievement of objectives	Minor contribution to achievement of objectives	Moderate contribution to achievement of objectives	Higher contribution to achievement of objectives
Acceptability	Compliant with applicable laws, regulations, and public policies	Compliant with applicable laws, regulations, and public policies	Compliant with applicable laws, regulations, and public policies	Compliant with applicable laws, regulations, and public policies	Compliant with applicable laws, regulations, and public policies	Compliant with applicable laws, regulations, and public policies

System of Accounts	No Action	Widening Plan 1 (450 feet)	Widening Plan 2 (500 feet)	-42 feet	-43 feet	-44 feet
NED	Highest transportation costs	Minor transportation cost savings	Moderate transportation cost savings	Minor transportation cost savings	Moderate transportation cost savings	Greater transportation cost savings
RED	Port is a major contributor to local economic activity	No discernible impact to RED account	No discernible impact to RED account	No discernible impact to RED account	No discernible impact to RED account	No discernible impact to RED account
EQ	Port maintains all protection and impact avoidance policies and procedures	Temporary minor impacts during construction; no significant environmental impacts	Temporary minor impacts during construction; no significant environmental impacts	Temporary minor impacts during construction; no significant environmental impacts	Temporary minor impacts during construction; no significant environmental impacts	Temporary minor impacts during construction; no significant environmental impacts
OSE	Safe vessel and terminal operations are compromised by channel dimensions	Minor improvement to safe vessel and terminal operations	Major improvement to safe vessel and terminal operations	Minor reduction in energy requirements due to reduced vessel trips	Moderate reduction in energy requirements due to reduced vessel trips	Highest reduction in energy requirements due to reduced vessel trips

Table 6-26
Contributions to Planning Objectives: Combined Plans (Widening Plan 1 [450 feet] and Deepening)

Opportunities	No Action	Widening Plan 1 & -42 feet	Widening Plan 1 & -43 feet	Widening Plan 1 & -44 feet
Improve cruise ship operations efficiency	Under wind conditions large cruise ships require tug assistance	Minor improvement because fewer tug assist events are needed	No incremental change to cruise ship tug assistance	No incremental change to cruise ship tug assistance
More efficient cargo vessel loading	Cargo vessels are depth constrained causing light loaded conditions	Vessels may load up to two feet deeper draft with minor efficiency improvements	Vessels may load up to three feet deeper draft with moderate efficiency improvements	Vessels may load up to four feet deeper draft with greatest efficiency improvement at this channel width
Use of larger cargo vessels	Cargo vessel length is constrained to a maximum of 800 feet	Minor efficiency improvement; cargo vessel length is constrained to 850 feet but vessel may load two feet deeper	Moderate efficiency improvement; cargo vessel length is constrained to 850 feet but vessel may load three feet deeper	Greatest efficiency improvement at this channel width; cargo vessel length is constrained to 850 feet but vessel may load four feet deeper
Increase safety by reducing surge effects	Transit speeds to maintain safe crab angle cause surge effects at cargo piers and Trident basin	Minor increase in safe crab angle allows slower transit speed with minor reduction in surge effects	Minor increase in safe crab angle allows slower transit speed with minor reduction in surge effects	Minor increase in safe crab angle allows slower transit speed with minor reduction in surge effects
Accommodate development of more efficient berths and terminals	Berth operations constrained by surge effects; cargo vessels must stop loading and unloading when large cruise ships pass by	Minor reduction in berth operation constraints	Minor reduction in berth operation constraints	Minor reduction in berth operation constraints

Constraints	No Action	Widening Plan 1 & -42 feet	Widening Plan 1 & -43 feet	Widening Plan 1 & -44 feet
Avoid Significant Impacts to West Indian Manatee	No additional effects; existing and future protection measures would be followed	No additional effects; manatee protection measures will be followed during construction	No additional effects; manatee protection measures will be followed during construction	No additional effects; manatee protection measures will be followed during construction
Avoid Significant Impacts to Right Whales	No additional effects; existing future protection measures would be followed	Minor reduction in impacts to Right Whales due to fewer tug assist events	Minor reduction in impacts to Right Whales due to fewer tug assist events	Minor reduction in impacts to Right Whales due to fewer cargo vessel calls
Avoid Significant Impacts to Least Terns	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area
Avoid Significant Impacts to Florida Scrub Jay	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area
Avoid Significant Impacts to Southeastern Beach Mouse	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area
Avoid Significant Impacts to Gopher Tortoise	No additional effects; existing future protection measures would be followed	No significant impacts projected; any Gopher Tortoises found within the project area would be relocated	No significant impacts projected; any Gopher Tortoises found within the project area would be relocated	No significant impacts projected; any Gopher Tortoises found within the project area would be relocated
Avoid Significant Impacts to Sea Turtles	No additional effects; existing future protection measures would be followed	Protection measures will be taken during rip-rap removal to avoid significant impacts	Protection measures will be taken during rip-rap removal to avoid significant impacts	Dredging blackout window not required; no significant impacts projected
Avoid significant impacts to existing terminal facilities and operations	Existing facilities will be maintained and operated at existing levels of efficiency	Widening on the north side of the channel avoids impacts to south cargo piers	Widening on the north side of the channel avoids impacts to south cargo piers	No significant impacts to existing terminal facilities and operations

Evaluation Criteria	No Action	Widening Plan 1 & -42 feet	Widening Plan 1 & -43 feet	Widening Plan 1 & -44 feet
Completeness	Planning objectives would not be realized	Assumes that trend towards larger more efficient vessels, as historically observed at Port Canaveral and elsewhere will continue	Assumes that trend towards larger more efficient vessels, as historically observed at Port Canaveral and elsewhere will continue	Assumes that trend towards larger more efficient vessels, as historically observed at Port Canaveral and elsewhere will continue
Efficiency	Inefficient use of port, terminal, and vessels resources	Minor improvement in efficient use of port, terminal, and vessels	Moderate improvement in efficient use of port, terminal, and vessels	Greatest improvement in efficient use of port, terminal, and vessels at this channel width
Effectiveness	No contribution to achievement of objectives	Minor contribution to achievement of objectives	Moderate contribution to achievement of objectives	Greatest contribution to achievement of objectives at this channel width
Acceptability	Compliant with applicable laws, regulations, and public policies	Compliant with applicable laws, regulations, and public policies	Compliant with applicable laws, regulations, and public policies	Compliant with applicable laws, regulations, and public policies

System of Accounts	No Action	Widening Plan 1 & -42 feet	Widening Plan 1 & -43 feet	Widening Plan 1 & -44 feet
NED	Highest transportation costs	Minor transportation cost savings $3,329,576 Average Annual Transportation Cost savings	Moderate transportation cost savings $3,996,894 Average Annual Transportation Cost savings	Greatest transportation cost savings at this channel width $4,544,503 Average Annual Transportation Cost savings
RED	Port is a major contributor to local economic activity	No discernible impact to RED account	No discernible impact to RED account	No discernible impact to RED account
EQ	Port maintains all protection and impact avoidance policies and procedures	Temporary minor impacts during construction; no significant environmental impacts	Temporary minor impacts during construction; no significant environmental impacts	Temporary minor impacts during construction; no significant environmental impacts
OSE	Safe vessel and terminal operations are compromised by channel dimensions	Minor improvement to safe vessel and terminal operations and Minor reduction in energy requirements due to reduced vessel trips	Moderate improvement to safe vessel and terminal operations and Moderate reduction in energy requirements due to reduced vessel trips	Greatest improvement to safe vessel and terminal operations and Largest reduction in energy requirements due to reduced vessel trips for this channel width

Table 6-27
Contributions to Planning Objectives: Combined Plans (Widening Plan 2 [500 feet] and Deepening)

Opportunities	No Action	Widening Plan 2 & -42 feet	Widening Plan 2 & -43 feet	Widening Plan 2 & -44 feet
Improve cruise ship operations efficiency	Under wind conditions large cruise ships require tug assistance	Greatest improvement because fewer tug assist events are needed	No incremental change to cruise ship tug assistance	No incremental change to cruise ship tug assistance
More efficient cargo vessel loading	Cargo vessels are depth constrained causing light loaded conditions	Vessels may load up to two feet deeper draft with minor efficiency improvements	Vessels may load up to three feet deeper draft with moderate efficiency improvements	Vessels may load up to four feet deeper draft with greatest efficiency improvement
Use of larger cargo vessels	Cargo vessel length is constrained to a maximum of 800 feet	Minor efficiency improvement; cargo vessel length is constrained to 900 feet but vessel may load two feet deeper	Moderate efficiency improvement; cargo vessel length is constrained to 900 feet but vessel may load three feet deeper	Greatest efficiency improvement; cargo vessel length is constrained to 900 feet but vessel may load four feet deeper
Increase safety by reducing surge effects	Transit speeds to maintain safe crab angle cause surge effects at cargo piers and Trident basin	Greatest increase in safe crab angle allows slower transit speed with moderate reduction in surge effects	Greatest increase in safe crab angle allows slower transit speed with moderate reduction in surge effects	Greatest increase in safe crab angle allows slower transit speed with greatest reduction in surge effects
Accommodate development of more efficient berths and terminals	Berth operations constrained by surge effects; cargo vessels must stop loading and unloading when large cruise ships pass by	Moderate reduction in berth operation constraints	Moderate reduction in berth operation constraints	Greatest reduction in berth operation constraints

Constraints	No Action	Widening Plan 2 & -42 feet	Widening Plan 2 & -43 feet	Widening Plan 2 & -44 feet
Avoid Significant Impacts to West Indian Manatee	No additional effects; existing and future protection measures would be followed	No additional effects; manatee protection measures will be followed during construction	No additional effects; manatee protection measures will be followed during construction	No additional effects; manatee protection measures will be followed during construction
Avoid Significant Impacts to Right Whales	No additional effects; existing future protection measures would be followed	Minor reduction in impacts to Right Whales due to fewer tug assist events	Minor reduction in impacts to Right Whales due to fewer tug assist events	Minor reduction in impacts to Right Whales due to fewer cargo vessel calls
Avoid Significant Impacts to Least Terns	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area
Avoid Significant Impacts to Florida Scrub Jay	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area
Avoid Significant Impacts to Southeastern Beach Mouse	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area	No additional effects; species is not present in the project area
Avoid Significant Impacts to Gopher Tortoise	No additional effects; existing future protection measures would be followed	No significant impacts projected; any Gopher Tortoises found within the project area would be relocated	No significant impacts projected; any Gopher Tortoises found within the project area would be relocated	No additional effects; species is not present in the dredging or placement area
Avoid Significant Impacts to Sea Turtles	No additional effects; existing future protection measures would be followed	Protection measures will be taken during rip-rap removal to avoid significant impacts	Protection measures will be taken during rip-rap removal to avoid significant impacts	Dredging blackout window not required; no significant impacts projected
Avoid significant impacts to existing terminal facilities and operations	Existing facilities will be maintained and operated at existing levels of efficiency	Widening on the north side of the channel avoids impacts to south cargo piers	Widening on the north side of the channel avoids impacts to south cargo piers	No significant impacts to existing terminal facilities and operations

Evaluation Criteria	No Action	Widening Plan 2 & -42 feet	Widening Plan 2 & -43 feet	Widening Plan 2 & -44 feet
Completeness	Planning objectives would not be realized	Assumes that trend towards larger more efficient vessels, as historically observed at Port Canaveral and elsewhere will continue	Assumes that trend towards larger more efficient vessels, as historically observed at Port Canaveral and elsewhere will continue	Assumes that trend towards larger more efficient vessels, as historically observed at Port Canaveral and elsewhere will continue
Efficiency	Inefficient use of port, terminal, and vessels resources	Moderate improvement in efficient use of port, terminal, and vessels	Moderate improvement in efficient use of port, terminal, and vessels	Greatest improvement in efficient use of port, terminal, and vessels
Effectiveness	No contribution to achievement of objectives	Moderate contribution to achievement of objectives	Moderate contribution to achievement of objectives	Greatest contribution to achievement of objectives
Acceptability	Compliant with applicable laws, regulations, and public policies	Compliant with applicable laws, regulations, and public policies	Compliant with applicable laws, regulations, and public policies	Compliant with applicable laws, regulations, and public policies

System of Accounts	No Action	Widening Plan 2 & -42 feet	Widening Plan 2 & -43 feet	Widening Plan 2 & -44 feet
NED	Highest transportation costs	Moderate transportation cost savings $4,212,392 Average Annual Transportation Cost savings	Moderate transportation cost savings $4,820,195 Average Annual Transportation Cost savings	Greatest transportation cost savings $5,345,657 Average Annual Transportation Cost savings
RED	Port is a major contributor to local economic activity	No discernible impact to RED account	No discernible impact to RED account	No discernible impact to RED account
EQ	Port maintains all protection and impact avoidance policies and procedures	Temporary minor impacts during construction; no significant environmental impacts	Temporary minor impacts during construction; no significant environmental impacts	Temporary minor impacts during construction; no significant environmental impacts
OSE	Safe vessel and terminal operations are compromised by channel dimensions	Moderate improvement to safe vessel and terminal operations and Moderate reduction in energy requirements due to reduced vessel trips	Moderate improvement to safe vessel and terminal operations and Moderate reduction in energy requirements due to reduced vessel trips	Greatest improvement to safe vessel and terminal operations and Largest reduction in energy requirements due to reduced vessel trips

6.7 Recommended Plan

The Principles and Guidelines require that the plan which maximizes net benefits, the NED plan, be identified. Typically, the incremental analysis includes depths beyond the depth which maximizes net benefits in order to "bracket" the NED plan and to show that net benefits in fact decline at deeper depths. However, ER 1105-2-100 paragraph 3-2 b.(10) Categorical Exemption to NED Plan states:

> *For harbor and channel deepening studies where the non-Federal sponsor has identified constraints on channel depths it is not required to analyze project plans greater (deeper) than the plan desired by the sponsor.*

The non-Federal sponsor, the Canaveral Port Authority, has requested that channel widening alternatives considered be limited to no greater than a 500 foot wide channel, and channel deepening alternatives be limited to no greater than -44 feet depth under the Categorical Exemption to the NED Plan provision of ER 1105-2-100 (Paragraph 3-2.b.(10)).

The Recommended Plan is Widening Plan 2 (500 feet) with the -44-foot deepening, which is the plan that provides the greatest net benefits of all plans evaluated. The Recommended Plan is identified as the Preferred Alternative in Section 7: Environmental Consequences. Widening is the first added element because only the widening alternatives provide benefits to both cargo and cruise vessels. The last added element is the -44-foot deepening, which provides more than $214,271 in incremental net benefits (Average Annual Equivalent). Each added increment between the first added increment and the last added increment provide positive incremental net benefits. The recommended Plan is the most economical plan analyzed. The NED Plan has not been identified because the non-Federal sponsor has identified constraints to analyzing a greater plan than the 500-foot wide and -44-foot deep plan. The benefit-cost ratio of the Recommended Plan is 2.0 to 1. The Recommended Plan is:

- consistent with protecting the nation's environment;
- feasible from an engineering perspective;
- publicly acceptable; and
- implementable.

In addition, the Recommended Plan has greater net benefits than smaller scale plans, as required by ER 1105-2-100 para. 3-2 b. (10).

6.7.1 Description of the Recommended Plan

The Recommended Plan (see Figures 6-4 and 6-5) is described in terms of outer, middle, and inner reaches, the Middle Turning Basin and west access channels, and the West Turning Basin. The outer reach is oriented on roughly a northwest-southeast alignment. The remainder of the channels is oriented in a generally east-west alignment. Various cuts comprise the outer, middle, and inner reaches. Existing and recommended plan dimension are described below.

- Outer Reach, Cut 1A: Existing dimensions are -44' project depth X 400' wide X 11,000' long. New dimensions would increase the project depth to -46' within the yellow highlighted area shown on Figure 6-5.

- Outer Reach, Cut 1B: Existing dimensions are -44' project depth X 400' wide X 5,500' long. New dimensions would increase the project depth to -46' within the yellow highlighted area shown on Figure 6-5.

- Outer Reach, Cut 1: Existing dimensions are -44' project depth X 400' wide X 12,500' long. New dimensions would increase the project depth to -46' within the yellow highlighted area shown on Figure 6-5 only for the 5,300' long portion of Cut 1 that is seaward of buoys 7/8 (Station 0+00 to Station 53+00). The remainder of Cut 1 from buoys 7/8 to the apex of the channel turn, a length of 7,200', would also be deepened from -44' to -46'.

- US NAVY Turn Widener: Existing dimensions are -44' project depth X 7.7 acres (triangular shaped area) bounded by outer and middle reaches to the north and northeast and the civil turn widener to the southwest. New dimensions would increase the project depth to -46' within the yellow highlighted area shown on Figure 6-5.

- Civil Turn Widener: Existing dimensions are -41' project depth X 15.6 acres (irregular shaped area) bounded to the north and northeast by the middle reach and the US Navy turn widener. New dimensions would increase the project depth to -46' within the yellow highlighted area shown on Figure 6-5.

- New Turn Widener: New dimensions are -46' project depth X 23.1 acres (irregular shaped area) bounded to the north and northeast by the civil turn widener and Cut 1 of the outer reach within the brown highlighted area shown on Figure 6-5. As part of the recommended plan, the new turn widener will be constructed, and cut through the footprint of the existing sediment trap. To maintain the sediment trap's design capacity, it is proposed that the trap be deepened, consistent with the new channel depth, and slightly expanded to the south as described in Attachment J of the Engineering Appendix.

- Middle Reach: The middle reach extends from the apex of the channel turn westward to the western boundary of the Trident access channel. Existing dimensions are -44' project depth X 400' wide X 5,658' long. New dimensions would increase the project depth to -46' and the project width from 400' to 500' within the yellow highlighted area shown on Figure 6-5; and providing a 100' widener of 2,282' in length along the north side of the channel for the portion of the middle reach that is inside of the north jetty within the brown highlighted area shown on Figure 6-5. The eastern terminus of the 100' widener transitions from the existing to the new northern channel boundary over a plan distance of 500'.

- Trident Access Channel and Trident Basin: With exclusive use by US Navy, the Trident Access channel connects the middle reach to the Trident basin. Existing dimensions are -44' project depth throughout an irregularly shaped area to remain as is, except at the southern boundary of the existing Trident Access channel, where the new 100' north side channel widener will consume that portion of the Trident Access Channel within the brown highlighted area shown on Figure 6-5.

- Inner Reach, Cut 2 and Cut 3: Existing dimensions are -40' project depth X 400' wide X 3,344' long. New dimensions would increase the project depth to 44' and the project width from 400' to 500' within the blue highlighted area shown on Figure 6-4 and 6-5,

providing a 100' widener along the entire length of the reach on the north side of the channel within the brown highlighted area shown on Figures 6-4 and 6-5. The rip-rap protected shoreline and berm between the Middle and Trident Basins will be relocated northward to accommodate the 100' northside channel widener.

- Middle Turning Basin: The Middle Turning Basin has shared use by commercial and military activities. The federal project area encompasses 92.4 acres with project depths of -35' in the north and east portions of the basin used exclusively by the military and -39' in the remainder of the basin supporting commercial vessel traffic. Because of the somewhat limited room afforded by the present -39' federal project boundaries toward the northwest portion of the basin, CPA maintains an irregular shaped central portion of the basin to -39'. This provides additional area for maneuvering cargo vessels to and from the North Cargo Pier 1 and roll-on/roll-off ramp and enlarges the available area for turning displacement vessels on arrival or departure. The existing 39' federal project provides a turning circle diameter of 1200'. The new project dimensions for commercial purposes encompass 68.9 acres with a project depth of -43' yielding a turning circle diameter on the order of 1422' within the green highlighted area shown on Figure 6-4. Approximately 1.9 acres of the new -43' project area completes the western end of the north side channel widener in the area adjacent to the inner reach and the US Navy's Poseidon Wharf.
- West Access Channel (east of Station 260+00): Existing dimensions are -39' project depth X 400' wide X 1,840' long. New dimensions would increase the project depth to -43' and increase the project width from 400' to 500' within the green highlighted area shown on Figure 6-4; and providing 100' of widening along the entire length of the channel by redefining the northern channel boundary 12' north of the existing northern boundary, and widening the channel by 88' along the south side and into the barge canal.
- West Turning Basin and West Access Channel (west of Station 260+00): The West Turning Basin has exclusive use by commercial activities and the U.S. Coast Guard. The existing Federal basin the West Access Channel (west of Station 260+00) take up 78.6 acres with a project depth of -31' as federally maintained and -35' as maintained by the CPA. The CPA has also maintained a triangular shaped -35' project area adjacent to the northeast shoreline at the entrance to the West Turning Basin and at the request of the pilots, performed new work dredging beyond present project limits at this location since 2003 to facilitate cruise vessel access to and from the basin and cruise berths. The existing federal project basin provides a turning circle diameter of 1400'. The preferred alternative, comprising 141 acres, will expand the federal project limits in the northern and western portions as needed to support cruise ship access to present and planned terminals and will enlarge the entrance to the west basin providing a new turning circle diameter of 1725' to encompass the yellow, brown and grey cross hatched areas shown in Figure 6-4. The turning circle and entrance widening will be created by dredging beyond the present federal and CPA project boundaries to the northeast and to the south within the barge canal. Approximately 18.5 acres of existing bank, shoreline, and uplands adjacent to the CPA -35' project boundary and 6.9 acres within the existing barge canal will be dredged to the new project depth of -35'.

Figure 6-4
Recommended Plan: West of Trident Basin

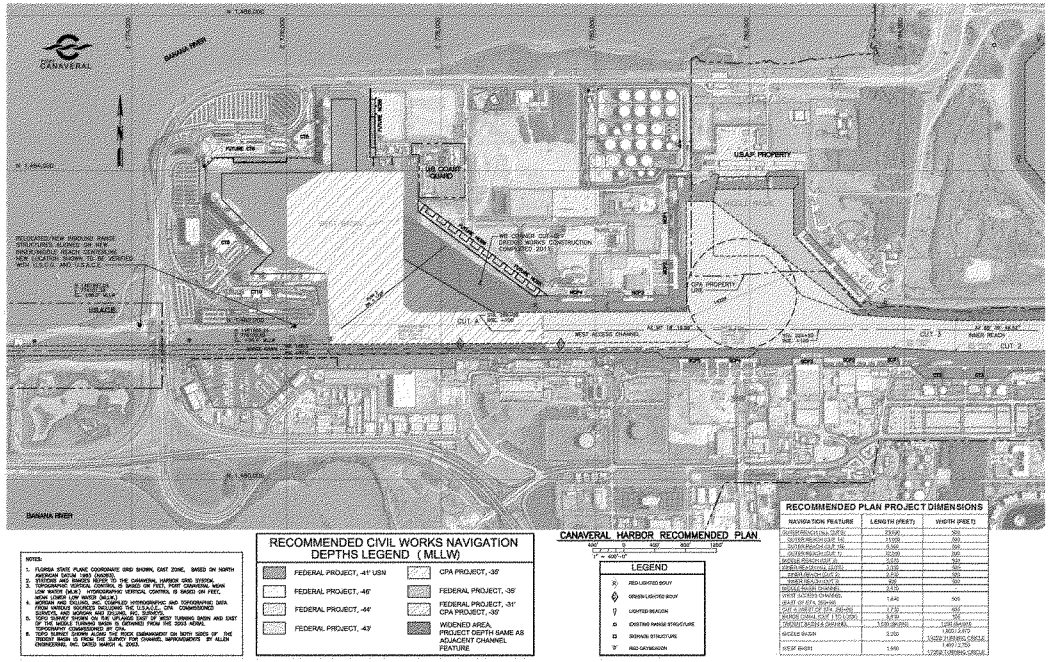
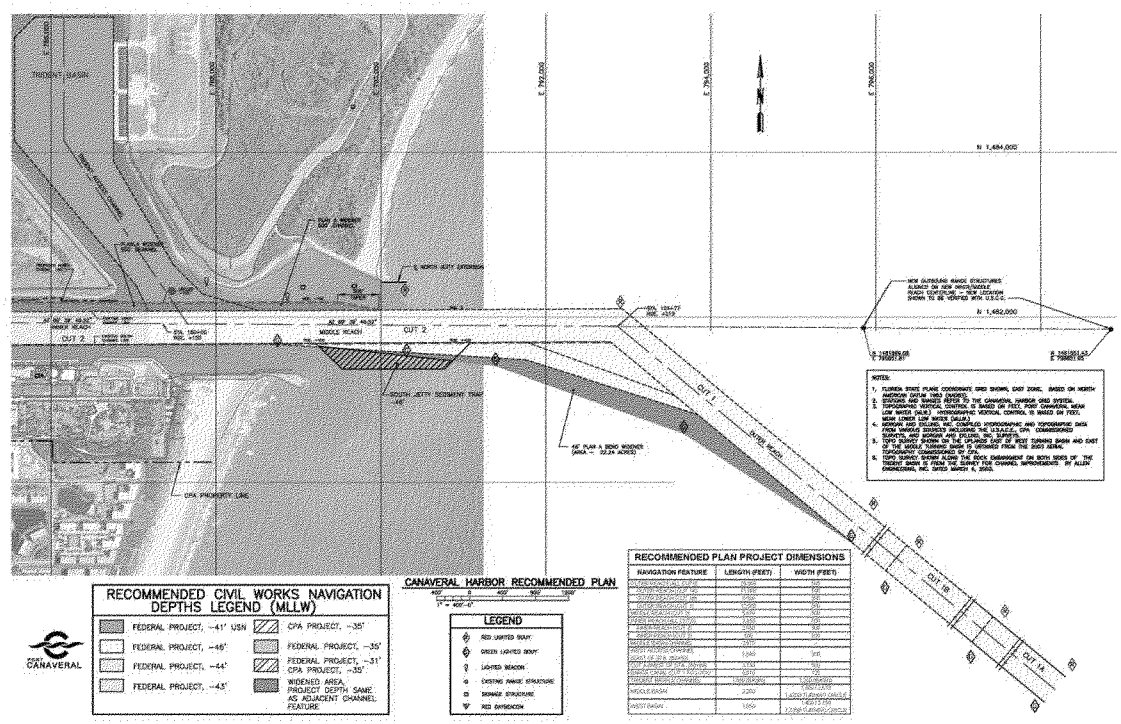


Figure 6-5
Recommended Plan: East of Trident Basin



6.7.2 Recommended Plan Construction

The major cost and construction time component of the project is the harbor and channel dredging. Dredging accounts for approximately 75% of the total project cost. Construction duration is estimated at 400 days or approximately 14 months (Figure 6-6). It is anticipated that the non-dredging project elements can be performed independently within this time frame with some sequencing of work necessary in the area of the northside widener. This excavation and dredging work must be performed far enough in advance to accommodate the berm and rock revetment replacements.

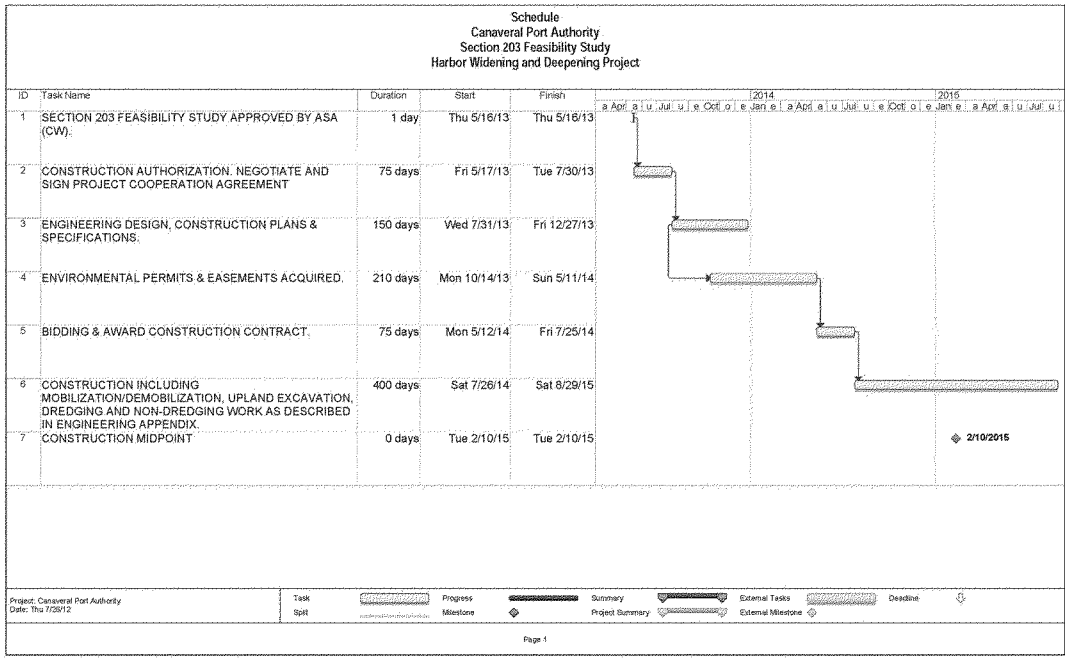
Construction methods will conform to applicable federal, state and local environmental permitting regulations. State standards for maintaining water quality, manatee protection and sea turtle protection will be adhered to throughout the project. Hopper dredging would not be employed and has been discouraged in past state and federal permits. Hydraulic and clamshell dredging are the methods of choice for economic and environmental concerns. More detailed environmental project information can be found in Section 7.3 of this report and in the Environmental Appendix.

Construction of the project involves both marine and uplands work and equipment. The following sequence of work is provided to generally describe the progression of the project.

- Remove all physical obstructions within the submerged project area and remove or relocate all physical obstructions within the uplands portions of the project area.
- Install temporary project security measures for protection of the uplands property and work. A plan will be created to address how vessel movements in and out of the Middle Turning Basin will be achieved during construction. The 45th Space Wing will request Explosive Site Plan (ESP) approval from the Department of Defense Explosives Safety Board (DDESB) as required to account of any changes in configuration to the channel adjacent to Air Force property.
- Perform the uplands earth work along the north side of the channel from the middle basin to the start of the north jetty and along the corner cut off at the entrance to the west basin. For the north dike project feature, remove and stockpile rip-rap for reuse.
- At the same time, dredging of the project features would begin, starting in the Outer Reach and working toward the Harbor and to the west basin.
- Replacement of the rock revetment at the northside widener, installation of the security fencing for the USACE dredged material containment site, realignment/addition of the aids to navigation (range structures) and replacement of the west "Surge Warning" sign at the North Jetty will complete the project.

The dredging operation will consist of clamshell bucket dredge(s) and bottom dumping scows for Canaveral ODMDS disposal. This method is preferred due to the 10 mile distance from the mouth of the harbor to the ODMDS. Piping of hydraulically dredged material would not prove to be logistically (from a navigation standpoint) or economically feasible. Dredged material suitable for nearshore disposal or other beneficial reuse would be stockpiled in the port in an existing diked containment area. Work would be closely coordinated with local pilots to ensure the safety of navigation while working around ship transits with the least disruption to both port

Figure 6-6
Recommended Plan: Construction Schedule



and dredge operations. The dredge contractor will be able to take advantage of working inside the harbor when conditions are such that it is not feasible to work offshore outside the jetties.

Port Canaveral currently has U.S. Coast Guard navigational range structures[29] for inbound traffic centered on the present 400 ft wide entrance channel middle and inner reaches. There is currently no outbound range, although Canaveral Pilots Association has requested that the Coast Guard provide an outbound range for the existing channel. The local pilots consider the inbound and outbound range structures as key navigation aids. The inbound aids will be relocated or replaced north and east of their existing locations to align with the new middle and inner reach centerline. Similarly, with expansion of the channel and handling of the largest cruise vessels afloat—the pilots and the STAR Center strongly urge that outbound range structures be installed to align with the new channel centerline in the Atlantic Ocean waters east of the turn widener area. The pilots conducted the recent simulations with inbound and outbound range structures featured in the visual geographical database. The outbound range structures were found to be extremely useful and enhanced safety as confirmed by the 2007 and 2009 simulations.

The authorization, funding, design and construction of aids to navigation such as the channel ranges and buoys are under the jurisdiction of the US Coast Guard. This navigation improvement project has recently been identified to the US Coast Guard District 7 Waterways Management Branch in Miami, Florida, to prepare a formal cost estimate of construction for new outbound ranges and realignment of the existing inbound ranges as dictated by the channel realignment due to widening. Documentation of coordination of the range navigation aids between the USCG and the Canaveral Port Authority and its consultants is included as Attachment N to the Engineering Appendix. The Canaveral Pilots confirm that the Recommended Plan project may be appropriately marked by relocating the existing floating aids to navigation such that no new floating aids will be required.

6.7.3 Dredged & Upland Material Management Plan

New work and incremental maintenance dredging volumes resulting from the proposed improvements to the Port Canaveral Florida federal Navigation Project fit within the limitations of the Jacksonville District's existing Dredge Material Management Plan (DMMP) and there are no substantial modifications to existing placement sites required. The existing DMMP describes the least cost method of dredge material disposal from the Canaveral Harbor project, which is the same method recommended in this report for project material.

The project recommended in this report does not include the previously completed work area in the West Turning Basin (the ICCO). Prior to construction of the ICCO, the project plan required dredging of approximately 3.6 million CY and excavation of approximately 808,391 CY of sand, silts and clays. The completed Interim Corner Cutoff (ICCO) dredging resulted in placement of 507,253 CY in the ODMDS, and 354,322 CY was placed in uplands on CPA property. Completion of the ICCO leaves approximately 3.1 million CY of project material for future ODMDS placement extending over a 14-month project implementation period.

The remaining 454,069 CY of excavation would occur at the north side widener. Approximately 100,000 CY of this volume is existing revetment material that would be reused as a component

[29] Navigation range structures are used by the Canaveral Pilots to identify the channel centerline on an inbound transit. The structures are in alignment with the centerline of the channel and are a visual aid to the pilot.

of revetment reconstruction. The remaining 354,069 CY of upland material from existing grade down to elevation -13 MLLW is designated for disposal in the adjacent upland disposal site, pending formal Air Force approval for use of that area for material placement. Air Force approval will be based on an evaluation of competing interests and on test results on the composition of the spoils to be placed. Based on the previous channel widening and the Sponsor's experience with the ICCO, the material above elevation -13 feet will be recovered using upland excavating methods. Dredged and excavated material disposal site alternatives are shown in the Engineering Appendix Attachment J.

The last series of sketches in Attachment J show the uplands and offshore disposal sites that would receive dredged or excavated material. The upland site consists of one existing diked area utilized by the USACE on Air Force property between the Middle and Trident Basins. The offshore sites, Canaveral Ocean Dredged Material Disposal Site (ODMDS) and the Nearshore Disposal Area are located approximately 10 miles from the entrance jetties via the outer reach.

The geotechnical investigations show that sands suitable for reuse are generally located at and above elevation -13 feet (MLLW). Although these sands do not appear to be suitable for direct placement on the beach, they can be stockpiled on land for beneficial reuse as construction fill material. Excavated material below -13 feet MLLW is generally not suitable for reuse and would be disposed in the offshore disposal site. In the event that suitable material is found below -13 feet MLLW, it would be placed in the Nearshore Disposal Area.

The following two subsections discuss in more detail the disposal plans for the excavated material below and above elevation -13 MLLW.

6.7.3.1 ODMDS (Ocean Dredged Material Disposal Site)

Dredge material below -13 feet (MLLW) generally consists of silts and clays, and are not suitable for reuse. Because CPA upland disposal sites are at capacity and the preference is to store suitable material for reuse, these silts and clays must be disposed in the Canaveral ODMDS located approximately 10 miles south of Canaveral Harbor.

It is the responsibility of the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (USACE) under the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 to manage and monitor each of the Ocean Dredged Material Disposal Sites designated by the EPA pursuant to Section 102 of MPRSA. Section 102(c)(3) of the MPRSA requires development of a Site Management and Monitoring Plan (SMMP) for each ODMDS and review and revision of the SMMP not less frequently than every 10 years.

The present management plan for the Canaveral Harbor ODMDS is the Site Management and Monitoring Plan (SMMP) dated February 2012, and is included as Engineering Appendix Attachment P. This updated SMMP replaces the previous SMMP dated October 2001. The estimated project dredged material quantity (below -13 MLLW) is 3.1 million CY, which would be dredged during a period of more than 200 days, spanning two calendar years. The current SMMP identifies an approved ten-year volume capacity as 9.2 million cubic yards (mcy) (i.e., half of the estimated remaining capacity of 18.4 mcy), and specifically recognizes and accounts for all construction dredging volumes associated with this project. Engineering Appendix Table 29 provides the history of disposal within the Canaveral ODMDS.

The suitability of the dredged material for ocean disposal will be verified as part of the permit process. Based on the recent and ongoing history of testing and evaluation of dredged material

in Port Canaveral for ongoing O&M dredging, CPA projects like the ICCO, and the current Section 103 EPA authorizations, it is expected that all of the material below -13 MLLW proposed for ocean disposal will be determined suitable and approved for disposal in the ODMDS.

6.7.3.2 Disposal and Reuse of Upland Excavated Material

The maximum amount of excavated material for reuse and/or upland disposal is estimated to be 354,069 cubic yards and will be disposed at the existing USACE upland containment site on the USAF property. Reuse of upland excavated material is considered to consist of the sands that are generally found at and above elevation -13 feet MLLW. The dredge material is expected to be of a quality suitable for construction fill material and would be stockpiled at an agreeable location on the containment site for later reuse pending formal Air Force approval for use of that area for material placement.

Air Force approval for use of the existing USACE upland containment site for material placement will be based on an evaluation of potentially competing interests and on test results of the composition of the spoils to be placed. Brevard County has a beach restoration project that also intends to use the USAF disposal area to stockpile beach quality sand. Disposal of upland material from the Canaveral Harbor project can complement the Brevard County project disposal on this site.

The beach quality sand from the Brevard County project will be hydraulically dredged from just offshore of the USAF coastline and will require a competent dike system to contain the fluid spoil. The existing USAF containment dike, however, is in poor condition and will need to be restored, and possibly raised in elevation, with a new intermediate dike constructed to subdivide the containment area. Based on the previous channel widening and the Sponsor's experience with recent dredging, the Canaveral Harbor material above elevation -13 feet will be construction grade fill material recovered using excavation methods. This material will be suitable for the necessary dike modifications and the new intermediate dike needed for the Brevard County project. CPA is currently coordinating with USAF and Brevard County to insure that the one-time placement of the recovered spoil will complement the Brevard County project. Use of the recovered stockpiled material to reconstruct and improve the containment dike system would not reduce the area available for spoil on the USAF site.

In the unlikely event that the USAF should not approve placing the excavated upland material on their existing spoil disposal site, other options for reuse of the upland excavated material can be further developed, including off-site placement on CPA property, or existing disposal area dike upgrades requiring suitable fill. If the USAF wishes to retain ownership of their material (since the upland material is being excavated from their property), then the Sponsor could truck the material to a different site on CCAFS as designated by the USAF. Adequate areas are also available on Port property owned by CPA if USAF sites are unavailable. These alternatives would be somewhat more expensive than the recommended upland disposal plan due to additional haul distances, but would be expected to remain within the contingency allowance estimated in this report.

6.7.4 Recommended Plan Operations and Maintenance

The operation and maintenance of the Recommended Plan is nearly identical to operation and maintenance of the existing Canaveral Harbor project, with the exception of an additional 69,000

cubic yards of annual maintenance dredging that is expected to occur mostly in the vicinity of the extended turn widener in the entrance channel. Material from this area has historically been suitable for placement at the ODMDS. This small volume of additional maintenance material is not projected to have a substantial impact on ODMDS capacity.

This additional maintenance volume in combination with the construction material, plus all other projected volumes as listed in the SMMP equal 9.75 mcy over a 10-year period, exceeding half of the remaining site capacity (9.2 mcy of 18.4 mcy) and therefore will (per the SMMP) require an assessment of the proposed action's impacts upon the ODMDS' capacity requirements prior to the next 10-year renewal cycle of EPA's Site Management and Monitoring Plan (SMMP). Impacts on the ODMDS site capacity would be assessed through a combination of management alternatives, evaluation of capacity based on bathymetric surveys, and an assessment using the USACE MDFATE or MPFATE modeling. At this time it is anticipated that the ODMDS, which is established in the Jacksonville District Corps of Engineers' Canaveral Harbor Dredge Material Disposal Plan (DMMP) as the least cost dredge material disposal site, will continue to be available throughout the project life, subject to decennial development and approval of SMMPs.

6.7.5 Recommended Plan Real Estate Considerations

Based on the recommended channel improvements, real estate owned by the CPA, the State, and the USA will be impacted. Navigation servitude will be exercised to use, control, and regulate the necessary submerged lands from CPA and the State for the channel widening. Real property rights for approximately 8 acres of USAF uplands required for the channel widening and approximately 11 acres of USAF uplands associated with land damages due to the channel widening will be sought via a modification of the existing permit. The permit modification would also include the 28 acres north of the USAF spoil containment dike and south of the existing leased spoil disposal area. These interests and estates are detailed in the Real Estate Appendix and illustrated in the real Estate Appendix: Exhibit 3: Preliminary Acquisition Map.

A preliminary meeting between the Canaveral Port Authority and United States Air Force representatives was held November 22, 2005, to discuss the potential land impacts. At that time, USAF representatives indicated that ownership in the land would not be transferred but an easement would likely be granted as was done in past Federal projects along the harbor channel. Subsequent meetings between CPA and the USAF have recently been held in July, August, and December 2011. The existing lease and permit documents were obtained at these later meetings. Current USAF personnel agree that the land would not be transferred and that interests could be sought via an easement. A June 28, 2012, memorandum from the 45th Space Wing of the USAF to the USACE-Jacksonville District as well as meeting minutes is included in the Real Estate Appendix: Attachment D. The letter provides comment from the USAF Commander acknowledging working closely with the USACE and CPA project team to work project issues and offering a continued partnership as the channel widening project moves forward. The next meeting is set for late September 2012.

Neither the Recommended Plan, nor any of the evaluated alternatives, requires the relocation of Coast Guard Station Port Canaveral.

6.7.6 Summary of Accounts

The National Environmental Quality (EQ) account impacts of alternative plans are described in detail in Section 7: Environmental Consequences of the Section 203 Study. Contributions to the

Regional Economic Development (RED) account are presented here, based on the Canaveral Port Authority FY 2009 Economic Impact Study (September, 2010). The alternative plans are not projected to affect total cargo volume at the port. Cargo is projected to be delivered more efficiently on more deeply laden vessels, but growth in the overall volume will not be influenced by the project. Table 6-28 presents Port Canaveral's estimated economic impact on business revenues, employment, and wages.

Table 6-28
Port Canaveral Economic Impacts

Port Canaveral Business Line	Business Revenues	Employment	Wages
Cruise	$916,011,000	8,908	$392,195,000
Cargo	$126,187,000	2,389	$178,393,000
Other	$98,711,000	1,796	$78,179,000
Total	**$1,140,910,000**	**13,093**	**$648,767,000**

Source: Port Canaveral FY 2003 Economic Impact (July, 2005)

Alternative plan contributions to the Social Effects account are limited by the nature of with-project beneficial effects, which are reduced transportation costs for some commodities and cruise ships. Transportation cost reductions at the Port would improve the relative efficiency and competitive advantage of Port Canaveral as compared to other ports. Improved competition at Port Canaveral would conceivably support job, income, and revenue stability at the Port. Improved local economic stability, although not measured or assessed in this analysis, would be considered a positive contribution to the Social Effects account.

6.8 Risk and Uncertainty

The potential impacts of relative sea-level change on this project has been assessed in accordance with USACE guidance (see Section 3.2 Sea Level Change Projections in the Engineering Appendix for more details). Guidance for incorporating the direct and indirect physical effects of projected future sea-level change in USACE projects is provided in the Engineering Circular EC 1165-2-211 titled *Water Resource Policies and Authorities Incorporating Sea-Level Change Considerations in Civil Works Programs* (USACE 2009), which was in effect when the analysis was conducted. EC 1165-2-211 has since been updated and replaced by a new guidance document, EC 1165-2-212. However, there is a negligible difference in sea-level rise projections (less than 0.1 feet) between EC 1165-2-211 and EC 1165-2-212; therefore, Agency Technical Review concluded that it was unnecessary to conduct a reanalysis using EC 1165-2-212.

The Corps guidance states that consideration should be given to how sensitive and adaptable proposed alternatives are to climate change and other related global changes. Because of the variability and uncertainty in projected future sea-levels, alternatives should be evaluated using low, intermediate, and high rates of future sea-level change for both "with" and "without" project conditions in order to bound the likely future conditions.

The estimated potential sea-level change at Port Canaveral was assessed over the period 2014 to 2064 based on guidelines presented in EC 1165-2-211, which includes an assessment of low, intermediate, and high relative sea-level projections. The results of calculations from the project completion in 2014 through 2064 indicate that sea-level change estimates over a 50-year life of the project range from 0.120 meters (0.39 ft) for the low rate of change scenario, to 0.245 m (0.80 ft) for the intermediate rate scenario, and 0.653 m (2.14 ft) for the high rate scenario. Sea-level rise at these rates will have little or no impacts related to the proposed navigation improvements.

With respect to the channel deepening, an increase in sea-level can result in greater water depths within the Port. However the channel depth is set relative to Mean Lower Low Water (MLLW), so as sea-level rises and the MLLW datum is adjusted upward in response, the dredged water depth relative to the new datum will not change. The same can be said about the navigation improvements outside the mouth of the Port. As part of the recommended plan, the new turn widener will be constructed, and cut through the footprint of the existing sediment trap. To maintain the sediment trap's design capacity, it is proposed that the trap be deepened, consistent with the new channel depth, and slightly expanded to the south as described in Attachment J of the Engineering Appendix. Sea level rise should have no impact related to these improvements. Depths of the sediment trap and the widener are both set relative to MLLW and though sea level may rise, maintenance dredging of these features will maintain similar depths relative to the future sea level.

The Engineering Appendix Attachment M: Cost and Schedule Risk Analysis Report addresses risk and uncertainty on the cost side of the project's economic analysis. The Cost and Schedule Risk Analysis identified 20.97% as the appropriate contingency level for this analysis. On the benefit side of the economic analysis, sensitivity analyses are conducted on parameters that affect cargo and cruise ship related benefits:

- Reduced cruise ship schedule and lower commodity forecast as compared to the base case;
- Higher commodity projection as compared to the base case; and
- Alternative Seaport Canaveral forecasts.

Additionally, commodity forecast uncertainty is addressed by ranking base-case commodity projections from most certain to least certain and assessing the benefit to cost ratio at alternative levels of certainty (Table 5-41). Additional sensitivity analyses concerning alternative origins for Seaport Canaveral vessels and alternative aggregate, slag, and cement forecasts are presented in Section 5.6 Risk and Uncertainty of the Economics Appendix.

The reduced cruise ship schedule and lower commodity forecast sensitivity analysis evaluates the effects of using a combined low cargo growth forecast and a reduced cruise ship schedule. The low growth scenario extends the impacts resulting from the recent economic down turn, such that rock products remain at one-half their projected 2011 through 2020, at which time they return to the base case forecast levels. Under this low growth sensitivity analysis Seaport Canaveral gasoline and distillate fuel imports remain at projected 2013 levels through 2020, at which time growth begins using the base case growth rates. This sensitivity analysis also reduces large cruise ship calls by 25%. Table 6-29 presents the cost-benefit analysis of the low forecast

scenario for incremental increases in the project, from Widening Plan 1 to Widening Plan 2 with Deepening Plan 3.

Table 6-29
Cost – Benefit Analysis: Low Forecast Scenario

Alternative Plan	Total AAEQ Costs	Total AAEQ Benefits	Total Net Benefits	Incremental Net Benefits	B/C Ratio
450-foot widening (W1) only	$1,448,734	$1,823,291	$374,557	$374,557	1.3
500-foot widening (W2) only	$1,960,442	$2,760,320	$799,878	$425,321	1.4
W2 and -42-foot deepening	$2,094,929	$4,087,131	$1,992,202	$1,192,324	2.0
W2 and -43-foot deepening	$2,377,931	$4,673,059	$2,295,128	$302,926	2.0
W2 and -44-foot deepening	$2,692,766	$5,177,039	$2,484,273	$189,145	1.9

Note: Discount rate = 4.00%, period 50 years

The most substantial differences between the high commodity forecast and the base case commodity forecast concerning Seaport Canaveral tanker and cement shipments to the Port. Under the high forecast Seaport Canaveral terminal grows at a faster short-term rate so that the facility achieves approximately 75% capacity by 2015, which is a 25% increase over the base case. The high commodity forecast for cement has cement imports returning to 2007 levels by 2012 instead of 2015. In addition, a third rock product terminal comes into operation by 2020. This higher estimate of projected calls increases channel widening benefits and channel deepening benefits, as presented in Table 6-30.

Table 6-30
Cost – Benefit Analysis: High Forecast Scenario

Alternative Plan	Total AAEQ Costs	Total AAEQ Benefits	Total Net Benefits	Incremental Net Benefits	B/C Ratio
450-foot widening (W1) only	$1,448,734	$2,212,348	$763,614	$763,614	1.5
500-foot widening (W2) only	$1,960,442	$3,365,043	$1,404,601	$640,987	1.7
W2 and -42-foot deepening	$2,094,929	$4,990,449	$2,895,520	$1,490,919	2.4
W2 and -43-foot deepening	$2,377,931	$5,680,659	$3,302,728	$407,208	2.4
W2 and -44-foot deepening	$2,692,766	$6,238,321	$3,545,555	$242,827	2.3

Note: Discount rate = 4.00%, period 50 years

Alternative Seaport Canaveral forecasts used as a sensitivity analysis include forecasts ranging from 80% of the base case forecast to 120% of the base case forecast (Table 6-31). The sensitivity analysis indicates proportionately similar impacts to net benefits for the higher and

lower alternatives. The highest alternative (120% of the base case forecast) increases the net benefits of Widening Plan 2 (500 feet) with the -44-foot deepening by 19.95%. The lowest alternative (80% of the base case forecast) decreases net benefits by 19.97%. Total AAEQ net benefits for Widening Plan 2 (500 feet) with the -44-foot deepening range from $2,847,125 for the higher forecast to $1,899,611 for the lower forecast. The benefit/cost ratio similarly ranges from 2.2 to 1.8.

Table 6-31
Cost – Benefit Analysis: Alternative Seaport Canaveral Forecasts

Alternative Forecast	Total Net Benefits	Impact to Net benefits	B/C Ratio
120%	$3,205,840	$537,294	2.2
110%	$2,918,011	$249,464	2.1
105%	$2,802,391	$133,845	2.0
Base Case	**$2,668,546**	- - -	**2.0**
95%	$2,516,379	-$152,167	1.9
90%	$2,393,951	-$274,595	1.9
80%	$2,101,632	-$566,923	1.8

Note: Discount rate = 4.00%, period 50 years

An additional assessment of the impact of commodity forecast uncertainty is developed by ranking commodity projections based on perceived levels of certainty, from the most confident forecast to the least confident (Table 6-32). Benefits based on commodities with the highest level of certainty (fuel) are presented as Scenario 1. Using fuel oil alone, as the single benefitting commodity, results in a benefit to cost ratio of 1.3 for the recommended plan. The addition of construction-related commodities (Scenario 2) increases the benefit to cost ratio up to the base case level (2.0) for the recommended plan. This assessment of uncertainty indicates that each alternative plan is economically justified using the most confident forecast assumptions. Therefore, the risk of recommending too large a plan is acceptable because the recommended plan is justified under the most restrictive commodity forecast.

Table 6-32
Port Canaveral Commodity Forecast Uncertainty Ranking

Scenario 1 Tug and Fuel Vessels Only (Most Certain)				
	500-foot widening only (W2)	W 2 and -42-foot deepening	W 2 and -43-foot deepening	W 2 and -44-foot deepening
Tugs	$745,426	$745,426	$745,426	$745,426
Fuel Vessels	$2,084,322	$2,476,427	$2,637,048	$2,719,182
Total Benefits	$2,829,748	$3,221,853	$3,382,474	$3,464,608
Costs	$1,960,442	$2,094,929	$2,377,931	$2,692,766
Net benefits	$869,306	$1,126,924	$1,004,543	$771,842
BCR	1.4	1.5	1.4	1.3
Scenario 2 Tug, Fuel Vessels, & Other Commodities (Less Certain)				
	500-foot widening only (W2)	W 2 and -42-foot deepening	W 2 and -43-foot deepening	W 2 and -44-foot deepening
Tugs	$745,426	$745,426	$745,426	$745,426
Fuel Vessels	$2,084,322	$2,476,427	$2,637,048	$2,719,182
Other Commodities	$ -	$999,976	$1,449,282	$1,896,704
Total Benefits	$2,829,748	$4,221,830	$4,831,756	$5,361,312
Costs	$1,960,442	$2,094,929	$2,377,931	$2,692,766
Net benefits	$869,306	$2,126,900	$2,453,826	$2,668,546
BCR	1.4	2.0	2.0	2.0

6.9 Implementation Requirements

6.9.1 Division of Responsibilities

This section defines implementation responsibilities necessary to ensure that the Recommended Plan's goals and objectives are achieved. Included are discussions of the division of plan responsibilities between Federal and non-Federal interests, institutional requirements, cost sharing, analysis of non-Federal financial capability, a discussion of the Project Cost Agreement, and views of the non-Federal sponsor.

6.9.2 Cost Sharing

Cost sharing for the Recommended Plan will be done in accordance with Section 101 of the WRDA 1986 and cost shared as a General Navigation Feature. The Recommended Plan requires a blended cost sharing structure as there are two cost sharing depth increments involved (Table 6-33). Channels with depths from 21 feet to 45 feet are cost shared 25 percent non-Federal and 75 percent Federal (78.5% of material to be dredged). Any depth greater than 45 feet is cost shared 50 percent non-Federal and 50 percent Federal (21.5% of material to be dredged). For the purposes of allocating the cost by depth, the 78.5% of the mobilization-demobilization costs are included in the cost for the 21 to 45-foot increment and 21.5% of the mobilization-demobilization costs are included in the cost for the deeper than 45-foot increment. The non-Federal sponsor will provide all Lands, Easements, Right-of-ways, and Relocations (LERR). The only financial LERR costs are administrative costs associated with federal involvement in permitting and other real estate issues. Disposal necessary for the federal project is cost-shared as a general navigation feature. An additional 10 percent of the total costs of General Navigation Features will be repaid by the non-Federal sponsor over a period not to exceed 30-years. All or a portion of this 10% can be offset by LERR costs borne by the non-Federal sponsor. The Interim Corner Cut Off dredging volumes and construction costs are not included in the cost sharing calculations.

A summary of cost shares at FY 2013 price levels is presented in Table 6-34. Cost sharing details for the Recommended Plan at FY 2013 price levels are presented in Table 6-35. Explanatory notes are provided in Table 6-36. The total certified project cost in FY 2013 price levels is $40,136,653, of which $28,652,305 is the federal cost share and $11,484,347 is the non-Federal cost share. Table 6-37 presents the fully funded cost estimate at the mid-point of each year of construction.

Table 6-33
Cost Share Zones

	Dredging Volume (Cubic Yards)	Percentage
-21 to -45 feet	2,441,661	78.51%
Deeper than -45 feet	668,396	21.49%
Total	3,110,057	100.00%

Table 6-34
Project Cost Sharing Summary (FY 2013 Price Levels)

PROJECT FEATURES	TOTAL PROJECT COSTS	FEDERAL SHARE	NON-FEDERAL SHARE
General Navigation Features (GNF)			
Dredging: 20 feet to 45 feet	$14,859,000	$11,144,000	$3,715,000
Dredging: Increment to deepen to greater than 45 feet	$4,068,000	$2,034,000	$2,034,000
Upland Construction Costs (in reach deepened to <45 ft)	$4,659,000	$3,494,000	$1,165,000
Revetment (in reach deepened to <45 ft)	$2,935,000	$2,201,000	$734,000
Associated General Items	$1,624,000	$1,218,000	$406,000
General Navigation Features E&D and S&A	$5,605,000	$4,001,000	$1,604,000
General Navigation Features Contingency	$6,389,000	$4,561,000	$,1,828,000
Total General Navigation Features	$40,136,000	$28,652,000	$11,484,000
Lands and Damages (LERRs)[1]	$104,000	$0	$104,000
Project First Cost	**$40,240,000**	**$28,652,000**	**$11,588,000**
Aids to Navigation[2]	$2,886,000	$2,886,000	$0
Additional Non-Federal Funding Requirements	$0	($3,910,000)	$3910,000
Local Service Facilities			
Berth Dredging[2]	$364,000	$0	$364,000
Total Cost	**$43,491,000**	**$27,628,000**	**$15,862,000**

[1] Includes Real Estate S&A costs; [2] Includes E&D, S&A, and contingency

Table 6-35
Project Cost Sharing Details (FY 2013 Price Levels)

PROJECT FEATURES	TOTAL PROJECT COSTS	FEDERAL SHARE	NON-FEDERAL SHARE
General Navigation Features (GNF)			
Dredging: 20 feet to 45 feet	$18,231,108	$13,673,331	$4,557,777
Dredging: Increment to deepen to greater than 45 feet	$4,990,701	$2,495,350	$2,495,350
Upland Construction Costs (in reach deepened to <45ft)	$5,716,831	$4,287,623	$1,429,208
Revetment (in reach deepened to <45ft)	$236,735	$177,551	$59,184
Mooring Dolphin	$1,482,328	$1,111,746	$370,582
Boat Ramp Wall	$54,683	$41,012	$13,671
Sub Sail Monument	$125,542	$94,156	$31,385
Fencing	$21,514	$16,136	$5,379
Tower Guy Demolition	$71,069	$53,302	$17,767
Warning Sign	$3,601,319	$2,700,989	$900,330
GNF Subtotal	**$34,531,830**	**$24,651,197**	**$9,880,633**
E&D and S&A	$5,604,823	$4,001,108	$1,603,714
Total General Navigation Features	**$40,136,653**	**$28,652,305**	**$11,484,347**
Lands and Damages (LERRs)			
Land Acquisition	$0	$0	$0
Subtotal LERRs	$0	$0	$0
E&D and S&A[1]	$103,306	$0	$103,306
Total LERRS	**$103,306**	$0	**$103,306**
Project First Cost	**$40,239,958**	**$28,652,305**	**$11,587,653**
Aids to Navigation	$2,502,238	$2,502,238	$0
E&D and S&A	$384,149	$384,149	$0
Total Aids to Navigation[2]	**$2,886,386**	**$2,886,386**	$0
Additional Non-Federal Funding Requirements			
10% of GNF		$0	$4,013,665
Adjustment for LERR Credit		$0	($103,306)
Net 10% GNF Requirement		**($3,910,360)**	**$3,910,360**
Local Service Facilities			
Berth Dredging	$315,854	$0	$315,854
E&D and S&A	$48,491	$0	$48,491
Total Local Service Facilities	**$364,344**	$0	**$364,344**
Total Financial Cost and Cost Sharing	**$43,490,689**	**$27,628,332**	**$15,862,357**

Note that costs include contingencies
[1] S&A for administration of real estate issues
[2] Plans for proposed Aids to Navigation will be forwarded to Coast Guard District Seven Waterways Management Division for comprehensive review and determination

Table 6-36
Cost Sharing Explanations

Explanatory Notes
The Federal interest extends only to GNF (General Navigation Features): primary access channels, anchorages, turning basins, locks and dams, harbor areas, jetties and breakwaters
Non-Federal sponsor may plan, design and construct navigation projects and be reimbursed with the Federal share. NOTE: Use of this authority requires advance approval and close coordination with HQUSACE
For providing depths to 20 feet below Mean Low Water (MLW), the non-Federal sponsor pays 10% of the GNF
Per Section 203 of WRDA 1986, for authorized projects the Secretary shall credit toward the non-Federal share of the cost of construction of such project an amount equal to the portion of the cost of developing such study
Non-Federal sponsors must:
Provide, at their expense, all ancillary shore side harbor facilities such as docks, terminal and transfer facilities, berthing areas, and local access channels
Provide all Lands, Easements, Rights-of-way, and Relocations (LERR) for construction and maintenance. The costs of any utility relocations, arising from dredging in excess of 45', should be borne equally by the Sponsor and the owner of the utility, and that the Sponsor would be credited only for 50% of the costs of such relocations
For providing depths from 20 feet to 45 feet below mlw, the non-Federal sponsor pays 25% of the GNF
For providing depths beyond 45 feet below mlw, the non-Federal sponsor pays 50% of the GNF
Provide cash contributions toward the costs for construction of the GNF of the project, which includes the costs of constructing land-based and aquatic dredged material disposal facilities, paid during construction
Hold and save the U.S. free from damages due to the construction, operation and maintenance dredging
Contribute 50% of the incremental costs for maintenance dredging associated with project depths in excess of 45 feet
For all depths, provide an additional cash contribution equal to 10% of GNF, which includes dredged material disposal construction costs. These costs may be paid over a period not exceeding 30 years
The sponsor's costs for LERR, are credited against the additional cash contribution

Table 6-37
Fully Funded Costs

Civil Works Feature	Cost	Contingency	Total
Navigation Ports and Harbors	$28,734,000	$6,523,000	$35,256,000
PED	$2,284,000	$518,000	$2,802,000
Construction Management	$2,400,000	$545,000	$2,945,000
Totals	$33,417,000	$7,586,000	$ 41,003,000

Note: Totals may not sum due to rounding

6.9.3 Special Consideration: Credit for Previously Completed Work

The CPA is seeking Congressional Authorization to credit the CPA costs for the Interim Corner Cut Off (ICCO) towards the non-Federal cost share of the recommended project. The construction costs of the ICCO ($13,775,063) are not included as a project cost in this report, because a prior agreement or authorization for project improvement was not yet in place between the Corps of Engineers and the non-Federal sponsor, the Canaveral Port Authority. However, as has been the case for a number of previous Federal navigation projects, the CPA intends to seek post-facto credit for those costs as part of the specific Congressional Authorization for construction of the project improvements recommended in this report. The ICCO is fully within the recommended project area and is an integral component of project design. The ICCO was completed while the feasibility study was being conducted.

The CPA constructed the ICCO in advance of completing the feasibility study to maintain safe navigation within the harbor for newer, larger cruise ships that were entering the Port Canaveral fleet at that time. These vessels were larger than the design limits of the existing Federal navigation project so CPA made the decision to advance construction to serve the existing and future fleet. The ICCO is included as a without-project condition throughout the feasibility analysis. The project, including the costs of the ICCO, remains economically justified and the recommended plan does not change if the expended costs of this completed element are included. The required environmental documentation and coordination was also conducted by CPA prior to construction of these interim ICCO improvements.

6.9.3.1 Section 203 Study Costs

Should the project that is recommended in this feasibility study be authorized by Congress, the Canaveral Port Authority, who has fully funded this Section 203 feasibility study, intends to seek credit under the provisions of Public Law 99-662, 99th Congress, November 17, 1986, (WRDA 1986), Section 203.(d) Credit and Reimbursement.

Section 203(d) states *"If a project for which a study has been submitted under subsection (a) is authorized by any provision of Federal law enacted after the date of such submission, the Secretary shall credit toward the non-Federal share of the cost of construction of such project an amount equal to the portion of the cost of developing such study that would be the responsibility of the United States if such study were developed by the Secretary."*

6.9.4 Financial Analysis of Non-Federal Sponsor's Capabilities

A financial analysis is required for any plan being considered for USACE implementation that involves non-Federal cost sharing. The purpose of the financial analysis is to ensure that the non-Federal sponsor understands the financial commitment involved and has reasonable plans for meeting that commitment. The financial analysis includes the non-Federal sponsor's statement of financial capability, the non-Federal sponsor's financing plan, and an assessment of the sponsor's financial capability.

The Canaveral Port Authority has expressed support for a potential project. Their funding of this Section 203 study is proof of their willingness to proceed with the proposed solution to the channel constraint problems identified at Port Canaveral. The Canaveral Port Authority has the capability to fund the non-Federal share of project design and construction costs. Furthermore, their capability as a non-Federal sponsor has been evidenced by their performance as the non-Federal sponsor on all previous Federal projects at Port Canaveral.

The Chief Financial Officer of the Canaveral Port Authority has signed a self-certification of financial capability (Attachment 2) as required by CECW-PC Memorandum on Lean Six Sigma Actions to Improve the Project Cooperation Agreement Process – Non-Federal Sponsor's Self-Certification of Financial Capability (12 June 2007). The form at enclosure 3 of that memo has been completed and is submitted with this Section 203 Report.

7. ENVIRONMENTAL CONSEQUENCES*

This section provides the scientific and analytical basis for comparison of the project alternatives to assist in the decision making process. The following sections include summaries of anticipated changes to resources within the area of influence of the proposed action (the selected plan) including direct, secondary, and cumulative effects.

7.1 Environmental Evaluation Methodology

The evaluation of anticipated effects included consideration of both existing information and new data collected specifically for these analyses where existing information was determined to be insufficient. Various resource agencies were contacted early in the process to determine regulatory and coordination requirements and potential resources of concern. The agencies assisted the Port in determining what additional studies and information may be required. Public input was also important in determining additional issues for evaluation, and is described in Section 8.

A number of studies and field investigations were conducted to evaluate potential impacts to resources from the project. A field investigation was conducted to evaluate vegetative communities, wetlands, and terrestrial protected species and habitat within the study area (Figure 2-3). An additional field study was conducted to identify sea turtle foraging areas within the harbor, including extent of use and algal community characteristics of the foraging areas (Figure 2-5). A study was conducted to identify the presence or likely presence of hazardous substances or petroleum products in and around the project area, and an assessment of essential fish habitat was completed. The information in these reports was summarized in an environmental baseline report (see Environmental Appendix). A report evaluating potential impacts of channel widening to the north and south jetties as well as the south jetty sediment trap was also conducted (see Engineering Appendix, Attachment G).

7.2 Effects on Significant Resources

7.2.1 General

The general environmental effects identified as resulting from the proposed project would be those short-term, construction related direct effects from constructing and dredging a deeper and wider navigation channel. In addition, there would be the long-term direct effects from maintaining a larger navigation channel and secondary effects attributable to the operation of the port facilities once construction is complete.

Three alternatives are being considered in this NEPA analysis along with the No Action Alternative. During the plan formulation process (see Section 5), a series of measures were considered and evaluated for effectiveness in achieving the goals of the study. Operational measures included modifications to vessel operating procedures, such as varying transit speeds and increasing vessel controllability. Modifying aids to navigation were also considered as operational measures. Locally implemented structural measures included modifications to port infrastructure (berths, piers, and mooring conditions) and terminals. Structural modifications to the Federally authorized channels included deepening and/or widening of channels and turning basins.

None of the planning elements are feasible as standalone alternative plans. As described in Section 5.3, berth deepening and improving aids to navigation, by themselves, do not adequately address the navigational constraints and associated problems at Port Canaveral. Each of the structural measures to the federal channel requires a companion locally implemented planning element to fully address the navigational constraints and problems. Widening the channel, which would allow larger cruise ships to more safely and efficiently use the port's cruise terminals, requires improved aids to navigation to be fully effective. Similarly, channel deepening requires associated berth deepening so that channel deepening benefits can be realized. Therefore, three action alternatives were developed for analysis.

Alternative 1, the Preferred Alternative includes the following features:

- Channel widening from 400 feet to 500 feet, from the sea to the West Turning Basin, and placement of an outbound range as an aid to navigation;
- Channel deepening from the sea to the West Access Channel and Middle Turning Basin, in one-foot increments starting at -42 feet in the Inner Reach, plus berth deepening; and

Alternative 2 is similar to Alternative 1, but without the channel widening feature:

- Channel deepening from the sea to the West Access Channel and Middle Turning Basin, in one-foot increments starting at -42 feet in the Inner Reach, plus berth deepening; and

Alternative 3 is similar to Alternative 1, but the channel widening extends only 50 feet, from 400 feet to 450 feet:

- Channel widening from 400 feet to 450 feet, from the sea to the West Turning Basin, and placement of an outbound range as an aid to navigation, and
- Channel deepening from the sea to the West Access Channel and Middle Turning Basin, in one-foot increments starting at -42 feet in the Inner Reach, plus berth deepening.

7.2.2 Sediments (see 2.6.1)

7.2.2.1 No Action Alternative

The No Action Alternative would have no effect on sediments. Maintenance dredging in the harbor and port facilities would continue on its current schedule.

7.2.2.2 Alternative 1 – Preferred Alternative

Alternative 1 would result in the immediate removal of 3,110,057 CY of sediments from the existing and proposed confines of the navigation channel. Dredging would be performed using clamshell or hydraulic dredge and loaded into scows for offshore disposal. The sediments would be placed in the existing authorized ODMDS. The present management plan for the ODMDS is the Site Management and Monitoring Plan (SMMP) dated February 2012. The SMMP is a ten-year plan, which is jointly implemented by the Corps' Jacksonville District and USEPA's Region 4. The SMMP specifically accounts for construction and maintenance material resulting from the project. The SMMP does not identify an annual limitation on placement volume. Historically, the Corps was authorized a maximum of 500,000 CY of maintenance dredging material to be placed in the ODMDS annually. The Port is permitted to dispose a maximum of 100,000 CY of maintenance material in the ODMDS annually. Historically, however, the

amounts have been significantly less. Preliminary evaluations indicate that approximately 69,500 CY of additional annual maintenance dredging material would be generated by the proposed project, which is well within the confines of the existing authorizations.

Upland soils would be removed via upland excavation to the greatest extent possible down to -13 ft. MLLW and used as fill or transported to approved upland storage sites for future use. Turbidity control for the project has not been specified, but options could include installing temporary sheet pile walls or double turbidity barriers. In all cases, the contractor would be required to comply with the state water quality standards during construction.

7.2.2.3 Alternative 2

Alternative 2 would result in the immediate removal of 1,520,349 CY of sediments from the existing navigation channel. Dredging would be performed using clamshell or hydraulic dredge and loaded into scows for offshore disposal. Dredged material would be treated as is described for Alternative 1. Preliminary evaluations indicate that no substantial additional annual maintenance dredging material would be generated by the proposed project.

7.2.2.4 Alternative 3

Alternative 3 would result in the immediate removal of 2,496,731 CY of sediments from the existing navigation channel. Dredging would be performed using clamshell or hydraulic dredge and loaded into scows for offshore disposal. Dredged material would be treated as is described for Alternative 1. Preliminary evaluations indicate that no substantial additional annual maintenance dredging material would be generated by the proposed project.

7.2.3 Vegetation (see 2.6.2)

7.2.3.1 No Action Alternative

The No Action Alternative would have no effect on vegetation. Native upland communities are limited on the property currently owned-operated by the Canaveral Port Authority. However, the vegetation in the upland communities on the CCAFS property between the MTB and TTB would be further removed with continued use of the site as a spoil disposal area by the US Navy / US Air Force.

7.2.3.2 Alternative 1 – Preferred Alternative

Alternative 1 would result in loss of vegetation associated with the loss of 8 acres of open field (shrub and brushland/spoil area) between the MTB and the TTB north of the channel. The vegetation in the upland communities on the CCAFS property between the MTB and TTB would be removed with future USAF and USN planned use of the site as a spoil disposal area, probably within the next two years, as would also occur under the No Action alternative. There is no additional vegetation loss associated with the rip-rap placement, which would be within the 8 acres.

7.2.3.3 Alternative 2

Alternative 2 would have no effect on vegetation. Impacts would be the same as with the No Action Alternative.

7.2.3.4 Alternative 3

Alternative 3 would result in loss of vegetation associated with the loss of 4 acres of open field (shrub and brushland/spoil area) between the MTB and the TTB north of the channel. The vegetation in the upland communities on the CCAFS property between the MTB and TTB would be removed with future USAF and USN planned use of the site as a spoil disposal area, probably within the next two years, as would also occur under the No Action alternative. There is no additional vegetation loss associated with the rip-rap placement, which would be within the 4 acres.

7.2.4 Wildlife Resources

7.2.4.1 No Action Alternative (see 2.6.3)

The No Action Alternative would have no effect on wildlife. The US Navy and US Air Force are currently using the upland area between the MTB and TTB on the CCAFS as a spoil disposal area. CCAFS is currently planning relocation of gopher tortoises and associated commensal species to a designated site on the CCAFS.

7.2.4.2 Alternative 1 – Preferred Alternative

Alternative 1 would have no discernible impact on wildlife. Wildlife found within Port boundaries in the study area are typical species found in heavily developed Florida coastline communities. Mammals include raccoons (*Procyon lotor*), domestic and feral cats (*Felis cattus*), and mice (*Mus musculus*). Migratory bird species, including warblers and sparrows, typically roost in forested areas along the coast, particularly near to open water. These species would not be displaced or otherwise significantly affected by construction or operation activities. The relocation of gopher tortoises and associated commensal species, which will occur under the No Action Alternative, would also occur under Alternative 1.

7.2.4.3 Alternative 2

Alternative 2 would have no effect on wildlife. Impacts would be the same as with the No Action Alternative.

7.2.4.4 Alternative 3

Alternative 3 would have no discernible effect on wildlife. Impacts would be similar to Alternative 1.

7.2.5 Wetlands (see 2.6.4)

7.2.5.1 No Action Alternative

The No Action Alternative would have no effect on wetlands. There are no wetlands within the project area (Figure 2-3).

7.2.5.2 Alternative 1 – Preferred Alternative

Wetland habitats within the study area are limited primarily to the western perimeter adjacent to the Banana River outside the project area, and would not be affected by construction, dredging,

or operational activities with the project. Therefore, Alternative 1 would have no effect on wetlands. The project would be constructed within the 100-year flood plain. Due to the nature of the proposed activities (i.e., widening and deepening of the existing channel), no practical alternative exists that would not occur within the 100-year flood plain. However, the project would not adversely affect flooding in the region.

7.2.5.3 Alternative 2

Alternative 2 would have no effect on wetlands. Impacts would be the same as with Alternative 1.

7.2.5.4 Alternative 3

Alternative 3 would have no effect on wetlands. Impacts would be the same as with Alternative 1.

7.2.6 Marine Resources (see 2.6.5)

7.2.6.1 No Action Alternative

The No Action Alternative would have no additional effect on marine resources. Maintenance dredging of sand bottom habitat in the harbor and port facilities would continue on its current schedule and permit conditions require for the monitoring of manatees and sea turtles during construction activities.

7.2.6.2 Alternative 1 – Preferred Alternative

Alternative 1 would impact marine resources, but these impacts would be temporary in nature. No beach or dune habitat, hardbottom, or seagrass would be affected by the alternative. A study was performed by Olsen Associates, Inc. (2007) (see Engineering Appendix) to evaluate the potential impact to downdrift sand supply and the south jetty sediment trap. The study concluded that the proposed alternative would have no effect. As with the No Action Alternative, maintenance dredging of sand bottom habitat in the harbor and port facilities would continue on its current schedule. The additional dredging impacts that would affect sand bottom would be associated with the ocean channel widener. The dredging area is approximately 34 acres, with an existing grade of approximately -30 MLW. Dredging is proposed to -46' MLW (+ 2 overdredge), resulting in approximately 600,000 CY of dredging.

There would be a temporary loss of approximately one acre of the marine algal community associated with removal of the riprap located between the MTB and the TTB. This riprap area is presently used for foraging by juvenile green sea turtles. Once the new riprap was installed, recolonization of the algal community should occur relatively quickly, likely within one year from placement. It may be possible to stockpile the riprap in the water during construction to minimize impacts to the algal community. An additional 2.5 acres of algal covered riprap exists along the southern jetty, and an unknown amount of algal mats occur in the Trident Turning Basin. It is estimated that less than 20% of the algal community used by juvenile greens in the Port would be temporarily impacted as a result of the project, especially given the extent of riprap present in the Trident Basin (Ehrhart and Redfoot 2007). The shoreline segment proposed for construction is approximately 980 meters in length. The shoreline length of similar habitat within the Trident Basin is approximately three times that size (2,700 meters) and so offers a

significant amount of adjacent habitat for any displaced turtles. The turtle survey effort also identified some other locations within the Port near the shoreline segment proposed for construction that would also offer potential refugia for displaced turtles, notably the riprap shoreline at Jetty Park along the south side of the channel (266 meters) and the interior areas of the north entrance jetty (740 meters) and the South Entrance Jetty (590 meters) (Dial Cordy 2007). Like the Trident Basin, these areas have habitat similar to the shoreline segment between the two turning basins. Taken together, these areas represent a total of nearly 4,300 meters of appropriate habitat in the vicinity of the shoreline segment proposed for construction that would be available as a refuge for any turtles temporarily displaced by the construction activities.

7.2.6.3 Alternative 2

Alternative 2 would impact marine resources, but these impacts would be temporary in nature. No beach or dune habitat, hardbottom, or seagrass would be affected by the alternative. A study was performed by Olsen Associates, Inc. (2007) (see Engineering Appendix) to evaluate the potential impact to downdrift sand supply and the south jetty sediment trap. The study concluded that the proposed alternative would have no effect. As with Alternative 1 and the No Action Alternative, maintenance dredging of sand bottom habitat in the harbor and port facilities would continue on its current schedule. The dredging area is approximately 34 acres, with an existing grade of approximately -30 MLW. Dredging is proposed to -46 MLW (+ 2 overdredge), resulting in approximately 1,520,349 CY of dredging.

7.2.6.4 Alternative 3

Alternative 3 would impact marine resources, but these impacts would be temporary in nature. Impacts would be very similar to Alternative 1.

7.2.7 Essential Fish Habitat (see 2.6.6)

7.2.7.1 No Action Alternative

The No Action Alternative would have no effect on EFH beyond the current impacts to water column and un-vegetated sand bottom associated with continued maintenance dredging.

7.2.7.2 Alternative 1 – Preferred Alternative

Alternative 1 would result in temporary impacts to EFH. There would be a temporary impact to the water column during construction due to increased turbidity (within State water quality parameters) during dredging, but this would be minor and temporary in nature. Impacts to populations of managed species will occur due to dredging of soft bottom habitats, including those that lack seagrasses. Dredging will temporarily remove benthic organisms used as prey by managed species and as a result may temporarily impact certain species, such as red drum, that forage largely on such taxa. Dredged habitats are anticipated to recover, in terms of benthic biodiversity and population density, within two years (Taylor et al., 1973; Culter and Mahadevan, 1982; Saloman et al., 1982).

As a result of the north side inner reach widening, an additional 16 acres of sand bottom would be created, and an additional 13 acres of sand bottom would be created with the south side west access channel widening. Approximately one acre of man-made hardbottom habitat in the form of boulder riprap would be temporarily removed during the project widening, with replacement

of these features once dredging is completed (see Section 7.2.6.2 for additional information). Impacts to managed species and their prey would be minimal and short-term in nature. An EFH assessment was completed for the project and concurrence from NMFS was received on June 13, 2012. These documents are included in the Environmental Appendix.

7.2.7.3 Alternative 2

Alternative 2 would result in temporary impacts to EFH. There would be a temporary impact to the water column during construction due to increased turbidity (within State water quality parameters) during dredging, but this would be minor and temporary in nature. Impacts to populations of managed species will occur due to dredging of soft bottom habitats, including those that lack seagrasses. Dredging will remove benthic organisms used as prey by managed species and as a result may temporarily impact certain species, such as red drum, that forage largely on such taxa. Dredged habitats are anticipated to recover, in terms of benthic biodiversity and population density, within two years (Taylor et al., 1973; Culter and Mahadevan, 1982; Saloman et al., 1982).

7.2.7.4 Alternative 3

Alternative 3 would result in temporary impacts to EFH. Impacts would be very similar to the widening aspects of Alternative 1.

7.2.8 Protected Species (see 2.6.7)

7.2.8.1 No Action Alternative

The No Action Alternative would have no additional effect on protected species. Maintenance dredging activities would continue under the current schedule, and protection and monitoring measures for manatees and sea turtles would continue to be followed according to the state and federal requirements (see Section 7.2.8.3). Due to the CCAFS and the Corps' plans to utilize the upland site between the middle and east turning basins for dredged material disposal, the CCAFS would relocate all gopher tortoises on the site. In the unlikely event that indigo snakes were encountered during construction, standard protection measures would be taken in accordance with the U.S. Fish and Wildlife Service (USFWS) guidelines.

7.2.8.2 Alternative 1 – Preferred Alternative

Alternative 1 has the potential to affect certain protected species within the project area. However, no impacts to the scrub jay, bald eagle, least tern, or piping plover are expected, since these species are not present in the project impact area (see Figures 2-8, 2-9, and 2-10).

Since there would be no direct beach placement of sand with this alternative, there would be no direct effect on nesting or hatchling sea turtles or the southeastern beach mouse. However, light from upland sources has been shown to have an effect on sea turtle hatchlings as they emerge from nests. Light from upland sources may disorient the hatchlings and prevent them from reaching the ocean. Direct lighting can also impact beach mouse activity and predation. The Port developed a light management plan in cooperation with the USFWS and FFWCC to mitigate the Port's overall lighting impact, including direct light and cumulative glow. Measures include type and orientation of exterior lighting, management of new and existing exterior light

sources, and the use of cutoff style light fixtures and shielding for pier and cargo-handling areas. These measures apply to Port tenants as well as Port operations.

Light generated during construction activities also has the potential to affect and disorient sea turtle hatchlings. Appropriate measures would be required during construction to mitigate for potential effects. A construction-specific light management plan may be required and include such measures as limiting nighttime construction activities during the nesting season and specifying placement and types of exterior lighting. The USFWS determined in their letter dated June 29, 2012 that the project would not adversely affect nesting or hatchling sea turtles with the inclusion of the lighting conditions outlined for the project of the West Indian manatee, described in greater detail below.

The USACE determined that the proposed project may affect, but is not likely to adversely affect the Eastern indigo snake with the incorporation of the USFWS standard protection measures into the project plans and specifications. The USFWS concurred with this determination in their letter dated June 29, 2012 (see Environmental Appendix).

Alternative 1 has the potential to impact the West Indian manatee during construction and dredging. The manatee can be found in Canaveral Harbor year round and precautions and monitoring are undertaken to ensure they are not impacted during normal operations associated with Port activities. The Port has had a Manatee Protection Plan since 1996 for the harbor. In 2003, the Brevard County Board of County Commissioners approved a Manatee Protection Plan to identify and implement measures to provide protection for the manatee. Standard manatee protection measures are also followed during maintenance dredging, and these measures would be implemented with any dredging activities associated with Alternative 1. Standard protection measures include:

- All personnel associated with the project shall be instructed about the presence of marine turtles, manatees and manatee speed zones, and the need to avoid collisions with (and injury to) these protected marine species. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.

- All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four- foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

- Siltation or turbidity barriers shall be made of material in which manatees and marine turtles cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee or marine turtle movement.

- Any collision with or injury to a marine turtle or manatee shall be reported immediately to the FFWCC Hotline at 1-888-404-3922, and to FFWCC at ImperiledSpecies@myFWC.com. Collision and/or injury should also be reported to the USFWS (in Jacksonville 1-904-731-3336.

- Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Temporary signs that have already been approved for this use by the FFWCC must be used.
    - One sign which reads *Caution: Manatee Habitat* must be posted.
    - A second sign measuring at least 8 ½" by 11" explaining the requirements for "Idle Speed/No Wake" and the shutdown of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities.
    - These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to the email address listed above.

In addition to the above-mentioned standard manatee conditions for in-water work, the USFWS letter dated June 29, 2012, requires incorporating the following conditions into the project plans and specifications to reduce the probability of take of manatees, nesting and hatchling sea turtles, and the southeastern beach mouse, to insignificant or discountable levels:

1. All in-water operations, including vessels, must be shut down if a manatee(s) comes within 50 feet of the operation (75 feet during nighttime operations). Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation (75 feet during nighttime operations), or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation (75 feet during nighttime operations). Animals must not be herded away or harassed into leaving.
2. To reduce the risk of a vessel crushing a manatee, the Permittee shall install and maintain the proposed wharf fenders to provide sufficient standoff space of at least four (4) feet under maximum designed compression. Fenders or buoys providing a minimum standoff space of at least four (4) feet under maximum designed compression shall also be utilized between two vessels that are moored together such as, but not limited to, the mooring of the scow and dredge barges.
3. During clamshell operations, the dredge operator shall gravity-release the clamshell bucket only at the water's surface, and only after confirmation that there are no manatees within the 50-foot safety distance during the day or the 75- foot distance during nighttime operations. The observers shall notify the dredge operator if manatees enter within the designated safety distances.
4. During daylight hours, at least one person shall be designated as a protected marine animal observer when in-water work is being performed. During nighttime hours, at least two people shall be designated as protected marine animal observers. Designated observers shall have appropriate qualifications and observation experience. Appropriate experience shall be demonstrated by a minimum of 100 hours of documented experience as an approved USFWS or FFWCC observer that has monitored marine animals and their behaviors in association with in-water construction projects. No later than 15 calendar days prior to the commencement of each dredging event, the Permittee shall ensure that the names, contact information, and experience has been submitted to the USFWS at jaxregs@fws.gov. The protected marine animal observer must be on-site during all in-water construction activities and shall advise personnel to cease operation

upon sighting a manatee within 50 feet of any in-water construction activity (75 feet for nighttime operations).

5. All observers shall maintain a daily log that details sightings, collisions, or injuries to protected marine animals, as well as project specific information such as work itinerary, weather, work shutdowns, observer shift changes, etc. In regard to manatee behavior, the observers shall also log time of observation, estimated distance of manatees from the dredge, type of behavior (such as passing through, pausing in the vicinity of the project, interacting with the dredge, scows, tugs, etc., attracted to running or dripping water), detection method (i.e., unaided visual, infrared, light intensification equipment, etc.) and whether the dredge is operating at the time of observation. A final report for each dredging event, summarizing all activities noted in the daily observer logs, an assessment and documentation (via photo or digital imagery) of effectiveness of any new technology implemented for observation (such as infrared) and new protocols, the location and name of project, and the dates and times of work shall be submitted within 30 days following project completion. The final report shall be submitted to the USFWS at jaxregs@fws.gov.
6. From March 1 through November 30, all project lighting east of the port locks shall be limited to the immediate area of active construction only and shall be the minimal lighting necessary to comply with U.S. Coast Guard, USACE and/or OSHA requirements. In order to better observe manatees during nighttime clamshell operations, the Contractor shall use shielded lights to illuminate the water surface for 75 feet around the hoist line (cable attached to bucket). These lights shall be shielded and/or positioned such that they are not visible from any sea turtle nesting beaches immediately north and south of Port Canaveral. The light intensity shall be a minimum of 54 lux (5 foot candles) at the water surface throughout this 111uminated area including the edge. The Contractor shall also have a handheld spotlight with a minimum of 10,000,000 candle power available to better observe manatees outside of this illuminated area. The Contractor shall measure the size of the illuminated area, intensity of the specified illumination, and assess its direct visibility from adjacent beaches, prior to commencement of the project. Prior to commencement of work, USACE shall provide to the FWS at jaxregs@fws.gov written verification from the contractor that the lighting described above conforms to the required specifications. No night-time operations shall commence or continue if one or more of these lighting parameters do not comply with the required specifications.
7. If the dedicated observers determine that detection of manatees during certain weather conditions (i.e., fog, rain, wind, etc.) is not possible, and if other optional technologies, e.g., infrared and/or light intensification equipment, cannot be effectively used to compensate for the loss of visual detection during certain weather (i.e., fog, rain, wind, etc.), then dredging operations shall cease until weather conditions improve and detection is again possible. The observers shall report any issues of non-compliance with the special operating measures to the Permittee and record these instances on their logs.

8. At least 48 hours prior to the commencement of each dredging event, the Permittee shall ensure that notification is sent to the USFWS indicating the actual start date and the expected completion date to the USFWS at jaxregs@fws.gov.
9. Blasting is prohibited. If no other alternative exists, consultation must be reinitiated.

With the implementation of the above-referenced conditions and monitoring, Alternative 1 is not likely to adversely affect the West Indian manatee. The Biological Assessment submitted to the USFWS, and the USFWS' concurrence letter dated June 29, 2012, are included in the Environmental Appendix.

Alternative 1 has the potential to affect swimming juvenile sea turtles. Juvenile sea turtles forage on algae within the harbor, so protection measures would be required during removal of rock riprap, dredging activities, and replacement of riprap between the MTB and TTB. Appropriate safeguards during construction operations will be developed to minimize any potential "take", such as using a turbidity curtain around the riprap and using divers to ensure all sea turtles have been excluded prior to removal and replacement of rock riprap. The other major potential source of "take" involves the displacement of turtles foraging on the riprap habitat for the time period between its removal and up to the time following its replacement when it has developed an algal community similar to what currently exists. The most likely scenario is that turtles would be displaced from the shoreline area between the MTB and TTB to other areas within the Port that have suitable similar habitat, most likely within the TTB itself (see discussion in Section 7.2.6.2). The potential for "taking" sea turtles is reduced when protective measures are used during hydraulic and clamshell dredging, so no dredging blackout window would be in effect. With standard protection measures and use of the above defined safeguards, as would be included in any Federal or State permit, Alternative 1 would not likely adversely affect juvenile sea turtles. A Biological Assessment was submitted to NMFS. A response was received from NMFS dated May 14, 2012, concurring with the USACE determination that the project "may affect, but is not likely to affect" any of the species of sea turtles or smalltooth sawfish with the incorporation of the NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions dated March 23, 2006 (see Environmental Appendix).

Alternative 1 has the potential to affect the right whale. However, as previously discussed in this document, Alternative 1 is not expected to result in an increase in ship traffic calling on Port Canaveral. The project purpose is to handle the existing and projected cargo and cruise ship traffic, including larger vessels that the Port already sees, in a more efficient and safer manner. Alternative 1 would result in less delays for ships entering the harbor and reduce the amount of time offshore in right whale critical habitat, thus, reducing the potential of ship-whale incidents. Therefore, Alternative 1 is not likely to have an adverse effect on the right whale. The Port has been a primary sponsor of the Northern Right Whale Education & Monitoring Program with the Marine Resources Council since the mid to late-1990's.

Approximately 3.1 million cubic yards of material would be excavated and placed in the ODMDS. Based on the recently completed Corner Cut-Off dredging project, an average of 4,361 cubic yards of material was transferred per barge to the ODMDS. The proposed action would require approximately 710 trips to transfer the material to the ODMDS. The average time to traverse from the dredging site, disposal time, and travel back to the dredge site was 273 minutes. Transit velocity ranged from 3.4 knots (outbound speed) to 7.1 knots (return speed).

A Biological Assessment was prepared and submitted to the NMFS for concurrence (see Environmental Appendix). The NMFS determined that the project "may affect, but is not likely to adversely affect" the North Atlantic right whale and that non-federal vessels in excess of 65 feet in length entering and leaving the area are requested by NMFS to comply with the 10 knot speed restriction within the North Atlantic Right Whale Seasonal Management Area between November 15 and April 15 (73 FR 60173, October 2008). Federal vessels and contractors working on federal projects are exempt from this requirement.

7.2.8.3 Alternative 2

Alternative 2 has the potential to affect certain protected species within the project area. However, no impacts to the scrub jay, bald eagle, least tern, or piping plover are expected, since these species are not present in the project impact area (see Figures 2-8, 2-9, and 2-10).

Alternative 2 would have similar effects on nesting and hatchling sea turtles, the southeastern beach mouse, the West Indian manatee, and the right whale as Alternative 1. Potential effects and mitigation measures have been previously described.

7.2.8.4 Alternative 3

Alternative 3 has the potential to affect certain protected species within the project area. However, no impacts to the scrub jay, bald eagle, least tern, or piping plover are expected, since these species are not present in the project impact area (see Figures 2-8, 2-9, and 2-10). Effects on other species would be very similar to Alternative 1.

7.2.9 Cultural Resources (see 2.6.17)

7.2.9.1 No Action Alternative

The No Action Alternative would have no effect on cultural resources.

7.2.9.2 Alternative 1 – Preferred Alternative

The cultural resource report was revised in December 2007 (PBS&J 2007) and submitted to the State Historic Preservation Office (SHPO) for review. Subsequently, after the report was finalized it was determined that the National Register boundary associated with the Cape Canaveral Air Force Station is larger than the National Landmark Boundary for the Cape Canaveral Air Force Station. While project impacts will not adversely affect significant elements key to the listing of the Historic Property on both the National Register of Historic places and the listing as a National Landmark, clarification will be sought prior to project implementation during the Corps consultation on its final determination of effects under Section 106 of the National Historic Preservation Act. The report stated that the project was unlikely to affect historic properties. A letter was received from SHPO concurring with this determination (see Environmental Appendix). Therefore, Alternative 1 would have no effect on cultural resources. Initial recommendations from SHPO during the scoping process included providing 10-20 meter buffer areas around two distinct areas of cultural deposits identified in the initial cultural resource survey (PBS&J 2006). However, these sites are located on the CCAFS and are the responsibility of the U.S. Air Force. To ensure that no cultural resources are impacted an Archaeological Monitor will be utilized during initial ground clearing operations in preparation

of the work to ensure that no portions of these sites extend into the project area. All work will also be subject to an unexpected finds clause should any archeological materials are identified.

7.2.9.3 Alternative 2

Alternative 2 would have no effect on cultural resources.

7.2.9.4 Alternative 3

Alternative 3 would have the same effect on cultural resources as Alternative 1, and similar protective measures would be implemented.

7.2.10 Socio-Economic Resources

7.2.10.1 No Action Alternative

The No Action Alternative would generate no change to the study area's socio-economic conditions.

7.2.10.2 Alternative 1 – Preferred Alternative

Alternative 1 would generate no change to the study area's socio-economic conditions.

7.2.10.3 Alternative 2

Alternative 2 would generate no change to the study area's socio-economic conditions.

7.2.10.4 Alternative 2

Alternative 3 would generate no change to the study area's socio-economic conditions.

7.2.11 Aesthetics

7.2.11.1 No Action Alternative

The No Action Alternative would have no effect on aesthetic resources.

7.2.11.2 Alternative 1 – Preferred Alternative

Alternative 1 would have no significant effect on aesthetic resources, although construction and dredging equipment would be visible from nearby beaches and parks. The Port has construction equipment and industrial amenities visible on a regular, if not continuous, basis. Therefore, this would not present an aesthetic change from current conditions.

7.2.11.3 Alternative 2

Alternative 2 would have a similar effect on aesthetics as Alternative 1.

7.2.11.4 Alternative 3

Alternative 3 would have a similar effect on aesthetics as Alternative 1.

7.2.12 Recreation

7.2.12.1 No Action Alternative

The No Action Alternative would have no effect on recreational resources.

7.2.12.2 Alternative 1 – Preferred Alternative

Alternative 1 would have no significant effect on recreational resources. Dredging activities may be noticeable from the local recreation amenities in the port or from the nearby beaches located within a half-mile of the proposed channel widener, and dredging of the ocean widener would temporarily displace any fishing activities within or near the dredge area, but these effects would be minor and temporary.

7.2.12.3 Alternative 2

Alternative 2 would have no significant effect on recreational resources. Dredging activities may be noticeable from the local recreation amenities in the port or from the nearby beaches.

7.2.12.4 Alternative 3

Alternative 3 would have no significant effect on recreational resources. Impacts would be very similar to Alternative 1.

7.2.13 Coastal Barrier Resources

7.2.13.1 No Action Alternative

The No Action Alternative would have no effect on coastal barrier resources.

7.2.13.2 Alternative 1 – Preferred Alternative

No coastal barrier resources are located within the project study area and are unlikely to be affected by the project construction or operations. Therefore, Alternative 1 would have no effect on coastal barrier resources.

7.2.13.3 Alternative 2

No coastal barrier resources are located within the project study area and are unlikely to be affected by the project construction or operations. Therefore, Alternative 2 would have no effect on coastal barrier resources.

7.2.13.4 Alternative 3

No coastal barrier resources are located within the project study area and are unlikely to be affected by the project construction or operations. Therefore, Alternative 3 would have no effect on coastal barrier resources.

7.2.14 Water Quality

7.2.14.1 No Action Alternative

The No Action Alternative would have no effect on water quality other than the minor temporary water column turbidity impacts associated with historical maintenance dredging. Maintenance dredging would continue in the harbor on the current schedule.

7.2.14.2 Alternative 1 – Preferred Alternative

Alternative 1 would have only a minor, temporary effect on water quality. Dredging would result in a temporary water column impact from turbidity, but all dredging would be conducted in accordance with the State water quality standards. Turbidity monitoring would be required to ensure that turbidity levels would not exceed 29 nephelometric turbidity units (NTUs) above background at the edge of a mixing zone. If turbidity levels exceed 29 NTUs over baseline at any time, construction activities would cease immediately and not resume until modifications or corrective measures were taken and turbidity has returned to acceptable levels.

Upland sediments would be removed by land to the greatest extent possible down to -13 ft. MLLW and used as fill or be transported to an upland storage site for future use. Turbidity control for the project has not been specified, but options could include installing temporary sheet pile walls or double turbidity barriers. In any case, the contractor would be required to comply with state water quality standards during construction.

7.2.14.3 Alternative 2

Alternative 2 would have only a minor, temporary effect on water quality similar to Alternative 1. Dredging would result in a temporary water column impact from turbidity, but all dredging would be conducted in accordance with the State water quality standards. Turbidity monitoring would be required to ensure that turbidity levels would not exceed 29 nephelometric turbidity units (NTUs) above background at the edge of a mixing zone. If turbidity levels exceed 29 NTUs over baseline at any time, construction activities would cease immediately and not resume until modifications or corrective measures were taken and turbidity has returned to acceptable levels.

7.2.14.4 Alternative 3

Alternative 3 would have only a minor, temporary effect on water quality. Impacts would be very similar to the widening aspect of Alternative 1.

7.2.15 Hazardous, Toxic, and Radioactive Waste

7.2.15.1 No Action Alternative

The No Action Alternative would have no adverse effects pertaining to the presence of any hazardous, toxic, and radioactive waste.

7.2.15.2 Alternative 1 – Preferred Alternative

Alternative 1 would have no adverse effects pertaining to the presence of any hazardous, toxic, and radioactive waste. A Hazardous, Toxic, and Radioactive Waste Assessment was conducted

for this study in 2006 (see Engineering Appendix). The 2006 Assessment concluded that the proposed action may potentially encounter low to moderate concentrations of hazardous toxic waste. This assessment stated that "a further detailed study is required for the property leased by Beyel Brothers, Inc. associated with the WTB area of the project. Additionally, a file review and summary of the activities associated with Coastal Fuels and Mid-Florida Freezer should be performed." The Beyel Brothers, Inc. property was assessed in August 2007, which indicated high levels of Volatile Organic Vapor. Contaminated soils from the site were excavated, and the excavation sites were backfilled with clean material. Subsequent sampling from six of seven groundwater wells indicated no presence of petroleum impacts, and a sampling from a seventh well did not result in any contaminants in excess of the groundwater cleanup target level (GCTL). The site meets the FDEP criteria for a "No Further Action Required" status. The 2007 assessment report may be found in Attachment K of the Engineering Appendix. The Coastal Fuels and Mid-Florida Freezer property is located outside of the project area and would not be affected by the preferred alternative.

7.2.15.3 Alternative 2

Alternative 2 would have no adverse effects pertaining to the presence of any hazardous, toxic, and radioactive waste (see previous section for additional information).

7.2.15.4 Alternative 3

Alternative 3 would have no adverse effects pertaining to the presence of any hazardous, toxic, and radioactive waste. Impacts would be very similar to Alternative 1.

7.2.16 Air Quality

7.2.16.1 No Action Alternative

Ambient air quality along the Brevard County coastline is relatively good due to the presence of on and off shore breezes. Under the No Action Alternative, increase in traffic with normal growth and development could result in potential impacts to air quality (see Section 7.2.18.1). Emissions from motor vehicles and non-road engines primarily hydrocarbons and nitrogen oxides, contribute to the formation of ground level ozone. Brevard County is not classified by EPA as a non-attainment/maintenance area for ozone or any criteria pollutants.

7.2.16.2 Alternative 1 – Preferred Alternative

Alternative 1 would result in minor, temporary impacts to air quality due to the operation of construction and dredging machinery. With Alternative 1, traffic will increase due to additional vehicles associated with larger cruise ships calling on the Port as well as with normal growth and development (see Section 7.2.18.2). This could result in potential impacts to air quality. Emissions from motor vehicles and non-road engines primarily hydrocarbons and nitrogen oxides, contribute to the formation of ground level ozone.

Direct emissions from Alternative 1 involving dredging of the channel, disposal of the material in the ODMDS, and construction of the new wharves would be confined to exhaust emissions from labor transport equipment (land and water vehicles) and construction equipment (dredge, barges, tugs, etc.). The proposed action may result in small, localized, temporary increases in concentrations of nitrogen oxides (NOx), sulfur dioxide (SO_2), carbon monoxide (CO), volatile

organic compounds (VOC), and particulates (PM). Since the project is located in an attainment area, there is no requirement to prepare a conformity determination. However, the total increases are relatively minor in context of the existing point and nonpoint and mobile source emissions in Brevard County (Table 7-1). Projected emissions from the proposed action would not adversely impact air quality given the relatively low level of emissions and the likelihood for prevailing offshore winds. With the proposed action, the criteria pollutant levels would be well within the national ambient air quality standards.

Table 7-1: 2002 Countywide Emissions for Brevard County (Tons Per Year)

	Emissions (tons)					
	NOx	**SO2**	**CO**	**VOC**	**$PM_{2.5}$**	**PM_{10}**
Nonpoint + Mobile	34,251	15,547	216,995	44,902	5,548	11,989
Point and Nonpoint + Mobile	46,403	25,865	218,319	45,561	6,712	13,350

7.2.16.3 Alternative 2

Alternative 2 would result in minor, temporary impacts to air quality due to construction and dredging machinery as previously described for Alternative 1.

7.2.16.4 Alternative 3

Alternative 3 would result in minor, temporary impacts to air quality due to construction and dredging machinery as previously described for Alternative 1.

7.2.17 Noise

7.2.17.1 No Action Alternative

The No Action Alternative would have no effect on noise levels.

7.2.17.2 Alternative 1 – Preferred Alternative

Alternative 1 would result in only minor, temporary impacts to ambient noise levels due to construction and dredging activities. Construction techniques for the proposed improvements may include activities such as pile driving for temporary turbidity control, which can create abrupt changes in the ambient noise levels. If techniques such as this are employed, mitigative measures such as limiting certain actions to daylight hours where they would be less disruptive may be implemented. However since the port operates 24/7 there is a constant noise level within the harbor associated with shipping and cargo movement and construction activities.

7.2.17.3 Alternative 2

Alternative 2 would result in minor, temporary impacts to noise due to construction and dredging machinery as previously described for Alternative 1.

7.2.17.4 Alternative 3

Alternative 3 would result in minor, temporary impacts to noise due to construction and dredging machinery as previously described for Alternative 1.

7.2.18 Traffic

7.2.18.1 No Action Alternative

Future traffic conditions (see Engineering Appendix: Attachment J) were determined from trip generations for future development described by the Port Authority and a 3% annual growth rate for traffic not associated with the Port's development. Southside expansion projects include the aggregate conveyor/yard by, fully occupied Premier Office Building, Milrose Hotel, and a Hotel and Conference Center on the Banana River site. North side expansion projects include the Cruise Terminals 6 and 7, Cargo Piers 5 and 6 supported by 18.5 acres of uplands by 2010 and then another 35 acres by 2015, and the Seaport Canaveral fuel tank farm. Future traffic analysis was performed for years 2010 and 2025. By 2010, the proposed developments will generate approximately 15,330 new daily trips. By 2025, the proposed developments under the No Action Alternative will generate approximately an additional 1,630 new daily trips, for a total trip increase of 16,960 by 2025.

7.2.18.2 Alternative 1 – Preferred Alternative

Alternative 1 would result in minor, temporary impacts to traffic due to construction and dredging machinery.

7.2.18.3 Alternative 2

Alternative 2 would result in minor, temporary impacts to traffic due to construction and dredging machinery as previously described for Alternative 1.

7.2.18.4 Alternative 3

Alternative 3 would result in minor, temporary impacts to traffic due to construction and dredging machinery as previously described for Alternative 1.

7.2.19 Navigation

7.2.19.1 No Action Alternative

Channel depths at Port Canaveral under the No Action Alternative will be the same as with existing conditions, based on the reasonable expectation of continued maintenance dredging. Large bulk carriers and tankers are constrained by existing channel depths as described in Sections 1 and 2 of this document, and will continue to be constrained under without-project conditions. Large bulk cargo vessels calling at Port Canaveral must operate under a combination

of constraints. These constraints consist of channel depth, channel transit schedules, and berth availability. The deepest operating draft currently approved by the Canaveral Pilots is 39.5 feet, which requires special coordination with the pilots so that the vessel arrives at peak high water. Any vessel arriving with a sailing draft of 36 feet or deeper must coordinate arrival with the rising tide. Schedule constraints are based on the priority given to cruise ship and submarine transits. When cruise ships and submarines are arriving or departing the port, all other vessel traffic must stand-by. Daily peak cruise ship arrival and departure times can effectively close the port to cargo vessel transits for an hour or more. Typically, arriving vessels are loaded to avoid reliance on a rising tide. The rationale for avoiding the need for tidal advantage is that having to wait for, or time arrival with the tide would likely cause conflict with scheduling or berth availability constraints.

Cruise ship operations at Port Canaveral under the No Action Alternative will be very similar to operations under existing conditions with the exception that interim channel modifications (i.e., spot dredging) will allow use of the channel by Freedom Class vessels. Port Canaveral will continue to be the home port for RCI's *Monarch of the Seas* (Sovereign Class), seven day cruises and RCI's *Freedom of the Seas* Freedom Class vessels (3, 4, and 7 day cruises).

Under the No Action Alternative, including interim channel modifications, Oasis Class vessels are too large to operate in Port Canaveral. Simulation-based evaluations conducted for this analysis indicate that an additional 100 feet of channel width, West Turning Basin expansion, and additional widener areas in the entrance channel would be required before an Oasis Class vessel can safely operate in Port Canaveral. In addition, Cruise Terminal 6/7 would need to be constructed to accommodate an Oasis Class vessel. The new Disney cruise ships will operate at Port Canaveral under without-project conditions. The newest Carnival cruise ship (*Dream*) is making Port Canaveral her homeport. The industry trend is towards ever larger and more luxurious cruise ships operating on their signature routes from the main Florida cruise ports (Miami, Port Canaveral, Fort Lauderdale). These largest and newest vessels are more highly prized by cruise customers, so it is reasonable to anticipate that the major cruise lines operating out of or calling at Port Canaveral will likely continue in the foreseeable future in upgrading the size of vessels in their Canaveral fleet to meet the demands of the cruise market.

7.2.19.2 Alternative 1 – Preferred Alternative

A detailed discussion of the navigation impacts of the preferred alternative is presented in Section 6: Plan Selection.

7.2.19.3 Alternative 2

A detailed discussion of the navigation impacts of Alternative 2 is presented in Section 6: Plan Selection.

7.2.19.4 Alternative 3

A detailed discussion of the navigation impacts of Alternative 3 is presented in Section 6: Plan Selection.

7.2.20 Energy Requirements and Conservation

The energy requirements for the preferred alternative would be associated with construction and dredging activities, and normal operations would not result in any increase in energy use. Energy use should actually decrease, since ships calling on the Port would not have a reduced wait time to enter the harbor, and ships would be less likely to be diverted to alternate ports. Diversion to alternate ports would also require higher energy use due to higher trucking costs for goods to reach final destinations, particularly in the Orlando area. Passengers on cruise ships using Port Canaveral as the home port would also be required to drive longer distances if cruise ships were diverted to alternate ports.

7.2.21 Natural or Depletable Resources

The sand and silt being dredged from below -13 feet MLW the harbor would be placed in the ODMDS. If any of the material is suitable for beach placement, it would be placed in the authorized nearshore berm area. If any of the material excavated from above -13 feet MLW is suitable for construction, it would be temporarily placed in the upland disposal site for future use.

7.2.22 Scientific Resources

No scientific resources would be lost with the project. Some of the studies performed during the evaluation process provide scientific data for future reference.

7.2.23 Native Americans

There are no Native American tribes or nations utilizing the area of influence of the proposed project and therefore, no Native American tribe or nation would be affected by this project.

7.2.24 Reuse and Conservation Potential

The sand and silt being dredged from the harbor would be placed in the ODMDS. It is not anticipated that any of the material dredged from below -13 feet MLW would be suitable for beach placement or construction. Material excavated from above -13 feet MLW is projected to be suitable for beneficial reuse as construction fill or dike construction material. The riprap between the MTB and TTB that would be removed may be conserved and reused once the channel has been widened.

7.2.25 Cumulative Impacts

Cumulative impacts are "impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or when a person undertakes such other actions" (40 CFR 1508.7). The purpose of the preferred alternative is to widen and deepen the current navigation channel. Only minor effects would be associated with loss of upland habitat, and no wetlands would be affected. Table 7-2 provides volumes of dredged material placed in the authorized ODMDS. This is a good indicator of cumulative dredging in the region because it includes dredging performed by the USACE, the Navy, and the CPA. Placement in the ODMDS has traditionally been the disposal method of choice since there are few options for upland disposal. Since 1974, approximately 22.6 million CY of dredged material from the entrance channel and various basins within the harbor have been disposed in the ODMDS site (USEPA

and USACE 2001). The proposed project would result in approximately 3,110,057 CY of material being removed and placed in the ODMDS. Historically, the Corps was authorized for 500,000 CY of maintenance dredging material to be placed in the ODMDS annually. The Port was authorized to dispose of 100,000 CY of maintenance material in the ODMDS annually, although actual amounts have been much lower. Preliminary evaluations indicate that an additional annual maintenance dredging volume of approximately 69,000 CY would be required with the proposed project improvements.

Tables 7-3 and 7-4 include a list of permits issued by the USACE and the State (FDEP and the SJRWMD) for various CPA projects. Few projects resulted in wetland impacts or involved protected species issues not associated with dredging. In addition, the Port is limited with regards to geographic expansion due to the proximity of the CCAFS to the north and the City of Cape Canaveral to the south. The uplands within the Port boundaries do not provide optimal habitat for protected species, but the surrounding areas including Brevard County beaches and dune habitat on the CCAFS support a variety of protected species including sea turtles, beach mice, and avian species. The Merritt Island National Wildlife Refuge (see Figure 2-13) was established, which is protected and provides habitat for many wildlife species and ensures that the region will be able to support significant natural resources in the years to come.

Future expansion projects identified in the 2007 Port Canaveral Master Plan include a hotel and conference center, Canaveral Cove Phase II, improvements to cruise terminals 6, 7, 11, and 12, improvements to cargo piers 5 and 6, and a fuel tank farm. Direct impacts to natural resources would be minimal as a result of these projects due to the highly urbanized nature of Port lands. The proposed tank farm and hotel and convention center would be constructed on historic spoil disposal sites, although there could be wetland impacts (treeless hydric savannah) with the hotel and convention site. The remainder of the future projects would occur in currently developed areas of the Port. Minor, temporary impacts to traffic would result due to construction and dredging machinery.

Cumulative impacts to nesting sea turtles could occur due to the additive effect of increased lighting from new buildings, increased Port operations, and increased traffic. However, as previously addressed, the Port has implemented a lighting plan that details appropriate mitigation measures to ensure the long-term success of nesting sea turtles. In fact, as older facilities are removed to make way for newer facilities, light pollution may be reduced, since some of the older structures may not have been designed to shield ambient light according to current standards.

Table 7-2
Volume of Dredged Material Placed in the Canaveral ODMDS (1974-2005)

Year	Action Type	Source	Volume (CY)	Sponsor	Composition
1974	NW	EC and TB	645,198	Navy	Sandy silt
1974	MD	EC and TB	223,986	Navy	Sandy silt
1975	NW	EC and TB	2,196,470	Navy	Sandy silt
1975	MD	EC and TB	187,212	Navy	Silty sand
1975	MD	TB	63,077	Navy	Sandy silt
1976	MD	EC	1,343,121	Civil Works	Sandy silt
1976	MD	EC	341,888	Civil Works	Sandy silt
1977	MD	EC	48,017	Civil Works	Sandy silt
1978	MD	EC	282,517	Civil Works	Sandy silt
1980	MD	EC	1,402,547	Civil Works	Sandy silt
1981	MD	EC	257,326	Civil Works	Sandy silt
1983	MD	EC	929,555	Civil Works	Sandy silt
1985	MD	EC	2,958,827	Civil Works	Silty sand
1986	NW	EC	63,370	Civil Works	Silty sand
1986	MD	EC	351,535	Civil Works	Silty sand
1988	MD	EC	442,750	Civil Works	Silty sand
1988	MD	EC	1,200,188	Civil Works	Silt
1989	MD	EC	203,000	Civil Works	Silt
1990	MD	EC	173,772	Civil Works	Silt
1991	MD	MTB	497,380	Civil Works	Silt
1992	MD	EC	342,000	Civil Works	Silt
1992	MD	MTB	208,000	Civil Works	Silt
1993	MD	EC	1,878,460	Civil Works	Silt
1993	MD	TAC	108,410	Navy	Silty sand
1993	NW	WTB SE CC	400,000	CPA	Clay
1994	NW	EC	454,000	Civil Works	Silty sand
1994	NW	MTB	1,039,000	Civil Works	Silty sand
1994	MD	EC	98,820	Civil Works	Silt
1994	MD	TAC	17,510	Navy	Sandy silt
1994	MD	WTB CT5	24,000	CPA	Sandy clay
1994	NW	WTB CT10	86,000	CPA	Silty sand
1995	MD	EC	243,180	Civil Works	Silt
1995	MD	TAC, TTB	12,090	Navy	Silt

Table 7-2
Volume of Dredged Material Placed in the Canaveral ODMDS (1974-2005)

Year	Action Type	Source	Volume (CY)	Sponsor	Composition
1996	MD	EC	245,274	Civil?	Sandy silt
1996	NW	WTB CT8	212,000	CPA	Silty sand
1997	MD	EC	773,999	Civil Works	Sandy silt
1997	MD	TTB	36,965	Navy	Silts & clays
1998	MD	EC	688,839	Civil Works	Sandy silt
1998	MD	EC,TTB,PW	160,044	Navy	Sandy silts clays
1998	MD	WTB CT5	5,600	CPA	Sandy clay
1999	MD	EC	1,312,703	Navy	Sandy silt
2000	MD	EC	300,320	Civil Works	Silt
2001-2005	MD	EC, WTB, MTB, IC, BC	500,000/yr	Civil Works	Silt & Fine sand
2001-2005	MD	EC, Cut 1A, TAC, TB	100,000/yr	Navy	Silt & Fine sand
2002-2003	NW	WTB Deepening	900,000	CPA	Silt & clay
2004-2005	MD	WTB	250,000/yr	CPA	Silt & fine sand
2002-2004	NW	CT 6&7	76,000	CPA	Fine sand
2002-2004	NW	WTB CC	750,000	CPA	Silt & fine sand
2002-2004	NW	Canaveral ADA	1,000,000	CPA	Silt and clay

Source: USEPA and USACE. 2001. Canaveral ODMDS Site Management and Monitoring Plan

NW – new work; MD – maintenance dredging;
EC – Entrance Channel;
TB – Trident Basin;
MTB – Middle Turning Basin;
TAC – Trident Access Channel;
WTB – West Turning Basin;
SE CC – Southeast Corner Cutoff;
TTB – Trident Turning Basin;
PW Poseidon Wharf;
CPA – Canaveral Port Authority

Table 7-3
Federal Permits Issued

Project	USACE Permit	Date Issued
West Turning Basin Deepening	198701217-IP-TB	9/9/99
ODMDS Extension	198701217 IP-TB Extension	9/6/02
Cruise Terminal 6&7, Corner Cutoff, Cruise Terminal 8	198701217 IP-TB Mod 1	9/5/01
Master Pier Permit	200000674 IP TB	7/27/01
Cruise Terminal 10 Scour Protection	200000674 IP-TB Mod 1	7/10/02
Cruise Terminal 10 Berth Improvements & Scour Repair	200000674 IP-TB Mod 2	11/6/02
Poseidon Wharf	200000674 IP-TB Mod 3	10/24/03
Temporary Tug Boat Berth	200000674 IP-TB Mod 4	11/12/03
Tanker Berth 2	200000674 IP-TB Mod 5	1/30/04
Maintenance Dredging	200005030 IP-TB	9/28/01
Maintenance Dredging	200005030 IP-TB Mod 1	8/27/02
Maintenance Dredging	200005030 IP-TB Mod 2	6/27/03
Cruise Terminal 12 Construction	200207924 IP-TSB	12/1/03
Artificial Reef Sites	200301550 IP-TB	3/15/04
Nationwide Permit 3	NW Permit 3	
N. Cargo Area Regional Stormwater Pond	NW Permit 6 200303787	5/6/03
West Turning Basin Stormwater Pond	NW Permit 7 200208539	2/18/03
SCP 1,2,3, Ct4, Tb2 Repair & Improvements	200000674 (IP-TB) MOD 6	02/15/2005
Time Extension – Master Pier Permit	200000674 (IP-TSB) MOD 7	
South Cargo Pier 2 Repair	200000674 (IP-TSB) MOD 8	11/13/2006
Time Extension – Master Pier Permit	200000674 (IP-TSB) MOD 9	
Sand Bypass	200309051(IP-TSB)	01/08/2003
South Jetty Sand Trap	20053195 (IP-TSB)	11/16/2005
SW Area Stormwater Management	20052677 (IP-TSB)	05/15/2007
Avocet Lagoon Mitigation Area	SAJ-2007-2109 (NW-TSD)	Application

Table 7-4
State Permits Issued

Project	FDEP/SJRWMD Permit	Date Issued
Cove Berth Improvements	0028763-001-ES	2/2/98
Canaveral Harbor Maintenance Dredging	0129260-001 JC	2/5/99
Cruise Terminal 12 Bulkhead Construction	01322822-007 EI	10/8/02
Maintenance Dredging	01322822-001 EI	6/18/01
Portwide Pier Improvement	01322822-002 EI	8/7/00
Freddie Patrick Park	01322822-003 EI	10/3/00
Cruise Terminal 5 Improvements	01322822-004 EI	12/15/00
Landbridge	01322822-005 EM	6/20/01
Cruise Terminal 8 & 5 Scour Repair	01322822-006 EM	7/13/01
Cruise Terminal 10 Repair and Improvements	01322822-008 EM	8/15/02
Cruise Terminal 10 Repair and Berth Improvements	01322822-009 EM	1/21/03
Canaveral Patrol Boat Berth	01322822-010 EM	7/21/03
Temporary Tug Boat Berth	01322822-011 EM	2/13/04
North Cargo Piers 1,2,3,4 South Cargo Pier 5	01322822-013 EM	4/30/04
West Turning Basin Deepening	0141951-001 EI	9/14/98
West Turning Basin Deepening	0141951-002 EM	8/2/00
West Turning Basin Corner Cutoff	0141951-003	8/8/01
West Turning Basin Corner Cutoff	0141951-004 EM	9/9/02
West Turning Basin Corner Cutoff	0141951-005 EM	10/8/02
West Turning Basin & Pilots Dredging	0209821-001-EI	6/20/03
Canaveral Harbor Bypassing	0220629-001-JC	8/24/04
Tug Boat Berth SW Pond	05-228973001	
Jetty Park	BE-1022	12/19/01
Jetty Park	BE-914	12/31/93
Jetty Park	BE-914 Amend 2	6/21/04
West Turning Basin Intermodal Gate	ERP05-0186093-001 ES	9/5/01
Marlin Street Improvements	ERP05-0186093-002 EM	4/8/02
Cruise Terminal 10 Parking Extension	ERP05-0186093-003	5/15/02
Grouper Road Improvements	ERP05-0186093-004 SI	9/30/02
West Turning Basin Stormwater Pond	ERP05-0186093-005 letter	4/13/04
West Turning Basin Stormwater Pond Mod	ERP05-0186093-005 SI	1/27/03
Port Canaveral Piers Minor Repairs	0132822-014-Ee	04/30/2004
Canaveral Maintenance Dredging	0132822-015-Em	11/04/2005
Portwide Pier Improvements	0132822-016-EM	06/26/2006
Master Pier Permit	0132822-016-DF	05/11/2006

7.2.26 Irreversible and Irretrievable Commitment of Resources

The loss of disturbed upland habitat associated with channel widening between the MTB and TTB would be for the most part irreversible. Sand dredged from the channel and the ocean widener that is not suitable for beach nourishment or construction would be placed in the ODMDS and lost. The benthic habitat associated with the sandy bottom would be temporarily displaced, but would recover quickly.

7.2.27 Unavoidable Adverse Environmental Effects

Temporary loss of sea turtle foraging habitat would occur with channel widening, and is unavoidable, but would quickly be replaced once new or recycled riprap is installed.

7.2.28 Local Short-Term Uses and Maintenance/Enhancement Of Long-Term Productivity

The proposed project would result in long-term economic benefit to the Port and the region. The Port's ability to accommodate current and projected cargo and cruise traffic depends on its ability to provide efficient service without costly delays, which would result in loss of projected revenues without the project.

7.2.29 Indirect Effects

Indirect effects are limited, since the proposed project was developed to handle current and projected cargo and cruise ship traffic more efficiently. Potential indirect impacts would include post-construction effects from erosion such as increased turbidity and sedimentation. Indirect effects were taken into consideration along with direct impacts in the analysis.

7.2.30 Compatibility with Federal, State, and Local Objectives

The project is consistent with local, state, and federal objectives. The need for more efficient and expanded port facilities is a high priority to the federal and state governments, and the proposed improvements are consistent with the Port's adopted comprehensive master plan.

7.2.31 Conflicts and Controversy

No conflicts or controversies have been identified being associated with this project. The project has been coordinated with the public as well as the various local, state, and federal government agencies (see Section 8).

7.2.32 Uncertain, Unique, or Unknown Risks

No uncertain, unique, or unknown risks have been identified being associated with this project.

7.2.33 Precedent and Principle for Future Actions

Implementation of this project would not set any precedent or principle for future actions.

7.2.34 Environmental Commitments

The Corps has established a policy of incorporating environmental and regulatory conditions into their construction contract specifications. This ensures that the contractor performing the work is obligated to comply with various construction methods, safeguards, monitoring, and other

specified precautions. Environmental commitments with this project would include standard manatee protection requirements, sea turtle protection, water quality protection and monitoring, and erosion control measures. The Corps oversees the projects to ensure permit compliance and address any issues that may arise.

7.2.35 Compliance with Environmental Requirements

7.2.35.1 National Environmental Policy Act of 1969

Environmental information on this project has been compiled and this Final Environmental Assessment has been prepared.

7.2.35.2 Endangered Species Act of 1973

Biological Assessments were prepared and submitted to the U.S. Fish and Wildlife Service and the National Marine Fisheries Service for their concurrence with Section 7 of this Act (Environmental Appendix). A response was received from the National Marine Fisheries Service on May 14, 2012, which determined that the project may affect, but is not likely to affect sea turtles, smalltooth sawfish, and the North Atlantic right whale with the incorporation of NMFS' Sea Turtle and Smalltooth Sawfish Construction Conditions. The U.S. Fish and Wildlife Service issued a letter on June 29, 2012, determining that the project may affect, but is not likely to adversely affect, the Eastern indigo snake, the West Indian manatee (with the inclusion of additional conditions), nesting or hatchling sea turtles, and the southeastern beach mouse.

7.2.35.3 Fish and Wildlife Coordination Act of 1958

A Draft Coordination Act Report was prepared by USFWS, and the recommendations were incorporated into the project to the extent practicable. One recommendation was to avoid impacts to algae-covered riprap used for foraging by juvenile sea turtles. If possible, impacts to algae-covered riprap will be minimized by stockpiling the riprap underwater during construction. Any loss would be temporary, and the proposed project would result in an area of riprap of approximately the same area as would be impacted. In addition, the existing algae-covered riprap would be preserved and used for the new riprap area to facilitate colonization. Once installed, re-colonization of the algal community should occur relatively quickly. Due to the temporal nature of the impact, additional mitigation is not warranted. This is consistent with planning guidance contained in ER 1105-2-100, Appendix C (Environmental Evaluation and Compliance), paragraph C-3.d(4)(b), which states "impacts of alternate plans shall be evaluated based on the extent, intensity, and duration of the impact on *significant (emphasis added)* ecological resources compared to the "future without plan" condition." The decision that mitigation is not warranted is consistent with additional planning guidance provided by the South Atlantic Division to the Jacksonville District, for the Port Everglades navigation project, on 31 August 2007 regarding impacts associated with navigation projects (see Environmental Appendix).

The U.S. Fish and Wildlife Service reviewed the proposed project for impacts to other Federal Trust and natural resources pursuant to the Fish and Wildlife Coordination Act of 1958, and provided their comments in a letter dated June 29, 2012 (see Environmental Appendix). In this letter, they determined that the proposed project would have minor, temporary effects on natural

resources, and no significant, long-term effects on other Federal Trust and natural resources. Therefore, they did not have any objection to the proposed project.

7.2.35.4 National Historic Preservation Act of 1966 (Inter Alia)

A cultural resource assessment was conducted for this project, and the report submitted to the State Historic Preservation Office. Section 106 consultation was completed when a letter from the Division of Historical Resources dated December 14, 2007 was received concurring with the conclusions and recommendation of the report (Environmental Appendix). The project is in full compliance with this Act.

7.2.35.5 Clean Water Act of 1972

As stated in the Florida Department of Environmental Protection's May 9, 2007 response to the Scoping Notice and June 19, 2012 response to the Notice of Availability of the Draft EA, the project will require issuance of a State environmental resource permit or joint coastal permit from the Bureau of Beaches and Coastal Systems in compliance with Section 401 of this Act. A Federal 404(b)1 evaluation is included in this report (Environmental Appendix).

7.2.35.6 Clean Air Act of 1972

The proposed action would not result in a change in attainment status for Brevard County and no air quality permits would be required for this project. Therefore, this project is in compliance with this Act.

7.2.35.7 Coastal Zone Management Act of 1972

A federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this report (Environmental Appendix). The state issued preliminary determinations that the proposed project is consistent with the Florida Coastal Management Program in the FDEP's May 9, 2007 response to the Scoping Notice and June 19, 2012 response to the Notice of Availability of the Draft EA (see the Environmental Appendix). Comments provided by the reviewing agencies, as part of the state's most recent review, were incorporated into this report where applicable (see the public comment matrix included in the Environmental Appendix). Final review of the project's consistency with the Florida Coastal Management Program will be conducted during the environmental permitting stage.

7.2.35.8 Farmland Protection Policy Act of 1981

A Farmland Conversion Impact Rating form AD-1006 has been prepared and submitted to the U.S. Department of Agriculture, Natural Resources Conservation Service for determination of the effects to prime and unique farmlands. There are no effects to prime or unique farmlands.

7.2.35.9 Wild and Scenic River Act of 1968

No wild or scenic river would be affected by this project. This Act is not applicable.

7.2.35.10 Marine Mammal Protection Act of 1972

Incorporation of safeguards used to protect threatened or endangered species during construction would also protect any marine mammals in the area. These were included in the Biological

Assessment to the National Marine Fisheries Service. In their letter dated May 14, 2012, NMFS noted that the ESA section 7 process does not authorize incidental takes of listed or non-listed marine mammals. If any such take occurs, an incidental take authorization under MMPA section 101 (a)(5) will be obtained.

7.2.35.11 Estuary Protection Act of 1968

No designated estuary would be affected by the project. This Act is not applicable. The Port is adjacent to the Indian River Lagoon; however, this project will have no impact to the estuary.

7.2.35.12 Federal Water Project Recreation Act

This Act is not applicable to this project.

7.2.35.13 Fishery Conservation and Management Act of 1976

The project was coordinated with the National Marine Fisheries Service and is in compliance with this Act.

7.2.35.14 Submerged Lands Act of 1953

The project does not occur on submerged lands of the state of Florida. The CPA holds title to all of the submerged lands within the harbor (with the exception of Navy and Air Force parcels which are outside of the project limits) and a perpetual easement for the offshore entrance channel. The project is in compliance with this Act.

7.2.35.15 Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990

Coastal barrier resources in the region have been identified, and no coastal barrier resources would be affected by the project. The project is in full compliance with this Act.

7.2.35.16 Rivers and Harbors Act of 1899

The project would not obstruct navigable waters of the United States. The project has been subject to public notice, public hearings, and other evaluations normally conducted for activities subject to this Act. The project is in full compliance with this Act, as it is a navigation improvements project.

7.2.35.17 Anadromous Fish Conservation Act

Anadromous fish species would not be affected with this project. This project has been coordinated with the National Marine Fisheries Service and is in full compliance with this Act.

7.2.35.18 Migratory Bird Treaty Act and Migratory Bird Conservation Act

No migratory birds would be affected by this project. The project is in full compliance with this Act.

7.2.35.19 Marine Protection, Research and Sanctuaries Act

All dredged materials would be placed in the authorized Canaveral ODMDS, the authorized nearshore berm, or authorized upland disposal site. Therefore, the project is in full compliance with this Act.

7.2.35.20 Magnuson-Stevens Fishery Conservation and Management Act

An Essential Fish Habitat evaluation was conducted to determine impacts from this project and was coordinated with the National Marine Fisheries Service (NMFS) on November 7, 2011. NMFS concluded that the project would not adversely impact EFH in their letter dated June 13, 2012, and they did not have any EFH conservation recommendations to provide (see Environmental Appendix). This project is in full compliance with this Act.

7.2.35.21 E.O. 11990, Protection of Wetlands

No wetlands would be affected by this project. Therefore, the project is in full compliance with this Executive Order.

7.2.35.22 E.O. 11988, Flood Plain Management

The project is in the base flood plain (100-year flood) and has been evaluated in accordance with this Executive Order. The project would not result in an adverse effect with regard to flooding within the region.

7.2.35.23 E.O. 12898, Environmental Justice

This environmental justice assessment recognizes the issues addressed in the Environmental Justice Guidance under NEPA (CEQ 1997), and uses the EPA Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses (EPA 1998) as a guide.

An environmental justice assessment requires an analysis of whether minority and low-income populations (i.e., "the populations of concern") would be affected by a proposed federal action and whether they would experience adverse impacts from the proposed action at any of the site alternatives. If there are adverse impacts, the severity and proportionality of these impacts on populations of concern must be assessed in comparison to the larger non-minority or non-low-income populations. At issue is whether such adverse impacts fall disproportionately on minority and/or low-income members of the community and, if so, whether they meet the threshold of "disproportionately high and adverse." If disproportionately high and adverse effects are evident, then the EPA Guidance advises that it should trigger consideration of alternatives and mitigation actions in coordination with extensive community outreach efforts (EPA 1998).

The CPA conducted public notification and outreach to the local community including minority and low income populations. A Notice of Intent (NOI) was published in the Federal Register on March 16, 2007 announcing the Jacksonville District, USACE intended to prepare a Draft Environmental Impact Statement (DEIS) for the Port Canaveral Improvements Section 203 Feasibility Study (FR 72(51) 12598). A letter was issued on March 21, 2007 inviting interested parties and stakeholders to attend a public meeting for the project. The meeting was advertised in the legal section of the Florida Today, the main newspaper in Brevard County. The meeting

was held on April 4, 2007 in the Commission Room of the Canaveral Port Authority. Additional public meetings will be held as the project continues to move forward.

The population of Brevard County was 534,000 in 2006, with 10% of the population of Brevard County was considered as living below the poverty level (U.S. Census 2007). The total population was reported (on race alone) as 86% White, 10% Black or African American; less than 0.5% American Indian and Alaska Native; 2% Asian; less than 0.5% Native Hawaiian or Pacific Islander; and 1% some other race (U.S. Census 2007). Two percent of the people of Brevard County reported 2 or more races. Six percent of the people in Brevard County was Hispanic, and 80% of were reported as White non-Hispanic. It is important to note that there are no residential areas within the immediate vicinity of the project, which is located in a highly industrialized area.

The project would not result in adverse human health or environmental effects. The project would not disproportionately adversely affect any minority or low-income population. The majority of the low-income populations reside west of the Banana River and the minority populations are not disproportionately located within the region of influence of the proposed action. The activity would not (a) exclude persons from participation in, (b) deny persons benefit of, or (c) subject persons to discrimination because of their race, color, or national origin. Therefore, the project is in compliance with this Executive Order.

7.2.35.24 E.O. 13089, Coral Reef Protection

No coral reef or hardbottom habitat would be affected by this project as there are none in the project area. This document was submitted to the National Marine Fisheries Service for review and concurrence. The project is in full compliance with this Executive Order.

7.2.35.25 E.O. 13112, Invasive Species

The project would not result in the propagation or spread of invasive species. Ships calling on Port Canaveral will continue to comply with industry protocols regarding ballast water discharges to prevent introduction of invasive marine species that could affect the region. Therefore, the project is in compliance with this Executive Order.

7.3 Measures to Avoid, Minimize and Mitigate Environmental Effects

The following text describes natural resources potentially affected by the proposed project and measures proposed to avoid, minimize and mitigate environmental effects.

Upland Habitat

The proposed project would result in a loss of 8 acres of upland habitat and associated vegetation (shrub and brushland) between the MTB and the TTB north of the channel. Vegetation that could be impacted is predominately bahia grass. The upland resources are not considered significant and mitigation would not be appropriate.

Wetlands

Wetland habitats within the study area are limited primarily to the western perimeter adjacent to the ICW and would not be affected by construction, dredging, or operational activities with the project. Therefore, the proposed project would have no effect on wetlands and no mitigation is required.

Marine Resources

The proposed project would impact marine resources (sand bottom and algae covered riprap), but these impacts would be temporary in nature. Dredging will remove benthic organisms, but these populations are anticipated to recover, in terms of benthic biodiversity and population density, within two years (Taylor et al., 1973; Culter and Mahadevan, 1982; Saloman et al., 1982). No beach or dune habitat, hardbottom, or seagrass would be affected by the proposed project. Maintenance dredging of sand bottom habitat in the harbor and port facilities would continue, and the additional dredging impacts that would affect sand bottom would be associated with the ocean channel widener. The dredging area is approximately 34 acres.

There would be a temporary loss of approximately one acre of marine vegetation in the form of an algal community associated with the riprap between the MTB and the TTB. The proposed project would result in new riprap of approximately the same area as would be impacted. Once installed, recolonization of the algal community should occur within approximately one year. New riprap was placed on the north side of the channel between the TTB and Poseidon Turning Basin several years ago, and new algal growth occurred in approximately one year, although it could have been somewhat longer (B. Redfoot, personal communication). An additional 2.5 acres of algae covered riprap exists along the southern jetty, and an unknown amount of algal community occurs in the TTB. It is estimated that less than 20% of the algal community would be temporarily affected by the project. The temporary loss of this habitat is not considered significant. Although juvenile sea turtles utilize the proposed impact area for foraging, they also forage within areas that will not be impacted by the project. Adequate habitat would remain in the interim to ensure that the juvenile sea turtle population would be unaffected by the proposed project. Due to the temporal nature of the impact, mitigation is not warranted. This is consistent with planning guidance contained in ER 1105-2-100, Appendix C (Environmental Evaluation and Compliance), paragraph C-3.d(4)(b), which states "impacts of alternate plans shall be evaluated based on the extent, intensity, and duration of the impact on ***significant (emphasis added)*** ecological resources compared to the "future without plan" condition." The decision that mitigation is not warranted is consistent with additional planning guidance provided by the South Atlantic Division to the Jacksonville District, for the Port Everglades navigation project, on 31 August 2007 regarding impacts associated with navigation projects (see Environmental Appendix).

Essential Fish Habitat

The proposed project would result in temporary impacts to EFH (water column and sand bottom) during construction and dredging. The impacts to water column would be minor and temporary in nature. Sand bottom habitat (34 acres) would be impacted due to dredging, but the benthic community would quickly recolonize the impacted area. As a result of the north side inner reach widening, an additional 16 acres of sand bottom would be created, and an additional 13 acres of sand bottom would be created with the south side West Access Channel widening. Dredging will temporarily remove benthic organisms used as prey by managed species and as a result may temporarily impact certain species, such as red drum, that forage largely on such taxa. Dredged habitats are anticipated to recover, in terms of benthic biodiversity and population density, within two years (Taylor et al., 1973; Culter and Mahadevan, 1982; Saloman et al., 1982). Please see Sections 7.2.6, 7.2.7, and 7.2.35.20 for additional information.

Protected Species

The proposed project has the potential to affect the indigo snake and gopher tortoise. Four gopher tortoise burrows (approximately two tortoises) were identified along the berm adjacent to the patrol road in the upland area. However, the Air Force has indicated that the site will be cleared and used as a staging area for dredged material in the near future. If that occurs, any gopher tortoises and/or indigo snakes on the site will be relocated to an approved site by Air Force personnel. If the site is not cleared for this purpose, the gopher tortoise burrows would likely be impacted during construction of the patrol road and fence, but approximately 125 acres of suitable habitat would remain unaffected by the project. Prior to construction activities, the area would need to be re-surveyed, and if gopher tortoise burrows would be impacted, a relocation permit from the Florida Fish and Wildlife Conservation Commission (FFWCC) would need to be obtained. Any active or inactive gopher tortoise burrows affected by the project would need to be excavated and relocated either on-site or an approved off-site location. New rule changes are currently under consideration. If indigo snakes were identified utilizing the burrows during construction, standard protection measures would be taken in accordance with the U.S. Fish and Wildlife Service (FWS) guidelines.

Since there would be no beach placement of sand with the proposed project, there would be no direct effect on nesting sea turtles. However, light from upland sources has been shown to have an effect on sea turtle hatchlings as they emerge from nests, and on southeastern beach mouse activity and predation. Compliance with the Port's light management plan and implementation of the conditions outlined in the USFWS' June 29, 2012 letter would mitigate for any potential effects.

The proposed project has the potential to impact the West Indian manatee during construction and dredging. The manatee can be found in Canaveral Harbor year round and precautions are taken to insure they are not harmed during normal operations associated with Port activities. The Port has a Manatee Protection Plan for the harbor and in 2003, the Brevard County Board of County Commissioners approved a Manatee Protection Plan to identify and implement measures to provide protection for the manatee. Standard manatee protection measures are also followed during maintenance dredging, and these measures would be implemented with any dredging activities. Additional conditions were required pursuant to the USFWS' June 29, 2012 letter to ensure the protection of the West Indian manatee. The standard manatee protection measures and the additional conditions required as part of the consultation with the USFWS under Section 7 of the Endangered Species Act are provided in Section 7.2.8.2.

The proposed project has the potential to affect swimming juvenile sea turtles. Juvenile sea turtles forage on algae within the harbor, so protection measures would be required with dredging activities and removal of any algae covered riprap between the MTB and TTB. Hopper dredging is not approved for Port Canaveral. Hydraulic and clamshell dredging are not known to "take" sea turtles, so no dredging blackout window would be in effect. With standard protection measures as would be included in any Federal or State permit, the proposed project would not likely adversely affect juvenile sea turtles.

The proposed project has the potential to affect the North Atlantic right whale. The Corps will comply with North Atlantic right whale protection measures as identified in the Section 7 NMFS May 14, 2012, consultation letter, including the federal speed zone rule (73 FR 60173, October

2008). Non-federal vessels in excess of 65 feet in length entering and leaving the area are required to comply with the 10 knot speed restriction within the North Atlantic Right Whale Seasonal Management Area between November 15 and April 15 (73 FR 60173, October 2008). Federal vessels and Contractors working on federal projects are exempt from this requirement. In addition, protection measures recommended by the FFWCC in their letter dated June 15, 2012, will be incorporated into the project from December 1 until March 31, including:

- A dedicated observer shall be posted to spot right whales. Additionally, all personnel on all support vessels (vessels associated with dredging and dredge spoil deposition in the off-shore dredge management disposal site) shall observe for right whales in the southeastern critical habitat area. The southeastern critical habitat area extends from 31o 15'N to 30°15'N out 15 miles offshore and from 30°15'N to 28°00'N out 5 miles offshore. If a whale is seen by the dedicated whale observer or support vessel personnel during daylight hours, the vessel operator shall take necessary precautions to avoid whales;
- Daily updates of whale sightings during this portion of the year are maintained by the National Marine Fisheries Service (NMFS) and should be obtained by contacting NMFS at se.rw.sightings@NOAA.gov. Such sighting update requests should include one valid return email address capable of receiving emails with sighting alerts;
- If whales have been spotted within 15 nautical miles (nm) of the vessel's path within the previous 24 hours, the dredge and support vessels shall slow to 5 knots or less when transiting between areas during evening hours or when there is limited visibility due to fog or sea states of greater than Beaufort 3 (unless weather and sea conditions dictate greater speeds for safe navigation);
- All dredge and support vessel operators shall be familiar with, and adhere to, the federal right whale minimum approach regulation, as defined in 50 CFR 224.103(c).

The FFWCC recommendation for vessels to slow to 5 knots or less when the Early Warning System (EWS) surveys have not been flown within the previous 24 hours goes above the federal standard as set in the NMFS South Atlantic Regional Biological Opinion, and will not be incorporated into the project specifications.

Summary

Habitat loss with the project would either be temporary or not significant, so no mitigation for these resources is proposed. No wetlands, beach or dune habitat, hardbottom, or seagrass would be affected by the proposed project. Impacts would occur to upland habitat (8 acres), sand bottom habitat (34 acres), and algae covered riprap (1 acre). Potential impacts to protected species would be provided through appropriate management measures (manatees, sea turtles) and on-site relocation (gopher tortoises).

7.4 Occupational Health and Safety (32 CFR 989.27)

All project activities will comply with the USACE EM 385-1-1, Safety and Health Requirements Manual. Specifications will be included in all bid documents and plans to ensure that all local, state, and federal safety regulations are followed.

8. PUBLIC INVOLVEMENT, REVIEW AND CONSULTATION*

8.1 Public Involvement Program

Prior to preparation of the Integrated Section 203 Navigation Study Report & Final Environmental Assessment by the Canaveral Port Authority, public involvement was conducted throughout the course of the study. At the request of CPA, the Jacksonville District, U.S. Army Corps of Engineers published a Notice of Intent in the Federal Register. While not required at this stage of the Section 203 study process, CPA requested that the Corps initiate the public scoping process in order to solicit public input while it could be considered in the plan formulation and evaluation process being conducted.

A public scoping meeting was held by the Corps, as was a study initiation public meeting hosted by CPA at Port Canaveral. A Scoping Letter was issued on March 21, 2007 inviting interested parties and stakeholders to attend a Scoping meeting for the project. The meeting was advertised in the legal section of Florida Today, the main newspaper in Brevard County. The Scoping meeting was held on April 4, 2007 at the Commission Room of the Canaveral Port Authority. A total of 15 persons registered at the meeting, of which six were involved with preparation of the DEIS. Coordination with resource agencies was conducted through agency coordination letters that solicited their comments. The Canaveral Port Authority considered the comments received by letter and statements made at public meetings in the plan formulation, evaluation, and alternative selection process. Individuals and agencies were provided the opportunity to present written comments relevant to the Section 203 study or request to be placed on the mailing list for announcements and for the eventual distribution by HQUSACE of the Draft EA. The comments received were very limited, but were considered in the preparation of the Integrated Section 203 Navigation Study Report & Final Environmental Assessment (Environmental Appendix: Scoping Documents and Correspondence).

8.2 Additional Required Coordination

At the request of CPA, formal consultation under the Fish and Wildlife Coordination Act has been initiated by the U.S. Army Corps of Engineers, Jacksonville District. Section 7 of the Endangered Species Act consultation with the USFWS and NMFS has been initiated and Biological Assessments have been submitted for review and concurrence. Section 7 consultation under NMFS was completed upon receipt of their concurrence letter dated May 14, 2012. Section 106 coordination has been completed with the SHPO regarding cultural and archaeological resource protection. An Essential Fish Habitat assessment was completed and submitted to the National Marine Fisheries Service for concurrence under the Magnuson-Stevens Fishery Conservation and Management Act, and a Farmland Conversion Impact Rating form AD-1006 has been prepared and submitted to the U.S. Department of Agriculture, Natural Resources Conservation Service for determination of the effects to prime and unique farmlands. State water quality certification review under Section 401 of the Clean Water Act and Clean Air Act compliance will be conducted by the Florida Department of Environmental Protection during the final environmental resource permitting process, which is currently underway.

The Integrated Section 203 Navigation Study Report & Draft Environmental Assessment has been circulated by the Jacksonville District, U.S. Army Corps of Engineers for formal review and comment as an Integrated Feasibility Report and Draft Environmental Assessment.

8.3 Scoping and Draft EA

A Notice of Intent (NOI) was published in the Federal Register on March 16, 2007 announcing the Jacksonville District, USACE intended to prepare a Draft Environmental Impact Statement (DEIS) for the Port Canaveral Improvements Section 203 Feasibility Study (FR 72(51) 12598). A Scoping Letter was issued on March 21, 2007 inviting interested parties and stakeholders to attend a Scoping meeting for the project. The meeting was advertised in the legal section of the Florida Today, the main newspaper in Brevard County. The Scoping meeting was held on April 4, 2007 in the Commission Room of the Canaveral Port Authority. A total of 15 persons registered at the meeting, of which six were involved with preparation of the DEIS. All comments and pertinent correspondence and scoping documents are included in the Environmental Appendix: Scoping Documents and Correspondence.

The USACE determined that preparation of an EA was the appropriate level of NEPA compliance with the proposed project due to the lack of significant adverse environmental impacts and agency and public comments.

A Notice of Availability was published issued on April 10, 2012 informing the public of the Draft EA and Feasibility Study for the project was available for review and comment. The notice also informed the public that a workshop was to be held to provide information about the project and answer any questions. The workshop was held in the Commission Room of the Canaveral Port Authority on May 14, 2012. A total of four persons not directly involved with preparation of the Feasibility Report attended the meeting. No written comments were submitted at that time.

A 60-day public notice period was completed on June 9, 2012, and formal comments were received from: the U.S. Environmental Protection Agency; the Seminole Tribe of Florida; the NMFS; the U.S. Coast Guard, the 45 SW Attachment of the U.S. Air Force Space Command (AFSPC/A4/7), and the Florida Department of Environmental Protection with the combined comments of FDEP, Florida Department of State, the St. Johns River Water Management District, the Florida Fish and Wildlife Conservation Commission, and East Central Florida Regional Planning Council. None of the commenters voiced objections to the project. Comments focused on clarification of items and measures for the protection of protected species. The individual comments were addressed, as appropriate and revisions were made in the Final EA and Feasibility Study Report. Please see the Environmental Appendix for a matrix summarizing the comments received and the responses/actions taken for each comment.

8.4 Agency and Public Coordination

Coordination with Federal, State, and local agencies has been initiated to aid in the formulation and evaluation of the Recommended Plan. Public and agency views including informal comments received to date from representatives of the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, National Marine Fisheries, US Navy, US Air Force, and Florida Department of Environmental Protection have indicated no opposition or major issues with the proposed action. The analysis of surge effects has resulted in a positive endorsement of the project from the US Coast Guard, US Air Force, and the US Navy.

8.5 List of Statement Recipients

The Integrated Section 203 Study Report and Environmental Assessment was circulated by the Jacksonville District per the requirements of Section 203 of WRDA 1986, and the Corps implementing guidance, ER 1165-2-122, Studies of Harbor or Inland Harbor Projects by Non-Federal Interests, 26 August 1991.

9. RECOMMENDATIONS

The Canaveral Port Authority recommends that the Assistant Secretary of the Army (Civil Works) transmit a favorable recommendation to Congress that the existing project for deep draft navigation at Canaveral Harbor, authorized by the River and Harbor Acts of March 1945 and October 1962, and Sections 101, 114, and 117 of the Water Resources Development Act (WRDA) of 30 October 1992, be modified as described herein to provide for implementation of a Federal project to deepen and widen the existing Federal channels, turning basins, and wideners, with such modifications as in the discretion of the Secretary may be deemed advisable; at a first cost to the United States presently estimated at $28,652,000; with an annual incremental operations and maintenance cost to the United States presently estimated at $451,000.

The recommended plan, which is the most economical plan analyzed consists of widening the main ship channel from the harbor entrance inland to the West Turning Basin and West Access Channel, from its current authorized width of 400 feet to 500 feet. In addition to widening, deepening of the existing Federal project and expansion of turning basins is recommended in the following reaches:

- Outer Reach, Cut 1A: deepen from -44' to -46' for a length of 11,000';
- Outer Reach, Cut1B: deepen from -44' to -46' depth for a length of 5,500';
- Outer Reach, Cut 1: deepen from -44' to -46' for the 5,300' long portion of Cut 1 that is seaward of buoys 7/8 (Station 0+00 to Station 53+00). The remainder of Cut 1 from buoys 7/8 to the apex of the channel turn, a length of 7,200', would also be deepened from -44' to -46';
- US Navy Turn Widener: deepen from -44' to -46' X 7.7 acres (triangular shaped area) bounded by outer and middle reaches to the north and northeast and the civil turn widener to the southwest;
- Civil Turn Widener: deepen from -41' to -46' X 15.6 acres (irregular shaped area) bounded to the north and northeast by the middle reach and the US Navy turn widener;
- New 203 Turn Widener: deepen to -46' X 23.1 acres (irregular shaped area) bounded to the north and northeast by the civil turn widener and Cut 1 of the outer reach;
- Middle Reach: deepen from -44' to -46' for a length of 5,658'. The middle reach extends from the apex of the channel turn westward to the western boundary of the Trident access channel;
- Inner Reach, Cut 2 and Cut 3: deepen from -40' to -44' for a length of 3,344';
- Middle Turning Basin: expand and deepen to encompass 68.9 acres to a project depth of -43' and a turning circle diameter of 1422'. The existing -39' federal project provides a turning circle diameter of 1200';
- West Access Channel (east of Station 260+00): deepen from -39' to -43' for a length of 1,840'; and
- West Turning Basin and West Access Channel (west of Station 260+00): expand the turning circle diameter from 1,400' to 1,725' X 141 acres at a depth of -35'. The recommended plan for commercial navigation is economically feasible, with total average annual benefits of $5,393,199, total average annual costs of $2,646,587, total net annual benefits of $2,746,613, and a benefit-cost ratio of 2.0 to 1. The plan was

evaluated based upon a 50-year project life at the current FY 2013 Federal discount rate of 3.75 percent using FY 2013 price levels.

The CPA will seek specific Congressional Authorization to credit the expended costs of the already constructed ICCO ($13,775,063) towards the non-Federal cost share of project costs, and therefore these ICCO costs are not included in this section of the report addressing future recommended actions.

The Canaveral Port Authority will:

a. Provide 25 percent of design costs in accordance with the terms of a design agreement entered into prior to commencement of design work for the project;

b. Provide, during the first year of construction, any additional funds necessary to pay the full non-Federal share of design costs;

c. Provide, during the period of construction, a cash contribution equal to the following percentages of the total cost of construction of the general navigation features:

i. Twenty-five percent of the costs attributable to dredging to a depth in excess of 20 feet, but not in excess of 45 feet; plus

ii. Fifty percent of the costs attributable to dredging to a depth in excess of 45 feet;

d. Provide 50 percent of the excess cost of operation and maintenance of the project over that cost which the Federal Government determines would be incurred for operation and maintenance for depths deeper than 45 feet;

e. Pay with interest, over a period not to exceed 30 years following completion of the period of construction of the project, up to an additional 10 percent of the total cost of construction of general navigation features. The value of LERRs and deep-draft utility relocations provided by the Sponsor for the general navigation features, described below, may be credited toward this required payment. The value of deep-draft utility relocations for which credit may be afforded shall be that portion borne by the Sponsor, but not to exceed 50 percent, of deep-draft utility relocation costs;

If the amount of credit equals or exceeds 10 percent of the total cost of construction of the general navigation features, the Sponsor shall not be required to make any contribution under this paragraph, nor shall it be entitled to any refund for the value of LERRs and deep-draft utility relocations in excess of 10 percent of the total cost of construction of the general navigation features;

f. Provide all LERRs and perform or ensure the performance of all relocations and deep-draft utility relocations determined by the Federal Government to be necessary for the construction, operation, maintenance, repair, replacement, and rehabilitation of the general navigation features (including all lands, easements, and rights of way, relocations, and deep-draft utility relocations necessary for the dredged material disposal facilities);

g. Provide, operate, maintain, repair, replace, and rehabilitate, at its own expense, the local service facilities in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and State laws and regulations and any specific directions prescribed by the Federal Government;

h. Accomplish all removals determined necessary by the Federal Government other than those removals specifically assigned to the Federal Government;

i. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the Sponsor owns or controls for access to the project for the purpose of operating, maintaining, repairing, replacing, and rehabilitating the general navigation features;

j. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project, any betterments, and the local service facilities, except for damages due to the fault or negligence of the United States or its contractors;

k. Keep, and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of 3 years after completion of the accounting for which such books, records, documents, and other evidence is required, to the extent and in such detail as will properly reflect total cost of construction of the general navigation features, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and local governments at 32 CFR, Section 33.20;

l. Perform, or cause to be performed, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights of way that the Federal Government determines to be necessary for construction, operation, maintenance, repair, replacement, or rehabilitation of the general navigation features. However, for lands that the Government determines to be subject to the navigation servitude, only the Government shall perform such investigation unless the Federal Government provides the Sponsor with prior specific written direction, in which case, the Sponsor shall perform such investigations in accordance with such written direction;

m. Assume complete financial responsibility, as between the Federal Government and the Sponsor, for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights of way that the Federal Government determines to be necessary for the construction, operation, maintenance, repair, replacement, and rehabilitation of the project;

n. To the maximum extent practicable, perform its obligations in a manner that will not cause liability to arise under CERCLA;

o. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the Sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

p. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987, and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights of way, required for construction, operation, maintenance, repair, replacement, and rehabilitation of the general navigation features, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

q. Comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army." The State is also required to comply with all applicable Federal labor standards requirements including, but not limited to, the Davis-Bacon Act (40 USC 3144 *et seq.*), the Contract Work Hours and Safety Standards Act (40 USC 3701 *et seq.*), and the Copeland Anti-Kickback Act (40 USC 3145 *et seq.*);

r. Provide the non-Federal share that portion of the costs of mitigation and data recovery activities associated with historic preservation, that are in excess of 1 percent of the total amount authorized to be appropriated for the project, in accordance with the cost sharing provisions of the agreement;

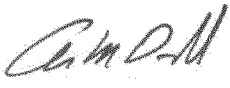
s. Prevent obstructions of or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) which might reduce the ecosystem restoration, hinder its operation and maintenance, or interfere with its proper function, such as any new development on project lands or the addition of facilities which would degrade the benefits of the project;

t. Do not use Federal funds to meet the Sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds in authorized;

u. Provide a cash contribution equal to the non-Federal cost share of the project's total historic preservation mitigation and data recovery costs attributable to commercial navigation that are in excess of 1 percent of the total amount authorized to be appropriated for commercial navigation; and

v. In the case of a deep-draft harbor, provide 50 percent of the excess cost of operation and maintenance of the project over that cost which the Secretary determines would be incurred for operation and maintenance if the project had a depth of 45 feet."

The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the State of Florida, the Canaveral Port Authority (the non-federal sponsor), interested Federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.



Alan Dodd
Colonel, U.S. Army
District Commander

10. LISTS OF PREPARERS AND REVIEWERS

Preparers

Lee Swain	Dial Cordy and Associates Inc.	Botanist	Final EA Author Biological Assessments
Jason Croop	Dial Cordy and Associates Inc.	Marine Biologist	EFH Assessment
Mark Howell	Dial Cordy and Associates Inc.	Wildlife Biologist	Protected Species Report Environmental Baseline Report
Jason Evert	Dial Cordy and Associates Inc.	Fisheries Biologist	Fish and Wildlife Coordination Act Report
Michael Bresette	Inwater Research Group	Marine Biologist	Sea Turtle Evaluation
Lee Terzis	PBS&J	Archaeologist	Cultural Resources Assessment

Reviewers

Robert Musser	Canaveral Port Authority	Past Director, Environmental Plans & Programs	Final EA
Carol Noble	Canaveral Port Authority	Director, Environmental Plans & Programs	Final EA
Mike Camardese	US Air Force Space Command, AFSPC/A4/7	Environmental Specialist	Final EA
Steve Dial	Dial Cordy and Associates Inc.	Marine Biologist	Final EA Biological Assessments Environmental Baseline Report EFH Assessment Protected Species Report
Lee Swain	Dial Cordy and Associates Inc.	Botanist	Protected Species Report Environmental Baseline Report Sea Turtle Evaluation Cultural Resources Assessment
Jerry Diamantides	David Miller & Associates	Planner/Economist	Final EA

11. REFERENCES

Anamar Environmental Consulting, Inc. 2005. Final Report for Canaveral Harbor 103 Evaluation – Deepening Work West Turning Basin Entrance Widening, Corner Cut-off and CT 6 & 7 Dredging.

Anamar Environmental Consulting, Inc. 2010. Final Report 2010 Canaveral Harbor Navigation Project 103 Sediment Report Cape Canaveral, Florida Bowen, B., J.C. Avise, J.I. Richardson, A.B. Meylan, D. Margaritoulis, and S.R. Hopkins-Murphy. 1993. Population structure of loggerhead turtles (Caretta caretta) in the northwestern Atlantic Ocean and Mediterranean Sea. Conservation Biology 7 (4):834-844.

Carr, A.F., M.H. Carr, and A.B. Meylan. 1978. The ecology and migrations of sea turtles. The Western Caribbean green turtle colony. Bull. Amer. Mus. Nat. Hist. 162(1): 1-46.

Carr, A. 1986. Rips, FADS, and little loggerheads. Bioscience. 36:92-100.

Carr, A. 1987. New Perspectives on the pelagic stage of sea turtle development. Conservation Biology 1(2): 103-121.

CH2M Hill 2006. Section 203 Feasibility Study Hazardous, Toxic and Radioactive Waste (HTRW) Assessment. Port Canaveral, Brevard County, Florida.

Cole, T.V.N., D.L. Hartley, R.L. Merrick. 2005. Mortality and serious injury determinations for large whale stocks along the eastern seaboard of the Unites States, 1999-2003. U.S. Dep. Commer., Northeast Fish Sci. Cent. Ref. Doc. 05-08. 18 pp.

Continental Shelf Associates, Inc. 1989. Environmental Impact Assessment for Beach Restoration. Brevard County, Florida.

Coyne, M. 1994. Feeding ecology of subadult green turtles in south Texas waters. MS Thesis, Texas A&M University. 76 pp.

Cruise Lines International Association. 2012. CLIA 2012 Industry Update. Accessed at http://www.cruising.org/sites/default/files/pressroom/2012CLIAIndustryUpdate.pdf on 05Sep12.

Dial Cordy and Associates Inc. 2006a. Protected Species Report, Port Canaveral Navigation Improvements, Port Canaveral, Florida.

Dial Cordy and Associates Inc. 2006b. Environmental Baseline Report, Port Canaveral Navigation Improvements, Port Canaveral, Florida.

Dial Cordy and Associates Inc. 2007a. Sea Turtle Foraging Report, Port Canaveral Navigation Improvements, Port Canaveral, Florida.

Dial Cordy and Associates Inc. 2007b. Essential Fish Habitat Assessment, Port Canaveral Navigation Improvements, Port Canaveral, Florida.

Dynamac Corporation. 2002. Environmental Site Survey in the Vicinity of the North Jetty at Canaveral Harbor, Brevard County, Florida.

Ehrhart, L. M. 1996. A study of the population ecology of in-water marine turtle populations on the east-central Florida coast from 1982-96 Comprehensive Final Report to U.S. Dept. of

Commerce-NOAA, National Marine Fisheries Service, 75 Virginia Beach Drive, Miami, FL 33149. Purchase Order No. 40GENF50015; 1996, 164 pp.

Erhardt, L.M. and W.E. Redfoot. 2007. Untitled Draft Report on Population Studies of Juvenile Green Sea Turtles in the Trident Submarine Basin, Port Canaveral FL. Prepared for the Cape Canaveral Air Station. 20 pp.

Ehrhart, L.M. and W.E. Redfoot. 2005. Final Report: Assessment of the Status and Population Dynamics of Marine Turtles in the Trident Submarine Basin at Port Canaveral, Florida in 2003 and 2004.

Ehrhart, L.M. and W.E. Redfoot. 2002. The structure, size, and feeding ecology of the unique juvenile green turtle population utilizing the Trident Turning Basin, Cape Canaveral Air Force Station, Florida as developmental habitat. Comprehensive Report to Specpro Inc. 37 pp.

Ehrhart, L.M., W.E. Redfoot, and D.A. Bagley. 1996. A study of the population ecology of in-water marine turtle populations on the east central coast of Florida. Comprehensive Final Report to NOAA. NMFS. 164 pp.

Ehrhart, L. M. and W.E. Redfoot. 1994. Assessment of green turtle relative abundance and behavior in Cape Canaveral Air Force Station Port Area, Trident Submarine Basin. Final Report to USAE Waterways Experiment Station, Coastal Ecology Group, Environmental Laboratory. 40 pp.

Erhart, L.M. and B.E. Witherington. 1986. Human and natural causes of marine turtle nest and hatchling mortality and their relationship to hatchling production on an important Florida nesting beach. Final Report No. GFC-84-018. Submitted to: Florida Game and Fresh Water Fish Commission, Tallahassee, Florida. 140 pp.

Frazer, N.B. and L.M. Ehrhart. 1985. Preliminary growth models for green (Chelonia mydas) and loggerhead (Caretta caretta) turtles in the wild. Copeia 1985: 73-79.

Humphrey, S.R. (Ed.). 1992. Rare and endangered biota of Florida: mammals.

Inwater Research Group. 2007. Canaveral Section 203 Project Sea Turtle Census, 2007 Supplemental Surveys, prepared for Dial Cordy and Associates Inc. Jensen Beach, Florida.

Knowlton, A.R. and S.D. Kraus. 2001. Mortality and serious injury of the northern right whales (Eubalaena glacialis) in the western North Atlantic Ocean. The Journal of Cetacean Research and Management Special Issue 2:193-208.

Magnuson, et al. (National Research Council). 1990. Decline of the Sea Turtles: Causes and Prevention. National Academy Press, Washington D.C.

Meylan, A.B., K.A. Bjorndal, and B.J. Turner. 1983. Sea turtles nesting at Melbourne Beach, Florida. II. Post-nesting movements of Caretta caretta. Biological Conservation 26:79-90.

Meylan, A., B. Schroeder, and A. Mosier. 1995. Sea turtle nesting activity in the state of Florida. Fla. Mar. Res. Publ. 52:1-51.

National Marine Fisheries Service (2003) Endangered Species Act – Section 7 Consultation for Dredging in the Gulf of Mexico and Use of Hopper Barges Biological Opinion Prepared by National Marine Fisheries Service, St. Petersburg, Florida.

National Marine Fisheries Service (2005) Recovery Plan for the North Atlantic Right Whale (Eubalaena glacialis) Prepared by National Marine Fisheries Service, Silver Spring, Maryland.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 1995. Status Reviews for Sea Turtles Listed under the Endangered Species Act of 1973. National Marine Fisheries Service, Silver Spring, Maryland.

Nelson, W.G. 1988. Sebastian Inlet rock outcrop reefs biological inventory study. Technical Report to Sebastian Inlet Commission. 86 pp.

Nelson, D. A. 1994. Preliminary assessment of juvenile green sea turtle behavior in the Trident submarine basin Patrick AFB, Florida Proceedings of the Fourteenth Annual Symposium on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFSC-351, 323 pp.; 1994, p. 104-108.

Olsen Associates, Inc. 2007. Memorandum on the Canaveral Harbor Navigation Channel Improvements: Jetty Impacts, prepared for CH2M Hill, Jacksonville, FL. 12 pp.

PBS&J. 2006. Cultural Resources Assessment for Proposed Navigation Improvements, Canaveral Port Authority, prepared for Dial Cordy and Associates Inc. Jacksonville, Florida, 11 pp.

Redfoot, W. E. 2000. The feeding ecology of juvenile green turtles utilizing the Trident Basin, Port Canaveral, Florida as developmental habitat Proceedings of the Eighteenth International Sea Turtle Symposium. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration (NOAA) Technical Memorandum NMFS-SEFSC-436, 293 pp.; 2000, p. 33

Redfoot, W. E. 1997. Population Structure and Feeding Ecology of Green Turtles Utilizing the Trident Submarine Basin, Cape Canaveral, Florida as Developmental Habitat, Master Thesis, University of Central Florida, Orlando, Florida.

Redfoot, W. E. 1996. A population of juvenile green turtles utilizing the Trident Submarine Basin, Port Canaveral, Florida Proceedings of the Fifteenth Annual Symposium on Sea Turtle Biology and Conservation. National Oceanic and Atmospheric Administration Technical Memorandum NMFS-SEFSC-387, 355 pp.; 1996, p. 258-259.

South Atlantic Fisheries Management Council. 1998. Final habitat plan for the South Atlantic region. South Atlantic Fisheries Management Council, Charleston, South Carolina. 457 pp.

U.S. Army Corps of Engineers. 1996. Final Environmental Impact Statement, Brevard County, Florida Shore Protection Project Review Study. U.S. Army Corps of Engineers, Jacksonville District. Jacksonville, Florida.

U.S. Fish and Wildlife Service. 1995. Piping Plover (Charadrius melodus), Atlantic Coast populations, revised recovery plan. USFWS, Hadley, Massachusetts. 245 pp.

U.S. Fish and Wildlife Service. 2007. Green Turtle Fact Sheet.

Witherington, B.E. and L.M. Ehrhart. 1989. Status and reproductive characteristics of green turtles (Chelonia mydas) nesting in Florida. Proc. 2nd Western Atlantic turtle symposium. 351-352.

Wyneken, J. and M. Salmon. 1992. Frenzy and post frenzy swimming activity in loggerhead, green, and leatherback hatchling sea turtles. Copeia (2): 478-484.

ATTACHMENT 1

SPONSOR'S LETTER OF INTENT

ATTACHMENT 2

NON-FEDERAL SPONSOR'S SELF CERTIFICATION OF FINANCIAL CAPABILITY FOR DECISION DOCUMENTS

CANAVERAL HARBOR, FLORIDA

Integrated Section 203 Navigation Study Report
&
Final Environmental Assessment

Environmental Appendix
(sub-part of Volume 1)

December 2012

US Army Corps of Engineers ®

PORT CANAVERAL

ENVIRONMENTAL APPENDIX

Section 404(b)1 Evaluation

CZMA Consistency Determination

Scoping Documents and Correspondence

Draft EA Public Workshop Documents and Comments

Environmental Baseline Report

Protected Species Report

Essential Fish Habitat Report

Section 7 Consultation Documents

Sea Turtle Foraging Report

Cultural Resource Reports and Correspondence

Draft Fish and Wildlife Coordination Act Report

Farmland Protection Policy Act Coordination

December 2012

Section 404(b)(1) Evaluation Report
Canaveral Harbor Section 203 Feasibility Study
Brevard County, Florida

I. PROJECT DESCRIPTION:

1. a. Location. Canaveral Harbor is located in Brevard County on the Atlantic coast of Florida.

b. Authority and Purpose. The Canaveral Port Authority decided to conduct a feasibility study of potential navigation improvements under the authority granted by Section 203 of WRDA 1986. Section 203 states (in part) that "*A non-Federal interest may on its own undertake a feasibility study of a proposed harbor or inland harbor project and submit it to the Secretary [of the Army].*" Corps of Engineers guidance for implementation of Section 203 is contained in Engineering Regulation (ER) 1165-2-122, Studies of Harbor or Inland Harbor Projects by Non-Federal Interests, 26 August 1991 (Attachment 1).

A Section 107 Initial Appraisal Letter Report was prepared by the Jacksonville District, U.S. Army Corps of Engineers in February 2002 documenting the economic feasibility of improving the west turning basin through construction of a cutoff and widening. Since the time of the Initial Appraisal it has been proposed that the existing Federal navigation channel be widened from 400 feet to 500 feet and also widen the widener in the approach channel. The purpose of the Section 203 study is to determine whether a Federal interest exists in implementing these proposed improvements.

c. General Description.

The following narrative describes the Canaveral Harbor preferred alternative project features relative to existing conditions and progressing from the Atlantic Ocean entrance channel to the West Basin. Canaveral Harbor channels are comprised of the outer, middle, and inner reaches, the middle turning basin and west access channels, and the west turning basin. The outer reach is oriented on roughly a northwest-southeast alignment. The remainder of the channels is oriented on a generally east-west alignment. Various cut(s) comprise the outer, middle, and inner reaches as described below.

- Outer Reach, Cut 1A: Existing dimensions are 44-ft project depth by 400 ft wide by 11,000 ft long. New dimensions would increase the project depth to 47 ft. Current USACE quarterly condition surveys indicate that the existing water depth at the end of the project and up to 200 ft beyond the end of the project is 47 ft.

- Outer Reach, Cut1B: Existing dimensions are 44-ft project depth by 400 ft wide by 5,500 ft long. New dimensions would increase the project depth to 47 ft.

- Outer Reach, Cut 1: Existing dimensions are 44-ft project depth by 400 ft wide by 12,500 ft long. New dimensions would increase the project depth to 47 ft only for

the 5,300-ft long portion of Cut 1 that is seaward of buoys 7/8 (Station 0+00 to Station 53+00). Project depth for the remaining 7,200-ft of Cut 1, from buoys 7/8 to the apex of the channel turn, would increase to 46 ft.

- US Navy Turn Widener: Existing dimensions are 44-ft project depth by 7.7 acres (triangular shaped area) bounded by outer and middle reaches to the north and northeast and the civil turn widener to the southwest. New dimensions would increase the project depth to 46 ft.

- Civil Turn Widener: Existing dimensions are 41-ft project depth by 15.6 acres (irregular shaped area) bounded to the north and northeast by the middle reach and the US Navy turn widener. New dimensions would increase the project depth to 46 ft.

- New 203 Turn Widener: New dimensions are 46-ft project depth by 23.1 acres (irregular shaped area) bounded to the north and northeast by the civil turn widener and Cut 1 of the outer reach.

- Middle Reach: The middle reach extends from the apex of the channel turn westward to the western boundary of the Trident access channel. Existing dimensions are 44-ft project depth by 400 ft wide by 5,658 ft long. New dimensions would increase the project depth to 46 ft and the project width from 400 ft to 500 ft, providing a 100-ft widener of 2,282 ft in length along the north side of the channel for the portion of the middle reach that is inside of the north jetty. The eastern terminus of the 100-ft widener transitions from the existing to the new northern channel boundary over a plan distance of 500 ft. This portion of the project requires that the western "Surge Warning" notification sign structure be relocated northward 100 ft.

- Trident Access Channel and Trident Basin: With exclusive use by US Navy, the Trident Access channel connects the middle reach to the trident basin. Existing dimensions are 44- and 41-ft project depth by irregular shaped areas for the access channel and the basin, respectively. Existing dimensions to remain except as affected by the new 100-ft north side channel widener at the entrance to the Trident access channel.

- Inner Reach, Cut 2 and Cut 3: Existing dimensions are 40-ft project depth by 400 ft wide by 3,344 ft long. New dimensions would increase the project depth to 44 ft and the project width from 400 to 500 ft, providing a 100-ft widener along the entire length of the reach on the north side of the channel. The rip-rap protected shoreline and berm between the middle and trident basins will be relocated northward to accommodate the 100-ft northside channel widener.

- Middle Turning Basin: The middle turning basin has shared use by commercial and military activities. The federal project area encompasses 92.4 acres with project depths of 35 ft in the north and east portions of the basin used exclusively

by the military and 39 ft in the remainder of the basin supporting commercial vessel traffic. Because of the somewhat limited room afforded by the present 39-ft federal project boundaries toward the northwest portion of the basin, CPA maintains an irregular shaped central portion of the basin to 39 ft. This provides additional area for maneuvering cargo vessels to and from the North Cargo Pier 1 and ro-ro ramp and enlarges the available area for turning displacement vessels on arrival or departure. The existing 39-ft federal project provides a turning circle diameter of 1200 ft. The new project dimensions for commercial purposes encompass 68.9 acres with a project depth of 43 ft yielding a turning circle diameter on the order of 1422 ft. Approximately 1.9 acres of the new 43-ft project area completes the western end of the north side channel widener in the area adjacent to the inner reach and the US Navy's Poseidon Wharf. As in the inner reach, the rip-rap protected north side shoreline will be relocated northward to accommodate the north side channel widening. The US Navy's mooring dolphin, located east of Poseidon Wharf and no longer used, sits within 25 ft of the new channel boundary and will be removed to eliminate a potential hazard to navigation.

- West Access Channel (east of Station 260+00): Existing dimensions are 39-ft project depth by 400 ft wide by 1,840 ft long. New dimensions would increase the project depth to 43 ft and increase the project width from 400 to 500 ft, providing 100 ft of widening along the entire length of the channel by redefining the northern channel boundary 12 ft north of the existing northern boundary, and widening the channel by 88 ft along the south side and into the barge canal.

- West Turning Basin and West Access Channel, Cut A (west of Station 260+00): The West turning basin has exclusive use by commercial activities and the Coast Guard. The Existing federal basin and Cut A of the west access channel take up 78.6 acres with a project depth of 31 ft as federally maintained and 35 ft as maintained by the CPA. The CPA has also maintained a triangular shaped 35-ft project area adjacent to the northeast shoreline at the entrance to the west turning basin and at the request of the pilots, performed new work dredging beyond present project limits at this location since 2003 to facilitate cruise vessel access to and from the basin and cruise berths. The Existing federal project basin provides a turning circle diameter of 1400 ft. The preferred alternative, comprising 141 acres, will expand the federal project limits in the northern and western portions as needed to support cruise ship access to present and planned terminals and will enlarge the entrance to the west basin providing a new turning circle diameter of 1725 ft. The turning circle and entrance widening will be created by dredging beyond the present federal and CPA project boundaries to the northeast and to the south within the barge canal. Approximately 18.5 acres of existing bank, shoreline, and uplands adjacent to the CPA 35-ft project boundary and 6.9 acres within the existing barge canal will be dredged to the new project depth of 35 ft.

The preferred alternative will result in dredging or excavation of 4,271,000 million cubic yards of sand, silts, and clays of which all but 455,000 cubic yards is identified for

uplands or offshore disposal. The 455,000 cubic yards designated as upland excavation and will be disposed upland for beneficial reuse. The upland excavated material comes from the West Turning Basin corner cut-off and the northside widener from existing grade down to elevation -13 MLLW. The geotechnical investigations show that sands suitable for reuse are generally located at and above elevation -13 feet (MLLW). Although these sands do not appear to be suitable for direct placement on the beach, they can be stockpiled on land for beneficial reuse as construction fill material. Excavated material below -13 feet MLLW is generally not suitable for reuse and would be disposed in the offshore disposal site. In the event that suitable material is found below -13 feet MLLW, it would be placed in the authorized nearshore disposal area.

d. General Description of Dredged or Fill Material. Predominately a combination of sand, silt, and clay.

e. Description of the Proposed Disposal Sites. All material will be placed in the authorized Canaveral ODMDS, an upland disposal site, or in the authorized nearshore disposal area.

f. Description of Disposal Methods. The material will be dredged with either hydraulic or clamshell dredges and placed on barges for disposal at the Canaveral ODMDS or nearshore disposal area.

II. FACTUAL DETERMINATIONS:

a. Physical Substrate Determinations.

(1). Substrate Elevations The existing depths are between approximately -31 feet and –44 feet.

(2). Sediment Type. Sand, silt, and clay.

(3). Fill Material Movement. No movement is expected at the disposal site.

(4). Physical Effect on Benthos. No effect on benthos.

(5). Other Effects. No other effects.

b. Water Circulation, Fluctuation and Salinity Determinations. Water fluctuation, circulation and salinity will not be adversely affected.

c. Suspended Particle/Turbidity Determinations.

(1). Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Sites. Except for minor disturbances at the disposal site, little or no turbidity is expected during construction and State water quality and turbidity standards will be met unless a mixing zone exemption is required.

(2). Effects (Degree and Duration) on Chemical and Physical Values

(a). Light Penetration. No difference in light penetration is expected in the vicinity of construction activities.

(b). Dissolved Oxygen. Dissolved oxygen (DO) levels should be unaffected by disposal activities.

(c). Toxic Metals and Organics. No toxic metals or organics are known to occur at the sites.

(d). Pathogens. Not applicable.

(e). Aesthetics. The presence of equipment during dredging activities will be aesthetically displeasing; however, upon completion of these activities all equipment will be removed. Therefore, there will be no long-term adverse aesthetic impacts.

d. Contaminant Determinations. No sources of pollutants or contaminants have been identified within the construction or disposal areas.

e. Aquatic Ecosystem and Organism Determinations.

(1). Effects on Plankton. No adverse impacts expected.

(2). Effect on Benthos. No adverse impacts expected.

(3). Effect on Nekton. No adverse impacts expected.

(4). Effect on the Aquatic Food Web. No significant adverse impacts expected.

(5). Effects on Special Aquatic Sites.

(a). Sanctuaries or Refuges. No adverse impacts expected.

(b). Wetlands. No wetlands would be affected.

(c). Mud Flats. No adverse impacts expected.

(d). Vegetated Shallows. No adverse impacts expected.

(e). Reefs. No adverse impacts expected.

(f). Threatened and Endangered Species. Threatened or endangered species will not be affected by disposal of the dredged materials. Appropriate manatee and sea turtle protection measures will be implemented during dredging and disposal operations.

(g). Other Wildlife. Adverse impacts to other wildlife will not occur due to disposal of the dredged materials.

f. Proposed Disposal Site Determinations.

(1). Mixing Zone Determination. Not applicable.

(2). Determination of Compliance with Applicable Water Quality Standards. State water quality certification will be obtained for the work and applicable state water quality standards will be met during construction. An exemption may be required during placement of dredged materials in the seagrass mitigation area.

(3). Potential Effects on Human Use Characteristics. No adverse impacts expected.

(a). Municipal or Private Water Supply. No effect.

(b). Recreational and Commercial Fisheries. No adverse impacts expected.

(c). Water Related Recreation. No impacts expected.

(d). Aesthetics. The presence of construction equipment during the construction period will be unsightly; however, upon completion of construction the equipment will be removed and there will be no long-term adverse aesthetic impacts.

(e). Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites and Similar Preserves. No adverse impacts expected.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. No adverse impacts expected.

h. Determination of Secondary Effects on the Aquatic Ecosystem. No adverse impacts expected.

PORT CANAVERAL SECTION 203 FEASIBILITY STUDY
FLORIDA COASTAL ZONE CONSISTENCY PROGRAM
FEDERAL CONSISTENCY EVALUATION PROCEDURE

1. Chapter 161, Beach and Shore Protection. The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Consistency Statement: The purpose of the proposed action is to improve and maintain safe navigation in Canaveral Harbor, Brevard County, Florida. Studies were conducted that determined the project would not adversely affect the existing natural shoreline.

2. Chapters 186 and 187, State and Regional Planning. These chapters establish the State Comprehensive Plan, which sets goals that articulate a strategic vision of the State's future. Its purpose is to define in a broad sense, goals and policies that provide decision-makers directions for the future and long-range guidance for orderly social, economic and physical growth.

Consistency Statement: The work has been coordinated with the State without objection.

3. Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a State Emergency Management Agency, with authority to provide for the common defense; to protect the public peace, health and safety; and to preserve and protect the lives and property of the people of Florida.

Consistency Statement: The proposed project would increase safety of ships leaving and entering the harbor.

4. Chapter 253, State Lands. This chapter governs the management of submerged State lands and resources within State lands. This includes archeological and historic resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands; mineral resources; unique natural features; spoil islands; and artificial reefs.

Consistency Statement: No seagrass beds, reef communities, or wetlands are located within the project area. The proposed activity will be coordinated with the State and appropriate State permits will be obtained. The proposed action will be consistent with the intent of this chapter.

5. Chapters 253, 259, 260 and 375, Land Acquisition. These chapters authorize the State to acquire land to protect environmentally sensitive areas.

Consistency Statement: As the property is already in public ownership, these chapters do not apply.

6. Chapter 258, State Parks and Aquatic Preserves. This chapter authorizes the State to manage State parks and preserves. Consistency with this chapter would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs or management or operations.

Consistency Statement: The proposed action will not impact any State managed parks or preserves.

7. Chapter 267, Historic Preservation. This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Consistency Statement: The proposed action was coordinated with the State Historic Preservation Officer (SHPO) and is consistent with the intent of this chapter.

8. Chapter 288, Economic Development and Tourism. This chapter directs the State to provide guidance and promotion of beneficial development through the encouragement of economic diversification and promotion of tourism.

Consistency Statement: The proposed improvements and maintenance are consistent with the goals of this chapter.

9. Chapter 334 and 339, Public Transportation. This chapter authorizes the planning and development of a safe and efficient transportation system.

Consistency Statement: The proposed action will not adversely affect public transportation.

10. Chapter 370, Living Saltwater Resources. This chapter directs the State to preserve, manage and protect the marine crustacean, shell and anadromous fishery resources in State waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the state engaged in the taking of such resources within or without State waters; to issue licenses for the taking and processing of fisheries products; to secure and maintain statistical records of the catch of each such species; and to conduct scientific, economic and other studies and research.

Consistency Statement: Marine resources will only be temporarily impacted during construction and dredging. Foraging sea turtles will likely utilize other foraging habitat within Canaveral Harbor in the short-term. This project is consistent with this chapter.

11. Chapter 372, Living Land and Freshwater Resources. This chapter establishes the Game and Freshwater Fish Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities

and distributions which provide sustained ecological, recreational, educational, aesthetic and economic benefits.

Consistency Statement; The work in the port will be have no significant effect on freshwater aquatic life or wild animal life.

12. Chapter 373, Water Resources. This chapter provides the authority to regulate the withdrawal, diversion, storage and consumption of water.

Consistency Statement: This work does not involve water resources as described in this chapter.

13. Chapter 376, Pollutant Spill Prevention and Control. This chapter regulates the transfer, storage and transportation of pollutants and the cleanup of pollutant discharges.

Consistency Statement: This work does not involve the transportation or discharge of pollutants. Conditions will be placed in the contract to handle inadvertent spills of pollutants such as vehicle fuels. The proposed action will comply with this chapter.

14. Chapter 377, Oil and Gas Exploration and Production. This chapter authorizes the regulation of all phases of exploration, drilling and production of oil, gas and other petroleum resources.

Consistency Statement: The proposed action does not involve the exploration, drilling or production of oil, gas or other petroleum products; therefore this chapter does not apply.

15. Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact of large-scale development.

Consistency Statement: The proposed action is consistent with the intent of this chapter.

16. Chapter 388, Arthropod Control. This chapter provides for a comprehensive approach for abatement or suppression of mosquitoes and other arthropod pests within the State.

Consistency Statement: The proposed action will be consistent with the goals of this chapter.

17. Chapter 404, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the State by the Department of Environmental Protection.

Consistency Statement: Appropriate State permits will be obtained for this project. The project is not expected to violate any State air or water pollution standards.

18. Chapter 582, Soil and Water Conservation. This chapter establishes policy for the conservation of State soils and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop and utilize soil and water resources both on-site and on adjoining properties affected by the work. Particular attention will be given to work on or near agricultural lands.

Consistency Statement: The proposed action is not located near agricultural lands; therefore, this chapter does not apply.

Florida Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

May 9, 2007

Mr. Paul E. Stodola
Planning Division, Jacksonville District
U.S. Army Corps of Engineers
P. O. Box 4970
Jacksonville, FL 32232-0019

RE: Department of the Army, Jacksonville District Corps of Engineers – Scoping Notice – Draft Environmental Impact Statement for the Port Canaveral Navigation Improvements Section 203 Feasibility Study – Cape Canaveral, Brevard County, Florida.
SAI # FL200703223171C

Dear Mr. Stodola:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16, U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4231, 4331-4335, 4341-4347, as amended, has coordinated a review of the subject scoping notice.

The Florida Department of Environmental Protection (DEP) advises that port terminal/ berth construction and new dredging and dredged material disposal activities will require issuance of an environmental resource permit or joint coastal permit by the DEP Bureau of Beaches and Coastal Systems. Please contact Mr. Marty Seeling at (850) 414-7728 for further assistance and permitting information.

The Florida Department of State (DOS) notes that a large coquina and shell midden, the NOTU Site (8BR1641), is located within the boundaries of the project area depicted on the enclosed location map. PBS&J, Inc. conducted an archaeological resource assessment of this area to delineate the site's boundaries and assess its potential for inclusion in the *National Register of Historic Places*. The resultant report concludes that Site 8BR1641 contains both intact and disturbed portions with two distinct areas of intact cultural deposits in Areas A and B. Areas A and B are thus eligible for listing in the *National Register* and staff recommends that a 10-and-20 meter buffer be established to protect both areas from disturbance. Please refer to the enclosed DOS letter and maps for additional information.

Based on the information contained in the scoping notice and the enclosed state agency comments, the state has determined that, at this stage, the proposed activities are consistent with the Florida Coastal Management Program (FCMP). The concerns identified by our reviewing agencies must be addressed prior to project implementation. The state's continued concurrence with the project will be based, in part, on the adequate resolution of issues identified during this and subsequent reviews. The state's final review of the project's consistency with the FCMP will be conducted during the environmental permitting stage.

Thank you for the opportunity to review the proposed project. Should you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2170.

Yours sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm
Enclosures

cc: Barbara Bess, DEP, Central District
Laura Kammerer, DOS

Scoping Documents and Correspondence

practicable alternative pursuant to the 404(b)(1) Guidelines (40 CFR 230.12).

FOR FURTHER INFORMATION CONTACT: Questions or comments concerning the Final EIS/EIR should be directed to Ms. Susan A. Meyer, Senior Project Manager, Regulatory Branch, U.S. Army Corps of Engineers, Los Angeles District, P.O. Box 532711, 915 Wilshire Boulevard, Los Angeles, CA 90053–2325, (808) 438–2137. Alternatively, comments can be submitted electronically to: *susan.a.meyer@usace.army.mil.*

SUPPLEMENTARY INFORMATION: Paper copies of the Final EIS/EIR will be made available to the public for review at the following libraries: Norman F. Feldheym Central Library (San Bernardino, California), Hesperia Branch Library (Hesperia, California), and the Rancho Cucamonga Public Library (Rancho Cucamonga, California). A CD copy of the document may be obtained by contacting Ms. Meyer in writing at the address or email above. Interested parties are invited to provide their comments on the Final EIS/EIR, which will become a part of the official record and will be considered in the final decision. Written comments must be received on or before April 16, 2007 and should be submitted to the contact listed above. A Record of Decision (ROD) will be issued by the Corps no earlier than 30 days after the Notice of Receipt for the Final EIS/EIR is published in the **Federal Register**. As a cooperating agency, the USFS intends to adopt the Final EIS/EIR and issue its own ROD in support of the issuance of a USFS special use permit.

Dated: March 7, 2007.

David J. Castanon,

Chief, Regulatory Branch.

[FR Doc. E7–4823 Filed 3–15–07; 8:45 am]

BILLING CODE 3710–KF–P

DEPARTMENT OF THE DEFENSE

Department of the Army; Corps of Engineers

Intent To Prepare a Draft Environmental Impact Statement for the Port Canaveral Navigation Improvements Section 203 Feasibility Study Located in Brevard County, FL

AGENCY: Department of the Army, U.S. Army Corps of Engineers, DoD.

ACTION: Notice of intent.

SUMMARY: The U.S. Army Corps of Engineers (Corps), Jacksonville District intends to prepare a Draft Environmental Impact Statement (DEIS) for the Port Canaveral Improvements Section 203 Feasibility Study. The study is being conducted by the Canaveral Port Authority under authority granted by section 203 of Water Resources Development Act (WRDA) 1986.

ADDRESSES: U.S. Army Corps of Engineers, Planning Division, Environmental Branch, P.O. 4970, Jacksonville, FL, 32232–0019.

FOR FURTHER INFORMATION CONTACT: Mr. Paul Stodola, by e-mail *Paul.E.Stodola@saj02.usace.army.mil* or by telephone at (904) 232–3271.

SUPPLEMENTARY INFORMATION:

a. Proposed Action. Canaveral Port Authority has elected to conduct a feasibility study of potential improvements under the authority granted by section 203 of WRDA 1986. Section 203 states (in part) that "A non-Federal interest may on its own undertake a feasibility study of a proposed harbor or inland harbor project and submit it to the Secretary of the Army." Corps of Engineers guidance for implementation of Section 203 is contained in Engineering Regulation (ER) 1165–2–122, August 26, 1991.

b. Objectives. The objectives of the Port Canaveral Navigation Improvements feasibility study are to prepare a Section 203 Study Report that fully complies with all Federal laws and regulations applicable to navigation project General Investigation feasibility studies, and to enable the Assistant Secretary of the Army to make appropriate recommendations to Congress regarding authorization of the Federal navigation improvements project for Port Canaveral.

c. Study Purpose and Need for Action. The purpose of the study is to evaluate modification to the Federal project for improvements to the navigational channels, the west turning basin, and wideners at the port, all of which would result in an increase in the efficiency of cargo vessels and cruise ships using the port. The study will identify and evaluate alternatives that will (2) reduce future congestion at Port Canaveral; (2) accommodate anticipated future growth in vessel traffic; (3) improve the efficiency of operations for cruise ships and cargo vessels within the Port complex; (4) allow for use of the Port by larger, more efficient, cruise ships and cargo vessels; and (5) allow for development of additional terminals/berths without encroaching on the West Turning Basin.

The total Federal project includes, a 41-foot-deep entrance channel and maintenance of the 44-foot-deep Navy Channel in the 41-foot channel reach; a 40-foot deep and 400-foot-wide inner channel; depths of 35 and 39 feet in the middle turning basin; a channel 39 feet deep and 400 feet wide from the middle turning basin west, 1,800 feet, hence a channel 31 feet deep and 400 feet wide to the west turning basin also 31 feet deep; a channel 39 feet deep and 350 feet wide from the middle turning basin and channel north to the end of Berth 4; relocation of the perimeter dike about 4,000 feet westward and extension of the harbor westward; a south entrance jetty 1,100 feet long and an entrance jetty 1,150 long; a barge dock 90 feet wide and 600 feet long west of the harbor dike; and a barge canal 12 feet by 125 feet from the middle turning basin tot he Atlantic Intracoastal Waterway.

The without project condition is for continuation of the same channel depths and dimensions, with maintenance dredging as needed to maintain current authorized depths. Without proposed project improvements the port will continue to experience the following three major problems which greatly impact port operations, safety, and economic viability.

1. The size of cruise ships calling at Port Canaveral is constrained by channel and turning basin dimensions. The potential for future cruise ship terminal expansion cannot be fully exploited under existing channel and turning basin dimensions and configurations. In addition, the increasingly larger cruise ships calling at Port Canaveral are beginning to encroach on the existing west turning basin. Also, passage of large cruise ships through the narrow ship channel causes surges at cargo piers, which result in cargo vessels having to stop loading and unloading activities while the cruise ships pass.

2. The size of cargo vessels calling at Port Canaveral is constrained by existing channel dimensions and configuration. Larger, more efficient vessels could be used for bulk items such as aggregates and cement if channels were improved.

3. Congestion at cargo berths reduces the effectiveness and efficiency of cargo vessels and landside facilities. Given the rapid growth in commodity movements at Port Canaveral, in the very near future a significant proportion of cargo vessels calling at Port Canaveral will have to wait offshore for a berth to become available. Some of these vessels will likely divert to an alternative port, and incur increased transportation costs, if channels are not improved. In addition, landside facilities will stand idle as vessels wait offshore for an available berth.

d. Alternatives. The proposed alternative navigation improvements at

Port Canaveral include making no further improvements to the project (no action alternative), deepening ocean access and interior channels to accommodate larger vessels; deepening the turning circles in the west and middle turning basins to accommodate larger vessels; increasing the diameter of the west turning basin to accommodate new larger cruise ships; deepening the widener to accommodate larger cruise ships; and widening interior channels to accommodate larger cruise ships.

e. Issues. The Environmental Impact Statement (EIS) will consider impacts on marine resources, protected species, water quality, fish and wildlife resources, cultural resources, essential fish habitat, socio-economics resources, coastal processes, aesthetics and recreation, and other impacts identified through scoping, public involvement, and agency coordination.

f. Scoping Process. Based on early coordination, the local sponsor determined that an EIS was needed. Scoping meetings were held by the local sponsor with Federal agencies. Additional agency meetings will be held in the coming months. All parties are invited to participate in the scoping process by identifying any additional concerns on issues, studies needed, alternatives, procedures, and other matters related to the scoping process. At this time, there are no plans for a public scoping meeting.

g. Public Involvement. We invite the participation of affected Federal, state and local agencies, affected Indian tribes, and other interested private organizations and parties.

h. Coordination. The proposed action is being coordinated with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act, with the FWS under the Fish and Wildlife Coordination Act, and with the State Historic Preservation Officer.

i. Other Environmental Review and Consultation. The proposed action would involve evaluation for compliance with guidelines pursuant to Section 404(b) of the Clean Water Act; application (to the State of Florida) for Water Quality Certification pursuant to Section 401 of the Clean Water Act; certification of state lands, easements, and rights of way; Essential Fish Habitat with National Marine Fisheries Service; and determination of Coastal Zone Management Act consistency.

j. Agency Role. The non-Federal sponsor (Canaveral Port Authority) will provide extensive information and assistance on the resources to be impacted, mitigation measures, and alternatives. The corps will provide coordination of the EIS process.

k. DEIS Preparation. It is estimated that the DEIS will be available to the public on or about January 2008.

Dated: March 7, 2007.

Stuart J. Appelbaum,

Chief, Planning Division.

[FR Doc. 07-1278 Filed 3-15-07; 8:45 am]

BILLING CODE 3710-AJ-M

END

DEPARTMENT OF DEFENSE

Department of the Army; Corps of Engineers

Intent To Prepare an Environmental Impact Statement for the Proposed Placer Vineyards Project, Corps Permit Application Number 199900737

AGENCY: Department of the Army, U.S. Army Corps of Engineers, DoD.

ACTION: Notice of intent.

SUMMARY: The Placer Vineyards Specific Plan Property Group proposes to construct a mixed-use master planned community with residential, employment, commercial, open space, recreational and public/quasi-public land uses. The Plan provides for 14,132 homes in a variety of housing types, styles, and densities. At full Plan build-out, projected to occur over a 20- to 30-year time period, Placer Vineyards will have a population of approximately 33,000 people, 42 acres of employment centers, 140 acres of retail commercial centers and approximately 930 acres of new parks and open space. This project, as proposed, would result in impacts to approximately 102.7 acres of waters of the United States, including 8.5 acres of temporary impacts to water and wetlands.

DATES: Two scoping meetings will be held on March 28, 2007. The first meeting will be conducted from 3 p.m. to 5 p.m., and the second will be conducted from 6 p.m. to 8 p.m.

ADDRESSES: The meetings will be held at the Placer County Community Development Resource Center, Planning Commission Hearing Room, 3091 County Center Drive (corner of Bell Road and Richardson), Auburn, CA 95603.

FOR FURTHER INFORMATION CONTACT: Questions about the proposed action and the Draft Environmental Impact Statement can be answered by Tom Cavanaugh, (916) 557-5261, e-mail: *thomas.j.cavanaugh@usace.army.mil.*

SUPPLEMENTARY INFORMATION: The applicants have applied for a Department of the Army permit under Section 404 of the Clean Water Act to construct a large-scale mixed-use development project. As part of the Section 404(b)(1) application process, the development of an Environmental Impact Statement (EIS) is required. No project alternatives have been defined to date. The proposed project and the alternatives to its proposed size, design and location will be developed through the EIS process.

Although wetland delineations have been conducted for each of the participating properties, some have not yet been verified. Based upon the best currently available information, approximately 156.1 acres of waters of the United States have been delineated within the participating properties. Of the 156.1 acres mapped on site, the applicants propose to result in impacts to approximately 61.3 acres of waters of the United States and to avoid approximately 60.1 acres of waters of the United States for construction of the project (not including infrastructure). For development of the infrastructure elements, the applicants propose to affect an estimated 41.4 acres of waters of the United States. Thus, the combined total proposed impacts to waters of the United States for all elements of this comprehensive permit application would affect 102.7 acres.

The Placer Vineyards Plan Area is bounded on the north by Baseline Road, on the south by the Sacramento/Placer County line, on the west by the Sutter/Placer County line and Pleasant Grove Road, and on the east by Dry Creek and Walerga Road. East to west, the Specific Plan area spans approximately 6 miles. North to south, at its widest point, it spans approximately 2 miles.

The Corps' public involvement program includes several opportunities to provide oral and written comments. Affected Federal, state, local agencies, Indian tribes and other interested private organizations and parties are invited to participate. Significant issues to be analyzed in depth in the EIS include, loss of waters to the United States, including vernal pools and other wetlands; cultural resources; threatened and endangered species; surface water and groundwater; water quality; socio-economic effects, and aesthetics.

The Corps will initiate formal consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service under Section 7 of the Endangered Species Act for two federally threatened and endangered species that may be affected by this project. In addition, the Corps will be consulting with the State Historic Preservation Officer under Section 106 of the National Historic Preservation Act regarding potential impacts to sites

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF
Planning Division
Environmental Branch

MAR 2 1 2007

TO ALL INTERESTED PARTIES:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, and the Canaveral Port Authority will host a scoping meeting to seek public comment on the development of Port Canaveral Navigation Improvements. This meeting will be held at the following time and place:

DATE:	April 4, 2007
TIME:	3:00 P.M.
PLACE:	Commission Room of the Canaveral Port Authority 445 Challenger Road Cape Canaveral, Florida

This meeting will focus on the area within and adjacent to Port Canaveral in Brevard County, Florida (please see enclosed map).

The scoping meeting will feature a presentation by Corps and Port Canaveral staff on project efforts to date, preliminary alternatives under consideration, environmental impacts, and project schedule. Federal and state natural resource agencies have also been informed of the meeting. An opportunity to ask questions and make comments will be given after the presentation.

In order that we may hear as many comments as possible during the meeting, we will provide a comment sheet for your use. You may wish to use this to write down your questions and submit them after or during the meeting. In the event that you can not attend the meeting, you are encouraged to send your written comments to the letterhead address, Attn. Mr. Paul Stodola. The enclosed Notice of Intent to prepare a Draft Environmental Impact Statement will provide you with additional information on the proposed action.

If you would like additional information, please contact Mr. Paul Stodola at phone number 904-232-3271, or email at Paul.E.Stodola@saj02.usace.army.mil.

Sincerely,

Stuart J. Appelbaum
Chief, Planning Division

Enclosures

COMMANDER (OAN)
SEVENTH COAST GUARD DISTRICT
909 SE 1ST AVENUE
BRICKNELL PLAZA FEDERAL BLDG
MIAMI FL 33131-3050

REGIONAL DIRECTOR
U S FISH & WILDLIFE SERVICE
1875 CENTURY BLVD
ATLANTA GA 30345-3301

FIELD SUPERVISOR
U S FISH & WILDLIFE SERVICE
6620 SOUTHPOINT DRIVE SOUTH
SUITE 310
JACKSONVILLE FL 32216-0912

NATIONAL MARINE FISHERIES SERVICE
CHIEF PROTECTED SPECIES BRANCH
263 13TH AVE. S.
ST. PETERSBURG FL 33701

MR GEORGE GETSINGER
NATIONAL MARINE FISHERIES SERVICE
C/O GTM NERR
9741 OCEAN SHORE BLVD.
ST. AUGUSTINE FL 32080-8618

REGIONAL DIRECTOR
FEMA INSURANCE & MITIGATION DIV
3003 CHAMBLEE-TUCKER ROAD
ATLANTA GA 30341

SOUTHERN REGION FORESTER
U S FOREST SERVICE
1720 PEACHTREE ROAD NW
ATLANTA GA 30309-2405

REGIONAL ADMINISTRATOR
US ENVIR PROTECTION AGENCY
ENVIRONMENTAL POLICY SECTION
61 FORSYTH STREET
ATLANTA GA 30303-3104

HOUSING AND URBAN DEVELOPMENT
REGIONAL ENVIRONMENTAL OFFICER
75 SRING STREET SW ROOM 600-C
ATLANTA GA 30303-3309
(2 CYS)

U S DEPT OF AGRICULTURE-NRCS
TAVARES SERVICE CENTER
1725 DAVID WALKER DRIVE
TAVARES FL 32778-4954

FLORIDA DEPT OF ENV PROTECTION
BUREAU OF SURVEY & MAPPING, DIV OF ST LANDS
MAIL STATION 105
3900 COMMONWEALTH BLVD
TALLAHASSEE FL 32399-3000

DR JANET S MATTHEWS
DIVISION OF HISTORICAL RES - SHPO
500 SOUTH BRONOUGH STREET
TALLAHASSEE FL 32399-0250

MS LAUREN MILLIGAN
FLORIDA STATE CLEARINGHOUSE
FL DEPT OF ENVIRONMENTAL PROTECTION
3900 COMMONWEALTH BLVD MS 47
TALLAHASSEE FL 32399-3000
(**16 CYS**)

MS LYNN GRIFFIN
FLORIDA COASTAL MANAGEMENT PROGRAM
FL DEPT OF ENVIRONMENTAL PROTECTION
3900 COMMONWEALTH BLVD
MAIL STATION 47
TALLAHASSEE FL 32399-3000

MR BRADLEY J HARTMAN
FL FISH & WILDLIFE CONSERV COMM
DIRECTOR OFFICE OF ENV SERVICES
620 SOUTH MERIDIAN STREET
TALLAHASSEE FL 32399-1600

MR WILLIAM STEELE
SEMINOLE TRIBE OF FLORIDA
AH THA THI KI MUSEUM
HC 61, BOX 31A
CLEWISTION FL 33440

MR FRED DAYHOFF
MICCOSUKEE TRIBE OF FLORIDA
ATTENTION STEVE TERRY,
POST OFFICE BOX 440021
TAMIAMI STATION
MIAMI FL 33144

U S FISH & WILDLIFE SERVICE
MR RON HIGHT
MERRITT ISLAND & PELICAN ISLAND
NATIONAL WILDLIFE REFUGES
P O BOX 6504
TITUSVILLE FL 32782

COMMANDER, 45TH SPACE WING
PATRICK AIR FORCE BASE
45 CES/CE
1224 JUPITER STREET
PATRICK AFB FL 32925-3343

ATLANTIC OCEANOGRAPHIC &
METEOROLOGICAL LABORATORY OF NOAA
DR PETER ORTNER
DIRECTOR OF OCEAN CHEMISTRY DIVISION
4301 RICKENBACKER CAUSEWAY
MIAMI FL 33149

FL FISH & WILDLIFE CONSERV COMMISSION
FLORIDA MARINE RESEARCH INSTITUTE
MR RICH PAPERNO
1220 PROSPECT AVE #285
MELBOURNE FL 32901

EAST CENTRAL FLORIDA REGIONAL
PLANNING COUNCIL
631 NORTH WYMORE ROAD
SUITE 100
MAITLAND FL 32751

MR PACE WILBUR
NATIONAL MARINE FISHERIES SERVICE
219 FORT JOHNSON ROAD
CHARLESTON SC 29412-9110

CANAVERAL NATIONAL SEASHORE
NATIONAL PARKS SERVICE
SUPERINTENDENT'S OFFICE
308 JULIA STREET
TITUSVILLE FL 32796-3521

U S GEOLOGICAL SURVEY
FLORIDA INTEGRATED SCIENCE CENTER
WATER & RESTORATION STUDIES
FEDERAL RESERVE BANK BLDG
9100 NW 36TH STREET SUITE 107
MIAMI FL 33178

NASA ENVIRONMENTAL MANAGEMENT
MR MARIO BUSACCA
MAIL CODE TA-C3
KENNEDY SPACE CENTER FL 32899

FL FISH & WILDLIFE CONSERV COMMISSION
FLORIDA WILDLIFE RESEARCH INSTITUTE
BUREAU CHIEF
100 8TH AVENUE SW
ST PETERSBURG FL 33701

FL FISH & WILDLIFE CONSERV COMMISSION
MR STEVE LAU
255-154TH AVENUE
VERO BEACH FL 32968

FL DEPARTMENT OF TRANSPORTATION
DIRECTOR DIVISION OF PLANNING & PROD
719 S WOODLAND BLVD
DELAND FL 32720

FL INLAND NAVIGATION DISTRICT
MR DAVID ROACH, EXECUTIVE DIRECTOR
1314 MARCINSKI ROAD
JUPITER FL 33477-9498

FL DEPT OF ENVIRONMENTAL PROTECTION
ST SEBASTIAN BUFFER PRESERVE
1000 BUFFER PRESERVE DRIVE
FELLSMERE FL 32948

MS DONNA WIETING
US DEPARTMENT OF COMMERCE
HCHB SP ROOM 6117
14TH & CONSTITUTION AV NW
WASHINGTON DC 20230
(5 CYS)

ISAAK WALTON LEAGUE
P O BOX 97
ESTERO FL 33928

ST JOHNS RIVER WATER MGMT DIST
P O BOX 1429
PALATKA FL 32178-1428

FL REGIONAL FIELD OFFICE
SIERRA CLUB FLORIDA OFFICE
475 CENTRAL AVENUE SUITE M-1
ST PETERSBURG FL 33701

SOUTH FLORIDA REGIONAL OFFICE
SIERRA CLUB FLORIDA OFFICE
2700 SW 3RD AVENUE SUITE 2F
MIAMI FL 33129

SAVE THE MANATEE CLUB
500 N MAITLAND AVENUE
MAITLAND FL 32751

CARIBBEAN CONSERVATION CORPORATION
P O BOX 2866
GAINESVILLE FL 32602

AUDUBON OF FLORIDA
444 BRICKELL AVE SUITE 850
MIAMI FL 33131

FLORIDA WILDLIFE FEDERATION
P O BOX 6870
TALLAHASSEE FL 32314-6870

PEGGY BUSACCA
BREVARD COUNTY ADMINISTRATOR
2725 JUDGE FRAN JAMIESON WAY
VIERA FL 32940

TRUMAN SCARBOROUGH, CHAIR
BREVARD COUNTY COMMISSION
400 SOUTH STREET SUITE 1A
TITUSVILLE FL 32780

RON JONES, DIRECTOR
STORMWATER UTILITY
BREVARD COUNTY
2725 JUDGE FRAN JAMIESON WAY
VIERA FL 32940

ERNIE BROWN, DIRECTOR
NATURAL RESOURCES MANAGEMENT OFFICE
BREVARD COUNTY
2725 JUDGE FRAN JAMIESON WAY
VIERA FL 32940

REGIONAL ADMINISTRATOR
NAT MARINE FISHERIES SERV, HABITAT CONS
263 13TH AVE. S.
ST. PETERSBURG FL 33701

MR STEVE KOKKINAKIF, USDC
1315 EAST-WEST HIGHWAY
BLDG SFMC3 ROOM 15723
SILVER SPRINGS MD 20910

MS LYNN GRIFFIN
FLORIDA COASTAL MANAGEMENT PROGRAM
3900 COMMONWEALTH BOULEVARD
MAIL STATION 47
TALLAHASSEE FL 32399-3000

FL DEPT OF TRANSPORTATION
605 SUWANNEE STREET
TALLAHASSEE FL 32399-0450

HONORABLE MEL MARTINEZ
UNITED STATES SENATOR
1650 PRUDENTIAL DRIVE, SUITE 220
JACKSONVILLE FL 32207

HONORABLE BILL NELSON
UNITED STATES SENATOR
1301 RIVERPLACE BOULEVARD SUITE 2218
JACKSONVILLE FL 32207

MR ALEXANDER STONE
AMERICAN LITTORAL SOCIETY (BHNI)
2809 BIRD AVENUE PMB 162
MIAMI FL 33133

FLORIDA WILDLIFE FEDERATION
PO BOX 6870
TALLAHASSEE FL 32314-6870

NATIONAL WILDLIFE FEDERATION
1330 WEST PEACHTREE STREET SUITE 475
ATLANTA GA 30309

NATURE CONSERVANCY
FLORIDA CHAPTER
222 S WESTMONTE DR SUITE 300
ALTAMONTE SPRINGS FL 32714-4269

REEFKEEPER INTERNATIONAL
P.O. BOX 1316
MIDDLETON MD 21769

MR MICHAEL GERHARDT
DREDGING CONTRACTORS OF AMERICA
503 D STREET NW, 1st FLR.
WASHINGTON DC 20001

MR BILL HANSON
GREAT LAKES DREDGE AND DOCK COMPANY, LLC
2122 YORK ROAD
OAK BROOK IL 60523

CANAVERAL PORT AUTHORITY
P.O. BOX 267
CAPE CANAVERAL FL 32920

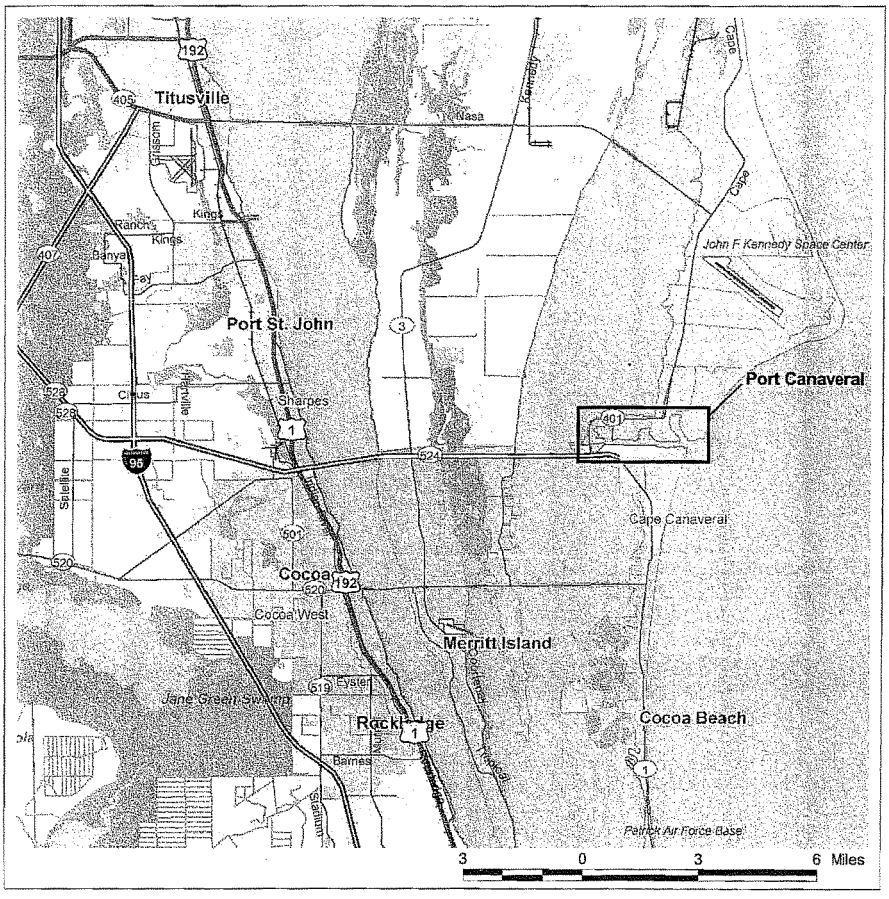
DIAL CORDY
490 OSCEOLA AVENUE
JACKSONVILLE BEACH FL 32250

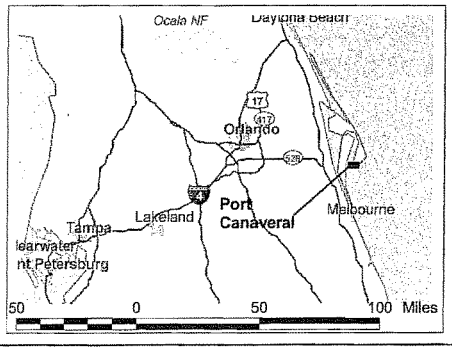
HONORABLE MIKE HARIDOPOLOS
1360 SARNO ROAD
SUITE C
MELBOURNE FL 32935

HONORABLE BOB ALLEN
321 MAGNOLIA AVENUE
MERRITT ISLAND FL 32952

HONORABLE DAVE WELDON
2725 JUDGE FRAN JAMIESON WAY BUILDING C
MELBOURNE FL 32940

CITY COUNCIL
CITY HALL ANNEX
111 POLK AVENUE
CAPE CANAVERAL FL 32920





Location Map	
Port Canaveral Environmental Baseline Report	
Scale: 1 inch = 3 miles	Drawn By: MR
Date: April 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 1

FLORIDA TODAY
PUBLISHED IN BREVARD COUNTY

Published Daily

RECEIVED
APR-6 2007
CPA

STATE OF FLORIDA
COUNTY OF BREVARD

Before the undersigned authority personally appeared **MAUREEN MALECHUK** who on oath says that she is **LEGAL ADVERTISING CLERK** of the **FLORIDA TODAY**, a newspaper published in Brevard County, Florida; that the attached copy of advertising being a **LEGAL NOTICE** **(AD#843827-$141.75)** **in the** matter of **CANAVERAL PORT AUTHORITY** The Court **MEETING NOTICE** was published in the **FLORIDA TODAY** in the issues of **APRIL 2, 2007**

affiant further says that the said **FLORIDA TODAY** is a newspaper in said Brevard County, Florida, and that the said newspaper has heretofore been continuously published in said Brevard County, Florida, regularly as stated above, and has been entered as periodicals matter at the post office in **MELBOURNE** in said Brevard County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that she has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in said newspaper.

Maureen Malechuk
(Signature of Affiant)

Sworn to and subscribed before this **2ND DAY OF APRIL, 2007**

Linda L. Braud
(Signature of Notary Public)

LINDA L. BRAUD
(Name of Notary Typed, Printed or Stamped)

Personally Known _____ or Produced Identification _____
Type Identification Produced _____

AD#843827-4/2/2007

U.S. ARMY CORPS OF ENGINEERS AND CANAVERAL PORT AUTHORITY CANAVERAL PORT AUTHORITY NAVIGATION IMPROVEMENTS DRAFT ENVIRONMENTAL IMPACT STATEMENT BREVARD COUNTY, FLORIDA SCOPING MEETING APRIL 4, 2007

The U.S. Army Corps of Engineers (Corps) and Canaveral Port Authority (Port), intend to prepare a Draft Environmental Impact Statement (EIS) to address the potential impacts associated with the construction of proposed navigation improvements within Port Canaveral in Brevard County, Florida. The EIS will be used as a basis for the selection of a preferred alternative and to ensure compliance with the National Environmental Policy Act (NEPA).

The Corps invites full public participation to promote open communication on the issues surrounding the proposal. All Federal, State, and local agencies, and other persons or organizations that have an interest are urged to participate in the NEPA scoping process. A public meeting will be held to help identify significant issues and to receive public input and comment. The scoping meeting will be held on April 4, 2007 at the Commission Room of the Canaveral Port Authority, in Brevard County, Florida beginning at 5pm. If you will be attending the meeting and require a sign language interpreter, please contact the Corps.

Commission Room of the
Canaveral Port Authority
445 Challenger Road
Cape Canaveral, Florida

Questions or written comments about the proposed action and the EIS should be addressed to Mr. Paul Sfodola, U.S. Army Corps of Engineers, Planning Division, Environmental Branch, P.O. 4970 Jacksonville, FL 32232-0019, phone (904) 232-3271, e-mail: Paul.E.Sfodola@sad02.usace.army.mil. Comments should be received by May 4, 2007.

RECEIVED
APR 11 2007
DIAL CORDY AND ASSOCIATES INC

U.S. ARMY CORPS OF ENGINEERS AND CANAVERAL PORT AUTHORITY

PORT CANAVERAL NAVIGATION IMPROVEMENTS
DRAFT ENVIRONMENTAL IMPACT STATEMENT
BREVARD COUNTY, FLORIDA

APRIL 4, 2007

SCOPING MEETING ATTENDANCE RECORD

Name	Residence Address	State	ZIP
Lee Swain - Dial Cordy & Assoc	Jax Beach	FL	32250
Mark Howell - DC+A	Jax Beach	FL	32250
Raymond Cox	West Palm Beach	FL	33410
Linda Batz / Atkins Hill	Merritt Island	FL	32953
PAUL STOBOLA	JAX	FL	32656
RICK DURABB	MERRITT ISL	FL	32952
Jeannie Adams CPA	Cape Canaveral	FL	32920
Shannon Rebuck City of Cape Canaveral	Cape Canaveral	FL	32920
Gregory McGILL	NOTU Cape Canaveral	FL	32920
Josh Hoops	Navy Cape Canaveral	FL	32920
LARRY WEBER	Merritt Island	FL	32952
John Milo	Jacksonville	FL	32225
Paula Berriton	Merritt Island	FL	32953
Rocky Sandella	Cape Canaveral	FL	32920
Robin Sobrino	Brevard County		

Florida Department of
Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

May 9, 2007

Mr. Paul E. Stodola
Planning Division, Jacksonville District
U.S. Army Corps of Engineers
P. O. Box 4970
Jacksonville, FL 32232-0019

RE: Department of the Army, Jacksonville District Corps of Engineers – Scoping Notice – Draft Environmental Impact Statement for the Port Canaveral Navigation Improvements Section 203 Feasibility Study – Cape Canaveral, Brevard County, Florida.
SAI # FL200703223171C

Dear Mr. Stodola:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16, U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4231, 4331-4335, 4341-4347, as amended, has coordinated a review of the subject scoping notice.

The Florida Department of Environmental Protection (DEP) advises that port terminal/ berth construction and new dredging and dredged material disposal activities will require issuance of an environmental resource permit or joint coastal permit by the DEP Bureau of Beaches and Coastal Systems. Please contact Mr. Marty Seeling at (850) 414-7728 for further assistance and permitting information.

The Florida Department of State (DOS) notes that a large coquina and shell midden, the NOTU Site (8BR1641), is located within the boundaries of the project area depicted on the enclosed location map. PBS&J, Inc. conducted an archaeological resource assessment of this area to delineate the site's boundaries and assess its potential for inclusion in the *National Register of Historic Places*. The resultant report concludes that Site 8BR1641 contains both intact and disturbed portions with two distinct areas of intact cultural deposits in Areas A and B. Areas A and B are thus eligible for listing in the *National Register* and staff recommends that a 10-and-20 meter buffer be established to protect both areas from disturbance. Please refer to the enclosed DOS letter and maps for additional information.

Based on the information contained in the scoping notice and the enclosed state agency comments, the state has determined that, at this stage, the proposed activities are consistent with the Florida Coastal Management Program (FCMP). The concerns identified by our reviewing agencies must be addressed prior to project implementation. The state's continued concurrence with the project will be based, in part, on the adequate resolution of issues identified during this and subsequent reviews. The state's final review of the project's consistency with the FCMP will be conducted during the environmental permitting stage.

Thank you for the opportunity to review the proposed project. Should you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2170.

Yours sincerely,

Sally B. Mann

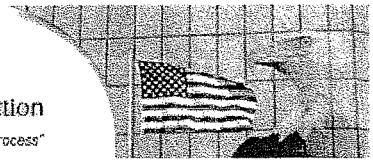
Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm
Enclosures

cc: Barbara Bess, DEP, Central District
Laura Kammerer, DOS

Florida
Department of Environmental Protection

"More Protection, Less Process"



Project Information	
Project:	FL200703223171C
Comments Due:	04/23/2007
Letter Due:	05/10/2007
Description:	DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - SCOPING NOTICE - DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PORT CANAVERAL NAVIGATION IMPROVEMENTS SECTION 203 FEASIBILITY STUDY - CAPE CANAVERAL, BREVARD COUNTY, FLORIDA.
Keywords:	ACOE - PORT CANAVERAL NAVIGATION IMPROVEMENTS FEASIBILITY STUDY - BREVARD CO.
CFDA #:	12.107

Agency Comments:

ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Please note that port berth construction and new dredging and disposal activities will require issuance of an environmental resource permit or joint coastal permit by the DEP Bureau of Beaches and Coastal Systems. Please contact Mr. Marty Seeling at (850) 414-7728 for further assistance and permitting information.

FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

No Comments Received

STATE - FLORIDA DEPARTMENT OF STATE

The DOS notes that a large coquina and shell midden, the NOTU Site (8BR1641), is located within the boundaries of the project are depicted on the location map. PBS&J, Inc. conducted an archaeological resource assessment of this area to delineate the Site's boundaries and assess its potential for inclusion in the National Register of Historic Places. The resultant report concludes that Site 8BR1641 contains both intact and disturbed portions with two distinct areas of intact cultural deposits in Areas A & B. Areas A & B are thus eligible for listing in the National Register and staff recommends that a 10-and-20 meter buffer be established to protect both areas from disturbance.

TRANSPORTATION - FLORIDA DEPARTMENT OF TRANSPORTATION

No Comment

ST. JOHNS RIVER WMD - ST. JOHNS RIVER WATER MANAGEMENT DISTRICT

According to the operating agreement between SJRWMD and the Florida Department of Environmental Protection (FDEP) concerning regulation under part IV of Chapter 373, F.S., FDEP will review port projects such as this. Item (5)n lists "seaports and adjacent seaport related development where the applicant or owner is the port authority" as the responsibility of FDEP. Sufficient information was not provided to determine the extent of potential impacts to wetlands and surface waters. It is expected that the project will be exceed thresholds and will require an Environmental Resource Permit (ERP) from FDEP. The FDEP contact, Lisa Prather, may be reached at (407) 894-7555 or lisa.prather@dep.state.fl.us.

E. CENTRAL FL RPC - EAST CENTRAL FLORIDA REGIONAL PLANNING COUNCIL

Released Without Comment

BREVARD -

For more information or to submit comments, please contact the Clearinghouse Office at:

3900 COMMONWEALTH BOULEVARD, M.S. 47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

RECEIVED
MAY 0 8 2007
OIP / OLGA

Ms. Lauren Milligan
Director, Florida State Clearinghouse
Florida Department of Environmental Protection
3900 Commonwealth Boulevard, Mail Station 47
Tallahassee, Florida 32399-3000

May 4, 2007

RE: DHR No. 2007-2087/ Date Received by DHR: March 26, 2007
SAI No. FL200703223171C/ Jacksonville District Corps of Engineers
Scoping Notice – Draft Environmental Impact Statement for the Port Canaveral Navigation Improvements Section 203 Feasibility Study – Cape Canaveral, Brevard County, Florida

Dear Ms. Milligan:

Our office received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act,* as amended, 36 *C.F.R.,* Part 800*: Protection of Historic Properties*, and the *National Environmental Policy Act* of 1969, as amended. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties, listed, or eligible for listing, in the *National Register of Historic Places* (National Register), assessing the project's effects, and considering alternatives to avoid or minimize adverse effects.

We reviewed the Florida Master Site File (FMSF) inventory and our records for information to define issues and concerns to be addressed in the referenced Draft Environmental Impact Statement (DEIS). We observe that a large coquina and shell midden, the NOTU Site (8BR1641), occurs within the boundaries of the project area depicted on the attached Location Map (Figure 1). We further note that in June 2006, Post, Buckley, Schuh & Jernigan, Inc. (PBS&J) conducted an archaeological resource assessment of this area to delineate the Site's boundaries and assess its potential for inclusion in the National Register.

In the resultant report, *A Phase I Cultural Resources Assessment and Management Plan of the NOTU Site, 8BR1641*(FMSF No. 11311), PBS&J concludes that Site 8BR1641 contains both intact and disturbed portions. Two distinct areas of intact cultural deposits are present within this site, the southern portion (Area A), and a northern portion (Area B). It is the opinion of PBS&J, that Areas A and B of Site 8BR1641 are eligible for listing in the National Register. It is also the opinion of PBS&J that a "10-and-20-meter buffer is established for Areas A and B" to protect

both portions from soil-disturbing activity, and that several small areas of disturbance and lightly scattered artifacts do not meet the criteria for inclusion in the National Register.

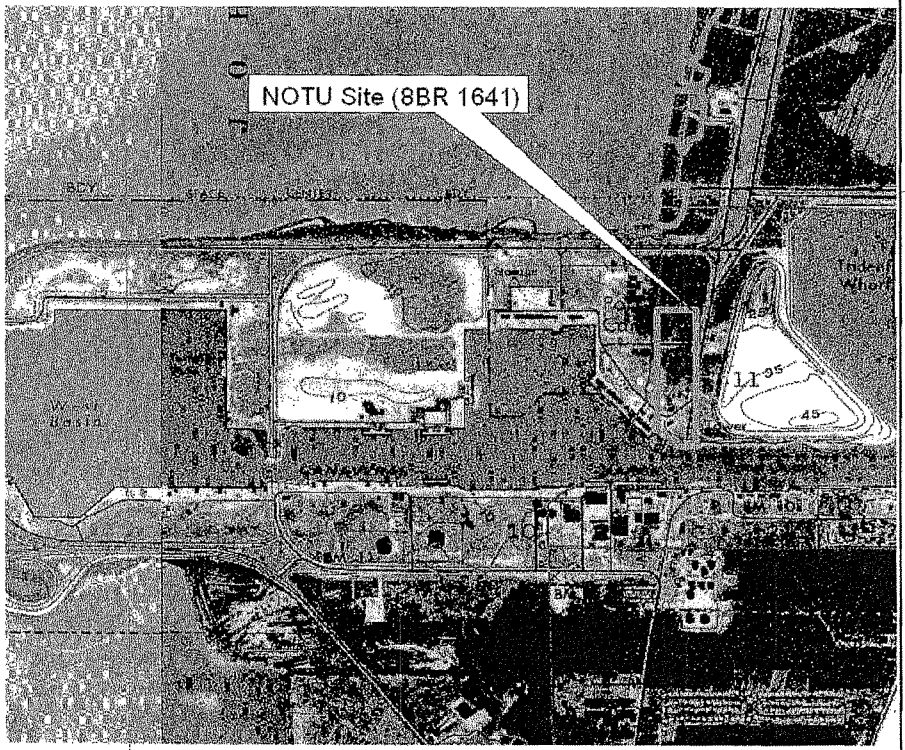
We concur with the conclusions and recommendations of PBS&J. Therefore, it is the opinion of this office that the referenced Draft Environmental Impact Statement address our recommendation that a protective buffer zone of at least 10-and-20 meters be established around Areas A and B of Sites 8BR1641 to ensure avoidance of these archaeologically sensitive areas by any soil-disturbing activities.

If there are any questions concerning our comments, please contact Janice Maddox, Historic Preservationist, by electronic mail at jmaddox@dos.state.fl.us, or by phone at (850) 245-6333. Thank you for your interest in protecting Florida's historic properties.

Sincerely,

Frederick P. Gaske

Frederick P. Gaske, Director, and
State Historic Preservation Officer



500 0 500 1000 1500 Meters

Compliance Review Section
DHR No.: 2007-2087
SAI No.: 20073223171C
Scoping Notice - Draft Environmental Impact Statement for the Port Canaveral Navigation Improvements Section 203 Feasibility Study

Map Legend

- Brevard County Sites
- STR
- USGS Cape Canaveral

WARNING! The locations of the archaeological site, historic structures, unmarked human burials, cemeteries, and other cultural features depicted on this map are for resource managment and law enforcement purposes. It is a felony to excavate, or to remove, deface, destroy, or otherwise alter any archaeological site or specimen located upon any state owned and controlled lands, without the permission of the Division of Historical Resources (see Section 267.13, Florida Statutes). State law protects human burial sites on all lands regardless of ownership. It is a felony to knowingly and willfully disturb, destroy, remove, vandalize or damage marked or unmarked human burial sites or to remove grave goods or other objects placed at grave sites (see Sections 872.02 and 872.05, Florida Statutes).

Florida Department of State
Division of Historical Resources
Bureau of Historic Preservation
Compliance Review Section
500 South Bronough Street
Tallahassee, Florida 32399-0250
(850) 245-6333

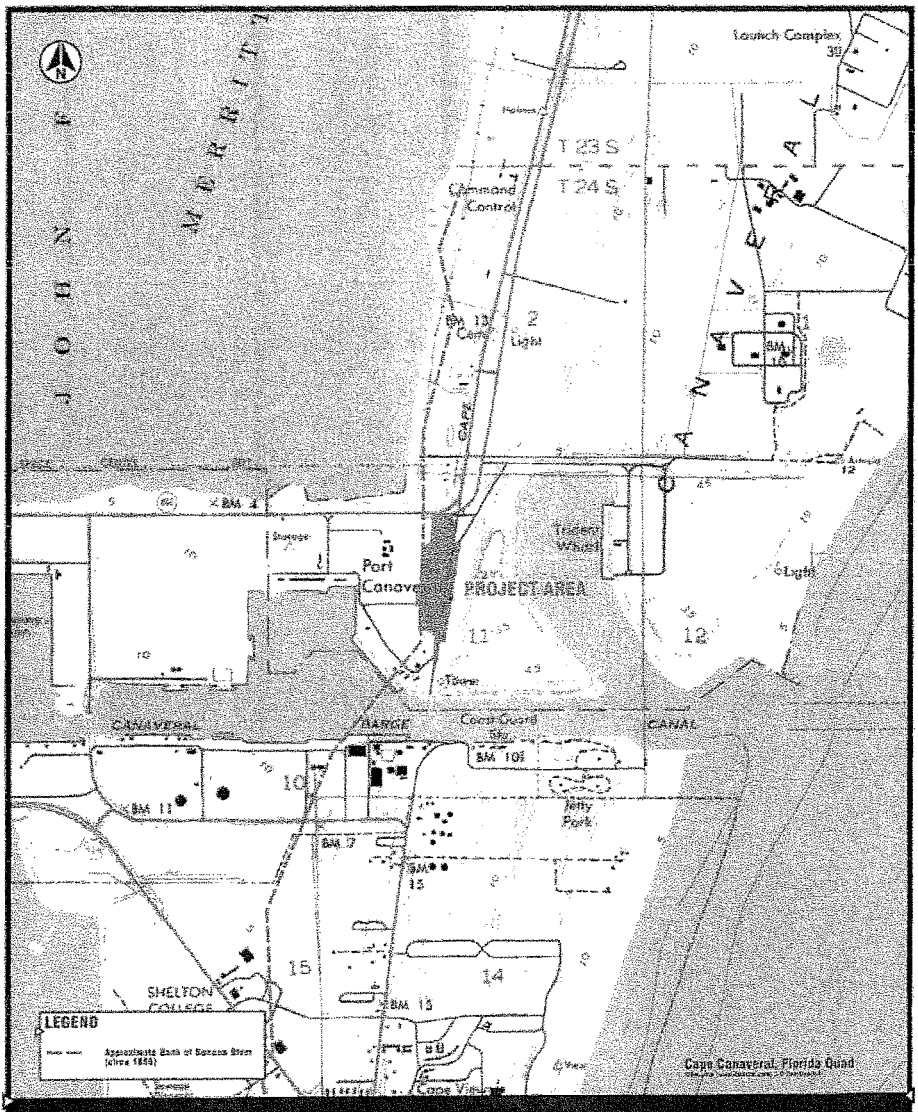


Figure 2 **Project Area**

Appendix A
Survey and Excavation Locations

AREA A
AREA B
Appendix C
Management Buffer Zones

Draft EA Public Meeting Documents and Comments

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning and Policy Division
Environmental Branch

APR 10 2012

To Whom It May Concern:

Pursuant to the National Environmental Policy Act and U.S. Army Corps of Engineers (Corps) Regulation (33 CFR 230.11), this letter constitutes the Notice of Availability of the Integrated Section 203 Report and Draft Environmental Assessment (EA) for improvements to the existing Federal navigation project at Port Canaveral, Brevard County, Florida. The recommended plan includes both widening and deepening various portions of the harbor. Enclosed is the draft Finding of No Significant Impact (FONSI).

This draft report is available on the Corps, Jacksonville District website at the following address for your review:

http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DocsNotices_OnLine_BrevardCo.htm.

At this time, we are inviting agencies, interest groups, and the public to provide input on the proposed alternatives and to identify significant resource concerns. Your comments will be incorporated during the preparation of the final EA. Comments should be addressed to the USACE at the following address:

U.S. Army Corps of Engineers
Jacksonville District
Attention: Jason Spinning (CESAJ-PD-EC)
Post Office Box 4970
Jacksonville, FL 32232-0019

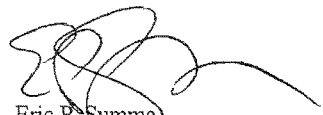
Please provide written comments within 60 days of the date of this letter.

In addition, Corps will hold a public workshop to offer further opportunity for comment. Please join us at:

Monday, May 14, 2012 at 6:00 p.m.
Canaveral Port Authority
445 Challenger Road, Commission Room
Cape Canaveral, Florida 32920

If you have any questions or comments, please contact either Jason Spinning (904-232-1231 or Jason.J.Spinning@usace.army.mil) or Paul Stodola (904-232-3271 or Paul.E.Stodola@usace.army.mil).

Sincerely,



Eric P. Summa
Chief, Environmental Branch

Enclosure

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning and Policy Division
Environmental Branch

FINDING OF NO SIGNIFICANT IMPACT

INTEGRATED SECTION 203 NAVIGATION STUDY REPORT & ENVIRONMENTAL ASSESSMENT

CANAVERAL HARBOR, BREVARD COUNTY, FLORIDA

I have reviewed the Environmental Assessment (EA) for the proposed action. This Finding incorporates by reference all discussions and conclusions contained in the EA enclosed hereto. Based on information analyzed in the EA, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed action will not significantly impact the quality of the human environment and does not require an Environmental Impact Statement (EIS). Reasons for this conclusion are in summary:

a) The proposed work includes deepening and widening the channels, wideners, and turning basins at Canaveral Harbor. Although eight acres of man-made uplands will be lost as a result of this project, these resources are not considered to be significant and mitigation is not appropriate. No wetland habitats will be affected by the proposed action. Impacts to marine resources include loss of benthic organisms at the dredge sites and the removal of one acre of algal community associated with the existing riprap. These impacts are anticipated to be temporary in nature.

b) This work would be conducted in accordance with the draft U.S. Fish and Wildlife Coordination Act Report of September 2007, which is pending final approval by the Department of the Interior.

c) The proposed action will be in compliance with the Endangered Species Act (ESA), the Coastal Barrier Resources Act, and the Fish and Wildlife Coordination Act. Measures to prevent or minimize impacts to sea turtles will be implemented during project construction, in accordance with consultations with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). The proposed action will not jeopardize the continued existence of any threatened or endangered species, or adversely modify any designated "critical habitat." The Corps determined that the proposed action may affect, but is not likely to adversely affect sea turtles, the Eastern indigo snake, and the West Indian manatee. Consultation with USFWS and NMFS pursuant to Section 7 of the ESA will be completed prior to project construction.

d) The State provided concurrence with the Federal Consistency Determination (CD) (Appendix B of the EA) on 9 May 2007finding the action to be consistent with the Florida Coastal Management Program (FCMP). The State may issue an additional concurrence with the project's consistency with the FCMP during the environmental permitting stage of the project. The Corps will obtain an environmental resource permit or joint coastal permit from the Florida Department of Environmental Protection to comply with Section 401 of the Clean Water Act of 1972 prior to project construction.

e) Consultations with the State Historic Preservation Officer (SHPO) indicate that the project will not impact any sites of cultural or historical significance.

f) Measures to eliminate, reduce, or avoid potential impacts to environmental and cultural resources include the following: (1) turbidity monitoring will be conducted during construction to ensure turbidity levels comply with State water quality standards; (2) the standard Eastern indigo snake protection measures will be followed if any indigo snakes are present; (3) the standard manatee protection measures will be followed; (4) the Jacksonville District's Migratory Bird Protection Policy would be followed if any migratory birds are encountered.

g) The draft FONSI will be coordinated with the public and agencies with a 60-day comment period pursuant to 40 CFR 1501.4(e) and 1508.13. Any resulting comments or concerns will be addressed in the Final EA and/or this FONSI.

The point of contact for this finding is Paul Stodola at 904-232-3271 or Paul.E.Stodola@usace.army.mil. An electronic copy of the draft EA can be accessed from the Jacksonville District Environmental Documents website at:

http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DocsNotices_OnLine_BrevardCo.htm

_____ _____

Ballard C. Barker
LTC, U.S. Army
Acting Commander

Date

DRAFT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

6/9/2012

U.S. Army Corps of Engineers
Jacksonville District
Attn: Jason Spinning, (CESAJ-PD-EC)
Post Office Box 4970
Jacksonville, Florida 32232-0019

Subject: EPA's Comments on the Integrated Section 203 Report and Draft Environmental Assessment (EA) and Finding of No Significant Impact (FNSI) for improvements to the existing Federal Navigation Project at Port Canaveral, Brevard County, Florida

Dear Mr. Spinning:

The U.S. Environmental Protection Agency (EPA) is responding to Mr. Eric Summa's April 10, 2012, letter inviting agencies, interest groups, and the public to review and comment on the above referenced draft EA for the proposed action, a plan to widen and deepen Port Canaveral's harbor.

Background

The EA describes Port Canaveral (the Port) as a multiple-use facility composed of cruise ship berths, cargo berths, U.S. Navy, U.S. Coast Guard, and Military Sealift Command (MSC) berths. The Canaveral Port Authority (CPA) is the owner of all cruise terminal and cargo berth facilities. The Corps, the Navy, and the CPA conduct the harbor's maintenance dredging.

Proposed Action

The EA defines the proposed action as Canaveral Port Authority (CPA)'s feasibility study to deepen and widen Port Canaveral's channels and turning basins. CPA's recommended preferred alternative is to widen the main ship channel from 400 feet to 500 feet, expand the West Turning Basin turning circle from 1,400 feet to 1,725 feet, and deepen twelve identified channel segments. The West Turning Basin is used by commercial traffic, cruise ships, and the U.S. Coast Guard.

Purpose and Need

EPA understands the existing channel capacity is inadequate to accommodate recent and anticipated future growth in both cruise and cargo vessel size and traffic

contributing to port congestion and inefficiencies in operations of all ships within the Port.

According to the EA, Port Canaveral ranked as the 3rd busiest cruise port with over twice the passengers as the 4th busiest, New York in 2010. Currently, large cruise ship operations are constrained by the Port's existing channel width and by the close proximity to moored cargo ships, naval vessels, and the day-trip ships berthing at the south side cruise terminals. In 2010, the CPA invested $32 million into upgrading and expanding the cruise terminal to service the new, larger Disney cruise ship vessels.

The EA indicates the largest cargo vessels coincide with those commodities having the greatest projected growth. Petroleum tankers are projected to be the largest cargo vessels calling at the Port's Seaport Canaveral Terminal, with sizes up to 100,000 plus dead weight tonnage. The existing channel depth forces large cargo vessels to either light-load or wait for the rising tide in order to transit the existing navigation channel.

EPA Comments

EPA recommends the final EA address the following four identified issues, which are unaddressed in the draft EA.

Federal Register Notice of proposed Environmental Impact Statement (EIS)

The Corps published an *Intent to Prepare a Draft EIS for the Port Canaveral Navigation Improvements Section 203 Feasibility Study Located in Brevard County, FL.*[1] In this Notice, the Corps indicated an EIS was necessary.[2] The final EA/FNSI should clarify why there was a change in the level of NEPA documentation.

Update the Sediment Evaluation Study

EPA disagrees with the draft EA's (Section 2.6.1) finding the 2005 sediment evaluation of the harbor as the most recent. The final EA/FNSI should discuss the results of the 2010 comprehensive sediment evaluation of the entire harbor.

Dredged Material Testing

The draft EA[3] indicates the Section 103 Evaluation will be conducted during the pre-construction engineering and design phase. EPA encourages starting this evaluation at the earliest possible phase with the allocation of one year, at a minimum, for testing and evaluation of the material. All sampling should be done to the proposed project depth consistent with the EPA Region 4 - USACE SAD Southeast Regional Implementation Manual.

---

[1] See: https://www.federalregister.gov/articles/2007/03/16/07-1278/intent-to-prepare-a-draft-environmental-impact-statement-for-the-port-canaveral-navigation#p-21

[2] 72 FR 12598, 12599 (March 16, 2007).

[3] Section 2.6.1

Canaveral Harbor Ocean Dredged Material Disposal Site (ODMDS)

According to the 2012 Site Management and Monitoring Plan (SMMP), which is not discussed in the draft EA, the 10 year projected capacity should not exceed half the estimated remaining site capacity. The draft EA indicates the ten-year projected volume (9.75 million cy) including the proposed action and its associated additional maintenance dredging exceeds half of the remaining estimated capacity (18.4 million cubic yards (cy)). Consequently the 2012 SMMP requires an assessment of the proposed action's impacts upon the ODMDS' capacity requirements.

Similarly the ports of Port Everglades, Miami, and Naval Station Mayport analyzed their prospective impacts on their designated ODMDS capacity associated with their proposed harbor-improvement actions. This assessment, at a minimum, should include modeling of the disposal mound using the Corps' MDFATE or MPFATE model and analyzing the resulting site capacity decrease. This assessment should be coordinated with both the Corps and EPA prior to initiation. The final EA/FNSI should reflect the capacity assessment results in Section 6.7.3.1 of the final EA along with a discussion the February 2012 Canaveral ODMDS SMMP.

Pipelines and Utility Infrastructure

The EA does not address whether the proposed harbor deepening may affect any existing pipelines or utility infrastructure in the harbor. EPA is aware the Corps has pipeline and other utility crossing in waterways burial guidance.[4] Compliance with this guidance may have resulted in utility infrastructure within the depth range proposed for dredging. Because the EA does not appear to indicate this issue has been investigated and appropriately addressed, the final EA should address and discuss it.

EPA appreciates the opportunity to review and comment on the draft EA/FNSI for the proposed action. For further discussion of EPA's dredged material and ODMDS comments, please contact Christopher McArthur at 404/562-9391 (mcarthur.christopher@epa.gov). Regarding the remaining EPA comments, please contact me at 404/562-9611 (mueller.heinz@epa.gov), or Beth Walls of my staff, at 404/562-8309 (walls.beth@epa.gov).

Sincerely,

Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management

Cc: Christopher McArthur, Region 4 EPA's ODMDS program

[4] http://dnr.louisiana.gov/assets/OCM/CoastItNotes/COEPipelineBurialRequirements.pdf

Inactive hide details for "Douglass, Edward C SAJ" ---11/27/2012 11:04:35 AM---Classification: UNCLASSIFIED Caveats: NONE"Douglass, Edward C SAJ" ---11/27/2012 11:04:35 AM---Classification: UNCLASSIFIED Caveats: NONE

From: "Douglass, Edward C SAJ" <Edward.C.Douglass@usace.army.mil>
To: Christopher McArthur/R4/USEPA/US@EPA, Beth Walls/R4/USEPA/US@EPA
Cc: "Bee, Patricia L HQ02" <Patricia.L.Bee@usace.army.mil>, "Savinon, Joana M SAJ" <Joana.M.Savinon@usace.army.mil>, "LaDart, Jeremy HQ" <Jeremy.M.LaDart@usace.army.mil>, "Brown, Stacey E HQ02" <Stacey.E.Brown@usace.army.mil>, "Rodriguez, Osvaldo SAJ" <Osvaldo.Rodriguez@usace.army.mil>, "Spinning, Jason J SAJ" <Jason.J.Spinning@usace.army.mil>, "Verhagen, Joelle SAJ" <Joelle.L.Verhagen@usace.army.mil>, "Bronson, Candida K SAJ" <Candida.K.Bronson@usace.army.mil>, "Stratton, Terry D SAD" <Terry.D.Stratton@usace.army.mil>
Date: 11/27/2012 11:04 AM
Subject: Canaveral Harbor Final EA - follow up to EPAs comment - Canaveral ODMDS capacity (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Mr. McArthur,

The Jacksonville District has provided a response to your open comment on the Canaveral Harbor Final Environmental Assessment (see below). As discussed in the response, per a telephone conversation yesterday we feel that the comment has been sufficiently addressed and that this comment can be closed. If you concur, USACE would greatly appreciate acknowledgement by memorandum or email if you prefer.

In an email dated November 26, 2012 from Ms. Beth Walls, Environmental Protection Agency (EPA) Region 4, NEPA Program Office, EPA has an outstanding comment to the Final Environmental Assessment (EA) for improvements to the existing Federal Navigation Project at Port Canaveral, Brevard County, Florida. Per Ms. Wall's email, Mr. Christopher McArthur, EPA, Region 4, Wetlands & Marine Regulatory Section, was concerned the Final EA did not specifically address their concerns regarding the need for an assessment of the proposed action's impacts upon the long-term capacity of the Canaveral Ocean Dredged Material Disposal Site (ODMDS). Mr. McArthur authored the Region's ODMDS comments to the Draft EA contained in their letter dated 09 June 2012.

EPA Comment: "According to the 2012 Site Management and Monitoring Plan (SMMP), which is not discussed in the draft EA, the 10 year projected capacity should not exceed half the estimated remaining site capacity. The draft EA indicates the ten-year projected volume (9.75 million cy) including the proposed action and its associated additional maintenance dredging exceeds half of the remaining estimated capacity (18.4 million cy). Consequently, the 2012 SMMP requires an assessment of the proposed action's impacts upon the ODMDS' capacity requirements."

The following was provided as a response to EPA comment in the Final EA:

"The recommended plan estimates an initial new work placement of 3.1 MCY in the ODMDS. This volume has been addressed in the approved February 2012 Canaveral Harbor ODMDS SMMP Table 3 Projected Volume of Dredged Material Disposed in the Canaveral Harbor ODMDS (10 year) within Table 4 Capacity Estimate Based on Existing Bathymetry and a Minimum Allowance Depth of -40 feet (MLLW). The SMMP states "Until the capacity of the ODMDS has been determined utilizing USACE approved models, use of the ODMDS should not exceed half the estimated remaining site capacity (9.2 million cubic yards). This will allow sufficient time for a more detailed assessment of the site capacity, implementation of management options, or environmental studies for site expansion to be conducted if necessary without adversely impacting maintenance dredging at the Port. Based on the current estimates, exceedence of this volume is not anticipated. Should the approval of any project cause the exceedence of this value, an analysis of the remaining capacity of the ODMDS will have to be conducted by the USACE or permit applicant, as the case may be, prior to approval of ocean disposal of the project. The analysis should demonstrate that more than half the remaining capacity will not be consumed within the next 10 years from the date of the analysis." The 3.1 MCY new works dredging placement has been included for planning purposes in the approved SMMP. The estimate of the annual maintenance dredging volumes of the civil and military portions of the harbor would exceed half of the remaining estimated ODMDS site capacity by approximately 3%. It is recommended that the requested disposal assessment request be deferred until after initial placement of the new work material for the following reasons: (1) Recently constructed structural improvements to the harbor jetties, along with the recent installation of the harbor entrance sediment trap and projected alternative beneficial uses of dredged material are expected to continue to establish the downward trend in annual disposal volumes to the ODMDS, and (2) Bathymetric surveys after the new work placement will provide accurate baseline conditions for the assessment."

Per conversation on 26 Nov 2012 between CESAJ-PD-EC and Mr. McArthur, and in response to EPA's email comment to the Final EA for Port Canaveral, CESAJ reiterates its commitment to conduct a capacity study at the Canaveral ODMDS. Per the current Canaveral ODMDS 2012 Site Management and Monitoring Plan (SMMP), use of the Canaveral ODMDS should not exceed half the estimated remaining site capacity until the capacity of the Canaveral ODMDS has been determined utilizing USACE approved models. Half of the estimated remaining site capacity, approximately 9.2 million cubic yards, equates to approximately ten years of use for new work and maintenance materials when considering the Port of Canaveral, the U.S. Navy, and USACE projects. USACE will initiate a modeling study during FY13 to verify future capacity beyond 10 years and to ensure future use of the site. This action (the modeling study) is separate from the Canaveral Harbor project and the Canaveral Port.

Thank you,
Eddie Douglass
Coastal/Navigation Planning
Jacksonville District

Classification: UNCLASSIFIED
Caveats: NONE

-----Original Message-----
From: Mcarthur.Christopher@epamail.epa.gov [mailto:Mcarthur.Christopher@epamail.epa.gov]

Sent: Monday, December 03, 2012 5:24 PM
To: Douglass, Edward C SAJ
Cc: Walls.Beth@epamail.epa.gov; Bronson, Candida K SAJ; Spinning, Jason J SAJ; LaDart, Jeremy HQ; Savinon, Joana M SAJ; Verhagen, Joelle SAJ; Rodriguez, Osvaldo SAJ; Bee, Patricia L HQ02; Brown, Stacey E HQ02; Stratton, Terry D SAD
Subject: Re: Canaveral Harbor Final EA - follow up to EPAs comment - Canaveral ODMDS capacity (UNCLASSIFIED)

Mr. Douglas,

Thank you for your response to our comments. I apologize for missing the USACE response to EPA's comments regarding this issue in the appendix to the Final EA. I am confused as to the proposed resolution of this issue. The response in the Final EA states "the requested disposal assessment request be deferred until after initial placement of the new work material." However, your email goes on to state "USACE will initiate a modeling study during FY13 to verify future capacity beyond 10 years and to ensure future use of the site." Is the USACE proposing to conduct the modeling in FY13 or following the initial disposal of the new work material or both?

Additionally, as I discussed with Jason Spinning last week, there are both MPRSA and NEPA issues in question. From a MPRSA and ODMDS site management perspective, conducting the modeling separate from the EA is not an issue. Under MPRSA, our concern is that the SMMP be implemented and site capacity be assessed. We believe that it would be best to conduct this prior to the deepening project so that changes in the disposal scheme could be implemented if warranted. If this is your planned approach, then as I discussed with Mr. Spinning, we concur. Regarding NEPA, we believe that impacts of dredged material disposal, including to the capacity of the disposal sites, should be evaluated as part of the Environmental Assessment of the construction project. If the modeling will be done at a later date we recommend that the EA be finalized or supplemented at that time.

Please clarify the time frame for implementing the modeling and any plans for finalizing or supplementing the EA in the future.

Thank you,

- Chris McArthur, Ocean Disposal Program
- Beth Walls, NEPA

From: "Douglass, Edward C SAJ" <Edward.C.Douglass@usace.army.mil>
To: Christopher McArthur/R4/USEPA/US@EPA
Cc: "Spinning, Jason J SAJ" <Jason.J.Spinning@usace.army.mil>, "Rodriguez, Osvaldo SAJ" <Osvaldo.Rodriguez@usace.army.mil>, "Ross, Steven R SAJ" <Steven.R.Ross@usace.army.mil>, "Bronson, Candida K SAJ" <Candida.K.Bronson@usace.army.mil>, "Verhagen, Joelle SAJ" <Joelle.L.Verhagen@usace.army.mil>
Date: 12/07/2012 11:01 AM
Subject: FW: Canaveral Harbor Final EA - follow up to EPAs comment - Canaveral ODMDS capacity (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Mr. McArthur,

Mr. Jason Spinning has provided the following response to the ongoing concern for the ODMDS in the Canaveral Harbor project. I hope this clarifies our responses so far and gives additional confidence that the modeling of the site capacity will take place and satisfy the EPA concern. Please let us know if this satisfies your comment so we can classify it as closed. If you feel that any language needs to be added to the feasibility report or the associated EA, please let us know. The Corps currently feels that the issue is satisfied outside the realm of the subject project and can be handled as such.

Thank you,
Eddie Douglass
Coastal/Navigation Planning

Team,

The NEPA document for Canaveral Harbor 203 was generated and evaluates the effects of the proposed project upon the human environment. Like any feasibility study, scientific judgment, experience, and all other pertinent data sources are compiled to ensure that decision makers have the appropriate information to take a federal action. This particular federal action is a decision to authorize an expansion to the Canaveral Harbor Federal Civil Works project.

The EA and FONSI for Canaveral Harbor 203 were based on the premise that sufficient capacity for disposal exists. The NEPA process allows for public review and comment. During that comment period, EPA provided their concerns for capacity within the existing Canaveral ODMDS to handle not just the continued maintenance of the existing project but also the new construction material and its maintenance. Once this comment from EPA was received, the Corps re-evaluated the capacity issue and concluded that though the concern has merit, it did not affect the outcome already described in the NEPA document.

The Corps also learned that it had promised the capacity modeling nearly 10 years ago and will honor that commitment to model the ODMDS in FY13. This is an entirely separate issue and one that will not delay the current Feasibility Study and NEPA process. The Corps has confidence that any modeling would conclude capacity is currently available and as such, will not lend to any different outcome in the NEPA determination of effects. Future expansion projects or unexpected capacity modeling results would be appropriately evaluated with respect to NEPA at that time.

Sincerely,

Jason Spinning
Chief, Coastal Section
Environmental Branch

Planning & Policy Division
USACE, Jacksonville District
Phone: 904-232-1231
Cell: 904-502-3218

-----Original Message-----
From: Mcarthur.Christopher@epamail.epa.gov [mailto:Mcarthur.Christopher@epamail.epa.gov]
Sent: Friday, December 07, 2012 5:51 PM
To: Douglass, Edward C SAJ
Cc: Bronson, Candida K SAJ; Spinning, Jason J SAJ; Verhagen, Joelle SAJ; Rodriguez, Osvaldo SAJ; Ross, Steven R SAJ; Derby.Jennifer@epamail.epa.gov; Walls.Beth@epamail.epa.gov
Subject: Re: FW: Canaveral Harbor Final EA - follow up to EPAs comment - Canaveral ODMDS capacity (UNCLASSIFIED)

Mr. Douglas:

Yes, this clarifies your response and we are satisfied with the proposed approach but not how it is currently reflected in the EA. Our preference would be to incorporate this response into Section 7.2.2 of the EA with the discussion of the ODMDS. Alternatively, it could be included as a final response to comment as an appendix to the EA (note the current EA only contains draft responses and the USACE's response is not consistent with what you have stated below). If neither of these approaches is used, it is unclear as to how this response will be incorporated into the environmental documentation and record for this project and how EPA's comment has been addressed.

Sincerely,

Chris McArthur

Christopher J. McArthur, P.E.
Environmental Engineer, Ocean Dumping Program Coordinator U.S. Environmental Protection Agency Region 4 Wetlands & Marine Regulatory Section
61 Forsyth Street, SW
Atlanta, GA 30303
Phone: (404) 562-9391, Fax: (404) 562-9343
email: mcarthur.christopher@epa.gov
http://www.epa.gov/region4/water/oceans/

From: "Douglass, Edward C SAJ" <Edward.C.Douglass@usace.army.mil>
To: Christopher McArthur/R4/USEPA/US@EPA
Cc: "Bronson, Candida K SAJ" <Candida.K.Bronson@usace.army.mil>, "Spinning, Jason J SAJ" <Jason.J.Spinning@usace.army.mil>, "Verhagen, Joelle SAJ" <Joelle.L.Verhagen@usace.army.mil>, "Rodriguez, Osvaldo SAJ" <Osvaldo.Rodriguez@usace.army.mil>, "Ross, Steven R SAJ" <Steven.R.Ross@usace.army.mil>, Jennifer Derby/R4/USEPA/US@EPA, Beth Walls/R4/USEPA/US@EPA
Date: 12/13/2012 05:05 PM

Subject: RE: FW: Canaveral Harbor Final EA - follow up to EPAs comment - Canaveral ODMDS capacity (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Mr. McArthur,

In response to your email below, it has been decided that the discussion on the ODMDS will be included as a final response to comment as an appendix to the EA as proposed in your email. In addition to the discussion, these emails will be included as documentation of the EPA comment and the response.

I hope that this satisfies EPA's concerns and we can formally close this comment.

Thank you,
Eddie Douglass
Coastal/Navigation Planning

-----Original Message-----
From: Mcarthur.Christopher@epamail.epa.gov [mailto:Mcarthur.Christopher@epamail.epa.gov]
Sent: Thursday, December 13, 2012 5:09 PM
To: Douglass, Edward C SAJ
Cc: Walls.Beth@epamail.epa.gov; Derby.Jennifer@epamail.epa.gov
Subject: RE: FW: Canaveral Harbor Final EA - follow up to EPAs comment - Canaveral ODMDS capacity (UNCLASSIFIED)

Yes, thank you.

Christopher J. McArthur, P.E.
Environmental Engineer, Ocean Dumping Program Coordinator U.S. Environmental Protection Agency
Region 4 Wetlands & Marine Regulatory Section
61 Forsyth Street, SW
Atlanta, GA 30303
Phone: (404) 562-9391, Fax: (404) 562-9343
email: mcarthur.christopher@epa.gov
http://www.epa.gov/region4/water/oceans/

SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE

TRIBAL HISTORIC
PRESERVATION OFFICE
SEMINOLE TRIBE OF FLORIDA
AH-TAH-THI-KI MUSEUM
30290 JOSIE BILLIE HWY
PMB 1004
CLEWISTON, FL 33440
PHONE: (863) 983-6549
FAX: (863) 902-1117

TRIBAL OFFICERS
CHAIRMAN
JAMES E. BILLIE
VICE CHAIRMAN
TONY SANCHEZ, JR.
SECRETARY
PRISCILLA D. SAYEN
TREASURER
MICHAEL D. TIGER

Jason Spinning
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

THPO#: 009850

May 9, 2012

Subject: Assessment of Effects for the Notice of Availability of the Integrated Section 203 Report and Draft Environmental Assessment for the Port Canaveral Navigation Project in Brevard County, Florida

Dear Mr. Spinning,

The Seminole Tribe of Florida's Tribal Historic Preservation Office (STOF-THPO) has received the public notice provided by the Corps of Engineers concerning the aforementioned project. The STOF-THPO has no objection to your proposal at this time. However, the STOF-THPO requests to be notified if cultural resources which are potentially ancestral or historically relevant to the Seminole Tribe of Florida are discovered at any point during the proposed project. We thank you for the opportunity to review the information that has been sent to date regarding this project. Please reference ***THPO-009850*** for any related issues.

We look forward to working with you in the future.

Sincerely,

Paul N. Backhouse, Ph.D.
Acting Tribal Historic Preservation Officer
Seminole Tribe of Florida

Direct routine inquiries to:
Anne Mullins
Compliance Review Supervisor
annemullins@semtribe.com

ETY:am:pb

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
(727) 824-5317; FAX (727) 824-5300
http://sero.nmfs.noaa.gov/

June 13, 2012 F/SER47:GG/pw

(Sent via Electronic Mail)

Colonel Alfred Pantano, Commander
Jacksonville District, Corps of Engineers
Regulatory Division, North Permits Branch
P.O. Box 4970
Jacksonville, Florida 32232-0019

Attention: Jason Spinning

Dear Colonel Pantano:

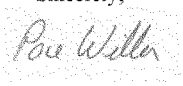
NOAA's National Marine Fisheries Service (NMFS) reviewed the Notice of Availability (dated April 10, 2012), Integrated Section 203 Report and Draft Environmental Assessment (dated March 2012), and draft Finding of No Significant Impact (attached to the Notice of Availability) for proposed improvements to the federal navigation project at Port Canaveral, Brevard County. In November 2011, the Jacksonville District provided NMFS with an essential fish habitat (EFH) assessment dated March 2008 for the project. The proposed work consists of widening from 400 feet to 500 feet the main ship channel from the harbor entrance inland to the West Turning Basin and West Access Channel. In addition to widening, deepening of the federal channel and expansion of turning basins is proposed for several reaches. The dredged material would be placed in the Canaveral Ocean Dredged Material Disposal Site (ODMDS). The Jacksonville District's initial determination is the proposed expansion of Port Canaveral would not have a substantial adverse impact on EFH or federally managed fisheries. As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, we concur with the Jacksonville District's determination and offer the following comments and recommendations pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

The EFH assessment adequately describes EFH and federally managed fishery species in the project area. No impacts to seagrass or coral are proposed and the impacts to hardbottom would be limited to replacement of riprap. The sediments that would be dredged are mostly sand, dredging operations would use best management practices to maintain compliance with State Water Quality Standards, and disposal at the Canaveral ODMDS would be in accordance with the site's approved management plan. Dredging is expected to require seven months and is scheduled for mid-October 2012 through mid-May 2013. While the Jacksonville District has not committed to using a particular type of dredge, the District notes only clamshell dredges have been used for the port's federal project for many years, except when emergency conditions are present, in which case a hopper dredge has been used.

Based on the information provided, NMFS concludes the project would not adversely impact EFH and no EFH conservation recommendations are provided. NMFS may provide EFH conservation recommendations in the future based on new information or changes in the project design that show adverse impacts would occur to EFH or federally managed fishery species.

Thank you for providing the opportunity to comment on this project. Please direct related questions or comments to the attention of Mr. George Getsinger, at our St Augustine Office. He can be reached at 9741 Ocean Shore Blvd, St. Augustine, Florida 32080, (904) 461-8674, or by email at George.Getsinger@noaa.gov.

Sincerely,



/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc:

CESAJ, Paul.E.Stodola@usace.army.mil
CESAJ, Jason.J.Spinning@usace.army.mil
CESAJ, Aubree.G.Hershorin@usace.army.mi
EPA, Eric.H.Hughes@usace.army.mil
FWS, John_Milio@fws.gov
SAFMC, Roger.Pugliese@safmc.net
FDEP, Martin.Seeling@dep.state.fl.us
F/SER4, David.Dale@noaa.gov
F/SER47, George.Getsinger@noaa.gov

United States Department of the Interior
U. S. FISH AND WILDLIFE SERVICE
7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:
FWS Log Nos. 41910-2012-I-0102/2012-CPA-0009

June 29, 2012

Mr. Eric Summa, Chief
Planning Division, Environmental Branch
Department of the Army
Jacksonville District Corps of Engineers
PO Box 4970
Jacksonville, Florida 32232-0019
(Attn: Aubree Hershorin)

Re: Review of Biological Assessment (BA): Port Canaveral Navigation Improvements Project, Brevard County, Florida

Dear Mr. Summa:

Our office has reviewed subject BA originally submitted submitted by the U.S. Army Corps of Engineers, Jacksonville District (USACE), on October 22, 2007, and resubmitted on April 14, 2011 as part of the Port Canaveral, Florida Integrated Section 203 Navigation Study Report and Draft Environmental Assessment. The proposed project involves a number of actions including the deepening and widening of the harbor entrance and exit channel, the main harbor channel waterway, and the Middle and West Turning Basins through dredging and excavation of adjacent uplands. All dredged material will be transported to the nearest Offshore Dredged Material Disposal Site located south of Port Canaveral. Excavated material will be stored and used on-site, and/or taken off-site for disposal or use as appropriate. We provide the following comments in accordance with section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 *et seq.*), and Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*).

Endangered Species Act

The proposed work occurs within the range of the West Indian (Florida) manatee (*Trichechus manatus latirostris*), and Eastern indigo snake (*Drymarchon corais couperi*). It is adjacent to beaches and dunes supporting nesting and hatchling loggerhead (*Carretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), Kemp's ridley (*Lepidochelys kempii*), and hawksbill (*Eretmochelys imbricata*) sea turtles, and the southeastern beach mouse (*Peromyscus polionotus nivieventris*).

The USACE made determinations of effect for the manatee and Eastern indigo snake. The USACE determined that by including the Standard Manatee Conditions for In-water Work, and the Standard Protection Measures for the Eastern Indigo Snake, the proposed deep draft

navigation improvements were not likely to adversely affect these species. No determinations of effect were made for nesting and hatchling sea turtles or the southeastern beach mouse.

We concur with the determination of effects for the Eastern indigo snake, and USACE's agreement to incorporate the standard protection measures into the project plans and specifications for terrestrial impacts associated with the proposed work. The measures can be viewed at our office website, http://www.northflorida.fws.gov. A copy of these measures is enclosed (enclosure 1).

We do not agree that the standard manatee conditions alone are sufficient to reduce the probability of adverse effects to manatees from clamshell dredging to insignificant or discountable levels. Manatees regularly occur within Port Canaveral, and are abundant there during spring, summer, and fall. Significantly fewer animals generally have been recorded during winter months, though their frequency of occurrence is greater during winters with above average temperatures. They readily use the Canaveral Lock to transit between the Port and water bodies west of the lock. They have been observed in the immediate vicinity of a clamshell dredge with its bucket in an aerial position and dripping water. This occurrence may be the result of their often observed behavior of orienting to similar inputs. Animals have been observed drinking freshwater from such sources, so the sound of dripping water appears to be a cue that attracts animals. There has been one documented instance of a manatee mortality resulting from mechanical dredging. The incident occurred within the Miami River in 2011 from work that was not a USACE civil works project. The specific circumstance of that mortality has not been determined.

The historic dredging, both new and maintenance, that has occurred within Port Canaveral has been accomplished primarily by mechanical means, and more specifically by clamshell dredge. As a result of the recognition of the risk this operation poses to manatees, the most recent maintenance dredging of Port Canaveral conducted by the USACE that included nighttime clamshell dredging contained specific conditions intended to address the potential impacts from that work to manatees. In addition, similar conditions were included in both USACE and Florida Department of Environmental Protection (DEP) permits to allow CPA to conduct clamshell dredging in support of a redesign and new construction of multiple berthing structures within the Port's West Turning Basin.

The proposed navigation improvements call for the dredging/excavation of over 3 million cubic yards of material. Given the likelihood of the use of mechanical dredging for this work twenty-four hours a day, seven days a week until completion, it is our view that the following protective conditions need to be applied to this work in order to reduce the probability of take of a manatee to insignificant or discountable levels.

1. All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation (75 feet during nighttime operations). Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation (75 feet during nighttime operations), or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation (75 feet during nighttime operations). Animals must not be herded away or harassed into leaving. Any collision with or injury to a manatee shall be reported immediately to the FWC Hotline at 1-888-404-3922. Collision and/or injury should also be reported to the U.S. Fish and Wildlife

Service (FWS) in Jacksonville (1-904-731-3336) and to FWC at ImperiledSpecies@myFWC.com. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities.

2. To reduce the risk of a vessel crushing a manatee, the Permittee shall install and maintain the proposed wharf fenders to provide sufficient standoff space of at least four (4) feet under maximum designed compression. Fenders or buoys providing a minimum standoff space of at least four (4) feet under maximum designed compression shall also be utilized between two vessels that are moored together such as, but not limited to, the mooring of the scow and dredge barges.
3. During clamshell operations, the dredge operator shall gravity-release the clamshell bucket only at the water's surface, and only after confirmation that there are no manatees within the 50-foot safety distance during the day or the 75- foot distance during nighttime operations. The observers shall notify the dredge operator if manatees enter within the designated safety distances.
4. During daylight hours, at least one person shall be designated as a protected marine animal observer when in-water work is being performed. During nighttime hours, at least two people shall be designated as protected marine animal observers. Designated observers shall have appropriate qualifications and observation experience. Appropriate experience shall be demonstrated by a minimum of 100 hours of documented experience as an approved FWS or FWC observer that has monitored marine animals and their behaviors in association with in-water construction projects. No later than 15 calendar days prior to the commencement of each dredging event, the Permittee shall ensure that the names, contact information, and experience has been submitted to the FWS at jaxregs@fws.gov. The protected marine animal observer must be on site during all in-water construction activities and shall advise personnel to cease operation upon sighting a manatee within 50 feet of any in-water construction activity (75 feet for nighttime operations).
5. All observers shall maintain a daily log that details sightings, collisions, or injuries to protected marine animals, as well as project specific information such as work itinerary, weather, work shutdowns, observer shift changes, etc. In regard to manatee behavior, the observers shall also log time of observation, estimated distance of manatees from the dredge, type of behavior (such as passing through, pausing in the vicinity of the project, interacting with the dredge, scows, tugs, etc., attracted to running or dripping water), detection method (i.e., unaided visual, infrared, light intensification equipment, etc) and whether the dredge is operating at the time of observation. A final report for each dredging event, summarizing all activities noted in the daily observer logs, an assessment and documentation (via photo or digital imagery) of effectiveness of any new technology implemented for observation (such as infrared) and new protocols, the location and name of project, and the dates and times of work shall be submitted within 30 days following project completion. The final report shall be submitted to the FWS at jaxregs@fws.gov
6. From March 1 through November 30, all project lighting east of the port locks shall be limited to the immediate area of active construction only and shall be the minimal lighting necessary to comply with U.S. Coast Guard, USACE and/or OSHA requirements. In order to better observe manatees during nighttime clamshell operations, the Contractor shall use shielded lights to illuminate the water surface for 75 feet around the hoist line (cable attached to bucket). These lights shall be shielded and/or positioned such that they are not visible from any sea turtle nesting beaches

immediately north and south of Port Canaveral. The light intensity shall be a minimum of 54 lux (5 foot candles) at the water surface throughout this illuminated area including the edge. The Contractor shall also have a handheld spotlight with a minimum of 10,000,000 candle power available to better observe manatees outside of this illuminated area. The Contractor shall measure the size of the illuminated area, intensity of the specified illumination, and assess its direct visibility from adjacent beaches, prior to commencement of the project. Prior to commencement of work, USACE shall provide to the FWS at jaxregs@fws.gov written verification from the contractor that the lighting described above conforms to the required specifications. No night-time operations shall commence or continue if one or more of these lighting parameters do not comply with the required specifications.

7. If the dedicated observers determine that detection of manatees during certain weather conditions (i.e., fog, rain, wind, etc.) is not possible, and if other optional technologies, e.g., infrared and/or light intensification equipment, cannot be effectively used to compensate for the loss of visual detection during certain weather (i.e., fog, rain, wind, etc.), then dredging operations shall cease until weather conditions improve and detection is again possible. The observers shall report any issues of non-compliance with the special operating measures to the Permittee and record these instances on their logs.
8. At least 48 hours prior to the commencement of each dredging event, the Permittee shall ensure that notification is sent to the FWS indicating the actual start date and the expected completion date to the FWS at jaxregs@fws.gov.
9. Blasting is prohibited. If no other alternative exists, consultation must be reinitiated

Based on the inclusion of these conditions in the project plans and specifications, we concur that the proposed work is not likely to adversely affect the manatee.

Due to the challenge of observing manatees at night with the unaided eye, additional technologies are available that may, under certain circumstances, enhance an observer's ability to sight manatees during nighttime dredging. As a result, we also request that the USACE, in accordance with Section 7(a)(1) of the Act, include a non-binding Conservation Recommendation to have available night vision technology with infrared light intensification during nighttime clamshell or mechanical dredging as a supplement direct observations. The observers shall, prior to commencement of work, be given operational information and time using the equipment to gain experience with the chosen type(s) of technology. In addition, due to the recent increase in watercraft-related, manatee mortalities in Port Canaveral, we further request the USACE to include a second non-binding Conservation Recommendation to have the Canaveral Port Authority coordinate a review and update of its current Port Protection Plan for the manatee, with our agency and the Florida Fish and Wildlife Conservation Commission with the goal of completing this update no later than March 1, 2013.

The USACE did not include nesting or hatchling sea turtles or the southeastern beach mouse in its biological assessment. Sea turtles nest on beaches immediately north and south of Port Canaveral. The lighting associated with a nighttime clamshell dredge operation has the potential, if directly visible from adjacent beaches, to disorient nesting and hatchling sea turtles. In addition, studies on the Santa Rosa beach mouse in the Florida panhandle have shown how direct lighting can impact beach mouse activity and predation. There are beach mice present

within the dune habitat immediately north of Port Canaveral. Indirect lighting that creates or adds to an existing light glow can have impacts on sea turtles similar to direct lighting. Proposed operation of the dredge within the easternmost section of the port, and westernmost section of the port access channel, has the greatest potential to result in adverse effects to these species. The conditions above afford the extent of protections that in our view is needed to reduce the probability of take of nesting and hatchling sea turtles, as well as the southeastern beach mouse, to insignificant or discountable levels

The USACE has agreed to incorporate these additional conditions into its project plans and specifications, and has determined that by doing so, the proposed project is not likely to adversely affect nesting or hatchling sea turtles or the southeastern beach mouse. We concur with that determination.

Due to the recent and proposed increases in infrastructure and navigation improvements at Port Canaveral, we also request that the USACE include a non-binding Conservation Recommendation to have the Canaveral Port Authority coordinate a review and update of its current Exterior Light Management and Security Awareness Plan for nesting and hatchling sea turtles, with the goal of completing this update by March 1, 2013.

Although this does not represent a biological opinion as described in section 7 of the Act, it does fulfill the requirements of the Act and no further action is required. If modifications are made to the project; if the responsible party fails to comply with the conditions agreed to in the project plans and specifications; if additional information involving potential effects to listed species becomes available; or if unauthorized take of manatee occurs, consultation will be reinitiated.

Fish and Wildlife Coordination Act

We have reviewed the proposed work for impacts to other Federal Trust and natural resources. The proposed dredging will convert some shallow water habitat to deep water, and result in the loss of some disturbed uplands adjacent to the West Turning Basin. We expect that the widening through dredging will be accomplished in a way that will retain some shallow water habitat through gradual sloping that is intended to minimize the rate of sedimentation into the Port Canaveral navigation channel. Likewise, the area at the mouth of the West Turning Basin planned for a combination excavation and dredging is expected to result in the maintenance of shallow sub-littoral habitat. Such sites provide the potential for growth of submerged aquatic vegetation. The hardened shoreline can facilitate the colonization of attached algae, benthic micro and macro invertebrates, and also serve to attract epifauna.

As a result, it is our view that the proposed project will have minor, temporary effects on natural resources, and no significant, long-term effects to other Federal Trust and natural resources will occur. We therefore have no objection to this work.

If you have any questions regarding this response, please contact Mr. John Milio of my staff at the address on the letterhead, by e-mail at john_milio@fws.gov, or by calling 904-731-3098.

Sincerely,

David L. Hankla
Field Supervisor

Encl as:

cc:
Carol Knox/Dr. Robbin Trindell
Fish and Wildlife Conservation Commission
Division of Habitat and Species Conservation
Imperiled Species Management Section
620 South Meridian Street
Tallahassee, Florida 32399

STANDARD PROTECTION MEASURES FOR THE EASTERN INDIGO SNAKE

1. An eastern indigo snake protection/education plan shall be developed by the applicant or requestor for all construction personnel to follow. The plan shall be provided to the Service for review and approval at least 30 days prior to any clearing activities. The educational materials for the plan may consist of a combination of posters, videos, pamphlets, and lectures (*e.g.*, an observer trained to identify eastern indigo snakes could use the protection/education plan to instruct construction personnel before any clearing activities occur). Informational signs should be posted throughout the construction site and contain the following information:

    a. a description of the eastern indigo snake, its habits, and protection under Federal Law;
    b. instructions not to injure, harm, harass or kill this species;
    c. directions to cease clearing activities and allow the eastern indigo snake sufficient time to move away from the site on its own before resuming clearing; and,
    d. telephone numbers of pertinent agencies to be contacted if a dead eastern indigo snake is encountered. The dead specimen should be thoroughly soaked in water, then frozen.

2. Only an individual who has been either authorized by a section 10(a)(1)(A) permit issued by the Service, or designated as an agent of the State of Florida by the Florida Fish and Wildlife Conservation Commission for such activities, is permitted to come in contact with or relocate an eastern indigo snake.

3. If necessary, eastern indigo snakes shall be held in captivity only long enough to transport them to a release site; at no time shall two snakes be kept in the same container during transportation.

4. An eastern indigo snake monitoring report must be submitted to the appropriate Florida Field Office within 60 days of the conclusion of clearing phases. The report should be submitted whether or not eastern indigo snakes are observed. The report should contain the following information:

    a. any sightings of eastern indigo snakes;
    b. summaries of any relocated snakes if relocation was approved for the project (*e.g.*, locations of where and when they were found and relocated);
    c. other obligations required by the Florida Fish and Wildlife Conservation Commission, as stipulated in the permit.

DEPARTMENT OF THE AIR FORCE
45th SPACE WING (AFSPC)

JUN 28 2012

MEMORANDUM FOR US ARMY CORPS OF ENGINEERS, JACKSONVILLE DISTRICT
ATTN: MR. JASON SPINNING (CESAJ-PD-EC)

FROM: 45 SW/CC
1201 Edward H. White II St.
Patrick AFB FL 32925-3299

SUBJECT: Review of Integrated Section 203 Report/EA (your memo, 10 Apr 12)

1. We appreciate the opportunity to formally review the Integrated Section 203 Report and Draft Environmental Assessment (EA) on improvements to the existing Federal Navigation Project at Port Canaveral, FL. Since last summer, we have been working closely with the Canaveral Port Authority (CPA) and your representatives to work issues, initiate government approval processes and provide informal comments relating to this project. Attached are the 45th Space Wing's formal comments to the current 203 Report/EA.

2. We look forward to our continued partnership as this channel widening project moves ahead. Our point of contact for any questions is Mr. Scott Cook, 45 SW/XPE, DSN 854-2377, Scott.Cook@patrick.af.mil.

ANTHONY J. COTTON
Brigadier General, USAF
Commander

Attachment:
45 SW Comments

cc:
45 MSG/CC
45 SW/XP
Canaveral Port Authority

Attachment -- 45th Space Wing Comments to 203 Study for Channel Widening Project

ORG	Page #	Para #	Line #	Comments
45 SW	General			**Comment:** Add in the appropriate location, "A plan will be created by the CPA and/or US Army Corps of Engineers to address how vessel movements in and out of the middle turning basin will be achieved during construction. The 45 SW will request Explosive Site Plan (ESP) approval from the Department of Defense Explosives Safety Board (DDESB) as required to account for any changes in configuration to the channel adjacent to Air Force Property." **Rationale:** Safety and ensuring no impacts to DoD ops
45 SW	General			**Comment:** We are still finalizing a new property boundary survey so the acreage calculations in the report may not be accurate but that can be worked/updated as part of the formal request for use of AF property after funding for the project has been approved. **Rationale:** Current surveys will drive update to report
45 SW	Main Report, p 6-51 Real Estate Plan, p. 4	Para 6.7.3.2. Para 2.2.3		**Comment:** Modify the study/EA language to indicate that "while the USACE upland containment site on the USAF property may be the preferred site for spoil disposal, the USAF has not agreed to use of that area for that purpose and would have to further evaluate that option in light of other competing interests for that same disposal area as well as test results on the composition of the spoil to be disposed of." **Rationale:** Clarification--caveat
45 SW	Engineering Annex; pgs. 56-57	Para 1.8.2. Middle Turning Basin sub-para		**Comment:** Add the following to end of the paragraph, "Work performed near under-channel communications lines, and related communications manholes will require careful coordination with the 45th Space Wing and AT&T to avoid service interruptions. This channel widening project will bear the cost to mitigate, replace, or relocate any impacted federal structure, utilities, or communications infrastructure. **Rationale:** Wing won't be responsible for bearing cost of funding impacts due to project
45 SW	Engineering Annex; pgs. 56-57	Para 1.8.2. Middle Turning Basin sub-para		**Comment:** This same portion of the report does mention the need to comply with the shoreline setback distance required by USAF regulations to the existing Bldg 1064 and the CPA previously produced site sketch showing how that setback distance could be achieved. Since then our regulations have been changed and now require an 86 foot set-back (versus 85 feet as shown in the previous CPA-provided site sketch), measured from the building to the mean high-water mark **Rationale:** Updated requirement

ENVIRONMENTAL ASSESMENT-SPECIFIC COMMENTS				
ORG	Page #	Para #	Line #	Comments
45 SW	1-10	Sec 1.5		**Comment:** The NEPA specific sections are noted with an asterisk. Recommend Chap 5 "Formulation and Evaluation of Alternative Plans" and Chap 8 "Public Involvement, Review, and Consultation" be marked with asterisks as well. **Rationale:** These sections contain NEPA specific information by providing the rationale for selection of alternatives and compliance with public scoping/consultation requirements.
45 SW	Chap 1 & 2	Fig 1-1/ 2-1 and Fig 1-2/ 2-2		**Comment:** The referenced figures are duplicative. **Rationale:** Edit
45 SW	2-4	Sec 2.1.5		**Comment:** The water quality discussion is based on information that is now 6 yrs old, although the section reports that ongoing water quality monitoring is being performed. Recommend updating section to reflect current condition, particularly since that information is presumably available. **Rationale:** NEPA analysis should utilize current available data.
45 SW	2-47	Sec 2.6.1		**Comment:** There is a statement in this section, "Concentrations of metals in the samples were typical of coastal waters, although some concentrations were above those of reference stations (Anamar 2005)" Please indicate the significance of this statement: for example, that regulatory standards were exceeded. **Rationale:** Clarification of statement
45 SW	Chap 5	Sec 5.1.3 and 5.2		**Comment:** Planning Objectives and Plan Formulation Criteria are presented in the referenced sections. Which criteria were used to select the preferred alternative? **Rationale:** Clarification
45 SW	6-5+	Fig 6-1 to 6-3		**Comment:** The legend identifying the alternatives on the figures do not match the names of the alternatives in the text. Recommend not using terms "Plan A" or "Plan B" because the text refers to Plan 1 and Plan 2. Please rectify on the figures which widening plan is Plan 1 and which is Plan 2. **Rationale:** Clarification and edit
45 SW	6-43	Sec 6.7.1		**Comment:** Recommend providing an explanation that the "Recommended Plan" referred to in Sec 6 is equivalent to the "Preferred Alternative" in Sec 7. This provides a link between the formulation of alternatives in Sec 6 and the final alternatives selected to be carried forward for analysis in Sec 7. **Rationale:** Clarification

45 SW	7-7 and 7-12	Sec 7.2.8.2 and 7.2.14.2		**Comment:** Mitigation measures are generally referred to in the text for potential construction effects to sea turtle hatchlings and to offset turbidity. Please specify the specific mitigation measures. **Rationale:** Clarification
45 SW	7-13	Sec 7.2.16.1		**Comment:** There is a statement in this section, "Brevard County is *not* classified by EPA as an attainment/maintenance area…" Should this read "Brevard County is classified by EPA as an attainment/maintenance area…" **Rationale:** Correction
45 SW	7-24	Sec 7.2.35.4		**Comment:** There is a reference to "Section 10 consultation" having been initiated in accordance with the NHPA. Shouldn't this be Sec 106? **Rationale:** Edit
45 SW	General			**Comment:** Recommend chart or table listing permits, licenses, and authorizations that need to be obtained to accomplish the project to ensure compliance with 40 CFR 1502.25 **Rationale:** Clarification
45 SW	General			**Comment:** Occupational safety and health impacts have not been assessed in accordance with 32 CFR 989.27 **Rationale:** Completeness
45 SW	General			**Comment:** Please delete references in the document to the US Air Force being a cooperating agency. **Rationale:** The US Air Force intends to participate in this planning process as a stakeholder.
45 SW	FONSI			**Comment:** The Proposed Action is not specifically defined in the FONSI. Please define the proposed action. **Rationale:** Clarification

U.S. Department of Homeland Security
United States Coast Guard

Commander
United States Coast Guard
Sector Jacksonville

4200 Ocean Street
Atlantic Beach, FL 32233-2416
Phone: (904) 564-7549
FAX: (904) 564-7651

16670
June 21, 2012

U.S. Army Corps of Engineers
Jacksonville District
Attn: Jason Spinning (CESAJ-PD-EC)
P.O. Box 4970
Jacksonville, FL 32232-0019

Dear Mr. Spinning:

Under the Coast Guard's statutory authority provided by the Ports and Waterways Safety Act of 1972, as amended by the Port and Tanker Safety Act of 1978, 33 U.S.C. § 1223, *et seq.*, among other authorities, in an effort to promote navigation, vessel safety, and protection of the marine environment, I have completed a review of the Integrated Section 203 Navigation Study Report and Draft Environmental Assessment (the report) submitted by your office on April 10, 2012. My comments are based on an objective assessment of the project as a whole as it relates to navigation and environmental impact.

Based upon the latest review of the project documents, the Coast Guard's formal comments are as follows:

a. Impact to Federal Aids to Navigation

Table 6-35, Volume 1 of the report reflects that $2.75M for Aids to Navigation is to be "provided and funded by the United States Coast Guard". Given the current federal fiscal environment, it is difficult to predict the Coast Guard's resource availability to begin work related to this project. All plans should be forwarded to Coast Guard District Seven Waterways Management Division for comprehensive review and determination of existing and proposed ATON, current cost estimating, construction planning, environmental review, funding determination and consideration for adding two proposed outbound range structures. The Coast Guard reserves the right to final approval under the authority outlined above.

b. Coast Guard Base Canaveral Property

Table 6-3, Volume 1 of the report reflects a future North Cargo Pier (NCP) 7, which would require the relocation of Coast Guard Station Port Canaveral. In an e-mail dated 24 June 2011, between Port Canaveral CEO Stan Payne and Mr. Michael Lesinski of the Coast Guard's Civil Engineering Unit Miami; Mr. Payne noted that the cost of relocating Coast Guard Station Port Canaveral would clearly outweigh the benefits. As a matter of closure the report should explicitly state that none of the report's findings are predicated on the relocation of Coast Guard Station Port Canaveral.

16670
June 21, 2012

If you have any questions, my point of contact is Lieutenant Steve Elliott who may be reached at (321) 784-6781.

Sincerely,

T. G. ALLAN, JR.
Captain, U. S. Coast Guard
Captain of the Port
Jacksonville, Florida

Copy: Canaveral Port Authority
US Air Force, 45th Space Wing
Commanding Officer, Naval Ordnance Test Unit Port Canaveral
Canaveral Pilots Association
Commander, Coast Guard District Seven (dl), (dp), (dpw)
Commander, Coast Guard Civil Engineering Unit Miami
Supervisor, Coast Guard Marine Safety Detachment Port Canaveral
Commanding Officer, Coast Guard Station Port Canaveral

Florida Department of Environmental Protection
Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinyard Jr.
Secretary

June 19, 2012

Dr. Aubree G. Hershorin, Biologist
Planning and Policy Division
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, FL 32232-0019

RE: Department of the Army, Jacksonville District Corps of Engineers
Canaveral Harbor Integrated Section 203 Navigation Study Report and Draft Environmental Assessment - Cape Canaveral, Brevard County, Florida.
SAI # FL201204206200C (Reference Previous SAI # FL200703223171C)

Dear Dr. Hershorin:

The Florida State Clearinghouse has coordinated a review of the Draft Environmental Assessment (EA) under the following authorities: Presidential Executive Order 12372; § 403.061(42), *Florida Statutes* (*F.S.*); the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. §§ 4321-4347, as amended.

The Florida Fish and Wildlife Conservation Commission (FWC) has provided a number of comments and recommended conservation measures related to potentially affected state- and federally listed fish and wildlife resources. The following revisions to the Final EA are recommended:

- Update the North Atlantic Right Whale sightings, vessel collision incidents and disposal ship transit timing and number data.
- Add the FWC's suggested conservation measures for right whales to address potential impacts.
- Update and clarify the Florida manatee mortality data, maps and discussion.
- Modify references to the Brevard County Manatee Protection Plan, as suggested.
- Update the Port Canaveral lock facility manatee sighting and mortality data.
- Include the revised, edited 2012 *Standard Manatee and Marine Turtle Construction Conditions for In-Water Work* and U.S. Fish and Wildlife Service's new manatee protection measures.
- Follow the FWC *Gopher Tortoise Permitting Guidelines* (Revised November 2011) to avoid, minimize and mitigate the potential impacts of construction activities.

Please refer to the enclosed FWC letter and contact Ms. Mary Duncan at (850) 922-4330 or Mary.Duncan@MyFWC.com for further information.

The Florida Department of Environmental Protection (DEP) states that its Central District Office in Orlando should be contacted for permitting construction of any new or modified docks and any upland construction projects requiring stormwater management. Widening or deepening of the navigation channels or turning basins would be permitted through the DEP's Bureau of Beaches and Coastal Systems (BBCS). BBCS staff notes that because the proposed dredging project will take place primarily within the port, the entrance channel improvements will not affect the current sand-bypassing protocol to benefit down-drift beaches. Although the project lies outside the Banana River Aquatic Preserve and Merritt Island National Wildlife Refuge, if the restricted mixing zone extends into the boundaries of those Outstanding Florida Waters, the project will be subject to anti-degradation permitting requirements of Rule 62-4.242, *Florida Administrative Code*. Please contact Ms. Kimberly Eisele in the Central District Office at (407) 897-2950 or Ms. Roxane Dow in the BBCS at (850) 922-7852 for additional information and assistance.

Based on the information contained in the Draft EA and the enclosed state agency comments, the state has determined that, at this stage, the proposed federal activity is consistent with the Florida Coastal Management Program (FCMP). To ensure the project's continued consistency with the FCMP, the concerns identified by reviewing agencies must be addressed prior to project implementation. The state's continued concurrence will be based on the activity's compliance with FCMP authorities, including federal and state monitoring of the activity to ensure its continued conformance, and the adequate resolution of the issues identified during this and subsequent reviews. The state's final concurrence of the project's consistency with the FCMP will be determined during the environmental permitting process in accordance with Section 373.428, *F. S.*

Thank you for the opportunity to review the draft EA. Should you have any questions regarding this letter, please contact Ms. Suzanne E. Ray at (850) 245-2172.

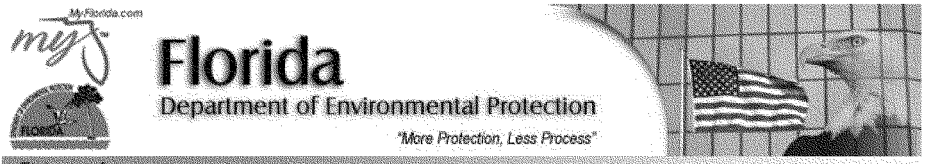
Yours sincerely,

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/ser
Enclosures

cc: Lu Burson, DEP Central District
Roxane Dow, DEP BBCS
Becky Prado, DEP CAMA
Scott Sanders, FWC

Florida State Clearinghouse



Project Information	
Project:	FL201204206200C
Comments Due:	06/01/2012
Letter Due:	06/19/2012
Description:	DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - CANAVERAL HARBOR INTEGRATED SECTION 203 NAVIGATION STUDY REPORT AND DRAFT ENVIRONMENTAL ASSESSMENT - CAPE CANAVERAL, BREVARD COUNTY, FLORIDA.
Keywords:	ACOE - CANAVERAL HARBOR SECTION 203 NAVIGATION STUDY REPORT/DEA - BREVARD CO.
CFDA #:	12.107

Agency Comments:

ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

The DEP states that its Central District Office in Orlando should be contacted for permitting construction of any new or modified docks and any upland construction projects requiring stormwater management. Widening or deepening of the navigation channels or turning basins would be permitted through the DEP's Bureau of Beaches and Coastal Systems (BBCS). BBCS staff notes that because the proposed dredging project will take place primarily within the port, the entrance channel improvements will not affect the current sand-bypassing protocol to benefit down-drift beaches. Although the project lies outside the Banana River Aquatic Preserve and Merritt Island National Wildlife Refuge, if the restricted mixing zone extends into the boundaries of those Outstanding Florida Waters, the project will be subject to anti-degradation permitting requirements of Rule 62-4.242, F.A.C. Please contact Ms. Kimberly Eisele in the Central District Office at (407) 897-2950 or Ms. Roxane Dow in the BBCS at (850) 922-7852 for additional information and assistance.

STATE - FLORIDA DEPARTMENT OF STATE

No Comment/Consistent

ST. JOHNS RIVER WMD - ST. JOHNS RIVER WATER MANAGEMENT DISTRICT

The project appears to be under the ERP permitting jurisdiction of the Florida Department of Environmental Protection, pursuant to the Operating Agreement Concerning Regulation Under Part IV, Chapter 373, F.S., Between St. Johns River Water Management District and Department of Environmental Protection (section II.A.1.n.). According to the agreement, DEP has jurisdiction on seaports and adjacent seaports related development where the applicant or property owner is a port authority. If there are any questions, please contact Ms. Susan Moor, Supervising Regulatory Scientist, in the Palm Bay Service Center at (321) 676-6626 or smoor@sjrwmd.com.

FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

The FWC has provided a number of comments and recommended conservation measures related to potentially affected state- and federally listed fish and wildlife resources. The following revisions to the Final EA are recommended: update the North Atlantic right whale sighting, right whale-vessel collision incidents and disposal ship transit timing and number data; add the suggested conservation measures for right whales to address potential impacts; update and clarify the Florida manatee mortality data, maps and discussion; modify references to the Brevard County Manatee Protection Plan; update the Port Canaveral lock facility manatee sighting and mortality data; include the revised 2012 Standard Manatee and Marine Turtle Construction Conditions for In-Water Work and U.S. Fish and Wildlife Service's new manatee protection measures; and follow the FWC Gopher Tortoise Permitting Guidelines (Revised November 2011) to avoid, minimize and mitigate the potential impacts of construction activities.

E. CENTRAL FL RPC - EAST CENTRAL FLORIDA REGIONAL PLANNING COUNCIL

The East Central Florida Regional Planning Council has received notice of the Canaveral Harbor Integrated Section 203 Navigation Study Report and Draft Environmental Assessment. Council staff has not identified any significant or adverse effects to regional resources or facilities, nor have any extra-jurisdictional impacts been identified that would adversely affect neighboring jurisdictions. Multiple biodiversity hot spots appear to be within the project site as represented in the Natural Resources of Regional Significance (NRORS) datasets identified in the agency's Strategic Regional Policy Plan (ECF 2060 Plan). It is recommended that proper environmental impact studies and wildlife mitigation plans are implemented prior to project construction. The proposed project is found to be consistent with the goals, policies, and objectives of the East Central Florida Regional Planning Council.

BREVARD -

Florida Fish and Wildlife Conservation Commission

Commissioners
Kathy Barco
Chairman
Jacksonville

Kenneth W. Wright
Vice Chairman
Winter Park

Ronald M. Bergeron
Fort Lauderdale

Richard A. Corbett
Tampa

Aliese P. "Liesa" Priddy
Immokalee

Charles W. Roberts III
Tallahassee

Brian S. Yablonski
Tallahassee

Executive Staff
Nick Wiley
Executive Director

Greg Holder
Assistant Executive Director

Karen Ventimiglia
Chief of Staff

Office of the
Executive Director
Nick Wiley
Executive Director

(850) 487-3796
(850) 921-5786 FAX

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

620 South Meridian Street
Tallahassee, Florida
32399-1600
Voice: (850) 488-4676

Hearing/speech-impaired:
(800) 955-8771 (T)
(800) 955-8770 (V)

MyFWC.com

June 15, 2012

Ms. Lauren P. Milligan
Department of Environmental Protection
Florida State Clearinghouse
3900 Commonwealth Boulevard, M.S. 47
Tallahassee, FL 32399-3000
Lauren.Milligan@dep.state.fl.us

RE: SAI #FL201204206200C, Canaveral Harbor Integrated Section 203 Navigation Study Report and Draft Environmental Assessment, Department of the Army, Jacksonville District Corps of Engineers, Cape Canaveral, Brevard County

Dear Ms. Milligan:

Florida Fish and Wildlife Conservation Commission (FWC) staff has reviewed the Canaveral Harbor Integrated Section 203 Navigation Study Report and the Draft Environmental Assessment (DEA) in accordance with the National Environmental Policy Act and the Coastal Zone Management Act/Florida Coastal Management Program (CZMA/FCMP). This review constitutes our preliminary assessment of the above-referenced U.S. Army Corps of Engineers (USACE) project to identify additional information that may be needed to offset potential fish and wildlife impacts associated with the project. In this regard, we provide the following comments and recommendations for your consideration.

Project Description

The Canaveral Port Authority (CPA), under the authority granted by Section 203 of the Water Resources Development Act, has conducted a feasibility study for deepening and widening the channels, wideners and turning basins at Port Canaveral to accommodate cruise ship fleets and to allow passage of deeper draft cargo vessels within the Port. As part of their review, the Jacksonville District U.S. Army Corps of Engineers (Corps) submitted an Integrated Section 203 Navigation Study Report and Draft Environmental Assessment for agency and public review and comment.

The recommended actions include widening the main ship channel from 400 feet to 500 feet, expanding the West Turning Basin from 1,400 feet to 1,725 feet, and deepening fourteen channel segments [Outer Reach Cuts 1, 1A and 1B, US NAVY turn Widener, Civil Turn Widener, New 203 Turn Widener, Middle Reach, Trident Access Channel and Trident Basin, Inner Reach, Cuts 2 and 3, Middle Turning Basin, West Access Channel (east of Station 260+00), West Turning Basin, and West Access Channel (west of Station 260+00)].

The construction timeframe is estimated to be 400 days or approximately 14 months and involves both marine and upland environments. The dredging operation will consist of clamshell bucket dredge(s) and bottom dumping scows for Canaveral Ocean Dredged Material Disposal Site (ODMDS) disposal. The preferred alternative includes the dredging or excavation of an estimated 4,271,000 cubic yards of material of which

3,110,057 cubic yards will be dredged from the existing and proposed navigational channel. All but 455,000 cubic yards is identified for uplands or offshore disposal. If suitable material is found below -13 feet Mean Lower Low Water (MLLW), it would be placed in an authorized nearshore disposal area.

Potentially Affected Resources and Recommended Conservation Measures

Work associated with the Port expansion, including upland excavation, marine dredging, vessel operations and offshore placement activities, has the potential to adversely affect state and federally protected fish and wildlife resources; however, the potential adverse impacts associated with this work should be adequately offset with additional, appropriate conservation measures.

Based on FWC's review, we offer the comments on the Draft EA as well as recommended additional conservation measures related to potentially affected state- and federally listed fish and wildlife resources:

North Atlantic Right Whale

Page 2-68 of the draft EA includes right whale sighting data for "Offshore surveys flown off the coast of Florida and southeastern Georgia from 1996 to 2001…". This information appears outdated and corresponds to sightings at more than 30 nautical miles offshore, which is not relevant for the project at Port Canaveral. Aerial surveys have been conducted near Port Canaveral since 2001 and these surveys are available from the North Atlantic Right Whale Consortium (http://www.narwc.org). We recommend updating right whale sighting data, as appropriate for this area, in the Final EA.

Page 2-68 also includes the statement "there have been few incidences of right whale-ship incidents along the Florida Atlantic coast, with none being reported as far south as Brevard County." This statement should be corrected to reflect that there have been three reported whale-vessel incidents involving five different vessels directly off Port Canaveral (unpublished data, see FWRI data attached).

Information related to the anticipated number of disposal transits to the ODMDS, and the timing of the transits is missing in the DEA but is a critical consideration in reducing the risks of potential impacts from these transits to North Atlantic Right Whales; therefore, we request additional information regarding transit timing and numbers be included in the Final EA for later review.

The DEA states (on Page 2-68) that the Port has participated and supported the Right Whale Monitoring program for many years; however, the measures to avoid, minimize and mitigate this project's effect on right whales were not included in Section 7.3 (page 7-28). At a minimum, we recommend that the following conservation measures for North Atlantic Right Whales be included to address potential impacts.

North Atlantic Right Whale protection precautions to be followed from December 1 to March 31 shall include:

- A dedicated observer shall be posted to spot right whales. Additionally, all personnel on all support vessels (vessels associated with dredging and dredge spoil deposition in the off-shore dredge management disposal site) shall observe for right whales in the southeastern critical habitat area. The southeastern critical habitat area extends from 31°15'N to 30°15'N out 15 miles offshore and from 30°15'N to 28°00'N out 5 miles offshore. If a whale is seen by the dedicated whale observer or support vessel personnel during daylight hours, the vessel operator shall take necessary precautions to avoid whales;

- Daily updates of whale sightings during this portion of the year are maintained by the National Marine Fisheries Service (NMFS) and should be obtained by contacting NMFS at se.rw.sightings@NOAA.gov. Such sighting update requests should include one valid return email address capable of receiving emails with sighting alerts;

- If whales have been spotted within 15 nautical miles (nm) of the vessel's path within the previous 24 hours, the dredge and support vessels shall slow to 5 knots or less when transiting between areas during evening hours or when there is limited visibility due to fog or sea states of greater than Beaufort 3 (unless weather and sea conditions dictate greater speeds for safe navigation);

- If the Early Warning System (EWS) surveys have not been flown within the previous 24 hours, the dredge and support vessels should slow to 5 knots or less when transiting between areas during evening hours or when there is limited visibility due to fog or sea states of greater than Beaufort 3 (unless weather and sea conditions dictate greater speeds for safe navigation);

- All dredge and support vessel operators shall be familiar with, and adhere to, the federal right whale minimum approach regulation, as defined in 50 CFR 224.103(c).

Florida manatee

A discussion of manatee data for Brevard County and in the vicinity of the Port was provided on Page 2-65 of the DEA. We recommend updating manatee mortality data, which is available online from FWC at http://myfwc.com/research/gis/data-maps/marine/. We also suggest that the maps included in the DEA match the data discussions in the text (the draft EA shows mortality data through 2005 but the text appears to be through 2007).

Section 2.6.8 includes a statement that "Brevard County also has one of the highest manatee mortality rates in the state, due to the high concentration of manatees combined with the popularity of recreational boating along the eastern coast of Florida (Figure 2-11), although the proportion of fatalities caused by watercraft is low." This statement is inaccurate and confusing, and should be revised. A more accurate statement could simply read "Brevard County also has one of the highest manatee mortality rates in the state." Figure 2-11 of the DEA refers to sea turtle nesting. This figure should be revised to Figure 2-13 and referenced later in the paragraph when discussing the specific data and/or re-organized to avoid confusion. The sentence referring to FWRI 2007 data

should read "Between 1974 and 2007, 1191 manatees deaths have been reported, 265 of which were from watercraft-related death". We also suggest revising earlier statements related to the proportion of fatalities caused by watercraft to state that the percentage is approximately 22%, which is average (not low as presently indicated). We also suggest not separating years 2008 and 2009 from the rest of the dataset and combining the data as one discussion, or alternatively, remove this data. In addition, the 2008 discussion of watercraft-related deaths found on Page 2-65 of the DEA should read 10, not 11 and the total in the vicinity of the Port should also read 43, not 44. The DEA reports that 15 deaths were attributed to "collisions with recreational watercraft." The term "recreational" should be stricken from that statement since at least five reported deaths have occurred from crushing between large vessels and seawalls/docks, and at least one death occurred from a strike with a large propeller, which is more indicative of a larger-than-recreational watercraft/vessel fatality.

The map on page 2-66 of the DEA is more representative of the statewide synoptic aerial survey dataset as it depicts "Manatee Aerial Survey (1991 – 2004)". We recommend amending this map to specify the aerial survey dates, as well as obtaining more recent data from the website mentioned above. There should also be a discussion of the dataset in the text. The synoptic aerial survey data set only represents annual winter surveys performed during the coldest time of the year, but is the least likely time manatees will be present in the Port. A two-year distributional aerial survey study was performed in Brevard County from 1997-1999, which depicts the year-round use of manatees in Brevard County as well as the Port. We highly recommend that the Final EA include this data in order to accurately represent manatee use in the Port area. This dataset is available from FWC by request by contacting ImperiledSpecies@myfwc.com.

Page 2-67 includes a discussion of the Port's Manatee Protection Plan and Brevard County's Manatee Protection Plan (MPP). While the Port has been very proactive in manatee protection and conservation measures have been in place for a long time, the County's plan was not based on the Port's Plan. The measures in the Port's plan are not typically applicable to the rest of the county and there are also conservation measures in the County's MPP that are unique from the Port's conservation measures; therefore, FWC suggests removing reference as to the basis for the County's MPP being that of the Port plan.

Page 2-67 also includes a discussion of Port Canaveral's lock facility and describes manatee sighting data and mortality as a result of the lock. We recommend updating this information which appears to be outdated. As of 2011, there have been a total of 18 deaths associated with this structure, with the most recent occurring June 2011.

Chapter 6.1 discusses the integration of environmental operating principles and states that the "Port has also adopted new manatee protection measures at the recommendation of the U.S. Fish and Wildlife Service". However, these new protection measures were not included in the DEA. The Port, USACE, FWC and the U.S. Fish and Wildlife Service (FWS) have been collaborating on drafting experimental observation techniques and measures in an attempt to increase nighttime observations of manatees and sea turtles during dredging operations. While these techniques are not yet known to be successful, we want to encourage future experimentation to improve monitoring. Many of these measures were included in the FWS's Review of the Biological Assessment dated May

31, 2012. The FWS's concurrence that the proposed work is *not likely to adversely affect* the manatee is also based on the inclusion of these conditions. The FWC concurs with the FWS's opinion concerning the need for these additional measures (see comments below in 7.2.8.2 discussion).

Page 6-48 includes the following statement: "Hydraulic and clamshell dredging are the methods of choice for economic and environmental concerns and are not known to "take" manatees or sea turtles when standards for operations and observance are employed as well as any additional protection measures stipulated by the FWS and/or NMFS under Section 7 ESA consultation." This statement is incorrect and should be edited to state that the potential for "take" is reduced with protective measures, not that "take" is not known to occur. There is at least one documented death of a manatee by clamshell dredge and observers were present (2011, MSE1157). In addition, anecdotal data during clamshell dredging operations indicate that turtles have been scooped up by a bucket. While it is not known whether these incidences result in death for the animal, it is still considered "take".

Chapters 7.2.8.2 and 7.3 discuss environmental consequences, including protected species and measures to avoid, minimize and mitigate environmental effects. Both of these sections state that the standard manatee construction conditions will be used during dredging and include the standard language. However, both versions of the standard conditions are out of date, with one section leaving out the important hotline number and the other section including a hotline number that is no longer in service. The standard manatee construction conditions were revised by the USACE Regulatory Division in 2011 and FWC edited these measures in 2012 to include marine turtles (attached). We recommend that the 2012 measures be included in the EA and followed during construction of the project. We also recommend that the additional conservation measures outlined in the FWS review dated May 31, 2012 be included in the EA and followed during the project.

Gopher Tortoise

According to the 2006 Environmental Baseline Report (Revised September 14, 2011), gopher tortoise (*Gopherus polyphemus*, State-Threatened) burrows were observed in or near the study area at Port Canaveral. We recommend that the applicant refer to the FWC Gopher Tortoise Permitting Guidelines (Revised November 2011; attached) for additional information and permitting guidance prior to construction activities in gopher tortoise habitat. Specific guidance includes methods to avoid permitting as well as options and state requirements to minimize, mitigate and permit the potential impacts. If a gopher tortoise relocation permit is necessary, then species associated with gopher tortoise burrows (i.e., commensals) are afforded protection under 16 U.S.C. 1531 et. seq., Section 379.2291, F.S., or 68A-27.004, F.A.C. and should also be relocated in accordance with the applicable guidelines for that species.

Summary

We find the Canaveral Harbor Integrated Section 203 Navigation Study Report and Draft Environmental Assessment consistent with our authorities under Florida's Coastal Zone Management Program. As additional project information is developed or becomes available, the FWC may have additional comments regarding appropriate conservation measures. Because details and adequate offsetting measures are still forthcoming, FWC's final recommendations and CZMA consistency determination will be provided during the environmental permitting process. However, if the applicant incorporates the above recommendations, it would facilitate our review of the project and accelerate the future permitting process.

We appreciate the opportunity to review the Draft EA. If further assistance or consultation is needed, please do not hesitate to contact Ms. Jane Chabre at 850-410-5367 or by email at FWCConservationPlanningServices@MyFWC.com. If your staff has any specific questions regarding the comments contained in this letter, please contact Mary Duncan at (850) 922-4330 or by email at Mary.Duncan@myfwc.com.

Sincerely,

Scott Sanders, Director
Office of Conservation Planning Services

ss/bg/mpd
ENV 1-3-2
Canaveral Harbor Integrated Section 203_16191_061512
Enclosures: FWC Gopher Tortoise Permitting Guidelines
2012 Manatee and Marine Turtle Conditions for In-water Work
FWRI spreadsheet of Right Whale incidents (WVIs off Port Canaveral.xls)

cc: Mr. John Milio, USFWS Jacksonville John_Milio@fws.gov
Mr. Stuart Santos, USACE Jacksonville Stuart.L.Santos@usace.army.mil
Mr. Paul Stodola, USACE Jacksonville Paul.E.Stodola@usace.army.mil
Mr. Eric Summa, USACE Jacksonville Eric.P.Summa@usace.army.mil
Ms. Carol Noble, Canaveral Port Authority cnoble@portcanaveral.com

STANDARD MANATEE AND MARINE TURTLE CONSTRUCTION CONDITIONS FOR IN-WATER WORK

March 2012

The permittee shall comply with the following conditions intended to protect manatees and marine turtles from direct project effects:

a. All personnel associated with the project shall be instructed about the presence of marine turtles, manatees and manatee speed zones, and the need to avoid collisions with (and injury to) these protected marine species. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.

b. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

c. Siltation or turbidity barriers shall be made of material in which manatees and marine turtles cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee or marine turtle movement.

d. All on-site project personnel are responsible for observing water-related activities for the presence of marine turtles and manatee(s). All in-water operations, including vessels, must be shutdown if a marine turtle or manatee comes within 50 feet of the operation. Activities will not resume until the animal(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the animal(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.

e. Any collision with or injury to a marine turtle or manatee shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1-888-404-3922, and to FWC at ImperiledSpecies@myFWC.com. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service (for north Florida, Jacksonville 1-904-731-3336 or for south Florida Vero Beach 1-772-562-3909).

f. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Temporary signs that have already been approved for this use by the FWC must be used. One sign which reads *Caution: Boaters* must be posted. A second sign measuring at least 8 ½" by 11" explaining the requirements for "Idle Speed/No Wake" and the shut down of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities. These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to the email address listed above.

g. Lighting on offshore or onshore equipment including dredge, crew boats, and all ancillary vessels shall be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the water's surface and visibility from adjacent marine turtle nesting beaches while meeting all Coast Guard, EM 385-1-1, and OSHA requirements. Light intensity of all fixtures on the vessels shall be reduced to the minimum standard required by OSHA for General Construction areas, in order not to misdirect marine turtles. Lights used to survey nearshore or inlet waters for manatees and sea turtles shall be mounted as low as possible and aimed to minimize visibility from adjacent nesting beaches. Shields shall be affixed to the light housing and be large enough to block light from all lamps from being transmitted outside the construction area.

CAUTION: MANATEE HABITAT

All project vessels

IDLE SPEED / NO WAKE

When a manatee is within 50 feet of work
all in-water activities must

SHUT DOWN

Report any collision with or injury to a manatee:

Wildlife Alert:

1-888-404-FWCC(3922)

cell *FWC or #FWC

GOPHER TORTOISE PERMITTING GUIDELINES

Gopherus polyphemus

April 2008
(Revised November 2011)

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
620 South Meridian Street
Tallahassee, Florida 32399-1600

Insert: Permitting Guidelines Revisions History

September 2008

Authorized Gopher Tortoise Agent requirements were revised (pages 10 - 13).

March 12, 2009

Revisions to the following sections have been made: definition of "gopher tortoise habitat" added to the glossary; Table 1, Mitigation Contributions, clarified, options for payment revised to delay acceptance of letters of credit; Recipient Site Permits; Appendix 3; Appendix 4; 100% surveying (various sections); 10 or Fewer Burrows permits criteria addressed in new Appendix 11; clarification of permit duration criteria; revision to when proof of local government approval is required; Improved Methods for Baseline Vegetation Sampling and Follow-up Monitoring on Recipient Sites in Appendix 7; Revised Indigo Snake handling and relocation guidance consistent with the U.S. Fish & Wildlife Service.

April 14, 2009

Revisions to the following sections have been made: clarification on permitting phased projects in Permit Duration; clarification on when FWC can provide notice to the permittee to do an on-site inspection of a 100% survey prior capture activities, and what the procedure is if more burrows are discovered Burrow Surveys on Development Sites and in Appendix 4; clarification on when the 100-mile north/south relocation would be waived under Holding and Transport; clarification on permit duration for 5-year permits.

Upon approval of the revision to these guidelines, all guidelines will be implemented with the exception of Settlement permits. Guidelines in this document that address the issuance of Settlement permits (Permit for Authorized Relocation Post-Settlement of Law Enforcement Cases) are shaded because proposed revisions are still in draft form and full stakeholder input has not yet been solicited. Until the Settlement permit has been approved, the "after-the-fact" permit process continues to be in effect.

June 2010

Revisions to the following sections have been made: added clarification on impacts that occur within 25 feet of a burrow; added mitigation contributions for Temporary Exclusion permit; replaced "Settlement" permit with "Disturbed Site" permit; revised marking scheme; added "Authorized Agent" permit activity for "trainer;" included the option for the on-site relocation of tortoises whose burrows compromise existing structures; revised financial assurance requirements; added Appendix 13: "Criteria for Gopher Tortoise Recipient Sites to Qualify as Research Sites."

June 2011

Revised the monitoring and reporting requirements for long-term protected recipient sites; added new criteria for the relocation of gopher tortoises from public projects to contiguous public conservation lands; added pre-application opportunity for potential recipient sites; added new definitions in the glossary, updated Florida Rule numbers, and editorial and punctuation revisions on pages 11, 12, 16, 24, 25, 40, 41, 42, and 53.

November 2011

Added Appendix 12: "Guidelines for Restocking Public Conservation Lands;" revised criteria and mitigation associated with the Disturbed Site permit; updated FWC contact information; clarified that the $200 mitigation only applies to a project one time; clarified about listing assistants to authorized agents on after action reports; editorial and punctuation revisions on pages ii, ix, 1, 11, 13, 16, 17, 21, 23 and 40.

TABLE OF CONTENTS

GLOSSARY ..... **vi**

I. INTRODUCTION **1**

II. DETERMINING IF A PERMIT IS REQUIRED **2**
Rules and Policies Protecting Tortoises and Their Burrows 2
Activities That Do Not Require a Permit 2
Activities That Require a Permit 3
Site Preparation Activities for Development 3

III. PERMITTING GUIDELINES **5**
Mitigation Contributions 5
Documentation for Permit Applications and Issuance 8
Permit Duration, Permit Posting, and Post-Relocation Reporting 9
Burrow Surveys on the Development Site 10
Capture, Handling, and Transport of Relocated Tortoises 11

IV.TYPES OF PERMITS **13**
Authorized Gopher Tortoise Agent Permit 13
Relocation Permits for Properties with 10 or Fewer Burrows 17
Conservation Permit 18
Recipient Site Permits 21
Temporary Exclusion Permit for Major Linear Utility Corridors 27
Burrow or Structure Protection Permit 28
Emergency Take without Relocation Permit 29
Disturbed Site Permit 30
Due Process for Gopher Tortoise Permit Applicants 32

V. HANDLING OF COMMENSAL SPECIES DURING RELOCATIONS **32**

APPENDICES **34**
Appendix 1. Rules and Policies Protecting Gopher Tortoises and Their Burrows 34
Appendix 2. FWC Gopher Tortoise Permitting System Process Map 37
Appendix 3. Information Needed for Relocation Permit Applications and Recipient Site Permit Applications 39
Appendix 4. Methods for Burrow Surveys on Development (Donor) and Recipient Sites 44
Appendix 5. Marking and Measuring Gopher Tortoises during Relocations 50
Appendix 6. Health Considerations for Gopher Tortoises during Relocations 51
Appendix 7. Methods for Baseline Vegetation Sampling and Follow-up Monitoring on Recipient Sites 56
Appendix 8. Draft FWC Conservation Easement 59
Appendix 9. Handling of Commensal Species during Relocations 64
Appendix 10. FWC Gopher Tortoise Contact Information 69

Appendix 11. Modified Application Requirements, Recipient Site Criteria, and Handling Procedures for the 10 or Fewer Burrows Permit and the Burrow or Structure Protection Permit 70
Appendix 12. Gopher Tortoise Restocking Guidelines for Publicly Owned Conservation Lands 73
Appendix 13. Criteria for Gopher Tortoise Recipient Sites to Qualify as Research Sites 83

LIST OF TABLES

Table 1. Permit Type and Corresponding Mitigation Contribution 8
Table 2. *Acceptable* and *Desirable* Criteria Thresholds for Recipient Site Characteristics 27

GLOSSARY

abandoned burrow – burrow appears unused and dilapidated. The entrance is partially or completely collapsed, and the burrow is partially or completely filled with leaves or soil. Recent rains, or recent activity by livestock or humans, do not appear to be the primary reason for burrow collapse. There are no trails into the burrow that might indicate that a tortoise recently passed through the leaf litter or that a small tortoise is using a dilapidated, adult burrow.

active burrow – burrow is in good repair, has the classic half-moon shaped entrance, and appears to be in use by a tortoise. These burrows generally have tortoise tracks or plastron scrapes clearly visible on the burrow floor or on the mound. The burrow floor often contains loose soil caused by tortoise activity. The burrow mound is usually clear of vegetation, and it may contain recently excavated soil. For burrow surveys and tortoise density determination, active burrows are combined with inactive burrows to create the *potentially occupied* classification.

asters – plants in the sunflower family.

baseline density – the estimated density (tortoises per acre) of resident gopher tortoises on a recipient site before relocated tortoises are released.

belt transect – a long, thin plot of specific or variable length and width. Burrows are counted within each transect to provide an estimate of the number of burrows, and tortoises, on a given site.

bucket trap – a plastic bucket (generally five gallons or 19 liters, but may be larger or smaller depending on burrow size) that is sunk directly in front of a burrow opening and covered with paper or cloth and soil (for camouflage) to create a pitfall trap for a gopher tortoise. Bucket traps may capture tortoises leaving or entering a burrow.

caliper – a device used to measure straight-line distance between two points of an object or animal. In this case, a caliper with two long metal "jaws" is used to measure the length of the top (carapace) and bottom (plastron) shells of gopher tortoises; this caliper was designed to measure the diameter of trees and can be obtained from forestry supply companies.

canopy cover – layer of vegetation extending above head height, usually composed of tree branches.

carapace – the top (upper) shell of a tortoise.

carrying capacity – the maximum number of individuals of a species that an area can support, given the amount and quality of food, water, and cover.

clinical signs – veterinary term referring to visible signs or symptoms of disease, illness, or lack of well-being in animals. Nasal discharge is a clinical sign that may be observed when tortoises have upper respiratory tract disease (URTD).

commensal – living in a relationship in which one animal derives food, refuge, or other benefits from another animal without hurting or helping it. The gopher frog, eastern indigo snake, Florida pine snake, and Florida mouse are listed commensal species of the gopher tortoise.

compromised burrow – gopher tortoise burrow that compromises the integrity or utility of an existing structure (e.g., under a propane tank), or the safety of the resident gopher tortoise (e.g., burrows in a grass parking lot, dirt driveway, etc.).

conjunctiva – the mucous membrane that covers the exposed portion of the eyeball and the inner surface of the eye.

conservation easement – a voluntary legal agreement between a landowner and a land trust or government agency that limits the type or amount of development on the landowner's property, thus protecting the land's conservation value while retaining private ownership.

contiguous public conservation land relocation- one type of on-site relocation where a public project occurs within ½ mile to public conservation lands and where the native population of tortoises can remain intact. Public projects and public conservation lands are considered contiguous if two or more upland communities occur within a distance of 2,640 feet (1/2 mile), and there is no physical obstacle [e.g., paved road open to the public (i.e., greater than 2 lanes, curb and gutter or other physical barriers, or a speed limit >30mph), railroad bed, impenetrable fence, river, and lake] that prevents tortoise movement to other upland areas within the relocation/restocking site.

correction factor – also known as a burrow occupancy rate; the percentage of gopher tortoise burrows on a particular site that are occupied at a given time (tortoises generally use more than one burrow over time).

densitometer – a forestry device used to determine canopy cover for a given area.

depth to the seasonal high water table (DWT) – a soil suitability criterion referring to a saturated zone in the soil. Values provided in the Natural Resources Conservation Service (NRCS) website database are representative values (neither the highest nor lowest) for a particular soil type. The average value of the depth to the seasonal high water table range that is provided for each soil type in the NRCS database should be used when determining whether a soil type meets the acceptable or desirable soils criteria.

disturbed site (area)- a site where disturbance to the ground or vegetation has occurred.

donor site – the property, usually a development, from which tortoises are removed during relocations.

enclosure – a temporary, specified area of a recipient site that is surrounded by approved fencing or hay/pine straw bales to initially contain relocated tortoises and to help them acclimate to their new surroundings. See "soft release."

endemic – exclusively native to a particular geographic area.

final stocking rate – the density of tortoises that can be relocated to a recipient site after considering the baseline density of the resident population. The final stocking rate is calculated by determining the maximum stocking rate (also known as the site evaluation stocking rate) and subtracting the baseline density.

filter fabric fencing – see "silt fencing."

forage – plant material, such as grasses, legumes, and other flowering plants, eaten by grazing animals.

global positioning system (GPS) – a satellite-based navigational system; the receiver provides latitude and longitude data for specific applications (in this case, burrow locations).

gopher tortoise habitat – gopher tortoises use a variety of generally upland habitats including, but not restricted to, sandhill, scrub, xeric hammock, mixed hardwood-pine, pine flatwoods, dry prairies, coastal grasslands and dunes, and disturbed habitats (e.g., old fields, pastures).

ground cover – herbaceous plants and the lowest shrubs occupying an area: a generic term used to describe the mat of plants found on the forest floor.

herbaceous –nonwoody plants, generally green and leafy in appearance and texture.

impact - for the purposes of these Permitting Guidelines, unless otherwise noted as a "positive impact," an impact includes any act or outcome as defined in Rule 68A-27.003 F.A.C., that may adversely affect any gopher tortoise or gopher tortoise burrow.

inactive burrow – burrow is in good repair, but does not show recent tortoise use. The lack of tortoise activity may be due to weather or season. These burrows have the classic half-moon shaped entrance, but the soil on the burrow floor is usually hard-packed, as is the burrow mound. There are no tortoise tracks or recently excavated soil, either on the burrow floor or on the mound. The burrow mound may have vegetation growing on it or be partially covered with fallen leaves. For burrow surveys and tortoise density determination, inactive burrows are combined with active burrows to create the *potentially occupied* classification.

infrastructure – structural elements that provide the framework supporting a development (e.g., roads, bridges, water resources, wastewater management, electric power transmission, and telecommunications).

legumes – plants in the bean family.

live trap – a mesh wire cage trap, either homemade or commercially available (e.g., Havahart) that is set directly in front of a burrow to capture the resident tortoise.

local government approval – a permit, agreement, development order, or other authorization issued or granted in writing by the local city or county government having jurisdiction over the property.

long-term protection (habitat) – either privately or publicly owned lands placed under a perpetual (i.e., endless duration) conservation easement.

mesic (habitat) – having a moderate or well-balanced supply of moisture.

midstory – the middle layer, generally 3-9 feet in height, of trees and shrubs (in a multi-layered forest) shaded by taller trees.

mitigation contribution – compensation, usually either in the form of monetary contributions or protected habitat donations, to offset the ill effects of human-related land change (e.g., development) on gopher tortoise populations.

mycoplasma – an infectious agent (bacterium) that has been associated with upper respiratory tract disease in gopher tortoises.

nares – external openings of the nostrils.

off-site recipient area – an area that does not lie within the same boundaries (as defined in the legal description or as identified by the county parcel identification number) of the development area from which tortoises are to be removed and that may be under either the same or different ownership.

on-site recipient area – an area that is located within the same boundaries (as defined in the legal description or as identified by the county parcel identification number) of the development area from which tortoises are to be removed and that is under the same ownership as the development area or contiguous to public conservation lands.

PIT tags – passive integrated transponder (PIT) tags are small microchips (about the size of a grain of rice) that are injected into a tortoise's hind leg using a hand-held applicator. A hand-held scanner reads the tag's electromagnetic code and displays the tag's number. PIT tags provide an alternative method for permanently and uniquely marking individual tortoises.

plastron – the bottom (lower) shell of a tortoise.

plat – a map of land made by a surveyor showing boundary lines, buildings, and other improvements on the land.

population – a group of individuals of the same species that occur in a defined area at the same time and regularly interact or interbreed.

potential tortoise habitat – those land cover types and soil associations that are known to support the life history requirements of the gopher tortoise. These habitats include, but are not limited to, sandhill, scrub, scrubby flatwoods, pine flatwoods, dry prairie, coastal strand, xeric hammock, mixed pine-hardwoods, and disturbed habitats on suitably drained soils.

potentially occupied burrow – this classification combines the active and inactive categories and, therefore, includes burrows with obvious signs of use and those with minimal or no obvious sign of use. A potentially occupied burrow is in good repair and has the classic half-moon shaped entrance. These burrows may have tortoise tracks or plastron scrapes clearly visible on the burrow floor or on the mound, or may have subtle or no tortoise sign. The lack of observable tortoise signs may be due to weather or season. The burrow floor may contain loose soil caused by tortoise activity, or it may be hard packed. The burrow mound may or may not have vegetation growing on it, and it may be partially covered by fallen leaves.

prescribed fire – a planned fire applied within a particular land area under the right weather conditions to accomplish specific, well-defined management objectives.

public conservation lands – publicly owned lands that are currently managed for conservation and are designated as conservation lands by Chapter 253.034, Florida Statutes, purchased for conservation purposes using funds from bonds or other monies dedicated specifically for conservation lands acquisition (e.g., Florida Forever, Preservation 2000, local bond initiatives, etc.), or afforded protection under federal law.

public project – a project on publicly owned land or land on which the government agency or entity has an easement and in which the public agency or entity is the applicant and subsequent permittee. Examples include public roads, schools, and government facilities.

recipient site – the property where relocated tortoises are released.

recommendation – preferred protocol or technique that permit applicants or permittees should follow, but that is not required (i.e., other viable methods are allowed). In the context of these guidelines, a recommendation is generally indicated by use of the verbs "should" or "may."

relocation – deliberately moving wild gopher tortoises.

requirement – action or protocol that must be followed before FWC will issue a permit. A requirement also includes actions that must be undertaken to avoid violating FWC permit conditions and rules. In the text of these guidelines, a requirement is generally indicated by use of the verbs "must" or "shall," or if an action is prohibited, by use of "do not."

rescue relocation – deliberately moving individuals or groups of tortoises to areas that are typically unprotected and may be relatively small, disturbed, or inadequately managed to support long-term population viability. Rescue relocation is conducted primarily to remove wild gopher tortoises from human-caused harm.

responsible relocation – deliberately moving wild gopher tortoises into protected, managed, suitable habitat where their future survival and population viability are very likely. Restocking to such sites where tortoise populations have been severely depleted is a form of responsible relocation; however, tortoises may also be responsibly relocated to sites with resident tortoises where the carrying capacity has been increased through habitat management to provide sufficient forage for additional tortoises.

restocking – deliberately moving wild gopher tortoises into protected, managed, suitable habitat where resident densities are extremely low and where the tortoises' future survival and long-term population viability are very likely.

restocking site – an area of protected, managed, suitable habitat where gopher tortoise populations have been severely depleted or eliminated.

roller chopping – a forestry method for preparing sites for planting pine trees; also used as a land management tool to reduce the height and density of understory vegetation. A bulldozer pulls a heavy cylindrical drum with cutting blades that chop vegetation.

scute – a bony external plate or scale, as on the shell of a tortoise.

seropositive – positive blood test indicating an immune response (exposure) to the bacteria that cause upper respiratory tract disease in gopher tortoises.

shaded – reducing or eliminating sunlight and excessive heat when using bucket traps or live traps or when transporting tortoises. Shade may be provided by man-made materials (e.g., plywood, plastic, cloth) or by vegetation (noting that vegetation dries with time and may fail to provide proper shade for more than a few days).

short-term protection (habitat) – either privately or publicly owned lands that have some enforceable protection commitment, but those commitments do not meet the definition of "long-term protection" or "public conservation lands."

shrub – a woody or herbaceous plant smaller in height than a tree and approximately 3 to 6 feet above the ground, often formed by a number of vertical or semi-upright branches or stems arising close to the ground.

silt fencing (Belton Industries, #935) – a durable type of silt fencing (36 in x 75 ft; pre-assembled, double-stapled, with oak stakes) that has been field-tested as an enclosure material for gopher tortoises. The manufacturer is Belton Industries, PO Box 127, Belton, SC; 800-845-8743; www.beltonindustries.com/silt.html. Distributors include

Pallen Enterprises, Conyers, GA (770-922-1812) and Certified Slings, Ft. Myers, FL (239-334-1343).

silt fencing (filter fabric) – temporary sediment barrier consisting of a filter fabric stretched across and attached to supporting posts and entrenched. There are two types: 1) the silt fence is a temporary linear filter barrier constructed of synthetic filter fabric, posts, and, depending upon the strength of the fabric used, wire fence for support; 2) the filter barrier is constructed of stakes and burlap or synthetic filter fabric. These types of silt fencing are useful for temporary exclusion, but are generally not durable enough for six month-enclosures on recipient sites.

silviculture – the art and science of establishing and growing healthy, high-quality forests to meet human needs.

site evaluation stocking rate (maximum stocking rate) – the maximum allowable density on a particular recipient site, determined by evaluating habitat conditions such as canopy cover, soils, etc. Generally, maximum stocking rates range from two to four tortoises per acre.

site fidelity – remaining within a particular area.

soft release (relocation) – those releases where relocated animals are contained in a temporary enclosure at the recipient site for some period of time before being allowed to roam freely; this differs from hard releases where animals are turned loose without any period to acclimate to their new surroundings.

Strategic Habitat Conservation Area – an area not within existing publicly owned conservation lands that FWC has identified as needing protection to meet minimum conservation goals and provide greater security for rare native plants, animals, and habitats.

take – taking, attempting to take, pursuing, hunting, molesting, capturing, or killing any wildlife or freshwater fish, or their nests or eggs, by any means, whether or not such actions result in obtaining possession of such wildlife or freshwater fish or their nests or eggs.

understory – the lowest vegetative layer in a forest, consisting of woody and herbaceous growth less than 3 feet in height.

unprotected site (relocation) – lands that do not have any enforceable protection commitments or use restrictions that would prevent them from being modified and made unsuitable for tortoises.

upland (habitat) – high, generally dry lands that are not wetlands (water).

upper respiratory tract disease (URTD) – a disease that occurs in gopher tortoises, where infected individuals may show a discharge from the nasal passages or eyes, swelling of

the eyelids or area around the eyes, or reddened third eyelid. These so-called clinical signs (i.e., symptoms) come and go over time.

viable population – a stable, self-sustaining population with a high likelihood (e.g., more than 95%) of surviving for a long-term period (e.g., 100 years).

xeric (habitat) – very dry, in this case due to soil factors.

I. INTRODUCTION

The following gopher tortoise (*Gopherus polyphemus*) permitting guidelines have been produced by the Florida Fish and Wildlife Conservation Commission (FWC), with input from stakeholders, to provide a comprehensive overview of FWC's gopher tortoise permitting system. The new gopher tortoise permitting system has been developed as one tool in accomplishing the goals and objectives set forth in FWC's *Gopher Tortoise Management Plan*, approved in September 2007.

The overall goal of the management plan is to restore and maintain secure, viable populations of gopher tortoises throughout the species' current range in Florida. Objectives under this goal include the following: 1) improving gopher tortoise carrying capacity on lands with existing or potential gopher tortoise habitat; 2) increasing the amount of protected gopher tortoise habitat; 3) restocking gopher tortoises to protected and managed areas; and 4) decreasing gopher tortoise mortality on lands proposed for development.

This permit system has been designed to help accomplish all four of these objectives by providing incentives to landowners to manage their habitat for gopher tortoises, tortoise commensals, and other native wildlife species; providing incentives to responsibly relocate and restock tortoises to protected, managed lands rather than unprotected sites; providing a new permitting system that does not allow entombment of tortoises; and providing a permitting system with regulation and enforcement sufficient to ensure compliance with FWC guidelines and rules.

The *Gopher Tortoise Permitting Guidelines* is a document that may be edited and updated as needed in the future. Proposed changes to these guidelines will be reviewed annually by an FWC standing team and a public stakeholder advisory group. All changes will require approval from the FWC Executive Director. The FWC Executive Director will also coordinate with the FWC Chairman to determine when changes to these guidelines are substantive and warrant full review by the FWC Commissioners.

These guidelines do not address technical details or aspects of the permit application process associated with the gopher tortoise permitting website. The online permitting system allows individuals to register and submit permit applications, electronically submit required mitigation, and receive official communications including permits from FWC. It also allows the public to search for and view permit applications and issued permits. Additional information, instructions and frequently asked questions on the online permitting system is available at MyFWC.com/GopherTortoise.

These guidelines include specific requirements and recommendations for various elements of the gopher tortoise permitting system. *Requirements* include actions or protocols that must be followed before FWC will issue a permit. They also include actions that must be undertaken to avoid violating FWC permit conditions and rules. The terms "shall" or "must" in this document denote guideline requirements. *Recommendations* include preferred protocols or techniques that applicants or permittees should follow, but that are not required (i.e., other viable methods are allowed). The terms "should" and "may" in this document denote guideline recommendations.

These guidelines are intended to be a single source for all policy and protocols associated with FWC's gopher tortoise permitting system. As such, they are written primarily for an audience seeking such in-depth knowledge. Other publications and online materials have been developed to address the informational needs of groups that do not require an in-depth understanding of the entire system.

II. DETERMINING IF A PERMIT IS REQUIRED

Rules and Policies Protecting Tortoises and Their Burrows

Rules protecting gopher tortoises and their burrows, and the Gopher Tortoise Enforcement Policy, are found in Appendix 1.

Activities That Do Not Require a Permit

Agricultural, silvicultural, and wildlife management activities that impact gopher tortoises or gopher tortoise burrows do not require a permit if they are conducted in accordance with the Gopher Tortoise Enforcement Policy (Appendix 1), which is a part of these guidelines. These activities include tilling, planting, harvesting, prescribed burning, mowing, disking, roller chopping, and tree cutting. For additional guidance on activities that do not require a permit, refer to the *Gopher Tortoise Enforcement Policy* in Appendix 1.

Linear utility and highway right-of-way vegetation maintenance activities that may impact gopher tortoises or gopher tortoise burrows do not require a permit. These activities include mowing and tree cutting.

Routine yard and vegetation maintenance and landscaping activities that do not harm gopher tortoises or collapse tortoise burrows do not require a permit.

Note: Agricultural, silvicultural, wildlife management, and linear utility and highway right-of-way vegetation maintenance activities have not been shown to routinely result in significant gopher tortoise deaths (i.e., beyond the infrequent, accidental death of individual tortoises). Therefore, FWC will investigate reports of the death of significant numbers of tortoises to determine if these deaths resulted from activities that did not constitute bona fide agricultural, silvicultural, wildlife management, or linear utility and highway right-of-way vegetation maintenance activities. The FWC may pursue such activities as a violation of Rule 68A-27.003, Florida Administrative Code (F.A.C.), which is included in Appendix 1.

Note: Activities that are intended to prepare land for development are not considered bona fide agricultural, silvicultural, and wildlife management, linear utility, or highway right-of-way vegetation maintenance activities. A permit is required for land development activities (including site preparation for such activities) that result in impacts to gopher tortoises or their burrows. See Site Preparation Activities for Development below.

A FWC permit is not required if development activity on a project site avoids impacts to tortoise burrows by 25 feet in all directions from the mouth of all burrows. Development activity must not harm gopher tortoises nor violate rules protecting them. Leaving a 50-foot diameter (25-foot radius) circle of habitat around each burrow (e.g., undisturbed "islands" or "crop circles") and developing the rest of a project site does not qualify and requires a permit to ensure that gopher tortoises are not harmed. Examples of other violations noted in the past by FWC include but are not limited to killing or injuring a tortoise, harassing a tortoise by blocking access to its burrow, and altering gopher tortoise habitat to such an extent that resident tortoises are taken (see Glossary and Site Preparation Activities for Development, below).

Activities That Require a Permit

A permit is required for any activity not covered in the section above, that causes a take, harassment, molestation, damage, or destruction to gopher tortoises or their burrows (see Rule 68A-27.003, F.A.C., in Appendix 1.) Activities that can lead to rule violations include, but are not limited to, clearing, grading, paving, bulldozing, digging, building construction, and site preparation for development.

Examples of actions that are rule violations include the following:

1) killing or causing direct harm to gopher tortoises
2) collapsing gopher tortoise burrow entrances or other parts of tortoise burrows without a permit
3) blocking, covering, or filling in gopher tortoise burrow entrances without a permit
4) placing harmful substances or devices inside gopher tortoise burrows
5) penning or restricting gopher tortoises into small areas for more than 72 hours without a permit
6) altering gopher tortoise habitat to such an extent that resident tortoises are taken (see Glossary) by such activities
7) excluding tortoises from their burrows without a permit
8) relocating or possessing tortoises without a permit

Site Preparation Activities for Development

A permit is required for any site preparation activity conducted as a precursor to development that disturbs vegetation or the ground which impacts gopher tortoises or their burrows at the time of or as a result of development. To conduct these activities without a permit is a violation of Rule 68A-27.003, F.A.C. (see examples 1-8, above).

Site preparation activities such as hand trimming vegetation and other minor determinations of suitability of property for development do not require a permit. These low-impact activities are allowed without a permit if they do not harm gopher tortoise burrows, harm gopher tortoises, or disturb the ground or vegetation so that accurate tortoise burrow surveys or FWC site checks cannot be conducted. FWC law enforcement will respond to reports of take, harassment,

molestation, damage, or destruction of gopher tortoises or their burrows and investigate any potential criminal violations.

On sites where tortoises are present and burrows (active or inactive) are present, most site preparation activities require a permit. These activities include building construction, bulldozing, paving, clearing, or grading. If work has started without the proper permit, work shall stop on-site until a relocation permit has been obtained and all gopher tortoises have been relocated. If work has begun before a relocation permit is issued or before gopher tortoise relocation is complete, all prior permits may be voided and a Disturbed Site permit may be required.

Permit applications must include tortoise surveys of the entire development, not just infrastructure components. Permits will not be issued solely for proposed infrastructure (e.g., roads and utilities) that are part of a larger common development plan, project, plat, or subdivision. Issued permits must address all burrows to be impacted on the entire project, development, plat, or subdivision site plan (the development footprint). For example, if the entire development footprint impacts more than 10 burrows, such sites will not be eligible (i.e., meet the criteria) for issuance of a 10 or Fewer Burrows permit, even if the infrastructure itself impacts 10 or fewer burrows.

Applicants submitting permit applications for projects with site plans that include lots or space for residential, industrial, institutional, commercial, or other development must consider all burrows within such areas to be impacted by the development footprint. Only those tortoises residing in burrows that are located within either designated preserves or other areas that will not be impacted by any activity associated with the ultimate build-out of the proposed development site do not have to be relocated. Large projects that are subdivided into development phases where each phase is approved by the local government under a separate development order may be permitted separately, but only one 10 or Fewer Burrows permit will be issued per multi-phased project.

If site preparation activities occur before a gopher tortoise relocation permit is issued, then a Disturbed Site permit may be required. The Disturbed Site permit process may result in the denial of an existing permit application or revocation of an issued gopher tortoise relocation permit (see Section IV).

In disturbed site cases, an FWC law enforcement investigation will be conducted to determine if gopher tortoises or gopher tortoise burrows have been impacted. Regardless of the outcome of investigations, the permit application review process will not resume until any gopher tortoises potentially buried in disturbed portions of the project site are given adequate time to dig out (a minimum of 28 days, comparable to that required during tortoise trapping efforts; however, longer periods may be warranted during cold weather when tortoise movement is typically slower).

III. PERMITTING GUIDELINES

The FWC uses a multi-tiered approach to permitting actions involving gopher tortoises. These permits are divided into three main types: 1) Authorized Agent permits, which authorize persons to trap, transport, and release tortoises; 2) Site-specific relocation permits, which authorize trapping and relocation of tortoises either within the boundaries of the area being impacted (on-site) or from the area being impacted to a permitted recipient site (off-site); and 3) Recipient Site permits, which authorize the use of designated sites meeting specific criteria as recipient areas for tortoises. Emergency Take permits, Disturbed Site permits, and Burrow or Structure Protection permits are three additional permit types, only issued under unusual circumstances. The types of permits are illustrated by the flow chart in Appendix 2, FWC Gopher Tortoise Permitting System Process Map.

Entombment of tortoises is not allowed under the conditions of any permit, with the exception of Emergency Take permits. Emergency Take permits are available only in extreme circumstances where there is an immediate danger to public health and safety or in direct response to an official declaration of emergency by the Governor or local government authority. Local emergency situations that do not rise to the level of an official declaration should be handled by coordinating with FWC's Division of Law Enforcement and seeking assistance in determining steps that must be taken in order to avoid additional take or endangerment of gopher tortoises.

Mitigation Contributions

A mitigation contribution is required for all relocation permits. A flat mitigation contribution from each applicant applies to the first 10 burrows (up to 5 tortoises for conservation permits) impacted on each project site. This flat mitigation contribution of $200 is only applied one time for each project site. Additional mitigation for sites supporting more than 10 tortoise burrows is required. Mitigation contributions are assessed by determining the estimated number of tortoises impacted (the number of potentially occupied tortoise burrows to be impacted, divided by 2). A variable scale for additional contributions is based on the overall conservation value of the action being permitted and the estimated number of gopher tortoises being impacted by the project. Preferred conservation actions, such as responsibly relocating tortoises to long-term protected lands, require a lower contribution per tortoise than relocations to short-term protected or unprotected lands or relocations associated with Disturbed Site permits. All mitigation contributions support gopher tortoise conservation actions as specified in the FWC-approved Gopher Tortoise Management Plan.

Other costs may be incurred by applicants obtaining permits or conducting activities related to gopher tortoises. Examples of such costs include fees paid to consultants, fees paid for on-site preparation for gopher tortoise related activities, fees paid to owners of recipient areas, and fees associated with establishing conservation easements. These fees are not paid to FWC nor controlled by FWC.

All mitigation contributions must be submitted to FWC as specified in these guidelines. Gopher tortoise mitigation contributions for a 10 or Fewer Burrows permit, Authorized Agent permit, Recipient Site permit, Temporary Exclusion permit, Burrow or Structure Protection permit, or

Disturbed Site permit must be submitted to FWC before the final permit will be issued. Mitigation contributions for Conservation permits representing 100% of the estimated total amount due will be submitted prior to issuance of the permit. Online submission of mitigation contributions is provided in order to expedite permit processing and issuance. FWC will continue to explore alternative methods of payment, such as letters of credit and performance bonds, in the future.

If the actual number of gopher tortoises relocated is less than the number estimated, a refund of any excess funds paid will be made to the permittee. Permittees seeking a refund must submit a refund request form to FWC within 60 days of the date that the final after action report is approved. Disturbed Site permits follow a different refund process (see Section IV). If an issued gopher tortoise relocation permit is used to attempt to capture a gopher tortoise(s) but no gopher tortoise is captured, the minimum mitigation amount required to obtain that type of relocation permit (e.g., $200 for 10 or Fewer Burrows permits or Conservation permits, or $100 for Temporary Exclusion permits with tortoises excluded for two months or less) will not be refunded to the permittee because the issued permit authorized both the capture of gopher tortoises, and the damage, collapse or covering of gopher tortoise burrow(s).

If the number of tortoises encountered during relocation exceeds the number permitted, then the permittee or agent must stop all attempts to capture any gopher tortoise in excess of the permitted number, and call the FWC Gopher Tortoise Permit Coordinator as soon as possible. The permittee or agent must submit an application to amend the relocation permit, submit the associated mitigation contribution for additional tortoises, and be in possession of the issued amended permit before attempting to capture or relocate any gopher tortoise in excess of the original number permitted.

Juvenile tortoises that are less than 130 mm [5 inches] carapace length must be included on the burrow surveys and permitted for relocation. However, refunds will be provided by the FWC for relocated juvenile tortoises that are less than 130 mm carapace length after the final after action report is submitted and approved, and a refund request form is submitted by the permittee or his/her agent. Gopher tortoise eggs and nests are not included when calculating the mitigation contribution. All eggs and juvenile tortoises must be relocated.

Emergency Take permit mitigation contributions will be handled on a case-by-case basis, in accordance with the facts and circumstances of each permit incident. In cases where the number of burrows impacted can be accurately determined because of pre-existing on-site surveys, mitigation contributions will be calculated by multiplying this number by 0.5. This adjusted number will be used to calculate mitigation contributions as prescribed in Table 1. In cases where the total number of burrows impacted cannot be accurately estimated from prior surveys, mitigation contributions will be based on actual documented burrow evidence. Such evidence may include, but is not limited to, exit holes from old burrows, partial remains of burrows, and the density of gopher tortoise burrows (per acre) that occur within surrounding areas that contain similar vegetation and soil characteristics.

When an Emergency Take permit includes requirements for trapping or excavating burrows within an area that has been disturbed by clearing, grading, disking or other ground disturbance

activities, no refunds will be made if the actual number of tortoises relocated is less than the number estimated, since gopher tortoises may have left the area during the disturbance.

The FWC realizes that all sites are unique and that circumstances influencing gopher tortoise populations are dynamic. For that reason, the initial permitting mitigation contribution is based on estimates from site surveys and a general application of a statewide correction factor. Estimating the total amount due is accomplished by calculating the number of potentially occupied burrows (based on surveys of not less than 15% of the project site areas where potential gopher tortoise habitat is found), dividing by 2, and then applying the mitigation contribution amounts shown for the various permit types described in Table 1.

The mitigation contribution amounts will be adjusted over time to keep pace with inflation. Tying these changes to the Consumer Price Index will ensure mitigation contributions are adjusted relative to actual price increases or decreases. The FWC will use the "All Urban Consumers Price Index" (CPI-U), which is a reflection of the highest percentage of the population, and the CPI-U for the Southeast region. Information on the Consumer Price Index is available online at www.bls.gov/cpi.

In subsequent years, mitigation contributions will change by an amount equal to the annual CPI-U for the Southeast region, and will be based on changes during the CPU calendar year (January 1– December 31). However, the minimum threshold for mitigation is set at the contribution levels outlined in the original approved version of the Gopher Tortoise Permitting Guidelines (April 2008). Adjustments to the contribution amount will take effect on March 1 of each year because the CPI for the previous year is usually not available until mid-February. The contribution will be calculated based on the date that a completed application is received by FWC. Mitigation contribution amounts will be published at MyFWC.com/GopherTortoise and sent out to all permittees.

Table 1. Permit Type and Corresponding Mitigation Contribution

PERMIT TYPE	MITIGATION CONTRIBUTION
Authorized Agent	$500 (one-time contribution)
Recipient Site	$500 per site (one-time contribution)
10 or Fewer Burrows *Tortoises are relocated on-site or off-site**	$200
Conservation *>10 burrows relocated to **long-term protected** area, to **public conservation lands**, or **from public projects to contiguous public conservation land***	$200 for first group of 10 burrows (up to five gopher tortoises) $300 each additional tortoise
Conservation *>10 burrows relocated to **short-term protected** area*	$200 for first group of 10 burrows (up to five gopher tortoises) $3,000 each additional tortoise
Conservation *Tortoises relocated to **unprotected** area*	$3,000 per tortoise
Temporary Exclusion *Exclusions for longer than 6 months must apply for a Conservation permit*	$100 per tortoise (exclusions <2 months) $200 per tortoise (exclusions 2 to 4 months) $300 per tortoise (exclusions 4 to 6 months)
Burrow or Structure Protection *On-site relocation only*	$25 for up to 2 burrows
Emergency Take	$4,000 per tortoise
Disturbed Site *See Section IV. Disturbed Site Permits for more information*	$500 additional per tortoise added to the standard mitigation for 10 or Fewer Burrows permits and Temporary Exclusion permits (exclusions 4-6 months only) $1,500 additional per tortoise added to the standard mitigation for a Conservation permit

*Gopher tortoises relocated off-site under a 10 or Fewer Burrows permit cannot be relocated to an unprotected recipient site.

Documentation for Permit Applications and Issuance

In accordance with the requirements of Rules 68A-27.007 and 68A-27.003 (F.A.C.), a permit for a gopher tortoise capture/relocation/release activity must be secured from FWC before initiating any relocation work. Required information for applications is outlined in Appendix 3, Informational Needs for Relocation Permit Applications and Recipient Site Permit Applications. Checklists are provided at MyFWC.com/GopherTortoise to assist applicants with the required information for each permit type.

As of April 2009, most permits can be applied for online at MyFWC.com/GopherTortoise. The online permitting system allows individuals to register, submit permit applications, electronically submit required mitigation, and receive official communications including permits from FWC. Paper applications are also available, but applicants are encouraged to apply online to expedite the review process. Additional information, instructions and frequently asked questions regarding the online permitting system are available online at MyFWC.com/GopherTortoise.

Paper applications are available online at MyFWC.com/GopherTortoise or from the Gopher Tortoise Permit Coordinator, Florida Fish and Wildlife Conservation Commission, 620 South Meridian Street, Mail Station 2A, Tallahassee, FL 32399-1600; (850)921-1031; (850)488-5297 fax. For those opting to submit paper applications, the complete application should be submitted to the Gopher Tortoise Permit Coordinator at the above address at least 90 days prior to the time needed, although most applications will be processed in 45 days or less. Timely issuance of permits is dependent on receipt of required documentation.

Demonstration of need for a permit will require submittal of a development plan or proof of local government approval for the activity proposed (in the form of preliminary or final subdivision plat, or master planned unit development approval; Development of Regional Impact [DRI] development order; or authorization to commence clearing, grading, or construction activities). The actual capture and relocation authorized by the permit shall be conditioned upon the permittee submitting proof of local government approvals for clearing, grading or construction activities (if required at the local government level) to the FWC prior to commencing capture and relocation activities. Local governments may have requirements that an applicant demonstrate that FWC permits have been issued, or even that FWC permit requirements have been met, before issuing their final local government approval. The FWC will provide letters of intent or special conditions to permits, if necessary, that can be used to demonstrate agency concurrence with a proposed project. However, permits are not issued to move tortoises off a property where no construction activity is planned.

Permit Duration, Permit Posting, and Post-Relocation Reporting

The duration of each type of permit will be indicated on the permit. Authorized Agent permits are valid for a two-year period and may be renewed without additional payment in two-year increments. Recipient Site permits with long-term protection do not expire, but will be subject to reporting requirements within the special conditions. Permits for short-term protected recipient sites and unprotected recipient sites may be renewed every two years, but will require no additional mitigation contribution. Relocation permits for 10 or Fewer Burrows and Burrow or Structure Protection Permits will be valid for six months from the date of issuance and may be amended by the permittee to extend the permit duration for up to 6 months if relocation activities have not been completed. Conservation and Temporary Exclusion permits will be valid for either 12 months or 60 months and may be amended by the permittee to extend the permit duration for up to 12 months if relocation activities have not been completed. Emergency Take permits and Disturbed Site permits will be handled on a case-by-case basis, considering the circumstances of the development and the conditions present. Any request for permit renewal or amendments shall be submitted at least 45 days prior to the expiration date of the existing permit.

Permit amendments are issued based on the permitting guidelines and specific permit conditions in effect at the time the complete application for a permit amendment is received by the FWC.

Phased projects, those projects with development phases based on geographic areas, may be permitted in one permit or in phases. Permits issued for individual phases will have conditions that specify the gopher tortoise conservation activities that must be conducted for those specifically permitted stages or phases of development. Refer to Appendix 3 for information needed for permit applications.

Either the original permit or a complete copy must be clearly posted at the affected site at all times while engaged in the permitted gopher tortoise relocation activities.

Within 30 days of release of the relocated tortoises, the permittee, or authorized agent if applicable, shall submit a report detailing the capture/relocation actions to FWC's Gopher Tortoise Permit Coordinator via FWC's permitting portal at MyFWC.com/GopherTortoise.

Burrow Surveys on the Development Site

A burrow survey covering a minimum of 15% of the potential gopher tortoise habitat to be impacted by development activities (including staging areas for heavy equipment) is required in order to apply for a relocation permit. These 15% surveys must be conducted no more than 90 days before an application is submitted to FWC. Burrow survey methods are outlined in Appendix 4, Methods for Burrow Surveys on Development (Donor) and Recipient Sites. Additional survey requirements for Disturbed Site permit applications are also listed in Appendix 4.

No more than 90 days prior to, and *no fewer* than 72 hours before (excluding weekends and holidays) commencing gopher tortoise capture and relocation activities, the authorized agent shall: 1) complete the 100% gopher tortoise survey of the donor site and burrow location map; and 2) deliver to the FWC the 100% survey and burrow location map. If FWC determines that an on-site survey inspection is necessary prior to commencing capture activities, FWC will provide notification to the permittee or authorized agent within 48 hours (excluding weekends and holidays) of receipt of the 100% survey and burrow location map.

All surveys completed by authorized agents are subject to field verification by FWC. If FWC determines from the on-site survey inspection that the number of gopher tortoise burrows on site causes the total to exceed the number authorized for capture and relocation under the existing gopher tortoise permit, the permittee must apply for an amendment and obtain a permit for the additional burrows from FWC before initiating any capture and relocation activities for the additional burrows.

Site preparation for development (such as land clearing) may commence on the project site, or for phases of the project site, for which gopher tortoise capture and relocation activities have been completed (see Section II for details.)

Capture, Handling, and Transport of Relocated Tortoises

Capture Methods: Tortoises must not be trapped, captured, or transported off project (donor) sites until local authorization for clearing, grading, or construction has been issued. Tortoises may be captured via bucket traps, live traps, hand capture outside burrows, and excavation by hand shovel or backhoe. To prevent impalement of tortoises during backhoe excavation, the backhoe bucket must have a flat plate rather than teeth (long prongs). Use of a pulling rod with a blunted tip to prevent injury to a tortoise will be allowed when the authorized gopher tortoise agent is permitted to utilize this method as authorized in the relocation permit. Only agents permitted to use this method of capture are authorized to capture tortoises using a modified pulling rod.

If bucket or live traps are used, the traps must be shaded, they must be checked at least once per day (preferably twice per day—once in the morning and once in the late afternoon), and they must remain in place for at least 28 consecutive days or until the resident tortoise is captured, whichever occurs first. In cases where traps are set during colder months in northern Florida (November – March) and no tortoise is captured after 28 consecutive days, burrows must be excavated to determine if they are occupied. Drainage holes must be drilled into the bottom and lower sides of bucket traps and must be sufficient in size and number to prevent rainwater from accumulating in the bucket. Bucket traps and live traps are not effective in capturing tortoises during cold weather, particularly in northern Florida (north of State Road 50), because tortoises may remain inactive for extended periods of time. Therefore, bucket traps are not recommended from November through March in northern Florida. In cases where traps are set and no tortoise is captured during winter months in northern Florida, burrows must be excavated to determine if they are occupied. If the 28-day trapping period has passed without a capture and property boundary constraints make excavation impossible, FWC should be contacted to discuss alternatives.

Burrow scoping is not an acceptable method of confirming vacancy or determining occupancy rates because not all potentially occupied burrows can be successfully scoped due to curves or obstructions. However, burrow scopes may be used to enhance capture success for tortoises and their commensals. Capturing a tortoise outside a burrow is not sufficient reason to assume the burrow is vacant. Although all burrows on the donor site must be flagged or otherwise marked, only potentially occupied burrows must be trapped or excavated (see Appendix 4).

All relocated tortoises must be individually marked, measured, and weighed (see exceptions in Appendix 11). Techniques for measuring shells and for uniquely marking individual tortoises (i.e., assigning them a permanent identification number) are provided in Appendix 5.

If gopher tortoise eggs are encountered, the following procedure should be followed:

1) place sand from around the eggs into a container;
2) remove soil from around the eggs carefully (eggs are fragile, please handle with care);
3) use a pencil to place a small "x" on top of each egg;
4) make an egg-sized depression with your finger in the sand in the container;

5) place each egg in a depression with "x" facing up;
6) make note of approximate depth of nest in original burrow location, and;
7) at the recipient site, locate an existing burrow apron or other sandy area in an open, sunlit area and excavate to the approximate depth of original nest, place eggs "x" up in the new nest in approximately the same orientation as they were originally located, and mark the new nest with a ring of fencing or flagging.

Any injury or fatality associated with the capture or relocation of gopher tortoises must be reported to the FWC Gopher Tortoise Permit Coordinator within two days.

Cold and hot weather handling: During the colder months, tortoises shall only be relocated when the low temperature at the recipient site is forecasted by the National Weather Service (www.nws.noaa.gov) to be above 50° Fahrenheit for three consecutive days after release (including the day of relocation). This three-day window of milder overnight temperatures is required to allow the relocated tortoises to settle into the recipient site and to reduce the chance of cold-related stress or mortality.

Because most tortoise relocations occur during the warmer months, overheating is a more common concern. During summer months, releases should not be made during the hottest part of the day at sites where shade is limited. Heat stress on gopher tortoises being captured and transported for relocation can be reduced or eliminated by assuring that captured tortoises and those tortoises being transported for release are continually in shaded or climate controlled conditions.

Holding and Transport: Gopher tortoises must be held in shaded conditions and in individual containers that are large enough to allow the tortoise to turn around. To help prevent dehydration, especially during times of drought, tortoises should be soaked for 20-30 minutes in just enough water to cover the container bottom and to allow the tortoise to easily drink. Moist soil may be used to cover the bottom of the bin. It is appropriate to use soil from the burrow depths during backhoe excavation. Hay, straw, or shredded paper are other acceptable materials to place in the bin.

Gopher tortoises must not be held more than 72 hours after capture—and preferably not more than 24 hours. Tortoises should be transported within covered, well-ventilated areas of vehicles (not in open trucks) and should be kept at moderate temperatures (i.e., 70-85° Fahrenheit).

Recipient areas may be situated any distance east or west of the donor site, but no more than 100 miles north or south of the donor site unless no such recipient site is available. Some recipient sites conducting research can accept tortoises from any location in the state and may be exempt from the 100-mile limit.

Relocated gopher tortoises should be released on the recipient site near existing abandoned burrows or excavated starter burrows. Starter burrows should be excavated to approximately two feet in length at an approximate 45° angle to the ground.

Health Considerations (including testing for mycoplasmal upper respiratory tract disease [URTD] and accommodation of symptomatic/seropositive tortoises): Most health variables are poorly known for wild gopher tortoises, and even veterinarians with advanced training in animal health can have difficulty detecting subtle clues that a tortoise is ill. Authorized agents may refer to Appendix 6 for detailed outlines of cursory health evaluations, clinical signs and symptoms, and a simple disinfection protocol to help prevent spread of pathogens. Although detailed health exams are not required, authorized agents should observe each tortoise for obvious clinical signs such as nasal discharge. Hands and equipment should be disinfected between handling tortoises within a donor site, but all equipment, particularly bins and bucket traps, must be disinfected between uses on different donor sites. Blood tests to detect exposure to the pathogen that causes mycoplasmal URTD are no longer mandated. However, in cases where recipient site owners require mycoplasmal URTD testing before relocation, Appendix 6 contains information on collection and handling of samples. Appendix 6 also provides guidance for the accommodation of symptomatic tortoises (i.e., those individuals that show signs of illness, especially respiratory disease) and those that test positive for mycoplasmal URTD or other diseases.

IV. TYPES OF PERMITS

Authorized Gopher Tortoise Agent Permit

Note: Authorized agents included under this type of permit are not authorized agents of FWC, but rather individuals authorized to handle gopher tortoises. These permits are not issued for scientific collection or research on gopher tortoises.

This permit authorizes the permittee, referred to as an authorized agent, to undertake those activities specified by the permit, including surveying, trapping, marking, transporting, relocating tortoises and tortoise commensals (e.g., gopher frog, pine snake, Florida mouse). The specific activities that an authorized agent is granted permission to perform will be listed on the permit. Authorized Agent permits also allow assistants to work under the authorized agent's supervision if these assistants are registered with the FWC. The permit must be carried at all times by the agent and assistants when conducting permit-related activities. Authorized Agent permits will not allow relocation of tortoises except when accompanied by a 10 or Fewer Burrows permit, a Conservation permit, a Temporary Exclusion permit, a Burrow or Structure Protection permit, or a Disturbed Site permit for a specific project.

Authorized agents must be well-qualified to perform the gopher tortoise conservation actions for which they are requesting permission. Agents will likely be the first point of contact for citizens when they are advised that gopher tortoises are protected. Agents must accurately represent FWC policies, guidelines, and rules to their clients and to the general public. As a benefit of receiving this permit, agents will have access to a streamlined online permitting process for certain gopher tortoise permit approvals.

This permit is conditional so that it can be withdrawn, suspended, revoked, or not renewed for just cause, as determined by FWC. In cases where agents or their assistants violate FWC rules, policies, or guidelines concerning gopher tortoises; engage in unethical or illegal behavior;

falsify gopher tortoise permit applications or monitoring reports; or violate conditions of any gopher tortoise permit, the agent permit may be immediately suspended pending an investigation. Substantiated violations will result in appropriate action, up to and including revocation, at FWC's discretion. Any person whose Authorized Agent permit is revoked will be ineligible for any gopher tortoise related permits for some period of time, depending on the severity of the violation.

Requirements for Authorized Gopher Tortoise Agents

Individual people may submit an application to FWC in order to be authorized to perform different activities related to gopher tortoise conservation. Not all agents will have the interest and the required expertise to perform all activities listed below. Each agent permit will clearly state what the agent is allowed to do and will be conditioned accordingly. Agent permits are authorizations to the agents and the assistants under their supervision to conduct the activities specified. The agent permits do not allow capture, possession, or transport of gopher tortoises unless a relocation permit specific to the development project or activity impacting gopher tortoises or their burrows has also been issued. All experience submitted in support of the application for an Authorized Gopher Tortoise Agent permit must have been from actions conducted in compliance with the FWC gopher tortoise permitting guidelines and standards.

Gopher tortoise surveys:
Applicant must have completed either 1) at least 120 hours conducting gopher tortoise surveys over the past year, or 2) a cumulative total of 480 hours conducting gopher tortoise surveys.

Completion of an FWC-approved training course module in gopher tortoise surveying may be substituted for the experience requirements.

Gopher tortoise capture using bucket trapping *or* live trapping *or* hand shovel excavation:
Applicant must have captured, with no gopher tortoise injuries or mortality, either: 1) an average of 10 gopher tortoises per year by a single method over a four-year period, or 2) a cumulative total of 40 gopher tortoises captured by a single method. Applicants are to list experience for each method separately in the agent permit application, as applicable.

Completion of an FWC-approved training course module in gopher tortoise capture methods may be substituted for the experience requirements.

Gopher tortoise capture using a modified pulling rod:
The applicant must have captured**,** with no gopher tortoise injuries or mortality, an average of 10 gopher tortoises per year over a four-year period by safely using a modified pulling rod. Applicants must include references to the permits under which the claimed experience was earned.

Certification of additional agents beyond those who meet these criteria will be considered only after further evaluation of this technique by FWC in April 2010.

Note: Not all tortoises can be captured by pulling. Therefore, pulling cannot be used as a method for verifying that a burrow is unoccupied. Pulling may be used only in combination with trapping or backhoe/hand excavation to assure that every tortoise is relocated from a designated donor site.

Completion of a training course will not be accepted in lieu of the experience requirements listed.

Transport, marking, and release of gopher tortoises:
The applicant must have completed, with no gopher tortoise injuries or mortality, either: 1) an average of 10 gopher tortoises per year transported, marked, and released over a four-year period, or 2) a cumulative total of 40 gopher tortoises transported, marked, and released. These activities are considered together as one skill in the agent permit application.

Completion of an FWC-approved training course module in gopher tortoise transport, marking, and release methods may be substituted for the experience requirements.

Collection of blood samples:
The applicant must have completed, under the direct supervision of a qualified veterinarian or other appropriately authorized person, the successful collection of 10 blood samples from gopher tortoises.

Completion of a training course will not be accepted in lieu of the experience listed.

Supervision of gopher tortoise burrow excavations using mechanical equipment:
The applicant must demonstrate with no gopher tortoise injuries or mortality, either: 1) on-site experience of supervising at least 50 gopher tortoise burrow excavations, with the successful extraction of at least 20 gopher tortoises (include references to the permits under which those occurred), or 2) on-site experience under the supervision of another Authorized Gopher Tortoise Agent who was directing backhoe operators in the excavation of at least 50 gopher tortoise burrows, with the successful extraction of at least 20 gopher tortoises, with the applicant actively participating in the recovery of gopher tortoises from the excavated burrows (include references to the permits under which those occurred).

Completion of an FWC-approved training course module in this activity, combined with experience directing backhoe excavation of 30 gopher tortoise burrows with successful extraction of at least 12 gopher tortoises, may be substituted for the full experience requirements above. Burrows mechanically excavated during the approved course in which the applicant actively directed excavation efforts without instructor input can count toward the excavation experience requirement; however, excavation must be conducted under the direct on-site supervision of an Authorized Gopher Tortoise Agent permitted in this technique.

It is the agent's responsibility to select operators of mechanical excavating equipment that are appropriately experienced and to direct their activity in a way that minimizes threats to gopher tortoises, commensal species, and persons assisting with the excavation. The authorized agent must be on-site at all times while mechanical excavation is being performed.

Authorization to train:
Authorized gopher tortoise agents may be authorized to train others in the activities and techniques associated with trapping, handling, and relocating tortoises with completion of a FWC-approved training course. Applicants must specify which courses and sections they will be teaching and provide a letter from the approved training entity verifying employment or agreement to train.

Application Criteria

All applications for the Authorized Agent permit must be from an individual, and the appropriate mitigation contribution as established in these guidelines must be paid before issuance of the permit. Applicants for this permit must provide standard contact information, satisfactory proof of knowledge, and specific gopher tortoise related experience in support of each of the activities they are requesting a permit to conduct. Applicants must list permit numbers under which experience was obtained for each skill listed in their application. For surveys, the applicant may list properties (and the associated gopher tortoise habitat acreages) surveyed, purpose of surveys, and documentation of completion and submittal of survey results where experience was acquired but no FWC permit applications were submitted, instead of listing permit numbers (since permits are not always obtained after surveying efforts). Applicants must swear and affirm that they have committed no wildlife violations in Florida, the information submitted in the application and supporting documents is complete and accurate, any false statement may result in criminal penalties, and agree to abide by all applicable state, federal, and local laws.

Professional certification by any industry body or trade group established for this purpose (gopher tortoise agent authorizations) in the future and approved by FWC may also be provided as supplementary documentation of knowledge and experience.

Note: Approval of courses for certification of gopher tortoise agents shall be at the discretion of the FWC Executive Director or his delegate.

Grounds for Suspension, Revocation or Nonrenewal of Agent Permit

Agents are responsible at all times for their own actions and for the actions of any other person assisting them with their permitted activities. The following will be considered by FWC as grounds for suspension, revocation, or nonrenewal of the permit issued to an agent:

- violations of gopher tortoise related rules, guidelines, or permit conditions
- surveys not conducted in adherence with guidelines
- significant numbers of burrows missed on surveys
- falsification of data submitted to FWC
- failure to appropriately supervise and direct persons assisting them

Assistants to Authorized Agents

An authorized agent may be assisted by additional persons. These assistants will be under the

supervision of the authorized agent and must adhere to all rules, guidelines, and permit conditions when conducting activities relating to gopher tortoises. They must carry a letter from the agent designating them as an assistant and a copy of the authorized agent's permit with them at all times while engaged in activities related to the permit. Such assistants must be directly supervised on-site by the authorized agent during blood collection and/or mechanical excavation of burrows, or they themselves must be an authorized gopher tortoise agent permitted to conduct these activities. In order for an assistant to gain credit for experience to meet qualification requirements for an Authorized Agent permit, the assistant must be listed in the relocation permit after action report within the online permit system. Assistants are not authorized to conduct any gopher tortoise related actions without approval of the authorized agent.

Relocation Permits for Properties with 10 or Fewer Burrows

This type of permit is available when 10 or fewer burrows (and the number of tortoises occupying those burrows) will be impacted on a development site. Application requirements, recipient site criteria, and tortoise handling procedures differ somewhat for this permit type (see Appendix 11.). In cases of phased developments, this permit may be obtained only once for any development on a single identified parcel or within a project under a common plan of development, platting, or subdivision/project name, whichever is largest. As part of the 10 or Fewer Burrows permit application process, the permit applicant must complete the required e-Learning (available online at MyFWC.com/GopherTortoise) or the approved equivalent written training, if the applicant is not an authorized gopher tortoise agent.

Most typical activities associated with residential lawn and landscape maintenance do not require a permit, provided they do not collapse gopher tortoise burrows or harm gopher tortoises. Activities that do require a permit are listed in Section II, Determining If a Permit Is Required. Contacting an authorized agent or FWC before implementing any construction or major habitat modifications is advised.

Consultants who are not Authorized Gopher Tortoise Agents may apply on behalf of property owners for 10 or Fewer Burrows permits when all tortoises will be relocated on-site. The consultant must complete a Registered Agent profile within the online permitting system and complete the e-Learning curriculum. Once submitted, this automatically issued status allows a Registered Agent to apply on behalf of the property owner for permits that do not otherwise require the use of an Authorized Gopher Tortoise Agent. Only property owners can be listed as permittees. Relocation activities for Registered Agents are limited to on-site relocation only using bucket trapping, hand shovel excavation, and live trapping to capture the gopher tortoises. The Registered Agent is not a permit, nor does it provide any authorizations not included in a separately issued 10 or Fewer Burrows permit. (Authorized Gopher Tortoise Agents may conduct activities specified by their permit and do not need to apply to become Registered Agents.)

10 or Fewer Burrows Permit with On-Site Relocation

This permit authorizes landowners or other individuals who have completed FWC online e-Learning to capture gopher tortoises (via bucket trapping, hand-shovel excavation, or live

trapping) and to relocate tortoises to an on-site location within the property boundaries of the development specified in the application. [**Note:** Only an authorized agent permitted to supervise burrow excavations may capture or attempt to capture gopher tortoises using a backhoe.] On-site recipient area criteria can be found in Appendix 11. Landowners may obtain the assistance of an authorized gopher tortoise agent for on-site relocations (as described in *Authorized Gopher Tortoise Agent* above).

Release of tortoises must be accomplished in such a way as to preclude tortoises from returning to their burrows. This permit type requires the temporary installation of filter fabric (silt fencing) or other comparable fencing (buried at least eight inches deep) along the outer edge of the construction right-of-way to block tortoise re-entry into the area of disturbance on the project site during construction activities. This temporary exclusion fencing must be removed following completion of construction activities. Penning is allowed only under this permit type, and only under specified circumstances (see Appendix 11).

10 or Fewer Burrows Permit with Off-Site Relocation

This permit authorizes gopher tortoises to be relocated off the development property to a permitted recipient area (a long-term protected site or a short-term protected site). An authorized agent must perform this relocation on behalf of the permittee. Authorized agents must have their own permit from FWC for working with gopher tortoises and may assist the landowner or developer in obtaining all permit approvals for this type of action.

Conservation Permit

Conservation permits for relocation of tortoises on-site or off-site will be issued when more than 10 burrows will be impacted on a development site and for subsequent activity on properties undergoing development of phased projects when a 10 or Fewer Burrows permit has been previously issued.

This permit authorizes gopher tortoises to be relocated either on-site or off-site of the development property. The permittee must have an authorized gopher tortoise agent perform this relocation. Authorized agents must have their own permit from FWC that authorizes them to conduct the activities required to relocate the gopher tortoises, and they may assist the landowner or developer in obtaining all permit approvals for this type of action.

One of the four objectives of the *Gopher Tortoise Management Plan* is to increase the acres of permanently protected gopher tortoise habitat by providing incentives to landowners who protect habitat under perpetual conservation easements. These protected acres of habitat provide a net conservation benefit and assurance for long term protection and management of the species. Restocking lands where populations have been depleted is another important objective which will also help to reach the Plan's goal. Therefore, mitigation contributions for gopher tortoise relocation are scaled based on the length of assurance for protection and management of the species at recipient sites.

The mitigation contribution for Conservation permits is determined by the level and duration of habitat protection and management provided by the recipient site to sustain gopher tortoises. Conservation permits issued for gopher tortoises relocated to a long-term protected recipient site or from public projects to contiguous public conservation lands will require a $200 mitigation contribution for the first group of ten burrows (up to five tortoises) and a $300 mitigation contribution per tortoise thereafter. If the tortoises are being moved to a short-term recipient site, a $200 mitigation contribution will be required for the first group of ten burrows (up to five tortoises), and a $3,000 mitigation contribution will be required per tortoise thereafter. Gopher tortoises that are relocated to an unprotected recipient site will require a $3,000 mitigation contribution per tortoise (see Table 1).

Conservation permits that involve on-site relocation to undeveloped areas that provide suitable tortoise habitat but that are not protected or do not meet the size criteria for a permitted recipient site will require a $3,000 mitigation contribution for each tortoise. Final stocking density is limited to of two per acre (including tortoises already on-site) within the designated recipient area. On-site relocation to an area that provides habitat protection equivalent to the requirements for a short-term protected recipient site will require $200 for the first 5 tortoises and an additional $3000 for each tortoise relocated on site.

On-site relocation may be authorized to areas that meet the criteria for a long-term protected recipient site, or when tortoises are relocated from public projects to contiguous public conservation lands. A separate long-term protected recipient site permit must be obtained before gopher tortoises are relocated to the on-site area (see Recipient Site Permits below). However, if gopher tortoises are relocated from public projects to contiguous public conservation lands, the recipient site must meet the criteria specified below and be authorized as an on-site recipient site unit under the issued Conservation permit. Mitigation contributions for tortoises relocated to these on-site areas under this permit option qualify for the lower mitigation amount included in Table 1.

Relocating gopher tortoises from public projects to contiguous public conservation lands

The FWC recognizes that keeping tortoises within their native population is an important measure in conserving tortoises. This type of on-site relocation permit option encourages contiguous relocation within public lands by reducing mitigation costs and streamlining the process, thereby facilitating enhanced conservation for tortoises. Under this permit option, gopher tortoises can be retained within their native population instead of being moved off-site or to an on-site short-term or unprotected recipient site.

The intent of this permit option to relocate gopher tortoises from public projects to contiguous public conservation lands is to:

1) Encourage relocation of gopher tortoises from public project sites that are contiguous to public conservation lands;
2) Maintain local gopher tortoise populations, and their genetic and breeding integrity;
3) Minimize stress and other negative impacts to individual gopher tortoises;
4) Minimize the potential for disease transmission to new areas; and

5) Align with and complement existing gopher tortoise relocation options.

The key component to achieving this intent is to limit contiguous relocations to public conservation lands that gopher tortoises could reasonably access naturally and on their own.

This relocation option is intended for public projects where the donor site is contiguous to public conservation lands (see definition) and there is no physical obstacle [e.g., paved road open to the public (i.e., greater than 2 lanes, curb and gutter or other physical barriers, or a speed limit >30mph), railroad bed, impenetrable fence, river, and lake] that would prevent tortoise movement to the recipient site or other upland areas within the relocation/restocking site.

Donor and recipient site parcels or lands that are owned by the same public entity but not part of the contiguous landscape, or donor sites located more than one half mile from the temporary enclosure area within the designated recipient site, will not be considered contiguous under this option. However, this permit option can be used if the contiguous habitat or land is owned by more than one entity, provided that a letter of acceptance is submitted from the recipient site landowner. If linear right-of-way project sites do not meet the definition of contiguous, or do meet the definition of contiguous but donor site tortoise burrow(s) are located more than one-half mile from the temporary enclosure within the designated recipient site, a Conservation permit for off-site relocation must be obtained.

Projects must meet the following criteria for relocating gopher tortoises from public projects to contiguous public conservation lands:

A. To receive a FWC Conservation permit for relocation to contiguous public conservations lands, donor sites must meet the following criteria.
    - The donor site must be contiguous to the public conservation land recipient site.
    - If the recipient site is contiguous but owned by a separate public entity, signed permission from the recipient site landowner must be submitted.
    - Mitigation for tortoises relocated under this Conservation permit option is $200 for the first group of 10 burrows (up to 5 tortoises) and $300 for each additional tortoise.
    - The location of the recipient site temporary enclosure must not be located more than one-half mile from the burrow(s) on the donor site.
B. The recipient site must be contiguous to the donor site and meet the following criteria.
    - Recipient sites must be designated as public conservation lands (see definition) or public lands protected by a minimum 50-year conservation easement (with FWC included as a grantee). For lands where title is held by the State of Florida, the land lease shall be amended to include a recipient site management commitment, and be renewed so the lease is valid for at least 50 years.
    - The public conservation lands recipient site must be a minimum of 40 acres and meet the *acceptable* or *desirable* criteria outlined in Table 2 of these guidelines. Smaller sites in highly developed counties, particularly in southern Florida, will be evaluated on a case-by-case basis, and will be allowed if they are instrumental in retaining the local tortoise resource and can be appropriately managed to perpetuate the relocated population.

- A habitat management plan that includes recipient site requirements that has been approved by the FWC (or a management agreement between the managing agency and FWC), and proof of financial assurance in the form of a general appropriation or allocation approved by a public governing body for management, or equal to that of a long-term protected recipient site (see Appendix 3) must be submitted.
- Monitoring reports that conform to the monitoring requirements described in Appendix 7 of the Gopher Tortoise Permitting Guidelines shall be submitted at the intervals specified for either the duration required for a long-term protected recipient site or 50 years, whichever is shorter.
- The location of the recipient site temporary enclosure must not be located more than one-half mile from the tortoise burrow(s) on the donor site.
- A contiguous recipient site may be utilized for more than one Conservation permit that meets the criteria for this permit option, but the number of tortoises relocated to the site shall not exceed the final site evaluation stocking density.
- The recipient site maximum allowable gopher tortoise density (see Appendix 4) shall not exceed 50% of the maximum stocking density.

Exceptions to some of these criteria may be considered by FWC if the proposed contiguous relocation meets most, but possibly not every requirement outlined in the above criteria, and alternative mitigation activities are also implemented. Examples of alternative mitigation activities that may be considered include: temporarily enclosing tortoises (soft release) for 12 months instead of the minimum of 6 months; permanent fencing that prevents tortoises from entering roadways to reduce the risk of mortality; reduced speed limits adjacent to recipient sites and installation of wildlife crossing signs; or, a combination of these examples or other proposed alternatives that are consistent with and support the intent of these guidelines.

Note: Other options for on-site relocation (short-term or unprotected site) are available if a property does not meet the criteria outlined above for this "contiguous public conservation lands" option.

FWC will review this permit option in two years (from the date of approval) to evaluate if it is still needed and is helping to achieve the management plan goals for the gopher tortoise.

Recipient Site Permits

Criteria for Relocation of Gopher Tortoises to Recipient Sites

The overall conservation goal of the *Gopher Tortoise Management Plan* is "to restore and maintain secure, viable populations throughout the species' current range in Florida." Property owners play a significant role in helping Florida achieve this goal by providing the highest level of security for the gopher tortoise and its habitat on permitted recipient sites. Elements that are integral to meeting this objective include appropriate habitat management, population monitoring, legal protection, and long-term financial assurance provided by the landowner. Not all recipient sites afford relocated gopher tortoises with the same level of protection, however

some sites do provide conservation value by restocking tortoises to managed lands where populations have been depleted, furthering research efforts, preventing the loss of tortoises on development sites, helping to retain local or regional tortoise resources and potentially contributing to the habitat preservation objective if such sites receive long-term protection in the future.

The *Gopher Tortoise Management Plan* contains a series of measurable objectives and conservation actions which include restocking gopher tortoises to protected, managed, suitable habitats where they no longer occur or where densities are low. A team of public conservation land managers has developed guidance regarding the restocking of gopher tortoises on public conservation lands (see Appendix 12). This team includes representatives from the Florida Department of Environmental Protection Florida Park Service, Florida Department of Agriculture and Consumer Services Florida Forest Service, the five Water Management Districts, Florida Communities Trust, and Florida Fish and Wildlife Conservation Commission. Likewise, some of the future research goals outlined in the Gopher Tortoise Management Plan may require the use of sites that receive displaced tortoises to carry out research projects and consequently be designation of research recipient sites. The criteria for research recipient sites are outlined in Appendix 13 and are intended to provide further clarity as to how the agency will implement conservation actions specified in the Plan.

To receive a FWC recipient site permit, candidate properties must meet site suitability criteria for size, soil, and habitat. Site suitability criteria vary according to the level of conservation value provided by the recipient site.

Landowners who meet the basic criteria in these guidelines are encouraged to contact the FWC Gopher Tortoise Permit Coordinator to schedule a pre-application site visit. A preliminary site visit allows FWC staff to evaluate the suitability of the habitat on proposed site. Staff may provide information on habitat management assistance or other measures that may be undertaken prior to completing an application for a FWC recipient site permit. The pre-application site visit can help identify and address potential issues in advance, so the permit application can be processed more efficiently.

A. Conservation Easements or Other Protection: The conservation value of a permitted project and the required mitigation contribution is determined by the level of protection afforded to the relocated gopher tortoise at the recipient site. Four levels of conservation have been defined:

- **Long-term Protected Recipient Sites**: These privately or publicly owned recipient sites must be protected by a perpetual easement that conforms to the standard format available from FWC (see Appendix 8). Conservation easements that were previously granted by landowners to other regulatory, governmental, or conservation entities may be acceptable to FWC if their conditions and restrictions provide habitat protection and management requirements for gopher tortoises and their habitats that are comparable to those contained within FWC's standard easement. However, those easements would need to be modified to designate FWC as a co-grantee.
- **Recipient Sites for Restocking Public Conservation Lands**: These recipient sites consist of publicly owned lands that are currently managed for conservation and are

either designated as conservation lands by Chapter 253.034, Florida Statutes; purchased for conservation purposes using funds from bonds or other monies dedicated specifically for conservation lands acquisition (e.g., Florida Forever, Preservation 2000, local bond initiatives, etc.); or afforded protection under federal law. These publicly owned lands must provide suitable gopher tortoise habitat and must be actively managed under an approved habitat management plan. The land managing agency and FWC must establish either a Memorandum of Understanding (MOU) or an easement that conforms to the standard format available from FWC. Additionally, existing land leases, covenants, and management plans may need to be amended to provide adequate assurance of management. See Appendix 12 for specific details and requirements for restocking public lands.

- **Short-term Protected Recipient Sites:** These recipient sites have some enforceable protection commitment, but those commitments do not meet the definition of "long-term."
- **Unprotected Recipient Sites**: These recipient sites provide relocated gopher tortoises protection for at least two years.

B. **Size**: Perimeter boundaries of recipient sites should ideally be configured in the form of a block, circle, or similar shape. Uplands are considered contiguous if two or more upland communities occur within a distance of 1,000 feet, and there is no physical obstacle (e.g., paved road open to the public, railroad bed, impenetrable fence, river, lake) to prevent tortoise movement to other upland areas within the recipient site. For administrative purposes, FWC will evaluate and authorize use of up to 1,000 acre portions of recipient sites in phases; however, only a one-time mitigation contribution of $500 will be required for permitting a recipient site.

- **Long-term Protected Recipient Sites:** Recipient sites must contain a minimum of 40 acres of contiguous suitable upland tortoise habitat that meet the criteria for soil and vegetation. Smaller sites in highly developed counties, particularly in southern Florida, will be evaluated on a case-by-case basis, and will be allowed if they are instrumental in retaining the local tortoise resource and can be appropriately managed to perpetuate the relocated population. Sites containing greater than 200 acres of contiguous suitable upland habitat will satisfy the size threshold for *Desirable* criteria and may be eligible for an additional 0.5 tortoise per acre increase in the site evaluation maximum allowable tortoise density (see below).
- **Recipient Sites for Restocking Public Conservation Lands:** Recipient sites must contain a minimum of 40 acres of contiguous suitable upland tortoise habitat that meet the criteria for soil and vegetation. Smaller sites in highly developed counties, particularly in southern Florida, will be evaluated on a case-by-case basis, and will be allowed if they are instrumental in retaining the local tortoise resource and can be appropriately managed to perpetuate the relocated population. Sites containing greater than 200 acres of contiguous suitable upland habitat will satisfy the size threshold for *Desirable* criteria and may be eligible for a 0.5 tortoise per acre increase in the site evaluation maximum allowable tortoise density.
- **Short-term Protected Recipient Sites:** Sites must contain a minimum of 25 acres of contiguous suitable upland tortoise habitat that meet the criteria for soil and vegetation.

- **Unprotected Recipient Sites:** Sites must contain a minimum of 25 acres of contiguous suitable upland tortoise habitat that meet the criteria for soil and vegetation.

C. **Soils**: Soils that meet *acceptable* criteria are moderately well-drained to excessively drained, with an average depth to the seasonal high water table (DWT) value of 45 centimeters (1.5 feet) or greater. For sites in flatwoods, land cover maps should be overlain on soils maps to help differentiate hydric areas from more mesic or xeric areas; site visits by FWC may also be required. Poorly drained soils with an average depth to the seasonal high water table (DWT) greater than 31 centimeters (one foot) may meet the *Acceptable* criteria, provided that the proposed site contains augmentation features or is drained by ditches, etc. In these select cases, there must be evidence of past or current use by tortoises. Additionally, stocking densities cannot exceed two per acre on these soil types. Long-term protected recipient sites with an average depth to the seasonal high (DWT) of 130 centimeters (4.3 feet) or greater meet the *Desirable* criteria threshold and may be eligible for a 0.5 tortoise per acre increase in the site evaluation maximum allowable tortoise density. Site-specific soil information can be obtained by referring to the Natural Resources Conservation Service (NRCS) Web Soil Survey (www.soils.usda.gov) for the appropriate county.

D. **Vegetation Features**: Sites with *Acceptable* habitat features are those that contain both of the following: average herbaceous cover of at least 30% and average canopy cover of 60% or less. Woody vegetation should not comprise more than an average of 20% of the herbaceous ground cover. Long-term protected recipient sites and public conservation lands recipient sites for restocking with average herbaceous cover greater than 50% and average canopy cover less than 40% meet the *Desirable* criteria threshold and may be eligible for a 0.5 tortoise per acre increase in the site evaluation maximum allowable tortoise density. Herbaceous cover (low-growing, soft-stemmed plants) should include broadleaf grasses and, preferably, grass-like asters (sunflower family) and legumes (bean family). Vegetation survey methods are outlined in Appendix 7.

E. **Enhanced Conservation Value**: Proposed long-term protected recipient sites and recipient sites for restocking public conservation lands may be awarded a 0.5 tortoise per acre increase in the site evaluation maximum allowable tortoise density if FWC determines that the site has enhanced conservation value by any of the following: 1) adjacency to existing public or private conservation lands that together provide >200 acres of contiguous suitable upland gopher tortoise habitat that satisfy the threshold for *Desirable* criteria; 2) the site boundaries are 100% within a designated Strategic Habitat Conservation Area; or 3) at least 75% of the recipient site is vegetated with one or more of the following native upland plant communities: sandhill, scrubby flatwoods, or dry prairies (Table 2).

F. **Baseline Densities**: Survey techniques to determine the existing (baseline) tortoise population density are provided in Appendix 4. Supporting information should include potential reasons for low tortoise densities (e.g., past harvest; previous, but now rectified, inadequate habitat management). The burrow survey used to generate this estimate must be performed no more than 90 days before the date the permit application is submitted. A map showing the site boundaries, transect locations, locations of all documented tortoise

burrows, and corresponding tortoise densities will serve as the baseline for future monitoring efforts.

G. **Site Evaluation Stocking Rate**: The site evaluation stocking rate is defined as the maximum allowable gopher tortoise density as determined by the scoring process depicted in Table 2, *Acceptable and Desirable Criteria Thresholds for Recipient Site Characteristics*. A site that meets all three *Acceptable* criteria will be assigned an evaluation stocking rate of two tortoises per acre. Evaluation stocking rates for long-term protected recipient sites recipient sites for restocking public conservation lands may increase in increments of 0.5 individual per acre for each *Desirable* criterion that is met, up to a maximum of two additional individuals (four per acre total).

H. **Determination of Final Stocking Rate**: The final stocking rate for a recipient site equals the site evaluation stocking rate minus the baseline density, i.e., final stocking rate = (site evaluation stocking rate) - (baseline density). For all calculations involving stocking rate, consider only tortoises greater than or equal to 130 mm (5 inches) in carapace length. Eggs and juvenile tortoises less than 130 mm are not considered in these calculations because of their low survivorship and minimal effect on the recipient site forage base. Recipient sites for restocking public conservation lands shall be stocked at no more than 50% of the site evaluation stocking rate

When assigning the baseline density and calculating the final stocking rates, applicants submitting permit requests for sites that have been previously approved by FWC and used as a recipient site for tortoise standard relocation and/or incidental take permits shall include the number of resident tortoises reported for the site when it was originally approved and all tortoises released at the site under previously issued FWC permits (or authorized for release when no post-relocation reports have been sent to FWC).

I. **Enclosure Methods**: Restraint of tortoises inside an enclosure at the recipient site for a minimum period of six months is required for all relocations as a condition of the relocation permit. This process is called "soft release." Recent studies have indicated that site fidelity is enhanced by temporarily enclosing tortoises. Because there is still insufficient scientific knowledge regarding tortoise carrying capacity, tortoise response to relocation, post-relocation site fidelity, social interactions between relocated and resident tortoises, and possible disease transmission through relocations, FWC is establishing experimental guidelines at this time to initiate relocation within temporary enclosures and to evaluate the effects. As additional information becomes available, these guidelines may be modified to ensure that they achieve the management plan objectives. The following guidelines include enclosure methods and procedures proven to be effective.

- All tortoises relocated to any recipient site (including unprotected recipient sites) shall be released into a temporary enclosure as described below and retained within the enclosure for a period of not less than six months and no more than twelve months. However, there is no maximum enclosure time limit for recipient sites that are permanently fenced in their entirety and that are stocked at a density equal to the approved final stocking density for the site.
- Applicants with special circumstances may apply to be released from this

requirement. Special circumstances include the following: recipient sites with natural or artificial boundaries to restrain most tortoises (e.g., islands, coastlines, major rivers or large lakes, existing fencing that prevents the passage of all tortoises released at the site).

- Tortoises shall be released into temporary fenced enclosures at no more than 1.5 times the approved overall final stocking density for the site. However, the maximum number of gopher tortoises approved by FWC for release into the entire recipient site parcel shall not be exceeded. Enclosures within recipient sites with varying approved stocking rates may be stocked at 1.5 times the approved density for the area in which the enclosure is located. If an enclosure encompasses an area with varying approved stocking rates, then the enclosure's approved gopher tortoise density will be proportional to the number of acres in each approved stocking rate area. For example, if a 40-acre recipient site initially containing no gopher tortoises includes a 15-acre enclosure encompassing five acres that are approved for a final density of two gopher tortoises per acre and ten acres that are approved for a final density of three gopher tortoises per acre, then the enclosure can receive up to 60 gopher tortoises 1.5 [(5 x 2) + (10 x 3)].
- Temporary enclosures may be of any material that prevents the passage of tortoises of all sizes released to the site. Recommended and cost-effective materials include Belton Industries #935 pre-assembled silt fence (a more durable type of silt fence; see Glossary for purchasing information) and hay or pine straw bales.
- With the exception of hay or pine straw bales, temporary fencing must be buried at least eight inches into the ground to prevent tortoises pushing beneath the enclosure and must be at least two feet high and of sufficient robustness to prevent tortoises pushing or climbing over.
- Temporary fencing must be regularly monitored and maintained to repair damage and maintain the integrity of the temporary enclosure.
- Tortoises observed above ground and tortoise burrow numbers and activity status within the temporary enclosures shall be monitored weekly for the first month and monthly thereafter to document any problems with relocated tortoises (e.g., illness, mortality, evidence of human poaching, emigration). The FWC permitting office must be contacted if decreases in tortoise numbers are documented.

J. **Management Plan:** Gopher tortoise habitat requires active management. A detailed management plan mirroring the length of protection is a vital part of gopher tortoise conservation efforts on all FWC-permitted recipient sites. Management plan requirements are outlined in Appendix 3.

Table 2. *Acceptable* and *Desirable* Criteria Thresholds for Recipient Sites

SITE CHARACTERISTIC	ACCEPTABLE CRITERIA	DESIRABLE CRITERIA
Size	> 40 acres	> 200 acres
Soil	> 45 cm DWT, with land cover verification for flatwoods sites >31 cm (select cases)	>130 cm DWT
Habitat	> 30% herb cover < 60% canopy cover	>50% herb cover <40% canopy cover
Enhanced Conservation Value		Adjacent to protected land, or in Strategic Habitat Conservation Area, or ≥75% native upland community (maximum of 0.5 per acre)
Maximum Allowable Gopher Tortoise Density	Two per acre (requires all above criteria be satisfied)	0.5 per acre for each site characteristic that is satisfied, up to a maximum of two additional (four per acre maximum)

Temporary Exclusion Permit for Major Linear Utility Corridors

This type of on-site relocation conservation permit is specifically reserved for the installation or maintenance of major linear utility transmission lines (e.g., major natural gas or electric transmission lines). This permit applies to situations that require the temporary exclusion of tortoises from the utility construction corridor and where habitats within the corridor will be restored to provide suitable habitat for tortoises following completion of the utility installation. These permits require the temporary installation of filter fabric (silt fencing) or other comparable fencing (buried at least eight inches into the ground) along the outer edge of the construction right-of-way to block tortoise re-entry into the corridor during construction activities. Such fencing is only required along those portions of the construction corridor where tortoises are documented and are to be relocated from the construction area. The FWC will also consider other proposed options of keeping gopher tortoises out of harm's way in the immediate area of construction on these types of projects.

Temporary exclusion permits authorize the capture of tortoises from within the utility corridor right-of-way project area and their immediate release on the other side of the temporary fencing into adjacent suitable habitat. Tortoises must be released outside the project corridor in close proximity relative to where each tortoise was captured. The gopher tortoise density after

relocation within the designated recipient area shall not exceed either three tortoises per acre, or 1.5 times the existing gopher tortoise density within the recipient area, whichever is greater. This does not authorize placement of tortoises on properties not under control of the permittee. The permittee must obtain written approval from the adjacent landowner granting permission to the permittee to release the tortoises on the landowner's property. The temporary fencing must be removed following completion of the utility project and after the habitat has been restored. Tortoises can then naturally reoccupy restored habitat within the utility corridor.

Gopher tortoises may be released into an on-site enclosure in conformance with the FWC enclosure requirements. Enclosures shall not be located on the opposite side of barriers which deter tortoises from returning to the location where they were originally captured. Enclosure fencing shall be removed before expiration of the permitted maximum temporary exclusion time period or upon project completion, whichever comes first. The final gopher tortoise density within the enclosure shall not exceed three gopher tortoises per acre.

The application information requirements for this permit are the same as for conservation permits with on-site relocation of the affected tortoises. This permit is not intended, and will not be issued, for the installation of local utility service lines that are being installed as a precursor to development or to facilitate the development of the adjacent or surrounding area (e.g., infrastructure for specific development projects, planned subdivisions, or multiple projects or subdivisions). Permit applications for those projects must address impacts to all tortoises and tortoise burrows contained within the entire planned project development boundaries. For major linear utility corridor projects that include the construction of permanent structures used to service or maintain the installed utilities (e.g., gas compressor stations, water wells, pumping stations) do not qualify for a Temporary Exclusion permit and must be permitted separately to permanently relocate gopher tortoises.

Burrow or Structure Protection Permit

Burrow or Structure Protection permits are available when the integrity or utility of an existing structure is jeopardized by one or two burrows and therefore poses a public safety concern (e.g., burrow under a propane tank), or if the safety of the resident tortoise is compromised (e.g., burrows in a grass parking lot, dirt driveway, etc.). Application requirements and tortoise capture and handling procedures are similar to those for 10 or Fewer Burrows permits (See Appendix 11); however, tortoises relocated under a Burrow or Structure Protection permit shall only be relocated on-site. This type of permit may only be issued once a year for a contiguous property under the same ownership. As part of the application process, the applicant must complete the required online training (available at MyFWC.com/GopherTortoise) or the approved equivalent written training, unless the relocation activities are conducted by an Authorized Gopher Tortoise Agent.

In most cases, it is best to live with tortoises and their burrows. Relocations are stressful for gopher tortoises. The process takes time, money, and physical labor. Typical activities associated with residential lawn and landscape maintenance do not require a permit, provided the activities do not collapse gopher tortoise burrows or harm gopher tortoises. Activities that

require a permit are listed in Section II, Determining If a Permit Is Required. Visit MyFWC.com/GopherTortoise or contact FWC for more information on living with gopher tortoises.

On-Site Relocation under the Burrow or Structure Protection permit

This permit authorizes landowners or other individuals who have completed FWC online training to capture gopher tortoises (via bucket trapping, hand-shovel excavation, or live trapping) and to relocate tortoises to an on-site location within the property boundaries specified in the application. [**Note:** Only an authorized agent whose permit authorizes the supervision of burrow excavations using mechanical equipment may capture or attempt to capture gopher tortoises using a backhoe.] On-site recipient area criteria follow the same criteria as the 10 or Fewer Burrows permits and can be found in Appendix 11. Landowners may obtain the assistance of an authorized gopher tortoise agent for on-site relocations, as described under *Authorized Gopher Tortoise Agent Permit* above.

Release of tortoises must be accomplished in such a way as to preclude tortoises from returning to their burrows. Penning is not allowed under the Burrow or Structure Protection permit. These permits may require permanent or temporary fencing in an appropriate configuration to exclude tortoises from returning to the compromised burrow. Collapsing or filling those burrows is required upon capture and relocation of the resident tortoises. If fencing is necessary, a brief explanation should be provided in the application addressing why and what methods will be used to restrict tortoise access.

Tortoises cannot be relocated off-site under a Burrow or Structure Protection permit. If adequate suitable gopher tortoise habitat is not available on-site and tortoises must be moved off-site, applicants may qualify for a 10 or Fewer Burrows permit.

Emergency Take without Relocation Permit

This permit will be issued only under limited and specific circumstances, in cases where there is an immediate danger to the public's health and/or safety or in direct response to an official declaration of a state of emergency by the Governor of Florida or a local governmental entity. Applications submitted for this permit must include all information that is required from any other applicant seeking a conservation permit, along with a copy of the official declaration of a state of emergency. This permit process may be handled after the fact or at least after construction activities have already started. It is preferred that contact with FWC should be made as soon as possible to minimize adverse impacts to gopher tortoises and their burrows.

This section does not cover what should happen when a local emergency requiring immediate action to protect human safety and welfare, property, and wildlife and its habitat occurs. Because it is not possible to anticipate every circumstance (*e.g.*, a local oil spill along a highway that contaminates soil adjacent to a gopher tortoise burrow), the best solution would be for anyone encountering an emergency to contact FWC as soon as possible and to request assistance in determining the best course of action to take.

Disturbed Site Permit

Criteria for Relocation of Gopher Tortoises from Disturbed Sites

The Disturbed Site permit may be required in situations where premature disturbance to the vegetation or ground has occurred before gopher tortoise burrow surveys are complete or before gopher tortoise capture and relocation activities have been completed. This permit provides an option for mitigation and relocation of tortoises within disturbed portions of the project area. These permits are not punitive and may or may not be issued in association with FWC law enforcement investigations, but will not be issued until all associated FWC law enforcement investigations have been completed. Survey, capture, and relocation activities must be conducted by an Authorized Gopher Tortoise Agent.

Disturbed Site permits are issued when ***all four criteria*** below are met:

- Evidence of site disturbance to the ground or vegetation must be present on the site and within suitable gopher tortoise habitat
- Site disturbance either prevents:
    - Complete and accurate tortoise burrow surveys from being conducted (15% and 100% surveys as described in FWC guidelines), or;
    - FWC staff from conducting on-site inspections to verify 15% or 100% survey results prior to site disturbance commencing.
- Any one of the following applies:
    - Impact is to any part of the project area with documentation of gopher tortoises burrows on site (e.g., a past, valid, tortoise burrow survey of the disturbed area exists, showing burrows were present; physical evidence that burrows were present; or photographs), or;
    - Evidence of tortoise burrows is visible within the disturbed area, on the property where disturbance occurred, or is within close proximity on adjacent properties, or;
    - Evidence of impact to any tortoise or tortoise burrow.
- Disturbance to the project site has occurred within the past 18 months.

The criteria above may be met before a tortoise permit application has been received by FWC, during the permit application process, or after a permit has been issued, depending on when disturbance activities occur.

If the project site meets all criteria before 100% burrow survey reports and maps are submitted to FWC, or before the 72-hour waiting period after which such reports have been received by FWC, or before the completion of gopher tortoise capture and relocation activities, then active relocation permits or permit applications will be revoked or denied so that a Disturbed Site permit application may be submitted.

In cases where only a portion of the project site is prematurely disturbed and all relocation activities will not be covered under a Disturbed Site permit, another relocation permit (e.g.,

Conservation permit) will be issued for the remainder of the property. This only applies when discrete and contiguous, undisturbed areas of the project site can be identified.

Disturbed sites require different burrow survey protocols for estimating numbers of tortoises present and calculating mitigation contributions. Refer to Appendix 4 for details.

Mitigation Contributions, Refunds, and Recipient Site Requirements

All mitigation contributions must be submitted before Disturbed Site permits are issued. Mitigation contributions for Disturbed Sites are higher than for other relocation permits to mitigate for tortoises which may be buried underground or have left the project site in response to disturbance activities and cannot be relocated. FWC may provide a refund for each tortoise successfully captured and relocated as described for each permit type. Refunds for mitigation are not provided if no tortoises are relocated.

Areas within the project site that were not disturbed will be covered in a separate conservation or temporary exclusion permit. Reduced mitigation for relocation permits for the first five tortoises (10 burrows) will only be allotted for one of the two permits associated with the project. The disturbed site permit and other associated permit will be applied for concurrently.

All project sites qualify for one of three disturbed site permit types: "10 or Fewer Burrows," "Conservation," or "Temporary Exclusion." The entire project site is considered when determining the permit category, including any undisturbed areas (which are permitted separately). For example, a project site with 10 burrows inside disturbed areas and three burrows outside disturbed area (i.e., a total of 13 burrows) would qualify for a Disturbed Site Conservation permit. In this case, a Disturbed Site Conservation permit would authorize gopher tortoise relocation for the disturbed areas and a separate Conservation permit would authorize gopher tortoise relocation for the undisturbed portion of the project site. Temporary Exclusion Disturbed Site permits only cover the disturbed portion of the project site.

Disturbed Site 10 or Fewer Burrows Permit

The mitigation contribution for this permit follows the standard 10 or Fewer Burrows permit (outlined in Table 1.) with an additional $500 required for each tortoise estimated within the disturbed area. FWC may provide a refund of $500 for each tortoise successfully captured and relocated. In instances where additional tortoises greater than the original permitted number are found, a permit amendment must be requested (with additional mitigation) and received prior to continuing relocation activities.

Disturbed Site Conservation Permit

The mitigation contribution for this permit follows that of the standard Conservation permit (outlined in Table 1.) with an additional $1,500 required for each tortoise estimated within the disturbed area. FWC may provide a refund of $1,500 for each tortoise successfully captured and relocated. In instances where additional tortoises are captured greater than the original permitted

number, a permit amendment must be requested (with additional mitigation) and received before additional tortoises are relocated.

Disturbed Site Temporary Exclusion Permit for Major Linear Utility Corridors

The mitigation contribution for this permit follows that of the Temporary Exclusion permit for exclusions of 4-6 months (outlined in Table 1.), with an additional $500 required for each tortoise estimated within the disturbed area. FWC may provide a refund of $500 for each tortoise successfully captured and relocated. In instances where additional tortoises are captured greater than the original permitted number, a permit amendment must be requested (with additional mitigation) and received before additional tortoises are relocated.

Due Process for Gopher Tortoise Permit Applicants

The FWC adheres to the time requirements specified in Chapter 120, Florida Statutes, for processing permit applications. Upon submittal of an application, FWC staff will respond within 30 days requesting any additional information from the applicant. Upon receipt of all information necessary to complete an application, FWC staff will prepare and issue a permit within 90 days (but attempt to accomplish this within 45 days). Any person has a right to challenge the action of FWC on a given permit application. Each permittee is provided an "Election of Rights" form with the issued permit that conveys instructions for filing an informal or a formal hearing request.

Any non-permitted person who believes that their substantial interests would be affected by the action taken by FWC on a gopher tortoise permit application may also petition the agency for a hearing. For information on how to submit such a request, please contact: The Office of General Counsel, Florida Fish and Wildlife Conservation Commission, 620 South Meridian Street, Tallahassee, Florida 32399-1600.

Deviations from permitting requirements shall be granted only when the person subject to the requirements demonstrates a substantial hardship not intended by these guidelines and which violates principles of fairness. The person must also demonstrate the goals of the underlying Gopher Tortoise Management Plan will be or have been achieved by other means. For purposes of considering granting a deviation, "substantial hardship" means a demonstrated economic, technological, legal, or other type of hardship to the person requesting the deviation. For purposes of considering granting a deviation, "principles of fairness" are violated when the literal application of rules or guidelines affects a particular person in a manner significantly different from the way it affects other similarly situated persons.

V. HANDLING OF COMMENSAL SPECIES DURING RELOCATIONS

As the keystone species of Florida's uplands, the gopher tortoise provides refuge to some 350-400 other species. These commensal species may be intimately tied to tortoise burrows or may be occasional visitors, but the underground microhabitats serve as multi-purpose retreats that are

used for feeding, resting, reproduction, and protection from temperature extremes, moisture loss, and predators. Threats to commensal species are similar in nature to those faced by the gopher tortoise and have been addressed in the Gopher Tortoise Management Plan. One of the objectives outlined in the Management Plan is to promote the responsible, humane relocation of burrow commensals encountered during relocation efforts. An added benefit is the likely increase in biodiversity when commensals are released with the tortoises on recipient sites. The guidelines in Appendix 9 have been created to provide guidance for authorized agents who capture commensal species during gopher tortoise relocations. Emphasis is placed on four listed species, with the understanding that these species have habitat needs that generally go beyond those of the gopher tortoise and will, therefore, need to be considered during relocations.

APPENDICES

Appendix 1. Rules and Policies Protecting Gopher Tortoises and Their Burrows

RULE:

68A-27.003 Designation of Endangered Species; Prohibitions.

(1)(d)3. The gopher tortoise (*Gopherus polyphemus*) is hereby declared to be threatened, and shall be afforded the protective provisions specified in this subsection. No person shall take, attempt to take, pursue, hunt, harass, capture, possess, sell or transport any gopher tortoise or parts thereof or their eggs, or molest, damage, or destroy gopher tortoise burrows, except as authorized by Commission permit or when complying with Commission approved guidelines for specific actions which may impact gopher tortoises and their burrows. A gopher tortoise burrow is a tunnel with a cross-section that closely approximates the shape of a gopher tortoise. Permits will be issued based upon whether issuance would further management plan goals and objectives.

Gopher Tortoise Enforcement Policy

Florida Fish and Wildlife Conservation Commission
620 South Meridian Street, Tallahassee, FL 32399

POLICY☒; POSITION☐; GUIDELINE☐.

TITLE: **Gopher Tortoise enforcement**

APPROVAL AUTHORITY: OFFICE OF EXECUTIVE DIRECTOR

DATE:

GENERAL POLICY STATEMENT

Agricultural, Silvicultrual, and Wildlife management activities

This policy is for the purpose of enforcement of Chapter 68A-27 relating to Gopher tortoises with respect to agricultural and silvicultural activities or activities intended to improve native wildlife habitat. The adoption of the Gopher Tortoise Burrow rule does not expand pre-existing gopher tortoise regulatory prohibitions or change existing policy or practice with respect to agricultural and silvicultural activities.

An illegal take of a gopher tortoise burrow includes, but is not limited to, damaging, collapsing or covering a gopher tortoise burrow from land clearing, bulldozing, grading, paving, or building construction associated with land development, without a permit issued under Chapter 68A, Florida Administrative Code.

Gopher tortoise or gopher tortoise burrow permits are not required to conduct agricultural activities, silvicultural activities, or activities intended to improve native wildlife habitat. Such activities include, but are not limited to, tilling, planting, mowing, harvesting, prescribed burning, mowing, disking, roller-chopping, and tree-cutting.

Burrow prohibition

The prohibitions related to gopher tortoise burrows will not be applied when a landowner can demonstrate that those burrows are no longer used by gopher tortoises by conducting a gopher tortoise survey in accordance with FWC guidelines.

As stated in Chapter 68A-27 "gopher tortoise burrow" is defined as a tunnel in the ground with a cross-section that closely approximates the shape of a gopher tortoise.

Solely for the purpose of this policy, the presence of one or more of the following characteristics indicates that gopher tortoises or gopher tortoise burrows may be present:

(a) Ground surrounding a burrow entrance shows evidence of gopher tortoise activity including but not limited to presence of a gopher tortoise; gopher tortoise eggs or egg shell fragments; impressions from the bottom shell of the tortoise;

foot-prints or tracks left by tortoises; scat; obvious feeding trails radiating out and extending into surrounding vegetation);
(b) Sand mound from the burrow excavation apparent at the burrow entrance;
(c) Located in well-drained to moderately well-drained, sandy soils;
(d) Located in sandhill, scrub, coastal dunes, flatwoods, dry prairie, dry hammock communities, or any disturbed version of these plant communities (such as, but not limited to, pastures, old fields, yards, power line corridors, roadsides);
(e) Other burrows with the shape defined above, and with one or more of the characteristics described in (a)-(d) above, located on the site or in proximity on adjacent property.

This policy will remain in effect until replaced with policy or rule.

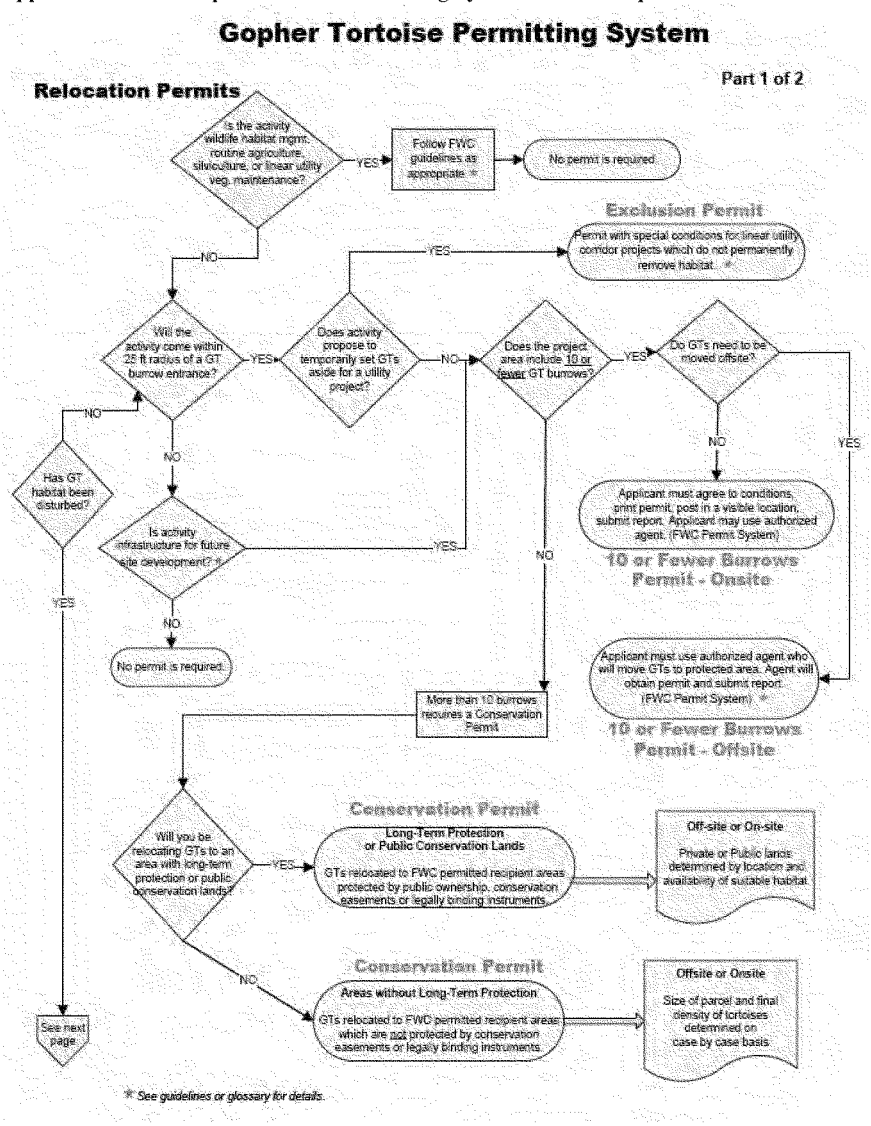
Signature on file

Kenneth Haddad, Executive Director

3/6/08

date

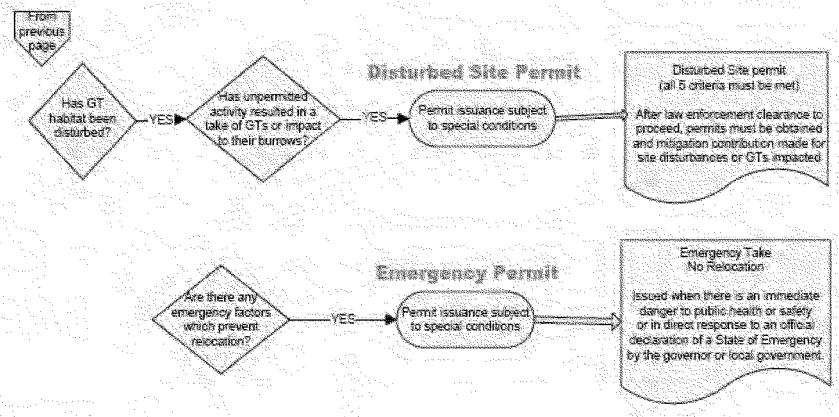
Appendix 2. FWC Gopher Tortoise Permitting System Process Map



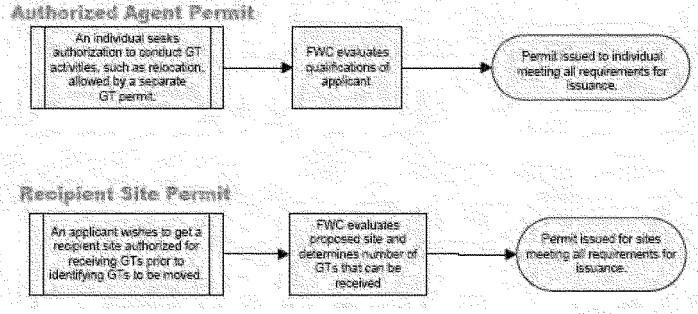
Gopher Tortoise Permitting System

Part 2 of 2

Special Permits



Authorizing Permits



February 2010

Appendix 3. Information Needed for Relocation Permit Applications and Recipient Site Permit Applications

Although each permit type has additional specific information that will be required on application forms either online or in hard copy, this appendix outlines the primary information that FWC staff will need to process applications for relocation permits and recipient site permits.

General information needed for relocation permits and recipient site permits:

1. Name and contact information of the authorized agent that will be performing the gopher tortoise activities. Mailing and physical addresses are needed, as well as phone and facsimile numbers and e-mail addresses.

2. Certification: Applicant must certify by signature that the information and supporting documents submitted are complete and accurate.

3. Name and all contact information for the property owner (for development sites, also provide the developer's name and contact information if different from that of the property owner).

4. Location map and directions to the site**:** Must provide sufficient detail (e.g., identify all adjacent roads, water bodies, and other major physical landmarks) to allow vehicular access for FWC inspection. All maps submitted during the application process should be in an 8.5x11-inch or 8.5x14-inch in format.

5. Most current digital orthoquad or equivalent one-meter resolution aerial photograph of the site**:** Scale of 1 inch = 800 feet or less.

6. Parcel identification**:** Provide latitude/longitude coordinates; section/township/range; parcel identification number (PID), which can be obtained from the county property appraiser's office; and deed showing proof of ownership. For development sites, also provide the name of the project; for recipient sites, provide the name of the property (if applicable). For temporary exclusion permit applications for major utility corridors, PIDs are not required, and latitude/longitude coordinates must be provided for only the beginning and end points of the utility corridor.

7. Habitat types**:** Provide a table listing existing land uses (i.e., vegetation community types) by acres (along with corresponding land cover maps) for the entire project and for all potential tortoise habitats to be impacted. For temporary exclusion permit applications, completion of the land use table is optional, but the land cover map must be provided. For recipient site applications, provide this habitat information (and maps) for the entire property and for the specific phase or parcel within the property proposed for relocation/restocking. For each community type on recipient sites, describe the condition, characteristics, land use history, and other factors that may influence tortoise habitat quality and/or manageability. Accepted sources for land use classifications are as follows:

- Florida Department of Transportation (DOT)–Florida Land Use, Cover and Forms Classification System (FLUCFCS); or
-
- FWC Center for Biogeographic Spatial Assessment-LANDSAT (i.e., satellite imagery).

8. Soils**:** In tabular form, provide a list of soil types, average depth to the seasonal high water table (DWT), and acreage for each soil found within the entire project and potential tortoise habitat to be impacted (development sites) and within the specific phase or parcel of the property proposed as a recipient site; also provide corresponding soils maps. The accepted source for soil type classification is the Natural Resources Conservation Service (NRCS) Web Soil Survey database that can be accessed at: www.soils.usda.gov. For temporary exclusion permit applications, completion of the soils table is optional, but soils maps must be provided.

9. Current gopher tortoise population size and density (tortoises per acre)**:** Provide a map depicting current locations of tortoise burrows and indicate burrow activity (potentially occupied vs. abandoned, see Glossary and Appendix 4). Burrow survey methods are outlined in Appendix 4. Show all transects, as well as observed burrows and their activity status, overlain on the map of potential tortoise habitat.

Additional information required for relocation permits:

1. Provide the proposed start date for the development.

2. Indicate whether tortoises are proposed to be relocated on-site or off-site, and provide the necessary location and contact information for the designated off-site recipient area, if known. You may use the online recipient site locator mapping tool (MyFWC.com/GopherTortoise) to find available recipient sites or contact FWC. All applicants must provide proof of reserved capacity at a recipient site(s) to accommodate all gopher tortoises to be relocated from the entire permitted donor site, with the reservations maintained for the duration of the issued permit.

3. If the relocation is to occur on-site, provide all the necessary information needed for recipient sites (size of on-site preserve, location within the project, habitat types, soils, proposed stocking density, etc.). On-site recipient areas may have site-specific requirements imposed as part of the permit to reduce potential harm to tortoises. For temporary exclusion permit applications, completion of the habitat types/land use table and the soils table are not required, but the land use and soils maps must be provided.

4. For temporary exclusion permits (major utility corridors), indicate the location of the exclusion fencing on the habitat map.

Additional information required for recipient site permits:

1. Calculated stocking rate: As described in the criteria for recipient sites, provide both the number of additional tortoises requested for release on the site and the final, post-relocation tortoise density that would result. To calculate current tortoise population size, baseline density, and stocking rate, consider only tortoises greater than or equal to 130 mm (5 inches) in carapace

length. Eggs and juvenile tortoises are not considered in these calculations because of their low survivorship and minimal effect on the recipient site forage base.

2. Enclosures: Requirements for using enclosures to temporarily contain the tortoises within the recipient area are described in the guidelines under Recipient Site permits. Provide information on enclosure(s) size, location, enclosure materials, and proposed tortoise density within enclosures (noting that maximum density within enclosures cannot exceed 1.5 times the final stocking density for the recipient site). Show proposed enclosure locations on a map of the site.

3. Draft conservation easement: Should conform to the standard format available from FWC (as found in Appendix 8); any changes to the standard must be provided with all proposed additions underlined and all proposed deletions indicated by a strike-through. Should include a survey and legal description, title search/commitment, and draft site management plan (described below).

4. Site management plan: Site management plans shall contain the following: both qualitative and quantitative baseline information that describes existing conditions; goals of future management actions; description of invasive exotic infestations and proposed control program; list and timeline for implementing management activities; quantifiable desired future conditions for canopy cover and herbaceous ground cover; schedule and methods for conducting tortoise population monitoring and habitat monitoring; remedial actions if proposed activities do not achieve desired results; estimate of annual management budget for the site. Below is a list of the major habitat management elements that are required as part of the application package.

    - *Base map*: Indicate property boundaries, land use cover types, management units, and baseline density transect locations with corresponding density values.
    - *Tree canopy management activities/timelines:* Describe practices and treatment intervals that will be used to maintain canopy cover at 60% or less.
    - *Ground cover management activities/timelines:* Describe practices and treatment intervals that will be used to maintain herbaceous ground cover at 30% or more; if applicable, include treatment practices for problematic exotic plants. Refer to Florida Exotic Pest Plant Council (www.fleppc.org) for a list of species.
    - *Compatibility of proposed land uses:* Describe what types of land uses are proposed for the site and how activities related to these land uses would be conducted to foster the open canopy and herbaceous ground cover noted above, while not adversely affecting the ability of gopher tortoises to excavate and maintain their burrows or to otherwise inhabit and utilize the site.
    - *Other habitat enhancement proposed:* Describe proactive measures that could enhance tortoise site fidelity, e.g., berms, spoil piles, forage plantings, fencing.
    - *Tortoise population and habitat monitoring*: Recipient site operators are required to submit a summary of the habitat management conducted and the results of habitat monitoring and tortoise density surveys in a report to FWC every three years; guidelines regarding survey methods, and a template for the report, will be provided.
    - *Financial assurance of management*: The purpose of the financial assurance instrument is to ensure that adequate funds will be generated and provided for the long-term management of gopher tortoise habitat within the recipient site. When FWC issues a permit for activities that impact species, the permittee may be required, as part of the

mitigation, to protect property and habitat. Typically, the permit will require permittees or their successors to actively manage the property in a way that will enhance or maintain the property.

The applicant must provide FWC with information about which instrument will be used by the permittee to ensure that funding will be available for the management of the mitigation property for the duration specified in the permit. Below are examples of commonly used assurance options:

- trust agreement
- deposit of cash or cash equivalent into an escrow account
- performance bond
- irrevocable letter of credit
- certificate of professional liability insurance
- general appropriation or allocation approved by a public governing body (e.g., Florida Legislature) for habitat management (public conservation lands only)

Each of these options provides different levels of assurance to FWC and relative burden on the permittee. Other forms of financial assurance of management may not be well-suited for ensuring adequate funding of perpetual management (e.g., audited financial statement), but may still be appropriate as an interim guarantee in conjunction with another option (suitable only six months maximum from permit issuance).

If a recipient site applicant elects to use a trust agreement or escrow account option to satisfy the financial assurance requirement, either of the options described below will be considered by FWC.

1) Establish a habitat management fund endowment that is fully funded when the recipient site is established. The per-acre endowment required for recipient sites would be determined on a case-by-case basis and based on the annual cost per-acre required to manage the site (e.g., a 200-acre site requiring $20/acre per year for management would require an endowment of $500/acre, or $100,000 total). The endowment would be maintained within an interest-bearing account that generates 4% per year. The interest generated by the account would be used to conduct the required habitat management; the principal is not spent.

2) Establish a base endowment initially, with additional funds added to that endowment as each relocated gopher tortoise is received at the recipient site. The base endowment should at least be equal to the amount of money required to implement one complete cycle of habitat management within the permitted phase(s) of the recipient site (e.g., burn or roller chop the permitted recipient site). Additional funds must be added incrementally to the base endowment, as each relocated gopher tortoise is received at the recipient site, so that the habitat management endowment is fully funded by the time all gopher tortoises that have been authorized for relocation to the recipient site have been received. The specific

dollar amount that must be added to the endowment for each relocated gopher tortoise depends on a number of factors, such as:

- the dollar amount needed to fund the total habitat management endowment;
- the number of gopher tortoises authorized for relocation to the recipient site; and,
- whether only interest generated by the financial assurance account will be used to fund ongoing habitat management, or if additional deposited principal funds will be used to fund ongoing habitat management.

Appendix 4. Methods for Burrow Surveys on Development (Donor) and Recipient Sites

Development (donor) Site Surveys

A burrow survey covering a minimum of 15% of the potential gopher tortoise habitat to be impacted by development activities (including staging areas for heavy equipment) is required in order to apply for a relocation permit (10 or Fewer Burrows permits require a 100% survey up-front, see Appendix 11). These surveys must take place no more than 90 days prior to submitting an application. Because gopher tortoises and their burrows are protected from development activities by Florida law, regulatory compliance requires a comprehensive, 100% burrow survey of all potential tortoise habitat proposed for development. These 100% surveys must be conducted no more than 90 days prior to, and no fewer than 72 hours before (excluding weekends and holidays) commencing gopher tortoise capture and relocation activities. To effectively locate all potentially occupied tortoise burrows and provide FWC staff the opportunity to check such surveys, 100% surveys and the burrow location map must be received by FWC at least seventy-two (72) hours (excluding weekends and holidays) before gopher tortoise capture and relocation activities begin. All gopher tortoise burrows must be marked with flagging tape. (See details presented below for burrow marking and survey methodology.) Site preparation for development (such as land clearing) may commence on the project site, or for phases of the project site, for which gopher tortoise capture and relocation activities have been completed (see Site Preparation Activities for Development, in Section II, for details). Site preparation which occurs prematurely may require issuance of a Disturbed Site permit (see p. 28).

Recipient Site Surveys

A minimum of 15% of potential gopher tortoise habitat must be surveyed on recipient sites that are proposed to receive relocated tortoises. This survey must be designed to assess all soil types and vegetative communities that are potential gopher tortoise habitat. The primary purpose of the recipient site survey is to obtain a density estimate of existing number of gopher tortoises per acre so that a biologically appropriate determination can be made regarding the number of relocated tortoises that can be added to the site. This value is the baseline density. The baseline density is subtracted from the maximum allowable gopher tortoise density (see Table 2), and the result is the final stocking rate for that particular recipient site.

All surveys completed by authorized agents are subject to field verification by FWC. If FWC determines that the submitted survey results provide an inaccurate estimation of the resident gopher tortoise population, either additional surveys or a re-survey may be required. If the number of gopher tortoise burrows identified on site exceeds the number authorized for capture and relocation under the existing gopher tortoise permit, the permittee must apply for an amendment and obtain an amended permit for the additional burrows from FWC before the initiating any gopher tortoise capture and relocation activities for the additional burrows.

Documentation and reporting results from development and recipient site surveys:

1. Land Cover Map: Provide an up-to-date aerial photograph of the development site or recipient site and identify all land cover types. (See acceptable types of land use classifications in Appendix

3.) All maps, including the aerial photograph, should be at a scale of one inch equals 800 feet or less. List all land cover types and associated acreage either on the map or on an accompanying table.

2. Soils Map: Attach a Natural Resources Conservation Service (NRCS) Web Soil Survey map depicting each soil type and the average depth to the seasonal high water table (DWT) value for each soil type within the project site.

3. Gopher Tortoise Habitat Map: Provide a map that delineates potential tortoise habitat on the project site or recipient site and provide an acreage estimate by land cover type.

4. Burrow Location Map: Plot and label the location of each burrow observed during the burrow survey. Attach a table that shows the burrow label, activity class (see below), and associated global positioning system (GPS) coordinates.

Gopher Tortoise Burrow Activity Classification

Potentially Occupied Burrow: This classification combines the active and inactive categories and, therefore, includes burrows with obvious sign of use and those with minimal or no obvious sign of use. A potentially occupied burrow is in good repair, with the classic half-moon shaped entrance. These burrows may have tortoise tracks or plastron scrapes clearly visible on the burrow floor or on the mound, or they may have subtle or no tortoise sign. The lack of observable tortoise sign may be due to weather or season. The burrow floor may contain loose soil caused by tortoise activity or it may be hard-packed. The burrow mound may or may not have vegetation growing on it, and it may be partially covered by fallen leaves. Potentially occupied burrows must be recorded on burrow location maps and used to calculate gopher tortoise densities.

Abandoned Burrow: An abandoned burrow appears unused and dilapidated. The entrance is partially or completely collapsed, and the burrow is partially or completely filled with leaves or soil. Recent rains, or recent activity by livestock or humans, do not appear to be the primary reason for burrow collapse. There are no trails into the burrow that might indicate that a tortoise recently passed through the leaf litter or that a small tortoise is using a dilapidated adult burrow. Abandoned burrows must be recorded on burrow location maps but **not** included in tortoise density calculations.

Burrows that are < 130 mm (5 inches) in width shall be recorded on burrow location maps. Potentially occupied of this size must be permitted and shall be included in tortoise density calculations. Mitigation contributions are required for burrows and tortoises in this size class found on donor sites. Refunds will be provided by the FWC for relocated juvenile tortoises (less than 130 mm carapace length) after a refund request form is submitted by the permittee or its agent and the permit's final after action report is approved by the FWC. These juvenile gopher tortoises must be relocated to the approved recipient site but they are not counted against a recipient site's remaining capacity to receive gopher tortoises after the final after action report for a permit is submitted and it is approved by the FWC.

Burrow Survey Methods (Minimum of 15%)

1. Using evenly spaced belt transects, distribute these transects across all potential tortoise habitat within the designated donor or recipient site to provide at least 15% coverage. This initial step is a map exercise (see illustration below), and transect locations should be indicated on the gopher tortoise habitat map.

2. Maximum dimensions for each individual transect are 250 meters (820 feet) long and 16 meters (52 feet) wide. The area covered by this size transect is approximately one acre (0.4 hectare). In areas with heavy cover, the width of each transect must be reduced to allow for 100% detection of burrows within the transect, and the total area covered by the transect must be recalculated to adjust for the reduced width.

3. One or multiple observers may conduct these burrow surveys. When multiple observers are used, sufficient distance must exist between observers to ensure that transects do not overlap. It is essential that observers focus solely on searching for burrows. They should not be performing vegetation sampling (i.e., on recipient sites) concurrently or conducting other activities.

4. Provide GPS coordinates for all burrows observed within, or partially within, the boundaries of each transect. GPS data taken with sub-meter accuracy in Decimal Degrees using the data settings of North American Datum of 1983 (NAD83 feet) Albers/High Accuracy Reference Network (HARN) is preferred, but not required. Burrows shall be marked with flagging tape indicating the burrow's label and activity class. This will assist field verification of surveys by FWC. The burrow label, status, GPS coordinates, accuracy of data and projection the coordinates shall be recorded and reported to FWC so that the burrow can be identified later.

5. For each transect, report the raw data in a table (transect dimensions, number of burrows by activity class, number of burrows by size class, and burrow density per acre). For the donor or recipient site, report the average tortoise density using the following calculation:

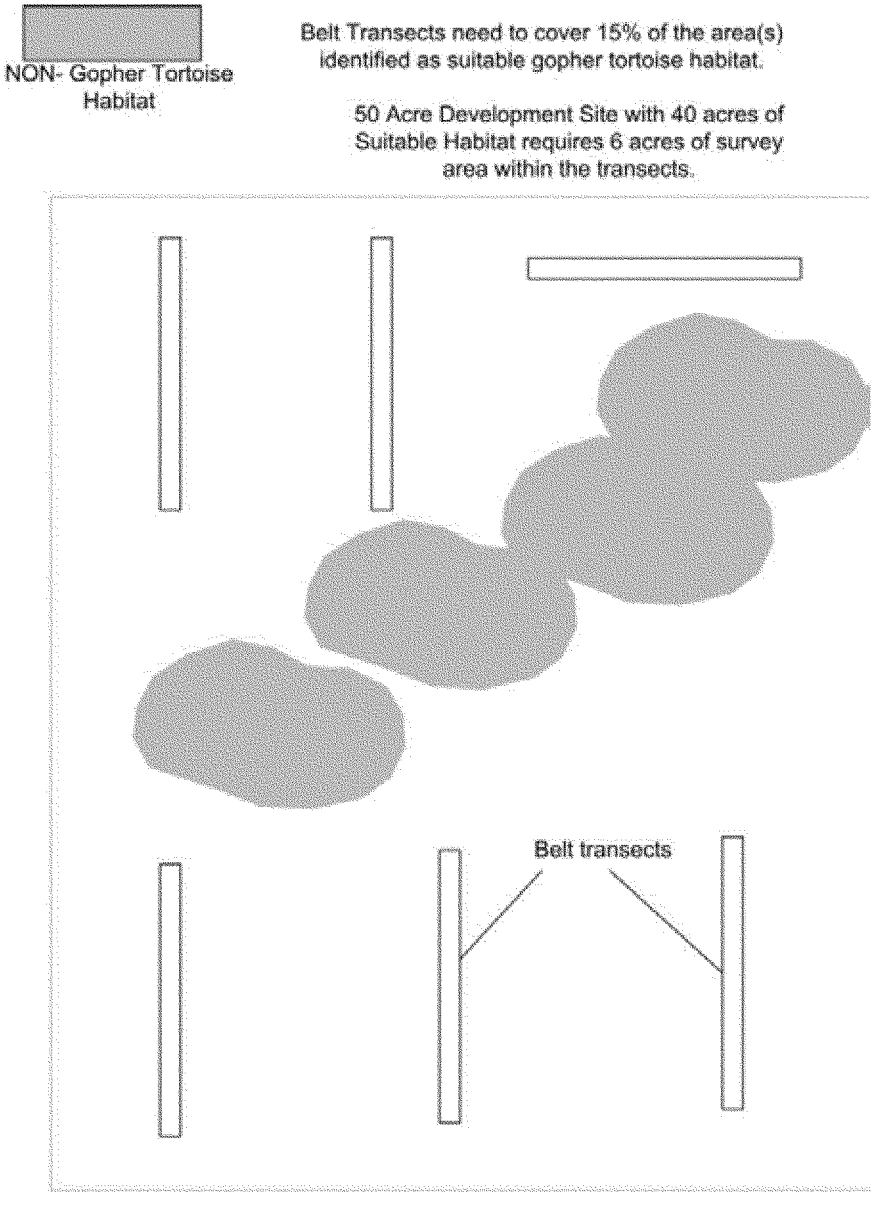
   $$\frac{\text{(Total Potentially Occupied Burrows)}}{\text{(Total Acres within Survey Area)}} \times (0.50) = \text{Tortoises / Acre}$$

   Estimating the Gopher Tortoise Population within a Donor Site:
   Tortoises/Acre multiplied by the Number of Acres of Potentially Occupied Gopher Tortoise Habitat = Estimated Number of Tortoises Present

   Calculating the Gopher Tortoise Stocking Density for a Recipient Site:
   Site Evaluation Maximum Allowable Gopher Tortoise Density minus the Baseline Density = Final Stocking Rate

   Calculating the Number of Gopher Tortoises that can be released within a Recipient Site:
   Final Stocking Rate multiplied by the number of Acres of Gopher Tortoise Habitat = Number of Gopher Tortoises Allowed to Be Released

Example of burrow survey using belt transects:



Burrow Survey Methods (100%)

1. All potential gopher tortoise habitat that will be impacted by development activities must be searched for burrows. The recommended approach is to systematically search the entire impact zone by traveling parallel transects spaced appropriately for the habitat conditions (i.e., the length may be consistent or vary with the shape of the site, but the width should allow 100% detection of burrows). The search can be conducted by one or more observers. Transect edges should be marked with flagging to ensure complete coverage. In open habitat, such as mowed pasture or natural sandhill, transects should be spaced no more than 10 meters (33 feet) apart. In thicker habitat, such as flatwoods and scrub, transects should be spaced as close as five meters (16 feet) apart. Patches of extremely thick habitat, such as saw palmetto or blackberry patches, should be searched more intensely, with spacing at approximately one meter (three feet) or less.

2. All burrows observed (i.e., potentially occupied and abandoned) should be marked with flagging tape that indicates the burrow's label and activity class. This will assist field verification of survey by FWC. The burrow label, status, and GPS coordinates should be recorded and reported to FWC so that the burrow can be identified later.

Surveys Conducted in Application for a Disturbed Site Permit

In cases of an application for a Disturbed Site permit, a modified survey protocol is required. It is necessary to estimate both the number of tortoises within the disturbed area and (if applicable) the number of tortoises outside the disturbed area which are still within the boundaries of the project site.
Once site disturbances within the project area cease, a minimum 28-day waiting period (this may be longer depending on temperature and season) is required before tortoise burrow surveys are conducted within disturbed areas. This gives tortoises time to dig out of collapsed burrows. Following this waiting period, 100% burrow surveys must be conducted throughout the disturbed area to provide an estimated number of tortoises present. All burrows receive the conversion factor of 0.5 (50% burrow occupancy rate).

These new 100% survey results must then be compared to one of the following surveys/options:

1. An "older, acceptable survey" of the disturbed area (surveys must not be more than one year old from the time new 100% surveys are completed, and must have been conducted in accordance with survey protocols in this document).
2. A 15% survey of remaining undisturbed tortoise habitat within the project site that is similar to the disturbed area (see survey methodology below). Survey area must be large enough to represent 15% of the total acreage of the project site.
3. A 15% survey adjacent to the project site (must be similar habitat to the project site and large enough to represent 15% of the total acreage of the project site).
4. If survey methods above cannot be conducted for some reason, the applicant shall estimate tortoise numbers within the disturbed area using a standard density of 2 gopher tortoises/acre with a minimum population estimate of 1 tortoise.

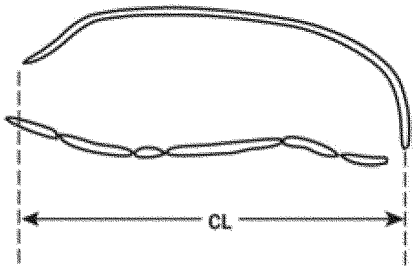
Results of the 100% survey within the disturbed area are compared with results from one of the four options above. The method which estimates the highest number of tortoises within the disturbed area will be used to calculate up-front mitigation costs for Disturbed Site permits.

An estimate of the total number of tortoises for the entire project area must also be calculated. In some cases, the disturbed area already covers the entire project site. In other cases, undisturbed habitat remains within the project site. If a 15% survey has already been conducted (option 2 above), then this survey can be used to estimate the number of tortoises outside the disturbed area. In other cases, a 15% survey must be conducted which is large enough to represent at least 15% of the remaining acreage of undisturbed suitable gopher tortoise habitat left on-site.

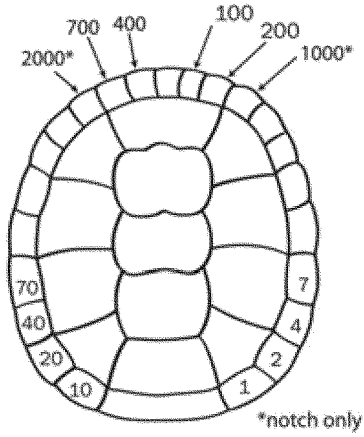
Appendix 5. Marking and Measuring Gopher Tortoises during Relocations

Marking: Tortoises must be permanently and uniquely marked by drilling holes in, or using a triangular file to notch, one or a combination of the eight rearmost marginal scutes (the four right ones and the four left ones) and the two right and left front marginal scutes. Each scute is assigned a numerical value, as illustrated below. The scheme is additive; e.g., tortoise #14 would require the drilling of the first scute left of the rear marginal and the third scute right of the rear marginal. For indicating numbers 1000-3999, notch (**do not drill**) the third marginal(s) to the right and left of the front central scute (nuchal), as shown in the figure below. For numbers >3999, contact FWC. The size of the drill bit or triangular file should be relative to the size of the tortoise, but no more than 25% the width of the marginal scute. Drilling or notching should be carefully undertaken to avoid injury to the limbs or head. Also, holes should be drilled closer to the marginal edge (without breaking through the edge) rather than higher up on the scute. PIT (Passive Integrated Transponder) tags may be used as an alternative to drilling or notching marginal scutes. These microchips are about the size of a grain of rice and are injected into a tortoise's hind leg using a hand-held applicator. A hand-held scanner reads the tag's electromagnetic code and displays the tag's number.

Measuring: Straight-line carapace length (CL) must be recorded in millimeters. (See below.) Forestry tree calipers are useful for measuring the carapace. Tortoise weight (in grams) should also be recorded.



Carapace length



Carapace
(upper shell)

Appendix 6. Health Considerations for Gopher Tortoises during Relocations

Making Decisions Regarding Relocations and Tortoise Health Assessments

Although relocation removes individual tortoises from harm on sites proposed for development, the transport of tortoises to new areas carries with it an inherent risk of exposure to infectious diseases for both recipient and donor populations. Determining the degree of risk and, therefore, the need for assessing tortoise health involves consideration of the following: the conservation value of the recipient site; whether tortoises exist within, or adjacent to, the recipient site; and the overall goals of the relocation. (See Table 1, below). Relocations to sites with high conservation value and established or adjacent populations, for example, carry a greater risk of adversely affecting these priority populations and, therefore, would generally warrant a correspondingly greater scrutiny of the relocated tortoises. Health assessments include physical examinations and the collection of biological samples (e.g., blood) for diagnostic tests. Currently, the only available blood test for a known gopher tortoise disease involves blood sampling for mycoplasmal upper respiratory tract disease (URTD; see below); however, even this well-documented test only indicates whether a tortoise has been exposed to the disease-causing organism; it does not provide information on whether the tortoise currently *has* the disease.

Table 1. Recipient Population Conditions, Goals, Disease Issues, and Suggested Health Assessment Needs

Recipient Population	Established or Adjacent Populations	Goals	Disease an Issue?	Health Assessment Needs
Highest conservation value (relatively large sites with long-term protection and management)	Yes	Healthy populations; minimize risks to adjacent/ existing populations	Yes–can impact both recipient and donor populations	Maximum on both donor and recipient populations. Monitor for success.
Highest conservation value	No	Healthy populations	Yes–due to established conservation goal	Maximum. Monitor for success.
Moderate conservation value (smaller protected sites or large sites with non-perpetual easements)	Yes	Healthy populations; minimize risks to adjacent/ existing populations	Yes–can impact both recipient and donor populations	Moderate, or based on land manager's guidelines and risk to adjacent populations.
Moderate conservation value	No	Site specific	Questionable–depends on goals and site	Based on land manager's guidelines.

			specifics	Monitor for success.
Minimal conservation value (sites with no long-term protection; may also be relatively small)	Yes	Humane or rescue relocation. Minimize risks to adjacent/ existing populations	Yes–can impact recipient and/or adjacent populations	Moderate or based on land manager's guidelines and risk to adjacent populations.
Minimal conservation value	No	Humane or rescue relocation.	No	Low. Based on land manager's guidelines.

Cursory Health Evaluations

Knowledge of normal gopher tortoise behavior and appearance is necessary when conducting health examinations. If biological samples are going to be collected, appropriate training by (or assistance from) a veterinarian or other person with extensive experience working with tortoises and collecting such specimens is required. The basic components of a physical exam include an overall assessment of the posture/behavior of the tortoise and an examination of the eyes, nostrils, skin, muscle mass, and shell. Shell measurements are not only important in determining the maturity of individual tortoises (e.g., juvenile, subadult, adult male or female) but, especially when correlated with weight, can also be helpful in assessing the overall body condition. The following are components of a cursory physical examination:

1. Overall posture/behavior: As noted above, some knowledge of tortoise behavior is necessary to discern between normal/abnormal.
   a. Alert and responsive or quiet but responsive–these two categories identify behavioral characteristics of normal tortoises. Alert/responsive tortoises paddle their forelimbs (front legs) when held, attempt to escape, and repeatedly retract into shell when handled. Quiet/responsive tortoises are shy and tend to remain withdrawn into their shell when being handled, but they have normal strength.
   b. Depressed and lethargic–these animals may hang forelimbs limp when lifted, may have poor muscle mass, are weak, and do not resist gentle tugging on their limbs.
   c. Walking/moving–normally/abnormally.
   d. Breathing sounds (normal, congestion, distress)–tortoises may normally create a very faint, high-pitched whistle when expelling air out of their nostrils. Wet or gurgling sounds associated with congestion are abnormal.

2. Examine eyes. May need a flashlight or, in some cases, magnification to examine.
   a. Clarity of eye (i.e., is cornea or lens clear or cloudy? Is there any discoloration?); position of eye within orbit (i.e., is eye bulging or sunken into orbit?)
   b. Discharges–clear/watery or cloudy; characterize as mild, moderate, or severe.

c. Examine eyelids, conjunctiva (the mucous membrane that covers the exposed portion of the eyeball and the inner surface of the eye), and area around eyes–look for swelling, redness, or traumatic wounds (e.g., lacerations). Characterize severity as mild, moderate, or severe.

3. Examine nares (nostril openings).
   a. Discharges–clear/watery or cloudy/thick; describe color of discharge and characterize as mild, moderate, or severe. Note if dirt/material is obstructing nostrils.
   b. Erosion or irregular shape of the nares (evidence of long-term discharge).

4. Examine shell (scutes and seams between scutes).
   a. Flaking, discoloration, defects/erosions, soft areas, fractures, chew marks.
   b. Note the distribution and severity of lesions.
   c. Photographs and drawings are extremely useful.
   d. Measure carapace (top shell) and record tortoise weight. Note whether tortoise has urinated/defecated, as this waste elimination may significantly affect body weight.

5. Examine skin and muscles
   a. Excessive flaking, discoloration of the skin, wounds, scars, or evidence of prior injuries.
   b. Evaluate muscle mass on head and limbs to look for muscle loss (i.e., wasting away of muscles). Note whether the head has "old man appearance": sunken eyes; skin drawn tightly over skull).
   c. Check to make sure the limbs are symmetric, look for swollen areas or malformations, and check toenails for symmetrical wear patterns.
   d. Note the presence of external parasites (e.g., ticks) and number (< or > 10).

Note: Although determining the health of an individual tortoise at a particular moment in time can be difficult (i.e., certain clinical signs or "symptoms" may come and go), there are some tell-tale signs that authorized agents can watch for: nasal discharge; severely eroded nares; "old man appearance" (eyes sunken, skin drawn tightly over skull); eyes/eyelids severely swollen or reddened, with discharge; poor muscle mass and emaciated (abnormally thin) appearance. Options for accommodating individuals that appear ill, or that test positive for mycoplasmal URTD, are indicated below.

Disinfection Protocol

Caution must be taken during relocations and whenever handling gopher tortoises to ensure that authorized agents do not contribute to the spread of pathogens (germs). It is recommended that hands and equipment be disinfected between handling individual tortoises. Cleaning and disinfecting bins, traps, and other equipment between uses on donor (development) sites is required to reduce the chance of cross-contamination between populations.

Disinfection Solution: 1:20 dilution of 5% household bleach in water. A stronger 1:10 dilution of 5% household bleach in water is recommended for equipment that is particularly dirty (i.e., stained with soil or feces).

Solutions should be stored in dark bins or in opaque bottles and should be made fresh regularly (e.g., weekly, depending on storage conditions). Bleach should be purchased in small bottles or dispensed into small bottles to minimize deterioration from opening/closing the lid.

Disinfecting Equipment: Remove dirt and feces by rinsing with water (e.g., from gallon jugs) or by brushing with paper towels. Spray equipment (including drill bits and files) liberally with the bleach solution and allow to dry. Between donor sites, thoroughly scrub bins and buckets with detergent and water before spraying with the bleach solution.

Disinfecting Hands: A pump-applicator, plastic bottle of 60% ethyl alcohol is an efficient way to disinfect hands between handling tortoises; smaller pocket-size bottles of hand sanitizers are also useful in the field. If hands are extremely dirty, rinse with water before using the alcohol sanitizer.

Testing for Mycoplasmal Upper Respiratory Tract Disease (URTD)

Authorized agents or other individuals wishing to collect blood or other samples for mycoplasmal URTD tests shall be appropriately trained by a veterinarian or other person experienced in such sample collection/handling for tortoises, and they shall sign an affidavit provided by FWC stating they have been so trained. The FWC blood collecting protocol and associated affidavit can be downloaded from MyFWC.com/GopherTortoise (click on Permits and then Permitting Guidelines to locate the necessary documents regarding URTD testing). The signed affidavit, in addition to their permit, authorizes the following:

1. Blanket authorization to capture, hold, and draw blood from gopher tortoises as needed for collecting blood samples. Tortoises may be held up to 24 hours, but shall not be held for more than 72 hours, as stipulated in the FWC permitting guidelines.

2. Blood samples must be identified by the applicant's name, county, and project name. Testing will be conducted by the Mycoplasma Testing Lab, University of Florida, Department of Pathobiology, 1600 South West Archer Road - BSB 350, Gainesville, FL 32610. The Lab may be contacted at (352)294-4068, extension 3986. The applicant is responsible for all fees and costs associated with testing.

3. Test results will be provided by the testing facility to FWC and the applicant.

It should be noted that there is currently no known cure for mycoplasmal URTD, making recovery of truly infected tortoises an unlikely scenario. Recipient site owners/managers reserve the right to request mycoplasmal URTD testing or other diagnostic tests that become available for URTD or other diseases and to refuse any, or all, tortoises from populations that have seropositive and/or symptomatic individuals. Such decisions will depend on the goals and priority of the recipient site (see table above) and, thus, will reflect the level of risk involved in allowing introduction of potentially ill or infected tortoises. In those cases where several clinically ill tortoises, or tortoises that test positive for URTD or other diseases, are encountered, consultation with FWC and wildlife veterinarians will be necessary to determine how best to accommodate such populations.

Protocol for Accommodating Gopher Tortoises that Appear Ill

- Authorized agents capturing gopher tortoises at donor sites must isolate tortoises with obvious health abnormalities as outlined in this Appendix (e.g., markedly lethargic; "old man appearance": sunken eyes, skin drawn tightly over skull; abnormally thin limbs with poor muscle mass; nasal discharge; eyes severely swollen and reddened, with discharge).
- Contact a local rehabilitation facility and transport the tortoise to the facility. A list of participating wildlife rehabilitators is provided by FWC. These facilities do not charge for assessment and treatment. Also report any ill tortoises to the FWC regional gopher tortoise conservation biologist and the contact for the targeted recipient site. Tortoises may also be treated at the Zoological Medicine Service at the University of Florida (UF) Veterinary Medical Center in Gainesville, but this service will incur a cost.
- If an ill tortoise dies (from causes not directly related to excavation or trapping) or if recently dead tortoises are found on the donor site, place the tortoise on ice (do not freeze) and notify the FWC regional gopher tortoise conservation biologist. If representatives for either the donor site or recipient site want to pursue the reason for tortoise mortality, they may deliver dead tortoises to the Pathology Service at the University of Florida Veterinary Medical Center in Gainesville for a postmortem evaluation. This service will incur a cost.

It is not necessary to interrupt capture efforts when ill tortoises are observed; these individuals can be isolated until the end of the burrow excavation or trapping for that day. Because some clinical signs of disease (e.g., nasal discharge) may appear and then disappear over time, it is helpful to photograph observed abnormalities with a digital camera.

Rehabilitation facilities or the UF Veterinary Medical Center will triage tortoises and either treat or euthanize. If the targeted recipient site refuses these tortoises post-treatment, such individuals will be accommodated as waif tortoises and either placed in captivity or in specifically designated waif sites.

Appendix 7. Methods for Baseline Vegetation Sampling and Follow-up Monitoring on Recipient Sites

Vegetation Surveys

The vegetation sampling method described below can be performed using 250-meter-long belt transects as are used to estimate tortoise density on recipient sites. Vegetation sampling shall occur at a minimum of 30% of the belt transects and be distributed across areas providing suitable gopher tortoise habitat. The beginning and end of each transect shall be permanently marked in one of two ways:

1) Use rebar, T-posts or other fire resistant material at least six feet high. These posts should either be painted with high visibility paint or the posts should be covered with painted PVC pipes to increase visibility and to provide the option for removal during prescribed burn; or

2) Use a GPS instrument capable of sub-meter accuracy to take latitude and longitude coordinates at the beginning and end of each transect. GPS data collected in decimal degrees using data type DATUM NAD83 feet Harn Albers is preferred. The data must specify the collection method (i.e., the projection and coordinates) as not all GPS instruments automatically attach a projection file with the data. The data collected must be reported to the FWC

Vegetation surveys and gopher tortoise surveys may be conducted simultaneously by multiple people, or an individual may perform each survey separately. However, at least 30% of the gopher tortoise transects shall be used as vegetation transects. For example, a 15% tortoise survey of a proposed 200-acre recipient site would require thirty 16-meter by 250-meter belt transects (each transect covering approximately one acre). Thirty percent of the transects, or 9 transects total, would be selected for vegetation sampling. Those transects selected for vegetation sampling should be located so there is representative coverage across the site. Each transect selected for vegetation sampling would have four stations associated with the 0-, 75-, 150-, and 225-meter points along the transect.

Canopy Cover–At 75-meter intervals along a transect (i.e., at the 0-, 75-, 150-, and 225-meter points along the transect), walk 15 meters perpendicular to each side of the transect line (a total of 30 meters). Every 1.5 meters (10 samples on each side), look through a densitometer (manufactured by Geographic Resource Solutions) with cross hairs and held directly overhead. Canopy vegetation is defined as woody stemmed plants three meters or greater in height. If there is canopy at the center point of the cross hairs, count that measurement as a plus. If there is no canopy cover, count that measurement as a zero. For 20 measurements, total the pluses, divide by 20, and multiply by 100 to obtain percent canopy cover at the station.

Shrub Cover–At each 75-meter interval along the transect line, walk 15 meters perpendicular to each side of the transect line (a total of 30 meters). Every 1.5 meters, hold arms outstretched approximately 1.5 meters off the ground. If the arms strike shrub plants (shrubs can be woody plants, semi-woody plants, vines, forbs, dwarf trees, tree seedlings, canes, and palms that are approximately 1.5 meters off the ground), count that measurement as a plus. If the arms strike nothing, count that measurement as a zero. For the 20 total measurements total the pluses, divide by 20 and multiply by 100. This provides an estimate of the percent shrub cover at the station.

Herbaceous Ground Cover–At each 75-meter interval along the transect line establish an herbaceous cover sampling station. Each sampling station shall be at a known location and marked on a map. Provide GPS location coordinates and general observational directions (e.g., between wetlands 1 and 2 and approximately 50 yards from large live oak, which is located 275° from sampling station). Extra sampling stations shall be used if critical habitat changes are occurring between the 75-meter intervals.

To estimate the relative percent cover of herbaceous species in each sampling station, use a 0.25 square meter (2.7 square feet) quadrate. The quadrate can be easily made using PVC pipe. Estimates are to be based on seven cover classes: less than 1%, 1-5%, 6-29%, 30-59%, 60-75%, 76-95%, 96-100%. Record cover class for each of the following: bare ground; debris; broadleaf grasses and grass-like vegetation (e.g., sedges, rushes); wiregrass; and any forbs, vines, saw palmetto, or woody vegetation that are < 3 feet in height. If possible, identify species of exotic vegetation known to be problematic for tortoises, *e.g.*, cogongrass (*Imperata cylindrica*). Also note the total height of the herbaceous vegetation.

Photographic Stations

Photographs shall be taken at each sampling station and shall display the general setting of the transect and herbaceous vegetation being sampled. Therefore, three photographs will be required at each sampling station: (1) a clear photograph of the vegetation inside the quadrate, (2) a photograph of the main belt transect, facing forward, and (3) a photograph of the main belt transect, facing rearward.

Monitoring and reporting requirements

The intent of long-term monitoring and reporting requirements on recipient sites is to ensure adequate and appropriate management continues and the gopher tortoise population is sustained and viable for the long term as specified in the Gopher Tortoise Management Plan.

Monitoring and reporting requirements may be reduced over time, in both frequency and scope, for landowners who have successfully met habitat management and reporting requirements. Reports are required from the landowner of a permitted long-term protected recipient site every 3 years for the first 15 years (Phase 1). If the landowner has met monitoring and reporting requirements during the first 15 years, the monitoring and reporting requirement is then reduced to every 5 years for the next 10 years (Phase 2). Following 25 years of successfully meeting all monitoring, habitat management and reporting requirements, reports will then be required every ten years with reduced monitoring and reporting requirements. Monitoring and reporting requirements during each phase are outlined in Table 1 below.

Recipient sites that do not successfully meet monitoring, habitat management and reporting requirements will be required to restart the monitoring and reporting requirements at the beginning of Phase 1. A report format (under development) will be provided by FWC to ensure that all required information is provided for each phase. Before the reports are deemed sufficient by FWC, a gopher tortoise regional conservation biologist will visit the recipient site to verify the survey(s) and report. Additional information may be requested after the site visit.

Habitat management shall continue as prescribed in the site habitat management plan for the life of the permit. Site visits will be conducted by FWC staff on an annual basis. Reports shall be submitted no later than 90 days following the completion of the baseline survey or follow-up monitoring surveys.

Reports for baseline vegetation surveys and follow-up monitoring shall include a brief narrative explaining the property location, size, ownership, authorized agent, and Florida Fish and Wildlife Conservation Commission (FWC) Recipient Site permit number(s). This introductory information shall be followed by the qualitative and quantitative data and an overall description of the present conditions within the recipient site. Vegetative transect maps, gopher tortoise transect maps, aerial images, land use maps, and soil maps are required. Spreadsheets (tabular form) that include the percent coverage of the vegetation at each sampling station are required.

Table 1. Phased recipient site monitoring and reporting requirements.

Reporting Phase	Years	Narrative including a qualitative assessment of vegetation and tortoise population	Habitat management summary*	Recent aerial images with property boundaries	Photographic stations	15% tortoise survey and transect maps with GPS coordinates	Quantitative vegetation survey and transect maps
Phase 1	1-15	X	X	X	X	X	X
Phase 2	16-25	X	X	X	X	X	
Phase 3	26-life of permit	X	X	X	X		

*Includes description and timeline of habitat management activities conducted and planned future management activities.

For monitoring reports, any changes of the land use and soil conditions shall be explained. A chronology (timeline) of the habitat management activities conducted since submittal of the previous baseline or monitoring report shall be provided. Major changes in vegetation (*e.g.*, due to forestry clearing, habitat degradation from absence of fire) shall be noted. Additionally, changes to any land management plans or other legal documents shall be attached and described in the report. If applicable, a narrative of any problems, remediation, or exceptional environmental changes that are improving the gopher tortoise habitat shall be reported (note locations). A timeline of habitat management activities proposed to occur over the next three-year monitoring period shall also be provided.

Appendix 8. Draft FWC Conservation Easement

[NOTE TO PREPARERS: PLEASE USE "TRACK CHANGES' WHEN YOU REVISE THIS FORM FOR SUMMITAL TO FWC. IF YOU DO NOT USE "TRACK CHANGES" FWC REVIEW OF THE FORM MAY BE SIGNIFICANTLY SLOWED.]

This instrument prepared by:

After recording please return the document to Grantee:
Florida Fish and Wildlife Conservation Commission
ATTN: Gopher Tortoise Permit Coordinator
620 South Meridian Street
Tallahassee, Florida 32399-1600

CONSERVATION EASEMENT

THIS DEED OF CONSERVATION EASEMENT is given this _____ day of _____ 200_ by _____ , a Florida corporation whose mailing address is _____ , ("Grantor") to the Florida Fish and Wildlife Conservation Commission, an agency of the State of Florida, with its principal office at 620 South Meridian Street, Tallahassee, FL 32399-1600 ("Grantee").

The parties agree as follows:

WITNESSETH

WHEREAS, the Grantor is the owner of certain lands situated in _____ County, Florida, hereinafter referred to as the "Property", more specifically described in Exhibit A attached hereto and incorporated herein by this reference; and

WHEREAS, the property possesses natural, scenic, open space, wildlife preservation and conservation values (collectively, "conservation values") of great importance to Grantor, the people of _____ County, and the people of the State of Florida; and

WHEREAS, the specific conservation values of the Property are documented as part of the Habitat Management Plan pertaining to the Property, dated _____ ("Plan"), part of which is entitled the "Baseline Documentation". A copy of the Plan is attached hereto as Exhibit B, and incorporated herein by reference. The Baseline Documentation is an accurate representation of the Property at the time of this grant and is intended to serve as an objective information baseline for monitoring compliance with the terms of this grant; and

WHEREAS, Grantor intends that the conservation values of the Property be preserved and maintained by the continuation of land use patterns, including, without limitation, those relating to ___ [e.g., farming, ranching, or timber production] existing at the time of this grant, that do not significantly impair or interfere with those values; and

WHEREAS, Grantor further intends, as owner of the Property, to convey to Grantee the right to preserve and protect the conservation values of the Property in perpetuity; and

WHEREAS, Grantee is a state public agency, part of whose mission is the conservation, preservation, protection or enhancement of lands such as the Property; and

WHEREAS, the Grantor, in consideration of the issuance by the Grantee of Permit No. _____ issued by the Grantee on _____ ("Permit") in favor of the Grantor for the incidental take of listed wildlife species, is required to grant and secure the enforcement of a perpetual conservation easement pertaining to the Property.

NOW THEREFORE, consistent with the issuance of the Permit, Grantor hereby grants, creates, and establishes a perpetual conservation easement upon the Property described in Exhibit A, which shall run with the land and be binding upon the Grantor, its heirs, successors and assigns, and remain in full force and effect forever.

1. Purpose. The purpose of this Conservation Easement is to ensure that the Property or part thereof as described in this Conservation Easement shall be protected forever and used as conservation areas, consistent with the Habitat Management Plan ("Plan"). The parties intend that this Conservation Easement will confine the use of the Property to such uses as are consistent with the purpose of this Conservation Easement.

2. Rights of Grantee. To accomplish the purpose of this Conservation Easement the following rights are conveyed to Grantee:

a. To preserve and protect the conservation values of the Property as defined in this Conservation Easement;

b. To enter upon the Property at reasonable times and upon reasonable notice to the Grantor in order to engage in activities consistent with this Conservation Easement, to monitor Grantor's compliance with this Conservation Easement, and to otherwise enforce the terms of this Conservation Easement; provided that Grantee shall not unreasonably interfere with Grantor's use and quiet enjoyment of the Property; and

c. To prevent any activity on or use of the Property that is inconsistent with the purpose of this Conservation Easement, and to require the restoration of such areas or features of the Property that may be damaged by any inconsistent activity or use.

3. Grantor's Reserved Rights. Grantor reserves to itself, its heirs, successors or assigns all rights as owner of the Property including the right to engage in all uses of the Property that are not expressly prohibited herein and are not inconsistent with the purpose of this Conservation Easement.

4. Prohibited Uses. Unless expressly authorized in accordance with the Plan (Exhibit B), the following are prohibited activities on the Property:

a. Construction or placing of buildings, roads, signs, billboards or other advertising, utilities or other structures on or above the ground.

b. Dumping or placing of soil or other substance or material as landfill or dumping of trash, waste, or unsightly or offensive materials.

c. Removal or destruction of trees, shrubs, or other vegetation.

d. Excavation, dredging, or removal of loam, peat, gravel, soil, rock or other material substance in such manner as to affect the surface.

e. Surface use except for purposes that permit the land or water areas to remain in their existing natural condition.

f. Activities detrimental to drainage, flood control, water conservation, erosion control, soil conservation, or fish and wildlife habitat preservation.

g. Act or uses detrimental to such retention of land or water areas in their existing natural condition.

h. Acts or uses detrimental to the preservation of the structural integrity or physical appearance of sites or properties of historical, architectural, archaeological, or culture significance.

i. Alteration of the Property except in compliance with the Plan.

5. No Public Access. No right of access by the general public to any portion of the Property is conveyed by this Conservation Easement.

6. Expenses; Taxes. Grantor retains all responsibilities and shall bear all costs and liabilities of any kind related to the ownership, operation, upkeep, and maintenance of the Property, including the maintenance of adequate comprehensive general liability insurance coverage. Such responsibilities and costs shall include those associated with the management activities discussed in the Plan. Grantor shall keep the Property free of any liens arising out of any work performed for, materials furnished to, or obligations incurred by Grantor. Grantor shall pay before delinquency all taxes, assessments, fee, and charges of whatever description levied on or assessed against the Property by competent authority, and shall furnish Grantee with satisfactory evidence of payment upon request.

7. Costs of Enforcement. Any costs incurred by Grantee in enforcing the terms of this easement against Grantor, including, without limitation, costs of suit and attorney's fees, and any costs of restoration necessitated by Grantor's violation of the terms of this Easement, shall be borne by Grantor.

8. Liability. Grantor and its successors shall hold harmless, indemnify and defend Grantee from and against all liabilities, penalties, costs, losses, damages, expenses causes of action, claims, demands or judgments, including attorneys fees, arising from or in any way connected with: 1) injury to or the death of any person, or physical damage to any property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Property, regardless of cause, 2) costs and liabilities of any kind related to the ownership, operation, upkeep and maintenance of the Property, including but not limited to the maintenance of adequate comprehensive general liability coverage, payment of taxes, and keeping the Property free of liens; and 3) the existence or administration of this Conservation Easement.

9. Remedies. If Grantee determines that Grantor or successors are in violation of the terms of this Conservation Easement, it may take any of the following actions, after 30 day written notice to Grantor or successors to correct the violation: 1) Grantee may itself correct the violation, including but not limited to restoration of any portion of the Property affected to the condition that existed prior to the violation, and demand payment from Grantor for all costs associated with such action; 2) Grantee may bring an action at law or in equity in a court of competent jurisdiction to enforce the terms of this Conservation Easement, for specific performance, to temporarily or permanently enjoin the violation, recover damages for violation of this Conservation Easement, including but not limited to the costs of restoration, and any other damages permitted by law. In any enforcement action Grantee shall not be required to prove either actual damages or the inadequacy of otherwise available remedies. Grantee's remedies shall be cumulative and shall be in addition to all remedies now or hereafter existing at law or in equity. As part of the consideration for this Conservation Easement, the parties hereby waive trial by jury in any action brought by either party pertaining to any matter whatsoever arising out of or in any way connected with this Conservation Easement.

10. Waiver. Grantor intends that enforcement of the terms and provisions of the Conservation Easement and the Plan shall by at the discretion of Grantee and that any forbearance on behalf of Grantee to exercise its rights hereunder in the event of any breach hereof by Grantor, its heirs, successors, personal representatives or assigns shall not be deemed or construed to be a waiver of Grantee's rights hereunder in the event of a subsequent breach. Grantor hereby waives any defense of laches, estoppel, or prescription.

11. Assignment. Grantee agrees that it will hold this Conservation Easement exclusively for conservation purposes and that it will not assign its rights and obligations under this Conservation Easement except to another organization qualified to hold such interests under the applicable state and federal laws and committed to holding this Conservation Easement exclusively for conservation purposes. Not later than thirty (30) days after recordation in the Public records of _____ County, Florida of an instrument transferring the title to the property, which is the subject of this easement, Grantor agrees to give written notice to Grantee of such transfer.

12. Severability. If any provision of this Conservation Easement or the application thereof to any person or circumstance is found to be invalid, the remainder of the provisions of this Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

13. Notices; References. All notices, consents approvals or other communications hereunder shall be in writing and shall be deemed properly given as of the second business day after mailing if sent by United State certified mail, return receipt requested, or by overnight mail service (e.g., FedEx, UPS), addressed to the appropriate party or successor-in-interest, at the address above set forth or such new addresses as either party may in writing deliver to the other. References in this Conservation Easement to the Grantor or Grantee include their successors-in-interest.

14. Venue; Waiver of Jury Trial. This Conservation Easement has been delivered in the State of Florida and shall be construed in accordance with the laws of Florida. As part of the consideration for this Conservation Easement, the parties hereby waive trial by jury in any action or proceeding brought by any party against any other party pertaining to any matter whatsoever arising out of or in any way connected with this Conservation Easement.

15. Amendment. This Conservation Easement may be amended, altered, released or revoked only by written agreement between the parties hereto, their successors or assigns.

16. Subordination of Liens. Grantor agrees that if the Property is subject to a mortgage lien or any other form of lien or security pertaining to the Property, Grantor shall provide recorded or recordable documentation to verify that such lien or security interest is subordinate to this Conservation Easement.

17. Recording. This Easement shall be recorded in the same manner as any other instrument asserting title to real property.

TO HAVE AND TO HOLD unto grantee, its respective successors and assigns forever. The covenants, terms, conditions, restrictions and purposes imposed with this easement shall not only be binding upon Grantor but also its agents, personal representatives, heirs, assigns and all other successors to it in interest and shall continue as a servitude running in perpetuity with the Property.

IN WITNESS WHEREOF Grantor has set its hand on the day and year first above written.

Signed, sealed and delivered
In our presence as witnesses:

_____
[Corporate name]

_____ By: _____

Name: _____ Name: _____

Title: _____

_____

Name: _____

STATE OF FLORIDA
COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____, 200_ by _____, the _____ of, a Florida corporation, on behalf of the corporation. The above-named individual is personally known to me or produced _____ as identification.

_____
Notary Public State of Florida
Commission No:
Commission expires:

GRANTEE'S ACCEPTANCE

The Florida Fish and Wildlife Conservation Commission hereby accepts the foregoing Conservation Easement.

FLORIDA FISH AND WILDLIFE
CONSERVATION COMMISSION

By: _____
Title: _____
Date: _____

Approved as to form and legal sufficiency:

_____
FWC Attorney

Appendix 9. Handling of Commensal Species during Relocations

INTRODUCTION

Commensals are species of animals that live within gopher tortoise burrows, deriving food, refuge, or other benefits from the burrow environment. Threats to commensal species are similar in nature to those faced by the gopher tortoise and have been addressed in the *Gopher Tortoise Management Plan*. These guidelines have been created to provide guidance for authorized agents who capture commensal species during gopher tortoise relocations. Authorized agents conducting activities under gopher tortoise permits are encouraged to minimize the mortality of commensal species and, where possible, to relocate commensals with the tortoises.

RULES PROTECTING COMMENSAL SPECIES

Florida Gopher Frog (*Rana capito*)

The Florida gopher frog is listed as a Species of Special Concern (Rule 68A-27.005, F.A.C.) by the Florida Fish and Wildlife Conservation Commission (FWC). It is illegal to take gopher frogs or their eggs without a permit issued by the FWC Executive Director (Rule 68A-27.007, F.A.C.). The gopher frog is also considered a Species of Concern (SOC) by the U.S. Fish and Wildlife Service (USFWS). The SOC designation is an informal term indicating some degree of concern for the future of the species, but does not impart any U.S. Endangered Species Act protection.

Florida Mouse (*Podomys floridana*)

The Florida mouse is listed as a Species of Special Concern (Rule 68A-27.005, F.A.C.) by FWC. It is illegal to take Florida mice or their nests without a permit issued by the FWC Executive Director (Rule 68A-27.007, F.A.C.). The Florida mouse is also considered a Species of Concern (SOC) by USFWS. The SOC designation is an informal term indicating some degree of concern for the future of the species, but does not impart any U.S. Endangered Species Act protection.

Eastern Indigo Snake (*Drymarchon couperi* [= *Drymarchon corais couperi*])

The eastern indigo snake is listed as a Threatened Species (Rule 68A-27.003, F.A.C.) in Florida by FWC. It is illegal to take indigo snakes or their eggs without a permit issued by the FWC Executive Director (Rule 68A-27.007, F.A.C.). The indigo snake has also been classified as a Threatened Species by USFWS since 1978. The Federal Threatened Species designation is a formal term indicating a moderately high level of protection provided by the U.S. Endangered Species Act. For federally listed species like the indigo snake, federal permits are required to capture, handle, or relocate individuals; therefore, authorized agents should coordinate with USFWS.

Florida Pine Snake (*Pituophis melanoleucus mugitus*)

The Florida pine snake is listed as a Species of Special Concern (Rule 68A-27.005, F.A.C.) in Florida by FWC. It is illegal to take pine snakes or their eggs without a permit issued by the FWC Executive Director (Rule 68A-27.007, F.A.C.), but individuals may possess one Florida pine snake without a permit (Rule 68A-25.002[10]).

SPECIES-SPECIFIC GUIDELINES: IDENTIFICATION, HABITAT NEEDS, AND FIELD ENCOUNTERS

Florida Gopher Frog

The Florida gopher frog is a stout-bodied frog with short legs, a large head and mouth, and prominent eyes that are slightly larger than the ear drums. The gopher frog's background color and belly are typically light gray. A series of irregular dark spots form rows along the back and side, and the limbs are distinctly striped. A raised ridge (dorsolateral fold) that is yellow or orange colored runs down each side of the back from head to groin.

The species' distribution corresponds to that of the gopher tortoise; however, unlike the gopher tortoise, the gopher frog appears to be absent from most coastal islands and dunes. This species occurs primarily in native, xeric upland habitats, particularly scrub and sandhill associations. The Florida gopher frog is extremely dependent upon gopher tortoise burrows, more so than the other listed commensals noted in these guidelines. In addition to its dependence on gopher tortoise burrows as an adult, the gopher frog tadpole only lives in isolated wetlands. These temporary water bodies generally have no fish and may have smaller populations of predatory invertebrates than permanent wetlands.

Relocation:
Gopher frogs are most commonly encountered during tortoise capture, either in bucket traps or during burrow excavation. They can also be trapped by drift fences and buckets or funnel traps set to intercept their seasonal breeding migrations to temporary or seasonal ponds and during breeding at those ponds. Frogs may be secured in plastic containers (one frog per container) with a quantity of moist soil from the burrow. Containers with frogs can be kept under the same conditions as gopher tortoises for transport. Agents who undertake tortoise relocations in central and south Florida should be aware of two exotic amphibians (Cuban tree frog and cane or marine toad) that may be confused with gopher frogs. These exotic species should not be relocated.

Gopher frogs should only be released directly into the mouth of existing tortoise burrows and only when such burrows are located on a recipient site that has temporary or fish-free ponds within 1 km (0.6 mi) distance and without significant barriers to frog movement (e.g., no roads). Several frogs may be released into one burrow.

Florida Mouse

The Florida mouse is distinguished from other rodents by the following: light reddish-tan color; comparatively large eyes, ears, and hind feet; long tail; presence of five instead of six well-developed plantar tubercles on the soles of the hind feet; fragile tail sheath that may slough off during handling; and a distinct, skunk-like odor.

The Florida mouse is endemic to Florida and is restricted largely to the northern two-thirds of the peninsula, where it typically occupies fire-maintained, xeric vegetative communities on deep, well-drained soils. The biology of the Florida mouse is closely tied to the gopher tortoise, whose burrows are used as nesting sites and refuges during dispersal. Florida mice are most common in sandhill, scrub, and scrubby flatwoods, but other xeric upland habitats may be used. These habitats are characterized by the presence of acorn-producing oak trees, especially scrub oaks and other species considered to be in the "white" oak group. The ground cover is usually interspersed with patches of bare sand, but a diverse assemblage of grasses and forbs is typically present. An open tree canopy typically composed of longleaf or other pines, may be present.

Relocation:
Florida mice can be captured alive in Sherman live traps baited with sunflower seeds and set in or near the gopher burrow entrance. Mice can also be opportunistically captured by hand during burrow excavation. Mice can be retained in Sherman traps for 24 hours, as long as they are carefully protected from extremes of heat and cold. Mice should be released at the mouth of gopher tortoise burrows at the relocation site. To maximize translocation success, mice should be released into active burrows of adult gopher tortoises. Florida mice should be released only within their known range.

Suitable habitats at the recipient site should primarily be limited to sandhill, scrub, or scrubby flatwoods. A tree layer, typically composed of longleaf or other pines, may be present; percent canopy cover should not exceed 30%. A shrub layer dominated by scrub oaks, other oaks, or other shrubby species (e.g., palmetto) should be present. The shrub layer should be discontinuous, typically 1-3 m (3-10 ft) high and with 30-70% coverage. A diverse ground cover assemblage of grasses and forbs should be present and interspersed with conspicuous patches of bare ground. Active and inactive gopher tortoise burrows should be present. The minimum size of suitable habitat patches for Florida mice probably should be 25 ha (62 acres); bigger is better. Isolated sites supporting suitable xeric upland habitat should be connected by less suitable (degraded) xeric upland or mesic habitats (native or reclaimed) considered capable of supporting tortoises. Because the maximum dispersal distance for Florida mice is not well known, suitable patches of xeric upland habitat probably should not be separated by more than 1-2 km (0.5-1 mi) to maximize the probability that Florida mice would be able to move successfully among patches.

Eastern Indigo Snake

The eastern indigo snake is a large, nonvenomous snake found throughout Florida. Its color is uniformly lustrous black except for reddish to cream coloring on the chin and throat.

Many indigo snakes in northern Florida are completely black with the exception of a white patch in the center of the throat. The indigo snake is most commonly confused with the black racer (*Coluber constrictor*), which is a duller black color, has a white chin and throat (or brown in the central Panhandle), and is smaller and thinner.

In northern Florida, eastern indigo snakes are intimately tied to gopher tortoise burrows that protect them from extreme temperatures and moisture loss. In the milder climates of central and southern Florida, especially in habitats where tortoises are not present, they rely on a wide variety of other shelters, including hollow tree root channels and logs, burrows of rodents and armadillos (*Dasypus novemcintus*), and limestone solution holes. Because indigo snakes have relatively large home ranges (hundreds of acres) and use a variety of upland and wetland habitats, large diverse recipient sites will best provide for their needs.

Encountering Indigo Snakes:
Indigo snakes may be encountered during site surveys, excavation of gopher tortoise burrows, or capture of tortoises. Snakes must be allowed to vacate the work area before conducting additional burrow excavation or other site manipulation in the vicinity. Site work may commence only after the Authorized Agent (or a registered assistant) observes the snake vacating the area. Indigo snakes may not be handled for any purpose without specific state and federal permitting authorizations.

Florida Pine Snake

The Florida pine snake is a large, nonvenomous snake with dark brown to reddish blotches on a gray to sandy-colored background. The scales on the upper part of the body are strongly keeled (ridged). The head and snout are distinctly cone-shaped and adapted for burrowing.

The species is restricted to xeric habitats in the Atlantic and Gulf coastal plains. In Florida, its historic distribution included most of the state north of Lake Okeechobee and coastal ridges to the south. Florida pine snakes spend much of their time underground, often burrowing into the tunnels of pocket gophers (*Geomys pinetis*) and other rodent prey.

Relocation:
Like indigo snakes, pine snakes may be encountered during site surveys, excavation of gopher tortoise burrows, or capture of tortoises. Snakes may be secured by gentle application of snake tongs, a stick, or other device. Unlike indigo snakes, pine snakes will often bite when captured or handled. Secured snakes should be enclosed in a cloth bag such as a pillow case or similar 'snake bag' constructed for the purpose. Alternatively, for those not wishing to handle snakes directly, snakes may be picked up with a rake or stick and dropped into a plastic garbage can with a secure lid. Snakes in bags can be placed in the same type container used for a gopher tortoise (without the gopher tortoise) and maintained under the same conditions as the tortoises until release. Snakes should be released with gopher tortoises and will make their own way to suitable cover.

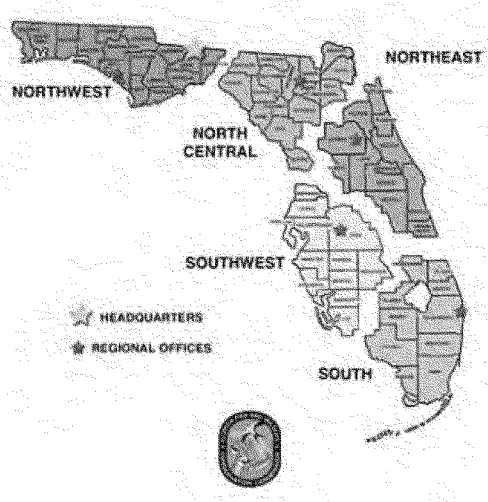
Nonlisted Burrow Commensals

The gopher tortoise is considered to be a keystone species, one whose burrows serve as a shelter from stressful environmental conditions (e.g., cold, heat, fire, dryness), as a site for feeding or reproductive activities, or as a permanent microhabitat for some 350-400 other species. Although FWC does not require nonlisted burrow associates to be relocated, these species, if encountered, may be relocated with the gopher tortoises. This practice has important positive implications for gopher tortoises and all the listed burrow associates. For example, cave crickets (*Ceuthophilus* sp) and other burrow-dwelling invertebrates are important prey of gopher frogs and Florida mice. Few or no data exist regarding relocation effectiveness or success for these nonlisted commensals. However, by relocating the entire suite of burrow associates, the biodiversity of recipient sites will likely be enhanced.

Relocation:
Material from the bottom of a gopher tortoise burrow, including specimens of invertebrate commensals and their larvae, may be transported in any suitable container and deposited at the relocation site. In addition, burrow soil used in tortoise relocation containers may be deposited at the recipient site.

Appendix 10. FWC Gopher Tortoise Contact Information

Florida Fish and Wildlife Conservation Commission
DIVISION OF HABITAT AND SPECIES CONSERVATION
GOPHER TORTOISE CONTACT INFORMATION



For inquiries related to the Gopher Tortoise Management Plan, please contact:

Gopher Tortoise Management Plan Coordinator
Division of Habitat and Species Conservation
Species Conservation Planning Section
Florida Fish and Wildlife Conservation Commission
620 South Meridian Street (Mail Station 2A)
Tallahassee, Florida 32399-1600
921-1019Fax: (850)921-1847

For specific inquiries related to gopher tortoise permitting requirements and status, please contact:

Gopher Tortoise Permit Coordinator
Division of Habitat and Species Conservation
Species Conservation Planning Section
Florida Fish and Wildlife Conservation Commission
620 South Meridian Street (Mail Station 2A)
Tallahassee, Florida 32399-1600
(850)921-1031; Fax: (850)488-5297
MyFWC.com/GopherTortoise

Appendix 11. Modified Application Requirements, Recipient Site Criteria, and Handling Procedures for 10 or Fewer Burrows and Burrow or Structure Protection Permits

The 10 or Fewer Burrows permit is available when fewer than 10 burrows or tortoises will be impacted on a development site. These permits are intended to provide a streamlined, less expensive, and faster option for applicants impacting smaller numbers of tortoises when the gopher tortoises are relocated to suitable on-site and off-site recipient areas. Therefore, the amount of information required for applications is reduced. Applications may be checked by FWC staff, and additional information may be required in situations where submitted information is not clear or does not appear to meet criteria for this permit type.

Such permits usually are issued for smaller properties (such as single-family residential lots), but larger properties may also meet the criteria for this permit when development activities are minimal or only small numbers of burrows are present on the property.

Burrow or Structure Protection permits are available when the integrity or utility of an existing structure is jeopardized by one or two burrows and therefore poses a public safety concern (e.g., burrow under a propane tank), or if the safety of the resident tortoise is compromised (e.g., burrows in a grass parking lot, dirt driveway, etc.).

Gopher Tortoise Burrow Surveys

In order for applicants to determine if they meet the criteria for the 10 or Fewer Burrows permit, 100% surveys must be conducted over the entire development footprint and submitted as part of the permit application (rather than after issuance of the permit). The 15% survey protocol for donor sites (Appendix 4) does not apply to this permit type. Survey maps listed in Appendix 4 are recommended but not required for these permit applications, unless specifically requested by FWC staff reviewing such applications. Surveys are not required for applications to relocate tortoises for Burrow or Structure Protection permits.

On-site Recipient Site Criteria

On-site recipient areas under 10 or Fewer Burrows or Burrow or Structure Protection permits do not require separate FWC recipient site permits. Therefore, requirements under permitted long-term protected recipient sites and short-term protected or unprotected recipient sites do not apply. However, recipient sites must be suitable set-aside areas that are not disturbed by construction activities and provide a safe environment that excludes (through temporary fencing or other means) tortoises from development areas until such development activities have been completed or from the area where the compromised burrow(s) is located. Gopher tortoises need access to the following: 1) sufficient areas of forage (herbaceous and low-growing plants including native broadleaf grasses, legumes [bean/pea family], asters, blackberries and other fruits, prickly pear cactus, and a variety of other non-native grasses, except cogon grass); 2)

sandy, well-drained, open (uncanopied), sunny sites for burrows and basking; 3) protection from dogs, cats, other exotic predators, human harassment, and busy roads. Such general conditions must remain after development, outside the built footprint on the site. Small sites typically have gopher tortoises that normally "roam" between adjoining neighboring parcels to forage or burrow, so this should be considered as well. The herbaceous vegetation must be maintained (mowing, burning, etc.), and pesticides/herbicides should not be used in the recipient area. If the recipient area does not appear to meet these requirements, please contact FWC staff or an authorized agent to discuss conservation options that may be available.

Stocking criteria (maximum of four per acre, Table 2) do not apply. Under 10 or Fewer Burrows permits, higher on-site recipient area densities are allowed; up to five tortoises may be moved into pens for up to 10 days.

Temporary Penning of Tortoises to Exclude Them from Development Activities

For the purpose of excluding tortoises from the development footprint (for on-site relocations only), tortoises may be penned for up to 10 days, only while bucket traps or other tortoise trapping activities are in progress. Once trapping activities are complete or 10 days have passed, whichever occurs sooner, penned tortoises must be released and effectively excluded from the development footprint using temporary fencing or other means.

Pens must provide partial (but not full) shade, forage, and water. Pens must not be smaller than 100 square feet; larger pens are recommended. Sites that cannot accommodate a recipient area pen of this minimum size or larger will require the applicant to relocate tortoises off-site.

Pens should be constructed ahead of time, so tortoises may be placed in pens as soon as they are captured. Silt fence barriers should be installed around the perimeter of the construction area after all tortoises have been trapped. The silt fence should be buried 8 inches into the ground so tortoises cannot crawl under it. Land clearing should occur immediately after all tortoises are relocated out of harm's way. Tortoises trapped and released before clearing has begun may find their way back to the construction site and be injured or entombed there. Tortoises have a strong homing instinct and will try to return to their burrows if there are not barriers that discourage them from doing so.

Tortoises captured under Burrow or Structure Protection permits must be relocated to the permitted on-site recipient area immediately after capture. Penning is not allowed under this permit type.

Habitat Maps, Soil Map, and Calculated Maximum Allowable Density for Donor and Recipient Sites

Habitat maps, soil maps, and calculated stocking rate (Appendix 3) are not required for this permit application unless gopher tortoises will be relocated to an off-site recipient area or this information is specifically requested by FWC staff reviewing such applications.

Vegetation Sampling on Recipient Areas

Vegetation sampling is not required for on-site relocations under this permit type. Vegetation sampling is required for all off-site recipient areas (see Appendix 7).

Marking and Measuring Gopher Tortoises

When conducting on-site relocations, marking and measuring tortoises is not required. Marking tortoises is required for off-site relocations to permitted recipient sites (see Appendix 5).

Health Considerations

Health evaluations are encouraged for any relocation, but are not required for on-site relocations under this permit type. Off-site relocation requirements are identical to other off-site relocation permits (see Appendix 6).

Appendix 12. Gopher Tortoise Restocking Guidelines for Publicly Owned Conservation Lands (created November 2011)

I. PURPOSE

The original version of the Gopher Tortoise Permitting Guidelines approved in April 2008 did not specifically address restocking public conservation lands. The purpose of the following restocking guidelines is to help bring consistency to the restocking and augmentation of gopher tortoise *(Gopherus polyphemus)* populations on public conservation lands owned, purchased, or managed with funding provided by the State of Florida (including the Water Management Districts and local governments). A team of public conservation land managers representing the Florida Department of Environmental Protection Florida Park Service, Florida Department of Agriculture and Consumer Services Florida Forest Service, the five Water Management Districts, Florida Communities Trust, and Florida Fish and Wildlife Conservation Commission developed these guidelines, in partnership with the Gopher Tortoise Technical Assistance Group, to further the public trust of conserving, restoring, and managing Florida's public lands.

The participants who drafted these guidelines, recognize that the success of gopher tortoise conservation depends both on public and private lands participation. These guidelines do not intend to create unfair competition with privately-owned long-term protected recipient sites, but serve as designated restocking sites to further the third goal of the Gopher Tortoise Management Plan, to restore and maintain secure viable populations of gopher tortoises throughout Florida. Long-term Protected Restocking Sites will be stocked at a lower density (≤2/acre) than Long-term Protected Recipient Sites (≤4/acre) so that tortoises can expand naturally over time. Public conservation lands established as Long-term Protected Recipient Sites under a perpetual conservation easement qualify for the full site evaluation stocking rate.

Lands under local government ownership and those owned by the State of Florida may chose to become a Long-term Protected Recipient Site for receiving relocated tortoises from development sites. These lands may meet the criteria for a long-term protected recipient site (see Permitting Guidelines) and be eligible for a final site evaluation rate of four tortoises per acre. Lands that are designated by the managing entity for restocking (i.e., where tortoises are depleted or no longer exist) must meet the criteria for restocking public conservation lands outlined in these guidelines. For purposes of the Gopher Tortoise Management Plan and Permitting Guidelines, restocking is defined as deliberately moving wild gopher tortoises into protected, managed, suitable habitat where resident densities are extremely low and where the restocked tortoises' future survival and long-term population viability are very likely. We refer to a designated site that meets the criteria for restocking as a recipient or restocking site and is an area of protected, managed, suitable habitat where gopher tortoise populations have been severely depleted or eliminated.

Restocking gopher tortoises to restore severely depleted populations is the preferred population management tool identified in the Gopher Tortoise Management Plan, just as prescribed fire is the premier habitat management tool. Restocking allows for the relocated tortoises to naturally expand into well-managed habitat. Restocking of other imperiled species is generally

undertaken with surplus individuals from protected populations. Restocking is a form of responsible relocation; however, tortoises may also be responsibly relocated to sites with resident tortoises where the carrying capacity has been increased through habitat management to provide sufficient forage for additional tortoises. The restocking strategy outlined in the Gopher Tortoise Management Plan is to relocate gopher tortoises to sites that can benefit from the restoration of this keystone species. The focus will be on establishing viable populations on protected, well-managed lands.

The intent of these Restocking Guidelines is to ensure that restocking of public lands is consistent with the goals and objectives for which the land was acquired and to provide a high conservation value for gopher tortoises in Florida. Furthermore, restocking efforts should be compatible with the uses described in the agency-approved land management plan (e.g., Acquisition and Restoration Council [ARC] approved management plans).

Florida Forever Act

Section 259.105, Florida Statutes, The Florida Forever Act ("Act") as amended by Chapter 2008-229, Laws of Florida, Section 13, directs that "public lands, both existing and to be acquired, identified by the lead land managing agency, in consultation with the Florida Fish and Wildlife Conservation Commission for animals or the Department of Agriculture and Consumer Services for plants, as habitat or potentially restorable habitat for imperiled species, be restored, enhanced, managed, and repopulated as habitat for such species to advance the goals and objectives of imperiled species management consistent with the purposes for which such lands are acquired without restricting other uses identified in the management plan."

Further, Section 259.105, Florida Statutes, the Act states: "As part of the state's role, all state lands that have imperiled species habitat shall include as a consideration in management plan development the restoration, enhancement, management, and repopulation of such habitats. In addition, the lead land managing agency of such state lands may use fees received from public or private entities for projects to offset adverse impacts to imperiled species or their habitat in order to restore, enhance, manage, repopulate, or acquire land and to implement land management plans developed under s. 253.034 or a land management prospectus developed and implemented under this chapter. Such fees shall be deposited into a foundation or fund created by each land management agency under 1s. 372.0215, s. 589.012, or s. 259.032(11) (d), to be used solely to restore, manage, enhance, repopulate, or acquire imperiled species habitat."

II. CRITERIA FOR RECIPIENT SITE SELECTION

Site Specific Restocking and Augmentation Plan

Each gopher tortoise restocking or augmentation project on public conservation lands must have a site-specific plan including the duration of the restocking activity ("restocking plan") that will be followed while conducting the project. The FWC will assess this restocking plan during the permit process to determine if restocking is appropriate for the specified site. The restocking plan shall document: what caused the lack of gopher tortoises on the site; what has been done to overcome the threat that caused the lack of gopher tortoises; site selection analysis (see below);

the restocking process; and post-restocking management, monitoring and reporting. These site-specific restocking plans must be kept on file by the managing agency and should be used as a tool to communicate the details of a project to future managers of the land.

Site Selection Analysis

Specific criteria to consider for selecting potential recipient sites are in the Permitting Guidelines (Recipient Site Permits). Additional protocol and considerations for selecting a site for restocking are included in *Protocol for Assessing Gopher Tortoise Densities on FWC Lands Identified as Potential Restocking Sites* (Appendix 7) of the Gopher Tortoise Management Plan.

Management Considerations

Maintain Natural Communities: The primary means to maintain or restore robust tortoise populations on public conservation lands is to restore or maintain natural communities that provide suitable gopher tortoise habitat in optimal condition. This requires the maintenance or restoration of natural processes including frequent fire, natural hydrology, and control of invasive exotic species (plant and animal). The best sites for restocking are those where natural communities are in the maintenance phase of management. Tortoises use a number of ruderal communities (e.g., abandoned agricultural fields, farm field borders, utility rights-of-way, roadsides, canopy gaps, and bare ground created in forests or pine plantations following thinning or harvest with ongoing or past disturbances). These ruderal communities may be suitable for restocking under certain circumstances; however, it is preferred that tortoises be relocated to appropriate natural communities.

Use Frequent Prescribed Fire: Natural tortoise populations occur in habitat that is fire-maintained. Fire return intervals vary based on natural community and site conditions and must be addressed in the site-specific restocking plan. It is generally accepted that sandhill, pine flatwoods, and dry prairie should be burned on one-year to three-year rotations while scrub, scrubby flatwoods, and coastal strand burn on longer fire return intervals. Fire at recipient sites needs to occur at appropriate intervals to maintain a diverse groundcover, and the restocking plan must address how this will be accomplished. Fire improves the condition of these natural communities by killing non fire-adapted plants, recycling nutrients, clearing out dead and diseased vegetation, promoting plant flowering and fruit production, and fostering new plant growth. The optimal benefits of fire for gopher tortoises are realized when applying prescribed burns in a manner that mimics the natural lightning fire season in early spring.

Natural Systems Management/Other Imperiled Species Considerations: Appropriate management of natural communities will generally benefit most imperiled species populations, including gopher tortoises. Natural systems management across the landscape often negates the need for single species management. In rare cases, conflicting management strategies between imperiled species can exist. For example, management of Florida scrub-jay habitat may require longer fire return intervals or less complete (mosaic) burns than would be desired to produce ideal habitat for gopher tortoises. Appropriate management activities should take into account all imperiled species that may be present.

Ruderal or Disturbed Lands Restoration

Desired Future Condition: To the extent feasible (and excepting infrastructure improvements such as limited roads, buildings, hiking and equestrian trails, camp sites, etc.), the desired future condition for the majority of ruderal and disturbed lands on public conservation lands is restoration to the natural communities that historically occurred on each site. Gopher tortoise restocking and augmentation can be an important part of community restoration since gopher tortoises are a keystone species that provide refuge and nesting habitat for a large number of other species.

Protect Tortoises During Restoration: If tortoises are restocked on ruderal lands that will be restored to their natural condition, all due care must be taken to ensure that tortoises and their burrows are protected, per the Permitting Guidelines. Plans to address this must be in the restocking plan.

Ensure Adequate Forage During Restoration: Tortoises should not be deprived of adequate forage during habitat restoration. If tortoises reside on pastures being restored to native groundcover, restoration must be done in a manner that ensures tortoises have adequate forage.

Compatibility of Uses

Restocking tortoises is not allowed within developed public use areas of management units, or within approved or proposed sites for facilities development (e.g., campgrounds, structures, parking lots).

Habitat Condition

Restocking of tortoises may be undertaken on public conservation lands if the habitat is in suitable condition to support them. During the recipient site permitting process, FWC evaluates proposed recipient sites to determine their suitability and the maximum number of tortoises that can be relocated to each site. Site suitability criteria are divided into two classes, *Acceptable* (minimum acceptable standards) and *Desirable* (highly desirable features).

Desirable conditions for tortoises in most suitable natural communities in Florida include canopy cover of no more than 40% and native herbaceous groundcover at 50% cover or greater. Acceptable conditions for tortoises in most suitable natural communities in Florida include canopy cover of no more than 60% and native herbaceous groundcover at 30% cover or greater. Refer to the Permitting Guidelines, Table 2. *Acceptable and Desirable Criteria Thresholds for Recipient Site Characteristics* for additional criteria used to evaluate recipient sites.

Gopher tortoise recipient sites should be of the same or similar habitat type as the donor site (e.g., tortoises should be relocated from a Sandhill site to a Sandhill site). In general, tortoises should not be introduced onto ruderal lands that did not originally support tortoise habitat (e.g., Hydric Hammock converted to pasture).

Recipient Site Surveys

Tortoise populations in potential recipient sites on public conservation lands must be surveyed to determine whether or not restocking or augmentation is warranted. Public land agencies may

utilize their own staff if they have the appropriate training and experience to conduct surveys and are Authorized Agents, or they may contract with Authorized Gopher Tortoise Agents from the private sector. The required survey protocol is outlined in Gopher Tortoise Permitting Guidelines (Appendix 4). Staff of public conservation lands may decide that surveying more than the required minimum (15% of the potential recipient site) is warranted based on the goals and objectives of the restocking effort.

Population Densities

Tortoise population densities vary considerably between various habitat types and over time. The goal on public conservation lands is to maintain tortoise populations within natural habitat-specific ranges and to allow natural population fluctuation within those ranges.

Restocking must not be used to attempt to create or maintain population levels at a constant maximum or super-abundance. For this purpose, restocking shall occur at only 50% of the site specific maximum allowable density.

Typically, only areas with suitable habitat conditions and low tortoise densities for designated habitat types shall be considered as potential restocking sites on public conservation lands. Additionally, tortoises should not be stocked into a patch of habitat that is adjacent to or contiguous with a patch that has a moderate to high tortoise density. Exceptions are allowable in special circumstances such as when a donor site is immediately adjacent to a management unit recipient site.

Stocking Rates for Restocked Areas

The section, *Types of Permits, Recipient Site Permits* of the Permitting Guidelines, include stocking rates for recipient sites. The Permitting Guidelines Table 2 establishes maximum allowable tortoise restocking rates (Site Evaluation Stocking Rate) for recipient sites having site characteristics that meet "acceptable" or "desirable" criteria. The formula for determining an allowable stocking rate for restocking public conservation lands is different from that outlined for other recipient site permits in Appendix 4. The final stocking rate = (site evaluation stocking rate x 50%) – baseline density for a maximum site density of two tortoises per acre (see Guidelines, Appendix 4). This will allow the population to expand naturally.

The FWC will base the final stocking rate assigned to a management unit on local conditions and objectives. Decisions should be guided by a strategy of establishing stocking rates well below maximum carrying capacity or site evaluation stocking rate, and allowing tortoise populations to expand naturally over time. The maximum allowed site evaluation stocking rate in the Permitting Guidelines is two tortoises per acre for *Acceptable* criteria and four tortoises per acre for *Desirable* criteria. However, for restocking public conservation lands, the number of tortoises per acre shall not exceed 50% of the site evaluation stocking rate. One potential strategy for restocking public conservation lands may be to establish a relatively small recipient area within a larger block of suitable habitat that contains a low density of gopher tortoises. This strategy will allow the maximum allowable gopher tortoise density of the recipient block to be clustered in the smaller recipient area as a means to restock the entire block. Agencies may

employ different strategies that are more efficient with their management purposes; however, FWC will always consider the larger block of suitable habitat as the restocking unit to be permitted.

Stocking rates for ruderal lands (e.g., pasture) should be assigned conservatively and should not exceed the final stocking density of the current habitat or of the natural habitat to which it may be restored. Stocking rates for ruderal lands slated for restoration should consider all necessary restoration treatments and the final community composition and structure. At no time should tortoise densities exceed the capacity of the limiting factors of the habitat community.

III. STANDARD PROCEDURES DURING RESTOCKING, AND HANDLING WITHIN A RESTOCKING SITE

Restocking within a Management Unit

Relocation of tortoises within a public conservation management unit during construction of facilities or for other reasons requires a permit and must be in accordance with the Gopher Tortoise Permitting Guidelines (see *Determining if a Permit is Required, Activities Which Require a Permit*). Permitting requirements depend on the number of burrows to be impacted. A permit for "10 or Fewer Burrows" is required if 10 or fewer burrows are to be impacted. A "Conservation Permit" is required if more than 10 gopher tortoise burrows are to be impacted (Permitting Guidelines, Section IV, *Types of Permits*). Mitigation requirements per gopher tortoise are summarized in Table 1 in the Permitting Guidelines.

"Routine" Handling

For the most part, tortoises should be left alone and not handled on public conservation lands unless these actions are associated with a permitted monitoring or development-related relocation project. This does not mean that staff should avoid taking common sense actions to save tortoises under imminent threat, such as moving a tortoise a few feet to remove it from a busy section of road within a management unit. Gopher tortoises should *not* be relocated to other sections of a management unit without an FWC permit.

Minimizing Disease Spread

Animals showing clinical signs of disease are not permitted to be relocated except to FWC-permitted recipient sites and shall not be accepted onto public conservation lands. Health screening for tortoise relocation (or rejection for relocation) onto a management unit will be guided by these Permitting Guidelines (see Appendix 6) and the managing agency's policy.

Decisions on how stringent the public land managing agencies should be in efforts to limit introduction of novel diseases or strains of diseases (such as requiring blood samples for URTD testing) should be made on a case-by-case basis by the recipient site manager, using existing knowledge of disease strains within a management unit's (or adjacent conservation land's) existing population.

Maintaining Donor Site Demographic Conditions

If warranted by the approved stocking rate, it is required that entire colonies (juvenile through adults) be relocated together into the same management unit or recipient site. When donor populations are too large and require more than one recipient site, a representative subsample that reflects the demographic condition, including sex and age ratio, of the donor site should be selected for relocation to each recipient site. Benefits of this approach include less stress on the animals and increased site fidelity.

Relocation Distances

To minimize stress to animals and conserve local genetic stock, it is preferred that relocated tortoises be moved from a donor site that is in close proximity to the recipient site (e.g., less than 100 miles). To the degree feasible, select suitable donor sites to conserve known genetic assemblages of tortoises in the state (using the best available data).

Commensal Species

Many other species depend on gopher tortoises and their burrows. Therefore, consideration should be given to relocating commensal species from donor populations, especially if tortoises have been extirpated (or nearly so) from the recipient site. Decisions to relocate commensals along with "their" tortoises will be made on a case-by-case basis, with recommendations and justifications discussed in the associated site-specific restocking plan. Federal and state law protects various commensal species and provides species-specific guidelines that should be followed when relocating these species to public conservation lands. Commensal species must not be relocated outside their known natural historic ranges or into management units where the species in question is already abundant. Additional information can be found in Appendix 9 of the Permitting Guidelines. Indigo snakes and other federally-listed species may not be relocated without obtaining federal authorization.

IV. CONSIDERATIONS FOR RECIPIENT AND RESTOCKING SITE MANAGEMENT

Permitting Requirements

A permit from FWC is required to move or receive gopher tortoises for purposes of restocking. Long-term Protected Restocking Sites must meet the criteria outlined in the Gopher Tortoise Permitting Guidelines (April 2008, as amended). Sites proposed as restocking sites must apply for and obtain a Long-term Protected Restocking Site permit. Requirements for this permit are similar to a long-term recipient site permit; but may contain slight differences that are specific to publicly-owned land. Long-term Protected Restocking Sites shall be stocked at no more than 50% of the site evaluation stocking rate. Public conservation lands established as regular recipient sites and under a perpetual conservation easement qualify for the full site evaluation stocking rate. See the Permitting Guidelines for additional requirements and criteria.

Protection of Land

Public conservation lands designated as restocking sites must be protected by one of the following: a permanent FWC conservation easement; a modification of an existing conservation easement with FWC as the grantee; or, a revised land lease that includes standard language to

ensure management and protection of land for gopher tortoises (i.e., Board of Trustee's lands). The revised land lease must also include language for an automatic renewal clause to continue the agency's commitment to manage the property for gopher tortoises, remedies if the habitat is not managed appropriately including actions to be taken, and reference to the Acquisition and Restoration Council's-approved management plan for the specific site designated for restocking. These details, including the specific requirements for financial assurances (below), will be outlined in a Memorandum of Understanding (MOU) between the lead managing agency and FWC, and include a timeframe when the revisions to the plan and lease must be completed. The length of the MOU will be consistent with the length of the land lease. FWC-accepted MOU template language is under development and will be provided.

Financial assurances

Financial assurance requirements for public conservation lands are consistent with those requirements outlined in the Gopher Tortoise Permitting Guidelines (April 2008, as amended). The purpose of creating a financial assurance is to establish a fund that helps to ensure that the property to which the gopher tortoises are moved to for restocking are managed appropriately into the future, should other funding sources no longer be available. Interest generated from the endowment or trust, once fully established, can be used to enhance site management activities; however the principle may not be spent. The amount required to establish the required principal in the endowment will be based on management costs submitted using the template provided in Worksheet 1 below. This is consistent with the current financial assurance requirements for all Long-term Protected Recipient Sites. Expenditure of those funds should be limited to the properties that generated them, or to enhance or restore other gopher tortoise habitat. Public agencies may establish a trust/endowment held by a 3rd party such as a Citizens Support Organization (CSO) or other non-profit organization.

Gopher Tortoise Cost Accounting

For public conservation lands, Gopher Tortoise Cost Accounting (See Gopher Tortoise Cost Accounting template below) must be used and submitted as part of the restocking plan. This accounting method will be used to determine any fee amount the land managing agency may charge to receive tortoises from donor site projects.

Mitigation Contributions

Mitigation contributions are required for all gopher tortoise permits. Mitigation amounts will be commensurate with those outlined in Table 1 of the Gopher Tortoise Permitting Guidelines.

Site Evaluation Stocking Rate

Long-term Protected Restocking Sites shall be stocked at no more than 50% of the site evaluation stocking rate. Public conservation lands established as regular Long-term Protected Recipient Sites and under a perpetual conservation easement qualify for the full site evaluation stocking rate.

Guidance on Ground Disturbing Activities

Permits are not required for bona fide agricultural, silvicultural, and wildlife management activities. For more information about these and other activities that do not require a permit, see

Section II., Determining if a Permit is Required, of the Gopher Tortoise Permitting Guidelines. However, the goal on public conservation lands should be that negative impacts to tortoises and their burrows are minimized during restoration and management. If management activities are found to create negative impacts to tortoises or burrows, the activity should be stopped and reassessed to determine how to reduce or eliminate the impacts.

Protect Tortoises When Using Heavy Equipment:
When mechanically treating vegetation or harvesting timber with heavy equipment in occupied tortoise habitat, the tortoises and their burrows must be protected to the extent feasible (e.g., by flagging and avoiding burrow entrances). Ideally, heavy equipment use should be scheduled during cooler months (November through March) to minimize direct impacts to tortoises that are active above ground, but these activities may be performed in other months as necessary.

Avoid Using Heavy Equipment in Tortoise Concentrations:
Gopher tortoises are not randomly distributed on the landscape. Many gopher tortoise populations tend to have clumps of higher densities. Avoid or minimize roller-chopping or use of heavy equipment in areas with high burrow concentrations. An exception would be when no other reasonable alternative is available to achieve vegetation management goals (e.g., reduction of unnaturally dominant saw palmetto).

Protect Tortoises When Mowing:
In general, when mowing vegetation in natural areas occupied by tortoises, blades or cutters should be set no lower than 18 inches above the ground to avoid injury to tortoises. Mowing of turf grass on road shoulders in tortoise habitat should be kept to a minimum width, and close attention is required to avoid injuring tortoises or damaging their burrows.

Monitoring and Reporting

Recipient site managers are required to submit a summary to FWC of habitat management conducted, and the results of habitat monitoring and tortoise population surveys (see Appendix 7). Monitoring techniques will be outlined in the site-specific restocking plan and should follow guidelines and recommendations in the Gopher Tortoise Permitting Guidelines and the Gopher Tortoise Management Plan.

Gopher Tortoise Cost Accounting

WORKSHEET 1. Categories of long-term, ongoing land management costs

Upland Activities	Cost/Acre	Cost/Acre/Year	Assumptions/Frequency
Burning	$	$	
Fencing	$	$	
Firelines	$	$	
Security	$	$	
Vegetation management	$	$	
Roads	$	$	
Administrative	$	$	
Invasive Plant & Animal Management	$	$	
Monitoring and reporting	$	$	
Vegetation monitoring	$	$	
Equipment (If not already included in other costs above)	$	$	
Payment in Lieu of Taxes ("PILT" as applicable)	$	$	
Other (as specified by the land managing agency)	$	$	
Total		$	

Annual Cost Figuring a % split uplands to wetlands $

Endowment required figuring a 4% return on investment $

WORKSHEET 2. Long-term *and* one-time costs compiled (example)

Acres		Total
Land management endowment/acre (*long-term/ongoing costs carried over from Worksheet 1*)	$	$
Easement value/acre	$	$
Temporary enclosures	$	$
Other fencing	$	$
Authorized agent permit	$	$
Recipient/restocking site permit (incl. permit app prep)	$	$
Mark, transport, release or GTs (either by consultant or agency)	$	$
Loss of opportunity (silvicultural, recreation, etc.)	$	$
Administrative	$	$
Per acre total cost	$	$
Total	$	$
Land managing agency fee per tortoise considering 2 gopher tortoises per acre	$	$

Appendix 13. Criteria for Gopher Tortoise Recipient Sites to Qualify as Research Sites (created November 2009)

The FWC has historically issued Scientific Collecting permits through the Protected Species Permit Coordinator for research projects. The gopher tortoise permitting program has similarly allowed approved recipient sites to be used solely as research recipient sites for tortoises relocated from developments. Research recipient sites were not specifically addressed in the Gopher Tortoise Management Plan ("Plan") or in the original version of the Gopher Tortoise Permitting Guidelines ("Permitting Guidelines"). This document outlines the criteria and process for research projects obtaining Research Recipient Site permits and Scientific Collecting permits for the relocation of gopher tortoises displaced by development.

The Research Recipient Site permit option is available when a previous or concurrent Scientific Collection permit has been issued for research that requires relocations to an unpermitted recipient area.

Criteria for Issuance of a Gopher Tortoise Research Recipient Site Permit

- Gopher Tortoise Research Recipient Site permits will only be issued to sites specified as part of a research project permitted under a previously issued or concurrently issued Scientific Collecting permit.
- Recipient Site permit applications will be required for Research Recipient Site permits and will subsequently be entered into the online permitting system by FWC staff.
- Research recipient sites should meet acceptable size and habitat criteria for recipient sites protected by a perpetual conservation easement; however, certain criteria may be waived according to the research needs outlined in the Scientific Collecting permit application. Appropriate documentation (e.g., soils and habitat maps) is required unless the research design demonstrates the need to waive such criteria. Like all other recipient site permit applications, a site habitat management plan is required (Permitting Guidelines, Appendix 3) and must be submitted as part of the permit application, (e.g., specific requirements regarding property size or conservation easements).
- The number of tortoises relocated to research recipient sites will be limited to the final stocking densities outlined in the Permitting Guidelines for recipient sites. Final stocking densities exceeding the two-per-acre standard (with 0.5 per acre for each site characteristic that is satisfied, up to a maximum of two additional) will be considered only if the applicant can demonstrate in the research proposal that the scientific design of the research depends on an increased density. If an increased final stocking density is permitted under the Scientific Collecting permit, FWC staff may require that tortoises be relocated upon completion of the project to achieve a sustainable final stocking density, or the permittee may be required to provide additional adjacent acreage for tortoise dispersal upon completion of the research project.
- As for other recipient site permit applications, a $500 mitigation contribution will be required for this permit.
- As with other recipient sites, an Authorized Gopher Tortoise Agent is required to perform initial surveys and monitoring associated with Research Recipient Site permits.

- The Research Recipient Site permit does not authorize an individual to conduct research. This permit authorizes the landowner to accept relocated tortoises for scientific purposes. Multiple research projects (each with separate or the same Scientific Collecting permit) may be allowed on a single research recipient site.
- Landowners accepting tortoises under the Research Recipient Site permit will be required to submit monitoring reports of management activities for recipient sites, as outlined in the Permitting Guidelines.
- Only gopher tortoises that are designated as part of a permitted research project will be accepted to a research recipient site.
- When the permitted research is concluded, or the Scientific Collecting permit has expired or becomes invalid, the research status is no longer afforded to the recipient site. If the landowner wishes to continue to receive gopher tortoises and has capacity to receive additional tortoises following the conclusion of the research project, the property owner must apply for, and receive, a new Recipient Site permit prior to accepting any additional tortoises.

Requirements for Scientific Collecting Permits that involve Research Recipient Sites

Any Scientific Collecting permit application submitted for research involving a Research Site permit must demonstrate that the proposed research project coincides with the needs identified in the list of research topics in the Plan, or that the research project otherwise contributes to the broader management plan goals and objectives. The FWC has the discretion to limit the number of research recipient sites for a particular study topic.

- Funding sources for research project(s) must be secured prior to issuance of a Scientific Collecting permit authorizing receipt of relocated gopher tortoises.
- A letter will be required from the landowner that acknowledges and allows this research on the specified property.
- Applicants for a Scientific Collecting permit involving the use of gopher tortoises relocated from development sites will be required to submit a copy of either the application for the Research Recipient Site permit or a letter of intent from the landowner to apply for the Research Recipient Site permit.
- Applicants for a Scientific Collecting permit involving research recipient sites will be required to submit a summary of the proposed relocations for each designated unit.
- Individuals working with relocated gopher tortoises under a Scientific Collecting permit will be required to submit progress reports to FWC over the course of the project. Upon completion of the research project, a final report must be submitted to FWC along with any publications resulting from the permitted research.
- Gopher tortoises cannot be relocated to a research recipient site until both a Scientific Collecting permit and a Research Recipient Site permit have been issued by FWC.

Process of Issuance of a Research Recipient Site Permit

Generally, the initiation of a research project begins with the submission of a Scientific Collecting permit application to the Protected Species Permit Coordinator. Because of the

additional coordination required to issue a concurrent Scientific Collecting permit and Research Recipient Site permit, the applicant for the Scientific Collecting permit may be advised to submit a waiver of the statutory application processing time requirements as part of a request for additional information (RAI).

- The owner of the potential research recipient site submits an application to the Gopher Tortoise Permitting Coordinator's office.
- FWC staff will ensure that the applications for both permit types meet all regulatory requirements and Plan research goals during the review period.
- If the Research Recipient Site permit is issued, the regional Gopher Tortoise Conservation Biologist will enter the site information into the online permitting system.

Issuance of a Research Recipient Site permit (or associated Scientific Collecting permit) does not imply that FWC will be providing any funds to support gopher tortoise research conducted at that site.

Mitigation Contributions for Relocations to Research Recipient Sites

The FWC recognizes the conservation value of new scientific findings regarding the management and relocation of gopher tortoises. The value of the research may be considered in determining the mitigation contributions for displaced tortoises relocated to a gopher tortoise research recipient site. The mitigation contributions associated with these sites may follow the mitigation structures of recipient sites with conservation easements or other enhanced conservation value to encourage, or at least not financially hinder, relocations to research recipient sites.

Brevard
SCH-CORPS-NEPA
2012-1914

COUNTY: BREVARD

DATE: 4/20/2012
COMMENTS DUE DATE: 6/1/2012
CLEARANCE DUE DATE: 6/19/2012
SAI#: FL201204206200C
REFER TO: FL200703223171C

MESSAGE:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
ENVIRONMENTAL PROTECTION	ST. JOHNS RIVER WMD		
FISH and WILDLIFE COMMISSION			
X STATE			

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

- _ Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.
- X Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.
- _ Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.
- _ Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - CANAVERAL HARBOR INTEGRATED SECTION 203 NAVIGATION STUDY REPORT AND DRAFT ENVIRONMENTAL ASSESSMENT - CAPE CANAVERAL, BREVARD COUNTY, FLORIDA.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

EO. 12372/NEPA
- ☑ No Comment
- ☐ Comment Attached
- ☐ Not Applicable

Federal Consistency
- ☑ No Comment/Consistent
- ☐ Consistent/Comments Attached
- ☐ Inconsistent/Comments Attached
- ☐ Not Applicable

From:

Division/Bureau: Historical Resources

Reviewer: Michael Hart — Laura A. Kammerer, Deputy SHPO

Date: 5/9/12 — 5-10-2012

RECEIVED
MAY 14 2012
DEP Office of
Intergovt'l Programs

RECEIVED
2012 APR 24 P 1:35
BUREAU OF
HISTORIC PRESERVATION

List of Public and Agency Comments on Draft Feasibility Report and Draft EA with Response/Action

Organization/ Agency	Last Name	First Name	Mailing Address	Town	State	Zip	Dated	Medium		Comment	Draft Response
								Email	Letter		
United States Environmental Protection Agency	Mueller	Heinz	Region 4 Atlanta Federal Center 61 Forsyth Street	Atlanta	GA	30303-8960	9-Jun-12		X	The Corps published an Intent to Prepare a Draft EIS for the Port Canaveral Navigation Improvements Section 203 Feasibility Study Located in Brevard County, FL. In this notice, the Corps indicated an EIS was necessary. The final EA/FNSI should clarify why there was a change in the level of NEPA documentation.	Concur. Explanation has been added to Section 8.3.
										EPA disagrees with the draft EA's (Section 2.6.1) finding that the 2005 sediment evaluation of the harbor as the most recent. The final EA/FNSI should discuss the results of the 2010 comprehensive sediment testing of the entire harbor.	Concur. Information has been updated in this Section.
										The draft EA indicates the Section 103 Evaluation will be conducted during the pre-construction engineering and design phase. EPA encourages starting this evaluation at the earliest possible phase with the allocation of one year, at a minimum, for testing and evaluation of the material.	Concur. Study is underway.
										According to the 2012 Site Management and Monitoring Plan (SMMP), which is not discussed in the draft EA, the 10 year projected capacity should not exceed half the estimated remaining site capacity. The draft EA indicates the ten-year projected volume (9.75 million cy) including the proposed action and its associated additional maintenance dredging exceeds half of the remaining estimated capacity (18.4 million cy). Consequently, the 2012 SMMP requires an assessment of the proposed action's impacts upon the ODMDS' capacity requirements.	The recommended plan estimates an initial new work placement of 3.1 MCY in the ODMDS. This volume has been addressed in the approved February 2012 Canaveral Harbor ODMDS SMMP Table 4 Capacity Estimate Based on Existing Bathymetry and a Minimum Allowance Depth of -40 feet (MLLW). The SMMP states "Until the capacity of the ODMDS has been determined utilizing USACE approved models, use of the ODMDS should not exceed half the estimated remaining site capacity (9.2 million cubic yards). This will allow sufficient time for a more detailed assessment of the site capacity, implementation of management options, or environmental studies for site expansion to be conducted if necessary without adversely impacting maintenance dredging at the Port. Based on the current estimates, exceedence of this volume is not anticipated. Should the approval of any project case the exceedence of this value, an analysis of the remaining capacity of the ODMDS will have to be conducted by the USACE or permit applicant, as the case may be, prior to approval of ocean disposal of the project. The analysis should demonstrate that more than half the remaining capacity will not be consumed within the next 10 years from the date of the analysis." The 3.1 MCY new works dredging placement has been included on the existing In Situ capacity analysis. The estimate of the annual maintenance dredging volumes of the civil and military portions of the harbor would exceed half of the remaining estimated ODMDS site capacity by approximately 3%. Recently constructed structural improvements to the harbor jetties along with the recent installation of a sand trap and projected alternative beneficial uses of dredged material are expected to support a further downward trend in annual disposal volumes in the ODMDS. It is recommended that the requested disposal mound modeling be deferred until after initial placement of the new work material to ensure in situ conditions are established for the material placed. If required at a future date, impacts on the site's capacity could be assessed through management alternatives, evaluation of capacity based on bathymetric surveys, or through an assessment using the Corps' MDFATE or MPFATE modeling.
										The EA does not address whether the proposed harbor deepening may affect any existing pipelines or utility infrastructure in the harbor. EPA is aware the Corps has pipeline and other utility crossing in waterways burial guidance. Compliance with this guidance may have resulted in utility infrastucture within the depth range proposed for dredging. Because the EA does not appear to indicate this issue has been investigated and appropriately addressed, the final EA should address and discuss it.	The utilities information is included in the Engineering Appendix Section 6.3 - Impacts to Existing Utilities provides a listing of all existing pipeline and utility infrastructure conduits in the vicinity of the project. All of the plan alternatives evaluated were determined to have no impact or require any remedial relocation actions for these existing features.

List of Public and Agency Comments on Draft Feasibility Report and Draft EA with Response/Action

Organization/ Agency	Last Name	First Name	Mailing Address	Town	State	Zip	Dated	Medium Email	Medium Letter	Comment	Draft Response
Seminole Tribe of Florida Tribal Historic Preservation Office	Backhouse	Paul	30290 Josie Billie HWY	Cleiston	FL	33440	9-May-12		X	No objection. Please notify the Seminole Tribe if cultural resources which are potentially ancestral or historically relevant to the Seminole Tribe of Florida are discovered.	Noted. No action required.
NOAA National Marine Fisheries Service	Fay	Virginia	263 13th Avenue South	St Petersb	FL	33701-5505	6/13/2012		X	Based on the information provided, NMFS concludes the project would not adversely impact EFH and no EFH conservation recommendations are provided.	Noted. No action required.
NOAA National Marine Fisheries Service	Crabtree	Roy	263 13th Avenue South	St Petersb	FL	33701-5505	5/14/2012		X	Determined that the project may affect, but is not likely to advesely affect, sea turtles, smalltooth sawfish, or the North Atlantic right whale.	Noted. Recommendations provided in the letter were incorporated into Section 7.2.8 of the report.
US Fish and Wildlife Service	Hankla	David	7915 Baymeadows Way, Suite 200	Jacksonv ille	FL	32256-7517	6/29/2012		X	Concur with determination effects and protection measures for the Eastern indigo snake.	Noted. Standard protection measures will be incorporated into the project plans and specifications.
										Do not agree that the standard manatee conditions alone are sufficient to reduce probability of adverse effects to manatees from clamshell dredging to insignificant and discountable levels. FWS proposes additional protection measures (provided) should be applied to this work to reduce the probability of take of a manatee to insignificant or discountable.	Noted. The additional protection measures will be implented during the construction phase. These measures were incorporated into Section 7.2.8 of the report.
										Provides a non-binding Conservation Recommendation that night vision technology be available with infrared light intensification during nighttime clamshell dredging.	Noted. The recommendation will be considered during the construction phase.
										Concurs with the Corps' incorporation of light reduction measures into its project plans to reduce potential impacts to nesting or hatchling sea turtles or the southeastern beach	Noted. No action required.
										Believe that the project will have minor, temporary effects on natural resources, and no significant, long-term effects to other Federal Trust and natural resources will occur. FWS has no objection to this work based upon their review of the project pursuant to the Fish and Wildlife Coordination Act.	Noted. No action required.
US Coast Guard	Allan, Jr.	T.G.	4200 Ocean Street	Atlantic Beach	FL	32223-2416	6/21/2012		X	Impacts to Federal Aids to Navigation. Table 6-35, Volume I of the report reflects that $2.75M for Aids to Navigation is to be "provided and funded by the United States Coast Guard." Given the current federal fiscal environment, it is difficult to predict the Coast Guard's resource availability to begin work related to this project. All plans should be forwarded to Coast Guard District Seven Waterways Management Division for comprehensive review and determination of existing and proposed ATON, current cost estimating, construction planning, environmental review, funding determination and consideration for adding two proposed outbound range structures. The Coast Guard reserves the right to final approval under the Ports and Waterways Safety Act of 1972, as amended by the Port and Tanker Safety Act of 1978.	Noted. Footnote #2 to table 6-35 has been revised as follows. 2 Plans for proposed Aids to Navigation will be forwarded to Coast Guard District Seven Waterways Management Division for comprehensive review and determination
										Coast Guard Base Canaveral Property: Table 6-3, Volume I of the report reflects a future North Cargo Pier (NCP) 7, which would require the relocation of Coast Guard Station Port Canaveral. In an e-mail dated 24 June 20 11, between Port Canaveral CEO Stan Payne and Mr. Michael Lesinski of the Coast Guard's Civil Engineering Unit Miami, Mr. Payne noted that the cost of relocating Coast Guard Station Port Canaveral would clearly outweigh the benefits. As a matter of closure the report should explicitly state that none of the report's findings are predicated on the relocation of Coast Guard Station Port Canaveral.	Concur. The following text has been added to section 6.7.5 Recommended Plan: "Neither the Recommended Plan, nor any of the evaluated alternatives, requires the relocation of Coast Guard Station Port Canaveral." In addition, drawings have been revised to not show changes to Coast Guard Station Port Canaveral.

List of Public and Agency Comments on Draft Feasibility Report and Draft EA with Response/Action

Organization/ Agency	Last Name	First Name	Mailing Address	Town	State	Zip	Dated	Medium: Email	Medium: Letter	Comment	Draft Response
Department of the Air Force, 45th Space Wing (AFSPC)	Cotton	General Ant	45 SW/CC 1201 Edward H. White II St.	Patrick AFB	FL	32925-3299	6/28/2012		X	Add in the appropriate location, "A plan will be created by the CPA and/or US Army Corps of Engineers to address how vessel movements in and out of the middle turning basin will be achieved during construction. The 45 SW will request Explosive Site Plan (ESP) approval from the Department of Defense Explosives Safety Board (DDESB) as required to account for any changes in configuration to the channel adjacent to Air Force Property."	Concur. Recommended text added to section 6.7.2 Recommended Plan Construction.
										We are still finalizing a new property boundary survey so the acreage calculations in the report may not be accurate but that can be worked/updated as part of the formal request for use of AF property after funding for the project has been approved	Concur. The following text has been added as a footnote to "approximately 8 acres" found in section 6.7.5 Recommended Real Estate Considerations: "Final acreage will be determined by a new property boundary survey, which will be a part of the formal request for Air Force property. The 8 acres used in this analysis may be a slightly high estimate."
										Modify the study/EA language to indicate that "while the USACE upland containment site on the USAF property may be the preferred site for spoil disposal, the USAF has not agreed to use of that area for that purpose and would have to further evaluate that option in light of other competing interests for that same disposal area as well as test results on the composition of the spoil to be disposed of."	Action Taken: The text in section 6.7.3 Dredged and Upland Material Management Plan has been revised to include the following: "The remaining 354,089 CY from existing grade down to elevation -13 MLLW is designated for disposal in the adjacent upland disposal site, pending formal Air Force approval for use of that area for material placement. Air Force approval would be based on an evaluation of competing interests and on test results on the composition of the spoils to be placed."
										Engineering Annex, pgs. 56-57; Para 1.8.2 Middle Turning Basin sub-para: Add the following to end of the paragraph, "Work performed near under-channel communications lines, and related communications manholes will require careful coordination with the 45th Space Wing and AT&T to avoid service interruptions. This channel widening project will bear the cost to mitigate, replace, or relocate any impacted federal structure, utilities, or communications infrastructure.	Concur. Change made as requested.
Department of the Air Force, 45th Space Wing (AFSPC) (Cont.)	Cotton	General Ant	45 SW/CC 1201 Edward H. White II St.	Patrick AFB	FL	32925-3299	6/28/2012		X	Engineering Annex, pgs. 56-57; Para 1.8.2 Middle Turning Basin sub-para: This same portion of the report does mention the need to comply with the shoreline setback distance required by USAF regulations to the existing Bldg 1064 and the CPA previously produced site sketch showing how that setback distance could be achieved. Since then our regulations have been changed and now require an 86 foot set-back (versus 85 feet as shown in the previous CPA-provided site sketch), measured from the building to the mean high-water mark	Concur. Change made as requested.
										The NEPA specific sections are noted with an asterisk. Recommend Chap 5 "Formulation and Evaluation of Alternative Plans" and Chap 8 "Public Involvement, Review, and Consultation" be marked with asterisks as well.	Concur. Change made to the Table of Contents as requested.
										Chap 1 & 2, Fig 1-1/ 2-1 and Fig 1-2/ 2-2: The referenced figures are duplicative.	No action taken. Concur that figures are duplicative, but they have been requested by previous reviewers.
										Page 2-4, Sec 2.1.5: The water quality discussion is based on information that is now 6 yrs old, although the section reports that ongoing water quality monitoring is being performed. Recommend updating section to reflect current condition, particularly since that information is presumably available.	Concur. The information has been updated.

List of Public and Agency Comments on Draft Feasibility Report and Draft EA with Response/Action

Organization/ Agency	Last Name	First Name	Mailing Address	Town	State	Zip	Dated	Medium		Comment	Draft Response
								Email	Letter		
										Page 2-47, Sec 2.6.1: There is a statement in this section, "Concentrations of metals in the samples were typical of coastal waters, although some concentrations were above those of reference stations (Anamar 2005)" Please indicate the significance of this statement: for example, that regulatory standards were exceeded.	Concur. The information has been updated to include results of more recent surveys conducted in 2009-2010, and additional explanation has been included.
										Chap 5, Sec 5.1.3 and 5.2: Planning Objectives and Plan Formulation Criteria are presented in the referenced sections. Which criteria were used to select the preferred alternative?	No action required. The objectives identified in Table 5-2 were used as a preliminary screening of measures. The measures, which meet the objectives, were then combined into alternatives; therefore all of the alternatives meet the criteria listed in Table 5-2. The final selection of a preferred alternative was based on the contribution to national economic development (NED) see Table 6-24 and on the Summary of Accounts evaluation (section 6.6).
										Page 6-5+, Fig 6-1 to 6-3: The legend identifying the alternatives on the figures do not match the names of the alternatives in the text. Recommend not using terms "Plan A" or "Plan B" because the text refers to Plan 1 and Plan 2. Please rectify on the figures which widening plan is Plan 1 and which is Plan 2.	Concur. Changes made as requested.
										Page 6-43, Sec 6.7.1: Recommend providing an explanation that the "Recommended Plan" referred to in Sec 6 is equivalent to the "Preferred Alternative" in Sec 7. This provides a link between the formulation of alternatives in Sec 6 and the final alternatives selected to be carried forward for analysis in Sec 7.	Concur. The following text has been added to section 6.7 Recommended Plan: "The Recommended plan is identified as the Preferred Alternative in Section 7: Environmental Consequences."
										Page 7-7 and 7-12, Sec 7.2.8.2 and 7.2.14.2: Mitigation measures are generally referred to in the text for potential construction effects to sea turtle hatchlings and to offset turbidity. Please specify the specific mitigation measures.	Concur. Mitigative measures recommended in the USFWS' June 29, 2012 ESA concurrence letter were incorporated into Section 7.2.8 of the report. Additional measures related to water quality will be identified during the FDEP permitting phase.
										Page 7-13, Sec 7.2.16.1: There is a statement in this section, "Brevard County is *not* classified by EPA as an attainment/maintenance area..." Should this read "Brevard County is classified by EPA as an attainment/maintenance area..."	Concur. The text has been corrected.
										Page 7-24, Sec 7.2.35.4: There is a reference to "Section 10 consultation" having been initiated in accordance with the NHPA. Shouldn't this be Sec 106?	Concur. The text has been corrected.
										General comment: Recommend chart or table listing permits, licenses, and authorizations that need to be obtained to accomplish the project to ensure compliance with 40 CFR 1502.25.	Do not concur. The permits, licenses, and authorizations have already been identified in Section 7 of the document.
										General comment: Occupational safety and health impacts have not been assessed in accordance with 32 CFR 989.27	Concur. Section 7.4 was added and indicates that the project will comply with the Corps' occupational health and safety requirements.
										General comment: Please delete references in the document to the US Air Force being a cooperating agency.	Concur. These references have been deleted.
										FONSI: The Proposed Action is not specifically defined in the FONSI. Please define the proposed action.	Concur. The Proposed Action will be described in greater detail in the Final FONSI.

List of Public and Agency Comments on Draft Feasibility Report and Draft EA with Response/Action

Organization/ Agency	Last Name	First Name	Mailing Address	Town	State	Zip		Medium		Comment	Draft Response
							Dated	Email	Letter		
Florida Department of Environmental Protection	Mann	Sally	3900 Commonwealth Blvd.	Tallahassee	FL	32399-3000	19-Jun-12		X	FDEP (Environmental Protection): The Central District Office of DEP in Orlando should be contacted for any new or modified docks and any upland construction projects requiring stormwater management. Widening and deepening would be permitted through DEP's Bureau of Beaches and Shores.	Noted. The Corps will contact the appropriate office of FDEP during permitting.
St. Johns River Water Management District										ST. JOHNS RIVER WATER MANAGEMENT DISTRICT: The project falls under the jurisdiction of DEP.	Noted. The Corps will contact the appropriate office of FDEP during permitting.
East Central Florida Regional Planning Council										EAST CENTRAL FLORIDA REGIONAL PLANNING COUNCIL: The proposed project is found to be consistent with the goals, policies, and objectives of the East Central Florida Regional Planning Council.	Noted.
FDEP Clearinghouse										FDEP CLEARINGHOUSE: At this stage, the proposed project is consistent with the Federal Coastal Management Program.	Noted. No action required.
Florida Fish and Wildlife Conservation Commission	Sanders	Scott	620 South Meridian Street	Tallahassee	FL	32399-1600	6/15/2012		X	Page 2-68 of the draft EA includes right whale sighting data for "Offshore surveys flown off the coast of Florida and southeastern Georgia from 1996 to 2001...". This information appears outdated and corresponds to sightings at more than 30 nautical miles offshore, which is not relevant for the project at Port Canaveral. Aerial surveys have been conducted near Port Canaveral since 2001 and these surveys are available from the North Atlantic Right Whale Consortium (http://www.narwc.org). We recommend updating right whale sighting data, as appropriate for this area, in the Final EA.	Concur. The information in this section was modified regarding the aerial surveys, and references to the surveys further offshore were removed from the document.
										Page 2-68 also includes the statement "there have been few incidences of right whale-ship incidents along the Florida Atlantic coast, with none of them being reported as far south as Brevard County." This statement should be corrected to reflect that there have been three reported whale-vessel incidents involving five different vessels directly off Port Canaveral (unpublished data, see FWRI attached).	Concur. The changes have been made as requested.
										Information related to the anticipated number of disposal transits to the ODMDS, and the timing of the transits is missing in the DEA but is a critical consideration in reducing the risks of potential impacts from these transits to the North American Right Whales; therefore, we request additional information regarding transit timing and numbers be included in the Final EA for later review.	Concur. This information has been included in the Final EA as requested.
										The DEA states (on page 2-66) that the Port has participated and supported the Right Whale Monitoring program for many years, however, the measures to avoid, minimize and mitigate this project's effect on right whales were not included in Section 7.3 (page 7-28). At a minimum, we recommend that the following conservation measures for North Atlantic Right Whales be included to address potential impacts.	The Corps will comply with North Atlantic right whale protection measures as identified in the Section 7 NMFS May 14, 2012, consultation letter, including the federal speed zone rule (73 FR 60173, October 2008).
										A discussion of manatee data for Brevard County and in the vicinity of the Port was provided on page 2-65 of the DEA. We recommend updating the manatee mortality data. We also suggest that the maps included in the DEA match the data discussions in the text.	Concur. The mortality data in Section 2.6.8 has been updated. The figure showing manatee sightings and mortality was removed for clarity.

List of Public and Agency Comments on Draft Feasibility Report and Draft EA with Response/Action

Organization/ Agency	Last Name	First Name	Mailing Address	Town	State	Zip	Dated	Medium		Comment	Draft Response
								Email	Letter		
										Section 2.6.8 includes a statement that "Brevard County also has one of the highest manatee mortality rates in the state, due to high concentration of manatees combined with the popularity of recreational boating along the eastern coast of Florida (Figure 2-11), although the proportion of fatalities caused by watercraft is low." This statement is inaccurate and confusing, and should be revised. A more accurate statement could simply read "Brevard County also has one of the highest mortality rates in the state."	Concur. The changes have been made as requested.
										Figure 2-11 of the DEA refers to sea turtle nesting. This figure should be revised to Figure 2-13 and referenced later in the paragraph when discussing the specific data and/or re-organized to avoid confusion.	Concur. The changes have been made as requested.
										The sentence referring to FWRI 2007 data should read "Between 1974 and 2007, 1191 manatee deaths have been reported, 265 of which were from watercraft-related death." We also suggest revising the earlier statements related to the proportion of fatalities caused by watercraft to state that since the percentage is approximately 22%, which is average (not low as presently indicated). We also recommend not separating years 2008 and 2009 from the rest of the dataset and combining the data as one discussion, or alternatively, remove this data. In addition, the 2008 data discussion of watercraft-related deaths found on Page 2-65 of the DEA should read 10, not 11 and the total in the vicinity of the Port should also read 43, not 44.	Concur. The changes have been made to Section 2.6.8 as requested.
Florida Fish and Wildlife Conservation Commission	Sanders	Scott	620 South Meridian Street	Tallahassee	FL	32399-1600	6/15/2012		X	The DEA reports that 15 deaths were attributed "collisions with recreational watercraft." The term "recreational" should be stricken from that statement since at least five reported deaths have occurred from crushing between large vessels and seawalls/docks, and at least one death occurred from a strike with a large propeller, which is more indicative of larger-than recreational watercraft/vessel fatality.	Concur. The change have been made as requested.
										The map on 2-66 of the DEA is more representative of the staewide synoptic aerial survey dataset as it depicts "Manatee Aerial Survey (1991-2004)". We recommend amending this map to specify the aerial survey dates, as well as obtaining more recent data from the website mentioned. There should also be a discussion of the dataset in the text. We highly recommend that the Final EA include this data to accurately represent manatee use in the Port area.	Because of the potential for confusion of this figure and because it did not contribute to the analysis, the figure was removed from the Final EA.
										Page 2-67 includes a discussion of the Port's Manatee Protection Plan and Brevard County's Manatee Protection Plan (MPP). While the Port has been very proactive in manatee protection and conservation measures have been in place for a long timme, the County's plan was not based on the Port's plan. The measures in the Port's plan are not typically applicable to the rest of the County and there are also conservation measures in the County's MPP that are uniquie from the Port's conservation measures; therefore, FWC suggests removing reference as to the basis for the County's MPP being that of the Port plan.	Concur. The change have been made as requested.
										Page 2-67 also includes a discussion of Port Canaveral's lock facility, and describes manatee sighting data and mortality as a result of the lock. We recommend updating this information…	Concur. The data were updated as requested.

List of Public and Agency Comments on Draft Feasibility Report and Draft EA with Response/Action

Organization/ Agency	Last Name	First Name	Mailing Address	Town	State	Zip	Dated	Medium		Comment	Draft Response
								Email	Letter		
										Chapter 6.1 discusses the integration of environmental operating principles and states that the "Port has also adopted new manatee protection measures at the recommendation of the U.S. Fish and Wildlife Service". However, these new protection measures were not included in the DEA.	Concur. The new manatee protection measures have been included in the Final EA.
										Page 6-48 includes the following statement: "Hydraulic and clameshell dredging are the methods of choice for economic and environmental concerns and are not known to "take" manatees or sea turtles when standards for operations and observvance are employed as well as any protection measures stipulated by the FWS and/or NMFS under Section 7 ESA consultation." This statement is incorrect and should be edited to state that the potential for "take" is reduced with protective measures, not that "take" is not known to occur.	Concur. The changes have been made as requested.
										Chapters 7.2.8.2 and 7.3 discuss environmental consequenses, including protected species and measures to avoid, minimize, and mitigate environmental effects. Both of these sections state that the standard manatee construction conditions will be used during dredging and include the standard language. Hoever, both versions of the standard conditions are out of date..... We recommend that the 2012 measures be included in the EA and followed during coinstruction of the project. We also recommend that the additional conservation measures outlined in the FWS review dated May 31, 2012 be included in the EA and followed during the project.	Concur. The new 2012 manatee protection measures and measures outlined in the USFWS' June 29, 2012 concurrence letter have been included in the Final EA.
										If a gopher tortoise relocation permit is necessary, then species associated with gopher tortoise burrows (i.e., commensals) and afforded protection under 16 U.S.C. 1531 et. Seq., Section 379.2291, F.S., or 68A-27.004, F.A.C. should also be relocated in accordance with the applicable guidelines for that species.	Concur. A gopher tortoise relocation permit will be obtained should any gopher tortoise burrows be impacted by the project.

Environmental Baseline Report
Port Canaveral Navigation Improvements
Port Canaveral FL

Prepared for
Canaveral Port Authority
200 George J. King Boulevard
Cape Canaveral, FL 32920

by
Dial Cordy and Associates Inc.
490 Osceola Ave
Jacksonville Beach, Florida 32250
904.241.8821

July 7, 2006
Revised September 14, 2011

TABLE OF CONTENTS

Page

LIST OF FIGURES III

LIST OF TABLES III

1.0 INTRODUCTION 1

1.1 Project Purpose 1

1.2 Study Area Location 1

2.0 AFFECTED ENVIRONMENT 4

2.1 Sediments 4

2.2 Surface Water 4

2.3 Hazardous, Toxic, and Radioactive Waste 4

2.4 Upland Communities 6

2.5 Wetlands 8

2.6 Marine Habitat 8

2.6.1 Beach and Dune Habitat 8

2.6.2 Nearshore Reef 9

2.6.3 Sand Bottom 9

2.6.4 Seagrass 9

2.6.5 Inshore Marine Habitat within Port Canaveral 11

2.7 Essential Fish Habitat 11

2.8 Protected Species 12

2.8.1 Sea Turtles 12

2.8.2 West Indian Manatee 16

2.8.3 Right Whale 18

2.8.4 Southeastern Beach Mouse 18

2.8.5 Scrub Jay 19

2.8.6 Bald Eagle 19

2.8.7 Least Tern 19

2.8.8 Piping Plover 19

2.8.9 Gopher Tortoise 20

2.9 Coastal Barrier Resources 20

3.0 LITERATURE CITED AND CONSULTED 22

LIST OF FIGURES

Page

Figure 1 Location Map 2
Figure 2 Study Area 3
Figure 3 Study Area Florida Land Use, Cover, and Forms Classification Map 7
Figure 4 Study Area Seagrass Coverage 10
Figure 5 Sea Turtle Nesting and Stranding Data 13
Figure 6 Manatee Mortality and Survey Data, 1974-2005 17
Figure 7 Coastal Barrier Resources 21

LIST OF TABLES

Page

Table 1 Natural Upland and Wetland Communities 8
Table 2 Sea Turtle Nesting Data for Brevard County, 1988-2005 14

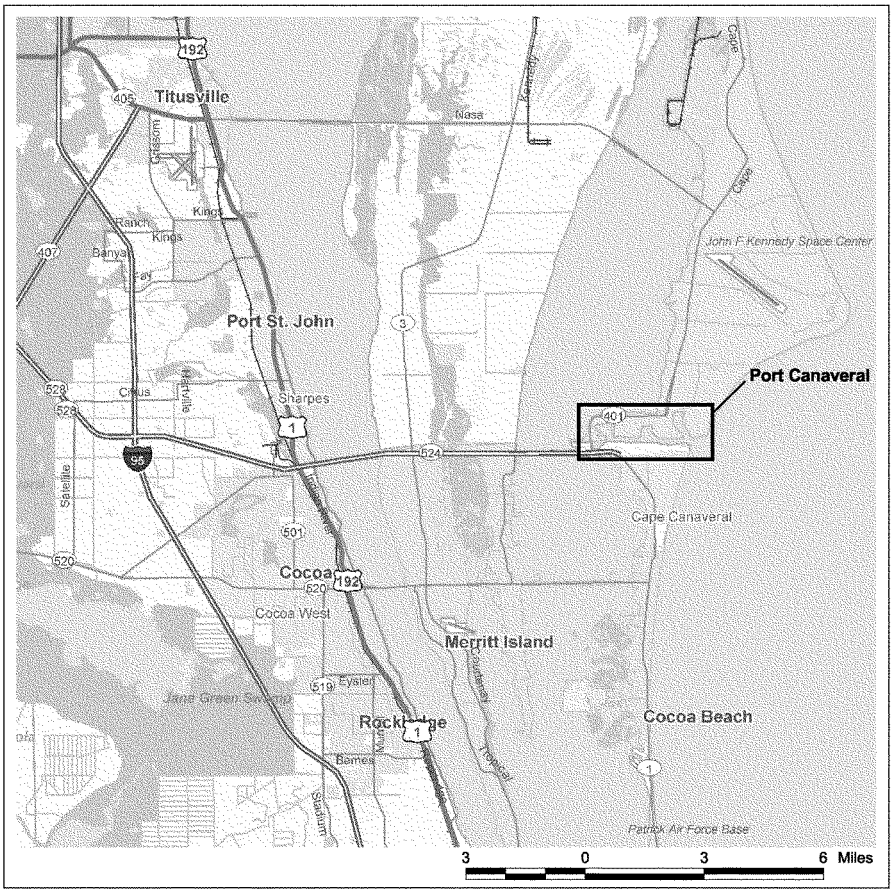
1.0 INTRODUCTION

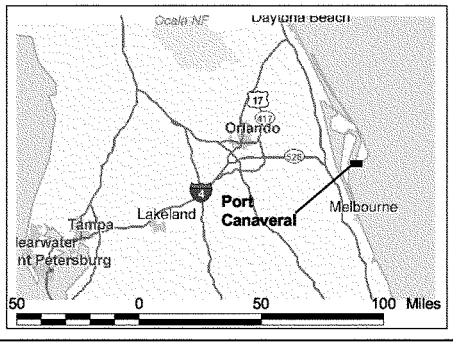
1.1 Project Purpose

The Canaveral Port Authority (CPA) is currently conducting a feasibility study of potential navigation improvements under the authority granted under Section 203 of the Water Resources Development Act (WRDA), 1986. The study is in response to problems and issues identified by the CPA and Canaveral Pilots Association with regard to ship maneuvering within the existing federal project. This report was prepared to describe the existing environmental conditions within the proposed project study area and to assist in identifying any environmental constraints that require consideration in the planning process.

1.2 Study Area Location

Port Canaveral is located in Brevard County on the east coast of Florida, approximately nine miles north of Cocoa Beach (Figure 1). The main port is orientated in an east – west direction, extending from the Atlantic coast to the Banana River. The port is bounded to the north by the Cape Canaveral Air Force Station (CCAFS) and the Banana River, and bounded to the south by the City of Cape Canaveral. The harbor consists of three turning basins (Figure 2). Starting from the east they are: the Trident Turning Basin (TTB), the Middle Turning Basin (MTB), and the West Turning Basin (WTB). The basins are connected by a channel (East Access Channel and West Access Channel) that forms the south boundary of each basin. Within this channel, a Federally maintained Barge Canal extends from the south side of the MTB, through the Banana River, across Merritt Island, and connects with the Intracoastal Waterway (ICWW) system in the Indian River. Where the Barge Canal enters the Banana River, a 600-foot long Corps of Engineers' lock (Canaveral Lock) separates the tidal harbor from the almost non-tidal river.





Location Map	
Port Canaveral Environmental Baseline Report	
Scale: 1 inch = 3 miles	Drawn By: MR
Date: April 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 1

Study Area	
Port Canaveral Environmental Baseline Report	
Scale: 1 inch = 0.5 mile	Drawn By: MR
Date: April 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 2

2.0 AFFECTED ENVIRONMENT

2.1 Sediments

Sediments with the Port have been extensively characterized in recent years. The most recent study (Anamar 2005) evaluated sediments within the west turning basin and entrance channel for disposal at the offshore dredged material disposal site (ODMDS). Sediments are comprised mainly of sand or silt/clay, with small amounts of gravel present. Concentrations of metals in the samples were typical of coastal waters, although some concentrations were above those of reference stations. A few polyaromatic hydrocarbons (PAH) were detected, but all of the sediment chemical characteristics were below the Threshold Effects Level (TEL) and Effects Range Low (ERL). These thresholds represent levels at which adverse effects to biological organisms may occur. A Tier III analysis using the ADDAMS model was performed, which determined that the sediments were suitable for offshore disposal.

2.2 Surface Water

Surface water resources within the study area consist of marine and estuarine systems. The inshore waters are classified by the State of Florida as Class II Waters. Aquatic preserves are designated as Class II waters, and includes the Banana River Aquatic Preserve and the Merritt Island National Wildlife Refuge. Class II waters are suitable for shellfish harvesting in addition to uses approved under Class III waters designation (recreation and propagation of fish and wildlife resources).

2.3 Hazardous, Toxic, and Radioactive Waste

A Section 230 Feasibility Study - HTRW Assessment was conducted by CH2M Hill (2006) in conformance with the scope and limitations of ASTM Practice E 1527 and ER-1165-2-132. The findings and conclusions provided below reflect existing HTRW conditions based on a HTRW database search, aerial photography, reviews of available records, site inspections and interviews. These findings and conclusions are of existing conditions as they were identified at this time.

A site inspection was performed on or in the immediate vicinity of the three project areas identified for navigation improvements at Port Canaveral. Two of the three areas (WTB and NC) are located within Canaveral Harbor and the third area (ECT) is located approximately one mile offshore. The hazardous and toxic waste evaluation revealed that the majority of the area is predominantly developed having construction and activities associated with marine and port facilities, including cruise terminals, marine maintenance, public parks, marine cargo

transfers and a military installation. The HTRW database search included the entire area and indicated that overall, that a relatively small portion of the proposed project area may have been impacted, to some extent, with hazardous and toxic waste. Most of these reported properties are located on the uplands portion of the northeast side of the WTB and West Access Channel and on the south side of the Inner Reach portion of the channel, up-gradient to two of the three areas (WTB and NC). No propertied were reported in the vicinity of the ECT. The most common type of HTRW, hydrocarbons, was reported in the EDR database and located along the southern portion of the Harbor.

The database also revealed several locations of Small Quantity Generators (SQG). Most of these SQG sites are reported to be in compliance with reported requirements. The site inspection revealed the presence of a location in the northeast section of the WTB that appears to be not in compliance with regulatory rules in regards to the operations conducted. There is another site reported by personnel from the Brevard County Environmental Protection Division suggests that a release of chlorinated solvents has occurred in the location that is leased to and operated by Mid-Florida Freezer on the south side of the Harbor. Contamination from the sites located on the perimeter of the proposed project may be migrating into the project area.

West Turning Basin

A site inspection was conducted on 20 December 2005. The HTRW database review of the existing conditions indicated the site to be free of hazardous and toxic materials and waste. However, during the site inspection indicated the presence of hazardous materials and waste in one area: the Beyel Brothers, Inc. property located at the southeastern edge of the WTB uplands. Most of the items observed were those used in connection with marine vessel repair and painting, and marine scrap (e.g., cranes, shipping containers, etc.). According to the lease agreement with CPA, these activities were not allowed on the property. An intrusive soil and groundwater study is recommended for the Beyel Brothers property to evaluate whether the soil and groundwater have been impacted by operations performed there. Upon evaluation and possible remediation of the Beyel Brothers leased property, these sites may be used for the project purposes.

Coastal Fuels, located on the south side of the Harbor, had a release of petroleum product via a location in their pipeline to the docks. Soil was excavated, during which the laboratory analytical results indicated the presence of chlorinated solvents, which are not typically found in petroleum impacted soils. The source of the chlorinated solvents is likely from past activities at another facility leased from CPA. The extent of impact in 2004 (last groundwater sampling event) suggests the size of the plume is slightly smaller, although temporal effects in the groundwater concentrations in and inferred plume size can occur. Currently, the majority of the plume is being monitored. An air-sparge remediation system is being designed and a risk assessment to establish clean-up criteria is being performed for an area in the vicinity of a weir adjacent to the Harbor. Past sampling of surface water and sediments in the Harbor indicates that no chlorinated solvents or petroleum constituents were reported as exceeding comparative clean-up criteria. A large bulkhead is present at the water's edge that may

impede the migration of the chlorinated solvents and petroleum constituents into the Harbor. The potential of HTRW risks at this site is considered moderate.

North Side of Channel (Inner and Middle Reaches)
A site inspection of the land adjacent to NC was performed on 20 December 2005, as the NC area is located completely underwater. The HTRW database review of the existing condition found the site to be free of hazardous and toxic materials and waste. The property surrounding the proposed project is a mix of commercial shipping, marine port activities, and a military installation. Please see the previous section for a discussion of releases on the south side of the Harbor, which is considered to be adjacent property. The potential of HTRW risks at this site is considered low.

Entrance Channel Turn
This area is located approximately one-mile offshore in the Atlantic Ocean. A site visit was not performed as it is in about 41 feet of water. None of the sites listed in the HTRW database review are located within the search distances. The potential of HTRW risk at this area is considered low.

2.4 Upland Communities

Natural upland communities within the study area are limited. There are a few isolated areas containing mixed hardwoods and conifers (FLUCFS 4340) including slash pine (*Pinus elliottii*), scrub oaks (*Quercus spp.*), Australian pine (*Casurina equisetifolia*), Brazilian pepper (*Schinus terebenthifolius*), and cabbage palm (*Sabal palmetto*) within the study area. Areas of herbaceous rangeland (FLUCFS 3100) and shrub rangeland (FLUCFS 3200) are more common and may be occasionally inundated by water, but not enough to lead to hydric soils. They contain typical coastal grasses, sedges, rushes, and herbaceous species such as *Panicum* spp., natal grasses, clovers, and wire grass (*Aristida stricta*). Saw palmetto (*Serenoa repens*) is also found scattered throughout this vegetative community.

Upland communities not considered natural communities make up the vast majority of the study area. These land use categories include those lad uses normally associated with port facilities such as industrial and spoil disposal areas. Figure 3 provides a map showing land cover according to the Florida Land Use, Cover, and Forms System (FLUCFS), and Table 1 provides a list and description of natural upland and wetland land cover for the study area.

Wildlife found within port boundaries in the study area are typical species found in heavily developed Florida coastline. Mammals include raccoons (*Procyon lotor*), domestic and feral cats (*Felis cattus*), and mice (*Mus musculus*). Migratory bird species including warblers and sparrows, typically roost in forested areas along the coast, particularly near to open water.

FLUCCS Map	
Port Canaveral Environmental Baseline Report	
Scale: 1 inch = 0.5 mile	Drawn By: MR
Date: April 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 3

Table 1 Natural Upland and Wetland Communities

	Category	Description
Natural Upland Communities	3100	Herbaceous Rangeland
	3200	Scrub and Brushland
	4340	Mixed Hardwood-Conifer
Natural Wetland Communities	6120	Mangrove Swamp
	6300	Mixed Wetland Forest
	6420	Saltwater Marsh
	6460	Treeless Hydric Savanna

2.5 Wetlands

Wetland habitats within the study area are limited primarily to the western perimeter adjacent to the ICWW (Figure 3; Table 1). These wetlands are either mangrove swamps and vegetated with white and black mangroves, and Brazilian pepper, or saltwater marsh habitat vegetated with cordgrass (*Spartina alternifolia*), needlerush (*Juncus roemerianus*), saltgrass (*Distichlis spicata*), and other salt-tolerant species. Treeless hydric savannah occurs south of the port facilities and is dominated by wiregrass and cutthroat grass (*Paspalum abscissum*).

2.6 Marine Habitat

2.6.1 Beach and Dune Habitat

The high-energy beach is a challenging environment for animal and plant life. Species diversity is typically low, although species adapted to sandy beaches may be highly abundant. Typical beach fauna in the proposed project area includes the mole crab (*Emerita talpoida*), surf clam (*Donax variabilis*) and ghost crab (*Ocypode quadrata*). These and other beach infauna provide forage for a wide variety of shorebirds such as plovers (*Charadrius spp.*), willets (*Catoptrophorous semipalmatus*), and ruddy turnstones *(Arenaria interpres*). Drift algae and sargassum stranded on the beach may support large numbers of insects and other invertebrate life. As elevation increases, conditions become less severe for the establishment of plant life. Tendrils of various plants extend down the beach, notably the beach morning glory *Ipomoea pes-capre*. As the dune crest is approached, other salt tolerant plants are found such as sea oats (*Uniola paniculata*), sea rocket (*Cakile sp.)* and beach elder (*Iva imbricata*). Sparsely vegetated beaches are preferred nesting habitat for the least tern (*Sterna antillarum*), listed as a threatened species by the Florida Fish and Wildlife Conservation Commission. The sea oat zone high on the dune provides habitat for another threatened species, the

southeastern beach mouse (*Peromyscus polionotus niveiventris*). Beaches in Brevard County also provide nesting habitat for sea turtles.

2.6.2 Nearshore Reef

Continental Shelf Associates previously identified a well-developed line of rock outcroppings running approximately 10 miles from Patrick Air Force Base (R-59) south to Paradise Beach Park (R-110). The rock had low relief at the northern and southern ends, with well defined ledges of 2-3 feet of vertical relief in the middle between R-78 and R-93 (USACE 1996). The rock outcrops are comprised of lithified coquina rock of the Pleistocene Anastasia Formation (Olsen 1989). The coquina rock provides a substrate for the sabellariid polychaete worm *Phragmatopoma lapidosa*. These sabellariid worm reefs provide important functions of dissipating and absorbing wave energy, thus, giving the shoreline some protection against erosion, and providing habitat for marine organisms. In the nearshore area off Brevard County, worm rock ranges from large, dense patches to small, isolated patches along the sides of rock ledges. It was estimated that worm rock composes approximately 5-10 percent of the 32 acres of rock outcrop in the nearshore area of Brevard County.

The rock and worm rock reefs provide habitat for a number of crustaceans, fish, macroalgae, sponges, and other invertebrates. The most recent comprehensive study of the nearshore habitat along Brevard County was conducted by Continental Shelf Associates (1989) and provides detailed species list.

2.6.3 Sand Bottom

Unvegetated sand bottom occurs along most of the nearshore area not occupied by worm rock reef habitat. Substrate is predominately made up of medium to fine grain sands and may include a variety of benthic organisms including annelids, bivalves, and gastropods such as pinaeid shrimp (*Panaeus setiferus*), box crabs (*Hepatus epheliticus*), and seastars (*Luidia clathrata*).

2.6.4 Seagrass

No seagrass has been identified within the harbor or entrance channel, and it is unlikely that it occurs. However, the waters west of the port in the Banana River State Aquatic Preserve support large areas of and small, isolated patches of seagrass adjacent to upland islands or other physical structures (Figure 4).

Indian River Lagoon Seagrass (FDEP/FMRI, 1999)
Patchy Seagrass Coverage
Dense Seagrass Coverage

0.5 0 0.5 1 Miles

Study Area Seagrass Coverage	
Port Canaveral Environmental Baseline Report	
Scale: 1 inch = 0.5 mile	Drawn By: MR
Date: April 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 4

2.6.5 Inshore Marine Habitat within Port Canaveral

The harbor in Port Canaveral provides an important resource to marine species, particularly sea turtles and manatees. The harbor serves as an access point for the West Indian manatee to traverse from the Atlantic coastal waters to the Banana River, which provides foraging and sanctuary for the species.

The riprap along the channel walls on the northern boundary of the Port provides excellent foraging habitat for juvenile sea turtles. The 980 meters of riprap located between the middle and east turning basins, in particular, appears to be heavily used for foraging. In surveys conducted in late August 2005 and February 2006, 200 and 111 individuals, respectively, were observed foraging along this portion of the harbor. The highest number of juvenile sea turtles observed at any other location during these surveys was 9 at a 266 meter stretch of riprap along the south side of the channel at Jetty Park. One of the unusual features of the riprap between the middle and east turning basins is the diverse algal community on the riprap. A study is currently underway to characterize the algal makeup of the harbor.

2.7 Essential Fish Habitat

The South Atlantic Fisheries Management Council (SAFMC) (1998) has designated seagrass, nearshore hardbottom, and offshore reef areas within the study area as EFH. The nearshore bottom and offshore reef habitats of Central Florida have also been designated as Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPC) (SAFMC, 1998). As many as 60 corals can occur off the coast of Florida (SAFMC, 1998) and all of these fall under the protection of the management plan.

Essential Fish Habitat in the Study Area

Marine Areas	Live/Hard Bottom
	Coral and Coral Reef
	Sargassum
	Artificial Reef
	Water Column

Source: South Atlantic Fisheries Management Council, 1998

Managed species that commonly inhabit the study area include pink shrimp (*Penaeus duorarum*), and spiny lobster (*Panularis argus*). These shellfish utilize both the inshore and offshore habitats within the study area. Members of the 73 species Snapper-Grouper Complex include sailors choice (*Haemulon parra*), gray snapper (*Lutjanus griseus*), mahogany snapper (*Lutjanus mahogoni*), and porkfish (*Anisotremus virginicus*). These species utilize the inshore habitats of Indian River Lagoon as juveniles and sub-adults and as

adults utilize the hardbottom and reef communities offshore. Other important species that utilize the inshore and nearshore areas of Brevard County include the red drum (*Sciaenops ocellatus*) and the snook (*Centropomis undecimalis*). In the offshore habitats, the number of species within the Snapper-Grouper Complex that may be encountered increases. Coastal migratory pelagic species also commonly utilize the offshore area adjacent to the study area. In particular, the king mackerel (*Scomberomorus cava*lla), and the Spanish mackerel (*Scomberomorus maculatus*) are the most common.

2.8 Protected Species

The Florida Natural Areas Inventory (FNAI) Species Summary for Brevard County was obtained to review the listed fauna that could potentially occur within this geographic region. In addition to the FNAI, existing reports from Cape Canaveral Air Force Station (CCAFS) and Port Canaveral (Port) were reviewed for potential protected species that may occur within the study area. Five terrestrial species were identified that could potentially occur within upland portion of the study area. These species include the gopher tortoise (*Gopherus polyphemus*), Florida scrub jay (*Aphelocoma coerulescens*), eastern indigo snake (*Drymarchon corais couperi*), and the southeastern beach mouse (*Peromyscus polionotus niviventris*). The bald eagle (*Haliaeetus leucocephalus*) is no longer a listed specie but is protected under the Bald and Golden Eagle Protection Act. In addition to the terrestrial species, three sea turtle species were identified as potentially utilizing terrestrial beach habitats within the study area. These species include the loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*), and green sea turtles (*Chelonia mydas*). The beaches and spoil areas may also be utilized by nesting and foraging shorebirds including the least tern (*Sterna antillarum*) and piping plover (*Charadrius melodus).*

The nearshore and inshore waters within the study area are frequented by protected marine mammals including the West Indian Manatee (*Trichechus manatus*) and the North Atlantic right whale (*Eubalanus glacialis*).

2.8.1 Sea Turtles

Five species of sea turtle are found in the waters offshore of Brevard County, and of these, three have been documented as nesting on County beaches (Figure 5). The loggerhead (*Caretta caretta*) is responsible for the vast majority of the nesting, although data suggest increasing numbers of green (*Chelonia mydas*) and leatherback turtles (*Dermochelys coriacea*) nesting statewide. The green sea turtle and leatherback sea turtle are both listed under the U.S. Endangered Species Act, 1973 and Chapter 370, F.S. the loggerhead turtle is listed as a threatened species. The hawksbill turtle (*Eretmochelys mydas*) and Kemp's ridley turtle (*Lepidochelys kempii*) are two additional sea turtle species that potentially are found in the area but are not known to nest on Brevard County beaches.

Documented Sea Turtle Strandings
Sea Turtle Observations
Sea Turtle Nesting Beach

0.5 0 0.5 1 Miles

Protected Species Map - Sea Turtles	
Port Canaveral Environmental Baseline Report	
Scale: 1 inch = 0.5 mile	Drawn By: MR
Date: April 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 5

Sea turtles use the habitats offshore of Brevard County to different degrees during different stages of their life cycle. During the summer months hatchlings utilize this habitat as a corridor to deeper waters farther off the coast. Juvenile and sub-adult turtles use the offshore habitats as a foraging area and to travel to inshore areas, while adult turtles are present year round with seasonally high abundances during the breeding season.

Loggerhead Sea Turtle

Loggerheads nest in the southeastern U.S. from April through September, with peak nesting occurring in June and July (National Marine Fisheries Service [NMFS] and United States Fish and Wildlife Service [USFWS], 1991a). The highest density of loggerhead nesting occurs from Canaveral National Seashore in Volusia County south to John U. Lloyd State Recreation Area in Broward County. Nesting may reach densities of over 600 nests per kilometer. Nesting along the northern beaches is substantially lower than nesting in the southern portions of the County. Between 1988 and 2010, County-wide loggerhead nesting ranged from a low of 13,181 in 1988 to a high of 34,596 in 1998 (Table 2). There were 25,741 documented loggerhead nests in 2010.

Table 2 Sea Turtle Nesting Data for Brevard County, 1988-2010

Year	Green Turtle Nests	Leatherback Turtle Nests	Loggerhead Turtle Nests
1988	134	0	13181
1989	246	1	19589
1990	841	0	27673
1991	214	3	28279
1992	1232	2	25555
1993	116	1	20600
1994	1720	5	28029
1995	171	4	31653
1996	1351	16	28742
1997	259	11	25221
1998	2764	30	34596
1999	125	43	34134
2000	3907	22	32910
2001	193	61	26198
2002	4316	18	23492
2003	705	68	22994
2004	1494	25	15678
2005	4878	68	19339
2006	2051	16	18089
2007	5743	105	14829
2008	4169	33	21242
2009	1697	70	17194
2010	5940	77	25741

Hatchlings emerge primarily at night and swim offshore in a "frenzy" until they arrive at offshore weed and debris lines (Carr 1986) (Wyneken and Salmon 1992). Post hatchling turtles from the Florida coast enter currents of the North Atlantic Gyre, eventually returning to the western Atlantic coastal waters (Bowen, et al. 1993). Adult loggerhead turtles in South Florida utilize foraging grounds in the Caribbean basin, the Gulf of Mexico, and along the U.S. east coast (Meylan et al., 1983). Abundances of adult loggerhead turtles in Florida waters increase during the nesting season (Magnuson et al., 1990).

Green Sea Turtle

Green turtle nesting occurs along southeastern Florida beaches from Volusia County through Broward County, but at much lower densities than loggerheads (Meylan, et al. 1995). Densities range from 1-5 per kilometer on most beaches, with higher densities of 13-30 nests per kilometer on the beaches within the major nesting zone in south Brevard County and Palm Beach County (Erhart and Witherington 1986). Brevard County accounts for approximately 40 percent of green turtle nesting in Florida. Green turtle nesting data for Brevard County are shown in Table 2. In 2010, green turtle nesting reached a period of record (1988-2010) high of 5,940 nests.

Green turtles show a similar life history pattern as loggerheads, but they leave the pelagic phase and enter developmental habitats at a considerably smaller size, about 20-25 cm carapace length (Magnuson et al., 1990). Typical developmental habitats are shallow, protected waters where seagrasses are prevalent (Carr et al., 1978), but green turtles are commonly found in reef habitats where algae is present (Ehrhart et al., 1996) (Coyne, 1994). Green turtles nesting in Florida have a minimum size of 83.2 cm carapace length, but they appear to leave Florida developmental habitats by about 60-65 cm carapace length (Witherington and Ehrhart, 1989), perhaps migrating to the southeastern Caribbean. Brevard County contains two significant developmental habitats for green turtles, the Indian River Lagoon and the nearshore reef system (Ehrhart et al. 1996). Dietary needs of juvenile turtles along with seasonal abundances of seagrasses and algae within the area may be factors influencing the habitat use of juvenile turtles within the area. As adults, offshore habitat utilization would be greatest during the nesting period.

Green sea turtles leave the early pelagic life stage and enter benthic foraging areas at about 20-25 cm carapace length. During this time they shift from an omnivorous diet to a more herbivorous diet. Juvenile green turtles feed primarily on seagrasses and algae during this life stage. In Florida, these turtles feed primarily on a diet of seagrasses such as *H. wrightii*, *S. filiforme*, and red and green algae (Lutz and Musick, 1997). The seasonal abundances of algal species offshore may limit the offshore foraging areas in the winter months. Nelson (1988) noted a great seasonal reduction in algal species richness (56 summer vs. 16 winter) on the nearshore reefs at Sebastian Inlet.

Leatherback Sea Turtle

Leatherback turtles occur worldwide in pelagic waters from the tropics to near the Arctic and Antarctic Circles. Nesting is primarily on the Pacific coast of Mexico and the Caribbean coast of South America, with some continental U.S. nesting in Florida. The majority of leatherback nesting activity is located within St. Lucie, Martin and Palm Beach counties (Meylan et al., 1995). Nesting data provided by FWC, however, show at least some nesting occurring in Brevard County, with 77 leatherback nests documented in 2010 (Table 2). Leatherback turtles are virtually unknown from the inshore waters of Brevard County and only are known to frequent the area during nesting periods.

2.8.2 West Indian Manatee

The West Indian Manatee (*Trichechus manatus*) is protected under the both the Endangered Species Act and the Marine Mammal Protection Act and is also listed as protected under Florida State law. The manatee is generally restricted in range to the Georgia coast southward around the Florida peninsula. Manatees frequently inhabit shallow areas where seagrasses are present and are commonly found in protected lagoons and freshwater systems. Manatees occasionally use open ocean passages to travel between favored habitats (Hartman, 1979). Manatees migrate seasonally, particularly on the east coast of Florida. During the summer months manatees utilize habitats all along the coast. During winter, when water temperatures drop, manatees use warm water refuges such as springs or warm water discharges at power plants.

Brevard County is one of the most utilized areas in Florida by manatees due to the presence of a warm water refuge and abundant foraging opportunities. Within Brevard County, manatees frequently use waters within or near the study area including the Banana River and Intracoastal Waterway, especially during the spring and fall (Figure 6).

Brevard County also has one of the highest manatee mortality rates in the state and it due to the high concentration of manatees combined with the popularity of recreational boating along the eastern coast of Florida. In 2009, the FWC reported 107 manatee deaths in Brevard County (the State total was 429), with 7 caused by watercraft injury and 2 from flood gate/locks. In 2008, Brevard County had 72 deaths (out of 337 for the State), with watercraft injury responsible for 10 of the deaths. In 2003, the Brevard County Board of County Commissioners approved a Manatee Protection Plan to identify and implement measures to provide protection for the manatee.

Documented Manatee Mortality (1974 - 2005)
Manatee Aerial Survey (1991 - 2004)

0.5 0 0.5 1 Miles

Protected Species Map - Manatees	
Port Canaveral Environmental Baseline Report	
Scale: 1 inch = 0.5 mile	Drawn By: MR
Date: April 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 6

2.8.3 Right Whale

The North Atlantic right whale has been listed as endangered under the Endangered Species Act (ESA) since 1972. The western stock of the North Atlantic right whale population ranges from wintering and calving grounds in the coastal waters of the southeastern United States to summer feeding and nursery grounds in New England waters and northward to the Bay of Fundy and the Scotian Shelf. Offshore surveys flown off the coast of Florida and southeastern Georgia from 1996 to 2001 had three sightings in 1996, one in 1997, 13 in 1998, six in 1999, 11 in 2000, and six in 2001. The western North Atlantic population size was estimated to be 291 individuals in 1998 (NMFS 2005).

The North Atlantic right whale primarily occurs in coastal or shelf waters. Five areas of "high use" were identified in the Recovery Plan and include coastal Florida and Georgia, from the Sebastian Inlet, Florida to the Altamaha River, Georgia, and includes the nearshore waters off Port Canaveral. This area was designated as critical habitat in 1994. Known wintering occurs along the southeastern U.S. coast, where calving occurs from December through March.

Ship collisions and fishing gear entanglements are the most common anthropogenic causes of mortality in the western North Atlantic right whale. Other potential threats include habitat degradation, noise, contamination, underwater bombing activities, climate and ecosystem change, and commercial exploitation (NMFS 2005).

The greatest known current cause of right whale mortality in the western North Atlantic is collision with ships (NMFS 2005). Of the 45 confirmed deaths of right whales between 1970 and 1999, 16 are known to have been caused by ship strikes and two additional collisions were determined to be possibly fatal (Knowlton and Kraus 2001). In the period between 1999 and 2003, 18 verified right whale mortalities occurred, of which five were due to ship strikes (Cole, *et al* 2005).

2.8.4 Southeastern Beach Mouse

The southeastern beach mouse (*Peromyscus polionotus neveiventris*) is listed as a threatened species at both the Federal and State levels. Beach mice primarily use coastal dune communities comprised of sea oats (*Uniola paniculata*), for habitat. Grasslands and open sandy areas in the fore-dune area may also be utilized (Humphrey, 1992). This subspecies was originally endemic to coastal dunes along the Florida coast from Ponce Inlet in Volusia County to Hollywood Beach, Broward County. Decline in beach mouse populations has been attributed to loss of habitat due to coastal development and beach erosion. Southeastern beach mice were recently identified at CCAFS north of Port Canaveral (Dynamac 2002).

2.8.5 Scrub Jay

The scrub jay (*Aphelocoma coerulescens*) is listed as threatened at both the State and Federal levels. The scrub jay is endemic to Florida's xeric oak scrub and scrubby pine habitat, maintaining territories approximately 22 acres in size. Only a small amount (approximately 16 acres) exists north of the Port within the study area, scrub jays are not known to utilize the area. A recent survey by Dial Cordy (2006) did not result in any scrub jay observations in the study area. The nearest known populations of scrub jays are located west of the Port on Merritt Island.

2.8.6 Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is no longer a listed species at either the State and Federal levels but is still protected under the Bald and Golden Eagle Protection Act. The breeding range of the bald eagle is associated with aquatic habitats (coastal areas, river, lakes, and reservoirs) with forested shorelines or cliffs in North America. Throughout their range, they select large, super-canopy roost trees that are open and accessible, mostly conifers. They winter primarily in coastal estuaries and river systems

No bald eagle nests are located within the study area, and no appropriate habitat for nesting was observed during the recent investigation by Dial Cordy and Associates. According to the FWC bald eagle website, the nearest known bald eagle nest locations are west of the Banana River Aquatic Preserve.

2.8.7 Least Tern

The least tern (*Sterna antillarum*) is a small member of the gull family (Laridae). The least tern is listed by Florida as a threatened species and is protected federally under the Migratory Bird Treaty Act. Least terns breed along the east coast of the United States from Massachusetts to Florida, with the Florida populations returning each year in April. The breeding season lasts through the summer. Least terns traditionally choose open sandy substrates to form breeding colonies. Least terns forage along coastal areas feeding on small fishes, as well as some crustaceans and insects. Within Brevard County least terns are known to nest on sandbars and spoil areas along the coastal area.

2.8.8 Piping Plover

The piping plover (*Charadrius melodus*)is a state and federally listed threatened species. Piping plovers are a migratory shore bird that also is protected under the Migratory Bird Treaty Act. Piping plovers migrate to the Florida coast in September and are found through March (USFWS, 1995). Piping plovers nest on open sand, gravel, or shell-covered beaches above the high tide line and are often found on the accreting ends of barrier islands and along

coastal inlets (USFWS, 1995). Foraging areas include intertidal beaches, mudflats, sandflats, lagoons, and salt marshes, where they feed on invertebrates such as marine worms, insect larvae, crustaceans, and mollusks. Within Brevard County piping plovers have been observed along the beach areas within the County.

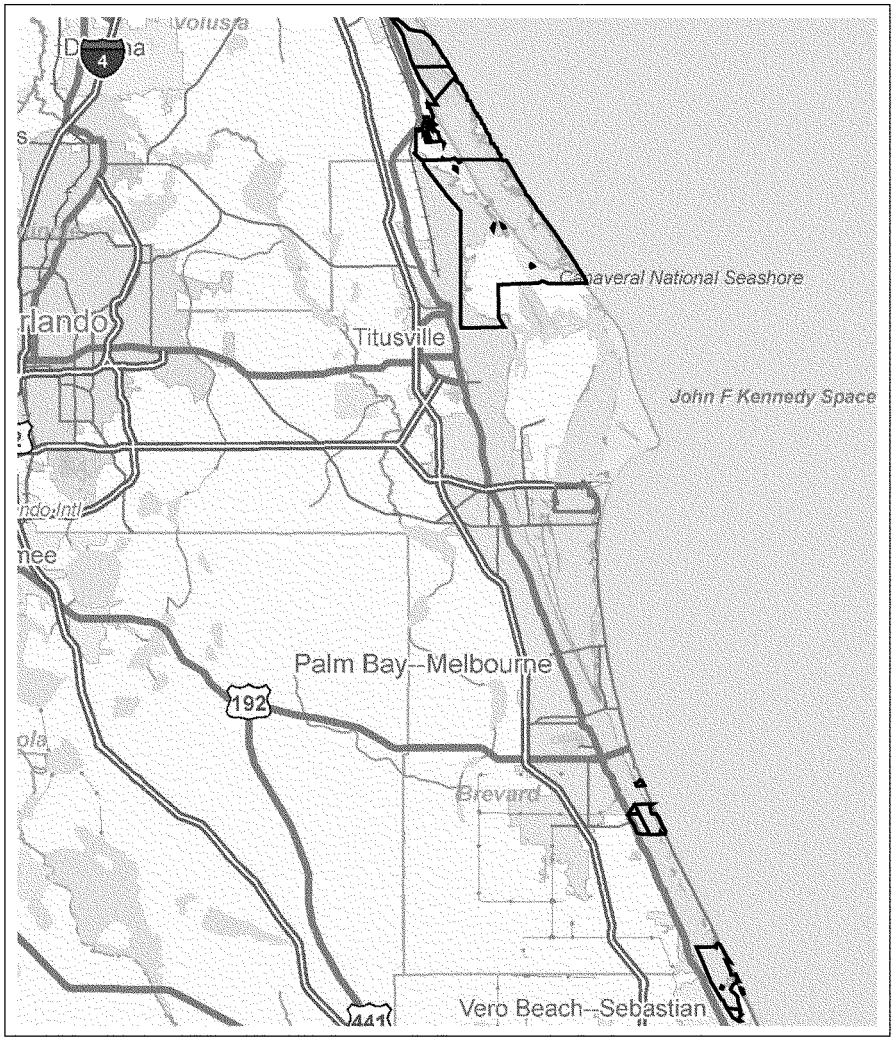
2.8.9 Gopher Tortoise

The gopher tortoise (*Gopherus polyphemus*) is listed as a species of special concern (SSC) by the State. It is a large, terrestrial turtle and utilizes many sandy, well-drained habitat including dunes, scrub, and pine flatwoods, although the gopher tortoise has been noted to occupy poorly drained habitat in Brevard County.

Habitat within the study area suitable for gopher tortoise utilization is limited to areas north of the harbor within the CCAFS. A recent survey conducted by Dial Cordy and Associates identified burrows on the CCAFS between the middle and eastern turning basins.

2.9 Coastal Barrier Resources

Congress passed the Coastal Barrier Resources Act (COBRA) in 1982 to address problems caused by coastal barrier development. This Act defined a list of undeveloped coastal barriers along the Atlantic and Gulf coasts. Designated coastal barrier resources have been identified within the project work area as shown in Figure 7. COBRA resources within the study area include the Canaveral National Seashore, the Merritt Island National Wildlife Refuge, and the Banana River State Aquatic Preserve.


Volusia
4
Canaveral National Seashore
Titusville
John F Kennedy Space
Palm Bay--Melbourne
192
Brevard
Vero Beach--Sebastian
441
Coastal Barrier Resource (USFWS, COBRA)
Aquatic Preserves \ Protected Areas
BANANA RIVER AQUATIC PRESERVE
MERRITT ISLAND NATIONAL WILDLIFE REFUGE
10 0 10 20 Miles
Coastal Barrier Resources System (COBRA)
Port Canaveral Environmental Baseline Report
Scale: 1 inch = 10 miles
Drawn By: MR
Date: April 2006
Approved By: LS
DIAL CORDY AND ASSOCIATES INC
Environmental Consultants
J05-850
Figure 7

3.0 LITERATURE CITED AND CONSULTED

Anamar Environmental Consulting, Inc. 2005. Final Report for Canaveral Harbor 103 Evaluation – Deepening Work West Turning Basin Entrance Widening, Corner Cut-off and CT 6 & 7 Dredging.

Bowen, B., J.C. Avise, J.I. Richardson, A.B. Meylan, D. Margaritoulis, and S.R. Hopkins-Murphy. 1993. Population structure of loggerhead turtles (Caretta caretta) in the northwestern Atlantic Ocean and Mediterranean Sea. Conservation Biology 7 (4):834-844.

Carr, A.F., M.H. Carr, and A.B. Meylan. 1978. The ecology and migrations of sea turtles. The western Caribbean green turtle colony. Bull. Amer. Mus. Nat. Hist. 162(1): 1-46.

Carr, A. 1986. Rips, FADS, and little loggerheads. Bioscience. 36:92-100.

CH2M Hill 2006. Section 203 Feasibility Study Hazardous, Toxic and Radioactive Waste (HTRW) Assessment. Port Canaveral, Brevard County, Florida.

Cole, T.V.N., D.L. Hartley, R.L. Merrick. 2005. Mortality and serious injury determinations for large whale stocks along the eastern seaboard of the Unites States, 1999-2003. U.S. Dep. Commer., Northeast Fish Sci. Cent. Ref. Doc. 05-08. 18pp.

Continental Shelf Associates, Inc. 1989. Environmental Impact Assessment for Beach Restoration. Brevard County, Florida.

Coyne, M. 1994. Feeding ecology of subadult green turtles in south Texas waters. MS Thesis, Texas A&M University. 76pp.

Dynamac Corporation. 2002. Environmental Site Survey in the Vicinity of the North Jetty at Canaveral Harbor, Brevard County, Florida.

Ehrhart, L.M., W.E. Redfoot, and D.A. Bagley. 1996. A study of the population ecology of in-water marine turtle populations on the east central coast of Florida. Comprehensive Final Report to NOAA. NMFS. 164 pp.

Erhart, L.M. and B.E. Witherington. 1986. Human and natural causes of marine turtle nest and hatchling mortality and their relationship to hatchling production on an important Florida nesting beach. Final Report No. GFC-84-018. Submitted to: Florida Game and Fresh Water Fish Commission, Tallahassee, Florida. 140 pp.

Ehrhart, L.M. 1979. A survey of marine turtle nesting at Kennedy Space Center, Cape Canaveral Air Force Station, North Brevard County, Florida, 1-122. Unpublished report to the Division of Marine Fisheries, St. Petersburg, Florida, Florida Department of Natural Resources.

Florida Marine Research Institute (FMRI). 2006. Sea Turtle Nesting Data for Southeast Florida. Website accessed 17 May 2006: http://floridamarine.org/features/view_article.asp?id=7630.

Hirth, H.F. 1971. Synopsis of biological data on the green sea turtle, Chelonia mydas. FAO Fisheries Synopsis No. 85: 1-77.

Humphrey, S.R. (Ed.). 1992. Rare and endangered biota of Florida: mammals.

Knowlton, A.R. and S.D. Kraus. 2001. Mortality and serious injury of the northern right whales (Eubalaena glacialis) in the western North Atlantic Ocean. The Journal of Cetacean Research and Management Special Issue 2:193-208.

Magnuson, et al. (National Research Council). 1990. Decline of the Sea Turtles: Causes and Prevention. National Academy Press, Washington D.C.

Meylan, A.B., K.A. Bjorndal, and B.J. Turner. 1983. Sea turtles nesting at Melbourne Beach, Florida. II. Post-nesting movements of Caretta caretta. Biological Conservation 26:79-90.

Meylan, A., B. Schroeder, and A. Mosier. 1995. Sea turtle nesting activity in the state of Florida. Fla. Mar. Res. Publ. 52:1-51.

Musick, J.A. and C.J. Limpus. 1997. Habitat utilization and migration in juvenile sea turtles. Pp. 137-164 In: Lutz, P.L., and J.A. Musick, eds., The Biology of Sea Turtles. CRC Press, New York. 432 pp.

National Marine Fisheries Service (2005) Recovery Plan for the North Atlantic Right Whale (Eubalaena glacialis) Prepared by National Marine Fisheries Service, Silver Spring, Maryland.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 1991. Recovery plan for U.S. population of loggerhead turtle. National Marine Fisheries Service, Washington, D.C. 64 pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 1992. Recovery Plan for Kemp's Ridley Sea Turtle (Lepidochelys kempii). National Marine Fisheries Service, Washington, D.C. 40pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 1993. Recovery Plan for Hawksbill Turtles in the U.S. Caribbean, Atlantic and Gulf of Mexico. National Marine Fisheries Service, Washington, D.C. 52pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 1995. Status Reviews for Sea Turtles Listed under the Endangered Species Act of 1973. National Marine Fisheries Service, Silver Spring, Maryland.

Nelson, W.G. 1988. Sebastian Inlet rock outcrop reefs biological inventory study. Technical Report to Sebastian Inlet Commission. 86 pp.

South Atlantic Fisheries Management Council. 1998. Final habitat plan for the South Atlantic region. SAFMC Charleston, South Carolina. 457 pp.

U.S. Army Corps of Engineers. 1996. Final Environmental Impact Statement, Brevard County, Florida Shore Protection Project Review Study. U.S. Army Corps of Engineers, Jacksonville District. Jacksonville, FL.

U.S. Fish and Wildlife Service. 1995. Piping Plover (Charadrius melodus), Atlantic Coast populations, revised recovery plan. USFWS, Hadley, Massachusetts. 245 pp.

Witherington, B.E. and L.M. Ehrhart. 1989. Status and reproductive characteristics of green turtles (Chelonia mydas) nesting in Florida. Proc. 2nd Western Atlantic turtle symposium. 351-352.

Wyneken, J. and M. Salmon. 1992. Frenzy and post frenzy swimming activity in loggerhead, green, and leatherback hatchling sea turtles. Copeia (2): 478-484.

Port Canaveral Protected Species Report
Brevard County, Florida

March 2006
Revised September 2011

Prepared for:
Canaveral Port Authority
200 George J. King Blvd.
Cape Canaveral, FL 32920

Prepared by:
Dial Cordy and Associates Inc.
490 Osceola Ave.
Jacksonville Beach, FL 32250

DC&A Project No. 05-850

TABLE OF CONTENTS

Page

LIST OF FIGURES II

LIST OF TABLES II

I. INTRODUCTION 1

II. METHODOLOGY 1

A. Pre-Field Investigation Database Search 1

B. Field Survey 3

III. RESULTS 3

A. Listed Species Survey 3

B. Project Area Habitats 5

IV. SUMMARY 7

V. LITERATURE CITED 8

Appendix A Florida Natural Area Inventory, Brevard County, Florida

LIST OF FIGURES

Page

Figure 1 Location Map 2

Figure 2 Survey within Suitable Gopher Tortoise Habitat 4

Figure 3 FLUCCS Map 6

LIST OF TABLES

Page

Table 1 Protective Status of the Targeted Listed Wildlife Species That May Occur Within the Port Canaveral Expansion Project Area, Brevard County, Florida. 1

I. INTRODUCTION

Dial Cordy and Associates Inc. (DC&A) was contracted to investigate the potential of protected wildlife species and associated habitats that may be present along the northern section of the Port Canaveral Port Expansion Project (Project), Port Canaveral, Florida. The Project site is located along the southern boundary of Cape Canaveral Air Force Station (CCAFS) and the northern portion of the Port of Cape Canaveral (Figure 1). As part of this investigation, natural habitats within the Project site were reviewed for their potential to provide the appropriate community required for listed wildlife species. The purpose of the current investigation is to determine the presence of listed species and their habitat within the boundaries of the Project.

II. METHODOLOGY

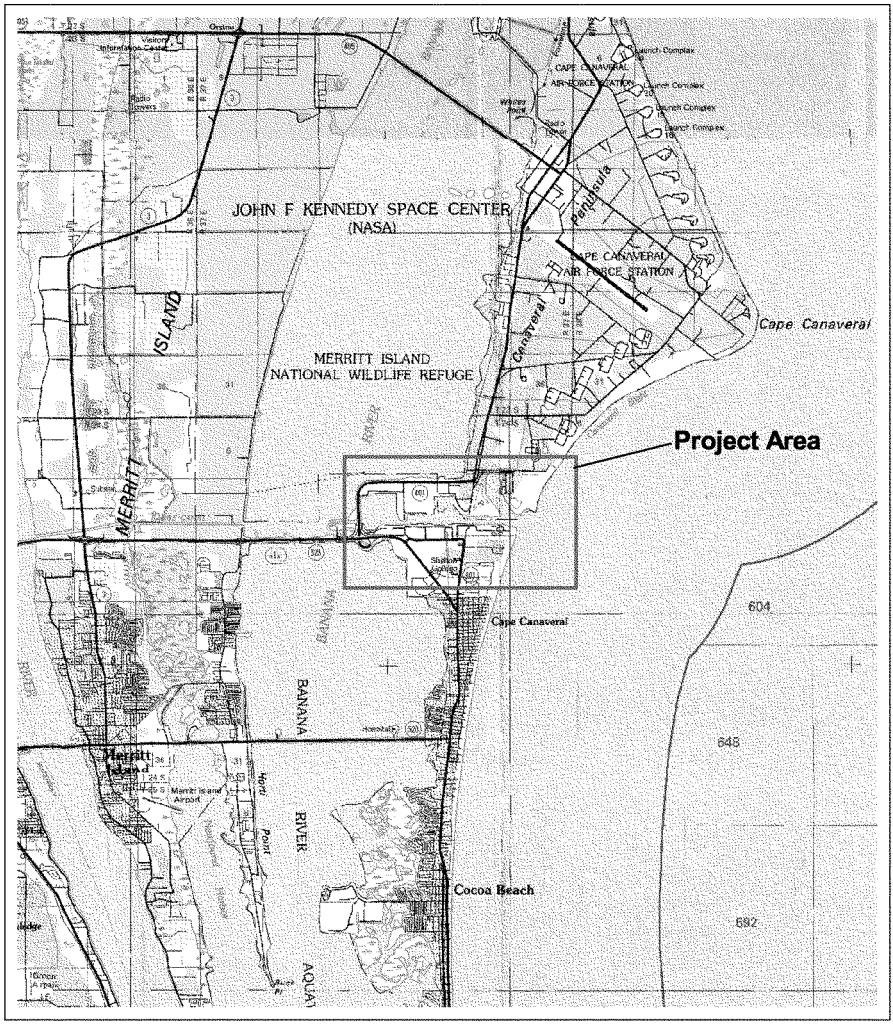
A. Pre-Field Investigation Database Search

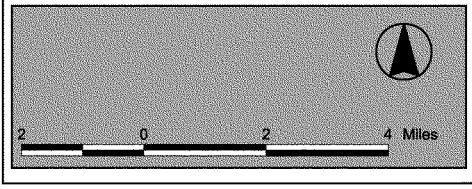
Dial Cordy and Associates Inc. conducted a wildlife pre-field investigation, to identify any threatened, endangered, or species of special concern which might inhabit the Project area. Prior to conducting the field work associated with the wildlife surveys, a Florida Natural Areas Inventory (FNAI) Species Summary for Brevard County was obtained to review the listed fauna that could potentially occur within this geographic region (Appendix A). In addition to the FNAI, existing reports from Cape Canaveral Air Force Station (CCAFS) and Port Canaveral (Port) were reviewed for potential protected species that may occur within the Project area. Four terrestrial species were identified that could potentially occur within the Project area. These species include the gopher tortoise (*Gopherus polyphemus*), Florida scrub jay (*Aphelocoma coerulescens*), eastern indigo snake (*Drymarchon corais couperi*), bald eagle (*Haliaeetus leucocephalus*), and the southeastern beach mouse (*Peromyscus polionotus niviventris*). In addition to the terrestrial species, three marine species were identified as potentially utilizing terrestrial beach habitats within the Project area. These species include the loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*), and green sea turtles (*Chelonia mydas*). The protected species and their listing status are provided in Table 1.

Table 1 Protective Status of the Targeted Listed Wildlife Species That May Occur Within the Port Canaveral Expansion Project Area, Brevard County, Florida.

Species	*State Listing**	*Federal Listing*
Gopher Tortoise	T	N
Florida Scrub Jay	T	T
Southeastern Beach Mouse	T	T
Eastern Indigo Snake	T	T
Bald Eagle	N	N

Source: Florida's Endangered Species, Threatened Species and Species of Special Concern, Official Lists. FGFWFC 1997.
* E=Endangered, SSC=Species of Special Concern, T=Threatened, and N=Not Listed





Location Map	
Port Canaveral Expansion	
Scale: 1 inch = 2 miles	Drawn By: MR
Date: December 2005	Approved By: MH
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 1

The three sea turtles also utilize the rock outcrops within the harbor for foraging. A separate study is being conducted to determine the extent of this utilization. The West Indian manatee (*Trichechus manatus latirostris*) is also known to occur in waters of Brevard County including Port Canaveral and to utilize the Port waters for passage from the Atlantic Ocean to the Banana River.

B. Field Survey

Habitat types were classified according to the Florida Land Use and Cover Classification System (FLUCCS) in order to assess what communities were available for the listed species. Both wandering and fixed transect methodologies were used to conduct terrestrial wildlife surveys within suitable habitats along the northern boundary of the Project area. This included habitats within both the Port and CCAFS. The terrestrial listed wildlife species were targeted using visual and audible cues. When any listed species was observed, the location was noted using DGPS. Along with field visits, reported data were used to provide additional information on species that occur within vicinity of the Project area.

III. RESULTS

Five listed species were specifically targeted during the on-site survey visits; gopher tortoise, scrub jay, eastern indigo snake, bald eagle, and southeastern beach mouse. The survey area consisted of the northern water limits of the Port and extended a distance 500 feet landward of that sea/land boundary. During the on-site survey, evidence of one listed species, the gopher tortoise, was observed. All other accounts of listed species within the Project area were derived from reported data. Five FLUCCS habitat types were identified and recorded to identify potential areas for the listed species.

A. Protected Species Survey

Gopher Tortoise

Pedestrian transects were conducted on September 14, 2005 to identify any gopher tortoise burrows. Gopher tortoise surveys were conducted within the Project areas that contained suitable habitat. Suitable habitat consists of shrub and brushland (FLUCCS 320), and spoil habitats (FLUCCS 743). These areas accounted for approximately 43 acres within the Project area, of which approximately 50% was surveyed. Within that area, a total of four gopher tortoise burrows were identified (Figure 2). All four burrows were identified as active and all burrows were located on the slope of the spoil area berm.

In order to estimate the gopher tortoise population within the Project area, the number of occupied burrows (active plus inactive) must be multiplied by the standard conversion factor (scf) of 0.614. The scf is derived from the Wildlife Methodology Guidelines (FGFWFC 1988). That yields a total of 2.5 gopher tortoises within the 22 acres surveyed. Dividing the

Gopher Tortoise Borrow Location
Gopher Tortoise Survey
Suitable Gopher Tortoise Habitat
Surveyed Area

2000 0 2000 4000 Feet

Survey within Suitable Gopher Tortoise Habitat	
Port Canaveral Expansion	
Scale: 1 inch = 2,000 feet	Drawn By: MR
Date: December 2005	Approved By: MH
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 2

total number of gopher tortoises per the area surveyed yields a density of 0.11 gopher tortoises per acre surveyed. This would yield an estimated total of 4.7 gopher tortoises for the 43 acres of suitable habitat in the Project area.

Florida Scrub Jay
While some suitable habitat was identified (FLUCCS 322, Coastal Scrub) on-site, the Florida scrub jay was not observed or heard within the Project area. However, there are known Florida scrub jay populations that occur within CCAFS.

Southeastern Beach Mouse
The southeastern beach mouse was not observed during the on-site visit. However, a survey conducted in April 2002 associated with the North Jetty Sand-Tightening Project resulted in 23 beach mouse captures on the CCAFS (Dynamac 2002). The area surveyed included areas along the northern boundary of the channel. This species is known to inhabit vegetative communities such as the ones identified within the Project area. These habitats include FLUCCS 320 and coastal scrub/non-vegetated shoreline (FLUCCS 322/652).

Eastern Indigo Snake
The eastern indigo snake utilizes gopher tortoise burrows and may be found where burrows exist. Pedestrian transects were conducted on September 14, 2005 to identify any gopher tortoise burrows within the Project areas that contained suitable habitat. Suitable habitat consists of shrub and brushland (FLUCCS 320), and spoil habitats (FLUCCS 743). These areas accounted for approximately 43 acres within the Project area, of which approximately 50% was surveyed. Within that area, a total of four gopher tortoise burrows were identified. All four burrows were identified as active and all burrows were located on the slope of the spoil area berm. No indigo snakes were identified, but previous trapping studies conducted on the Kennedy Space Center west of the Banana River and north of the Port identified a large number of individual indigo snakes (Dynamac 2003).

Bald Eagle
No bald eagles or nests were identified in the survey. No appropriate habitat for nesting was identified. A database search of FWC bald eagle nest locator website (http: //wld.fwc.state.fl.us/eagle/eaglenests/) indicated that the nearest known nests are located west of the Banana River.

B. Project Area Habitats

Five Florida Land Use Cover and Forms Classification System (FLUCCS) habitat types were identified within the Project area: military/open land (FLUCCS 173/190), shrub and brushland (FLUCCS 320), coastal scrub/non-vegetated shoreline (FLUCCS 322/652), spoil area (FLUCCS 743) and port facilities (FLUCCS 815) (Figure 3). The vegetative structure for each habitat type is described in the following section. All the habitats identified were uplands, no wetlands were observed within the Project boundary.

Port Canaveral FLUCCS
173/190 - Military/Open land (43.1 ac.)
320 - Shrub and Brushland (27.1 ac.)
322 - Coastal Scrub (16.6 ac.)
743 - Spoil Areas (14.8 ac.)
815 - Port Facilities (78.2 ac.)

2000 0 2000 4000 Feet

FLUCCS Map	
Port Canaveral Expansion	
Scale: 1 inch = 2,000 feet	Drawn By: MR
Date: December 2005	Approved By: MH
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 3

Military-Open Land - FLUCCS 173/190
This military/open land habitat type was identified on the east-central portion of the Project area and consists of approximately 43 acres (Figure 3). Military buildings, docks, roadways, and operation centers comprise the majority of the developed areas of this military community. Areas surrounding the military components within the project area consist of planted grasses and ornamental shrubs that are maintained regularly.

Shrub and Brushland - FLUCCS 320
Brazilian pepper (*Schinus terebinthifolius*), cabbage palm (*Sabal palmetto*), and live oak (*Quercus virginiana*) comprise the canopy trees within this community type and covers approximately 27 acres of the Project area (Figure 3). The herbaceous layer consists of vegetation such as bahiagrass (*Paspalum notatum*) and beggars-lice (*Desmodium spp*). This community type is interspersed between the rip-rap and spoil area.

Coastal Scrub/Non-Vegetated Shoreline - FLUCCS 322/652
This community type is characterized by the open, non-vegetated beach and continues to the vegetation located at the primary dune which extends landward toward the military/open land and spoil area communities (Figure 3). This community covers approximately 17 acres within the Project boundaries. Herbaceous species occurring within this FLUCCS community include beach morning glory (*Ipomoea pescaprae)*, sea oats (*Uniola paniculata*), and camphorweed (*Heterotheca subaxillaris*). Woody vegetation within the coastal scrub habitat consists predominately of wax myrtle (*Myrica cerifera*) and red cedar (*Juniperus silicicola*).

Spoil Area - FLUCCS 743
Spoil areas are located on CCAFS property and consist of dredged material dumped from previous Port dredging operations (Figure 3). The berms are approximately 100 feet in height and surround the area utilized for spoil material deposition. The berm consists of herbaceous vegetation such as bahiagrass and desmodium with the interior spoil area consisting of bare sandy areas, wax myrtle, and prickly-pear (*Opuntia stricta*) and comprises approximately 15 acres.

Port Facilities - FLUCCS 815
This category designates the area as a part of Port Canaveral (Figure 3). This community, which covers approximately 78 acres, consists of buildings, asphalt space for various Port activities, and open space. Vegetation within this habitat is similar to FLUCCS 173/190, consisting predominately of planted grass and ornamental shrubs that are regularly maintained through mowing.

IV. SUMMARY

The gopher tortoise was the only listed species observed during the on-site survey. Although several other listed species are known to occur at the CCAFS including portions of the Project area, none were observed. The Project has the potential to impact habitat of the southeastern beach mouse, eastern indigo snake, and the gopher tortoise.

V. LITERATURE CITED

Dynamac Corporation. 2002. Environmental Site Survey in the Vicinity of the North Jetty at Canaveral Harbor, Brevard County, Florida. Final Report.

Florida Natural Areas Inventory. 2005. (http://www.fnai.org/bioticssearch.cfm)

Florida Game and Freshwater Fish Commission. 1988. Wildlife Methodology Guidelines for Section 18.D of the Application for Development Approval.

Florida Game and Freshwater Fish Commission. 1997. Florida's Endangered Species, Threatened Species and Species of Special Concern, Official Lists.

L:\Jobs-Jax\801-900\05-850\T&E Report\T&E Report 5.doc
September 14, 2011

APPENDIX A

Florida Natural Area Inventory
Brevard County, Florida

BREVARD COUNTY

134 Total Elements Found
Last Updated: June 2011

Key
Scientific Name is linked to the FNAI Online Field Guides when available.
- links to **NatureServe Explorer**, an online encyclopedia of more than 55,000 plants, animals, and natural communities in North America, compiled by the **NatureServe** network of natural heritage programs, of which the Florida Natural Areas Inventory is a member.
- links to a species distribution map (**Adobe SVG viewer** required). If your browser does not support Adobe SVG, try this **link**

New Search

SEARCH RESULTS

NOTE: This is not a comprehensive list of all species and natural communities occurring in the location searched. Only element occurrences documented in the FNAI database are included.

Plants and Lichens

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Argusia gnaphalodes	Sea Lavender	G4	S3	N	LE
Calamovilfa curtissii	Curtiss' Sandgrass	G3	S3	N	LT
Centrosema arenicola	Sand Butterfly Pea	G2Q	S2	N	LE
Chamaesyce cumulicola	Sand-dune Spurge	G2	S2	N	LE
Conradina grandiflora	Large-flowered Rosemary	G3	S3	N	LT
Dennstaedtia bipinnata	Hay Scented Fern	G4	S1	N	LE
Dicerandra thinicola	Titusville Balm	G1Q	S1	N	LE
Glandularia maritima	Coastal Vervain	G3	S3	N	LE
Glandularia tampensis	Tampa Vervain	G2	S2	N	LE
Halophila johnsonii	Johnson's Seagrass	G2	S2	LT	N
Harrisia simpsonii	Simpson's Prickly Apple	G2	S2	N	LE

Lantana depressa var. floridana	Atlantic Coast Florida Lantana	G2T1	S1	N	LE
Lechea cernua	Nodding Pinweed	G3	S3	N	LT
Lechea divaricata	Pine Pinweed	G2	S2	N	LE
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Nolina atopocarpa	Florida Beargrass	G3	S3	N	LT
Ophioglossum palmatum	Hand Fern	G4	S2	N	LE
Pavonia spinifex	Yellow Hibiscus	G4G5	S2	N	N
Peperomia humilis	Terrestrial Peperomia	G5	S2	N	LE
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	LT
Tephrosia angustissima var. curtissii	Coastal Hoary-pea	G1T1	S1	N	LE
Zephyranthes simpsonii	Redmargin Zephyrlily	G2G3	S2S3	N	LT

Bivalves (Clams and Mussels)

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Villosa amygdala	Florida Rainbow	G3	S3	N	N

Gastropods (Snails and Allies)

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Praticolella bakeri	Ridge Scrubsnail	G2G3	S2S3	N	N

Spiders

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Sphodros abboti	Blue Purse-web Spider	G4G5	S4	N	N

Grasshoppers and Allies

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Melanoplus indicifer	East Coast Scrub Grasshopper	G1G2	S1S2	N	N

Beetles

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Aethecerinus hornii	Horn's Aethecerinus Long-Horned Beetle	G2G4	S2S4	N	N
Aphodius aegrotus	Small Pocket Gopher Aphodius Beetle	GNR	S3?	N	N
Aphodius laevigatus	Large Pocket Gopher Aphodius Beetle	G3?	S3?	N	N
Ataenius wenzelii	An Ataenius Beetle	G3G5	S2S3	N	N
Diplotaxis rufa	Red Diplotaxis Beetle	G2	S2	N	N
Haroldiataenius saramari	Sand Pine Scrub Ataenius Beetle	G3G4	S3S4	N	N
Hypotrichia spissipes	Florida Hypotrichia Scarab Beetle	G3G4	S3S4	N	N
Peltotrupes profundus	Florida Deepdigger Scarab Beetle	G3	S3	N	N
Phyllophaga elizoria	Elizoria June Beetle	G2G3	S2S3	N	N
Phyllophaga elongata	Elongate June Beetle	G2G4	S2S4	N	N
Selonodon floridensis	Florida Cebrionid Beetle	G2G3	S2S3	N	N

Butterflies and Moths

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Appias drusilla	Florida White	G5	S2S3	N	N
Atrytonopsis loammi	Loammi Skipper	G1	S1	N	N
Callophrys gryneus sweadneri	Florida Olive Hairstreak	G5T2	S2	N	N
Euphyes berryi	Berry's Skipper	G2G3	S1S2	N	N
Euphyes dukesi calhouni	Calhoun's Skipper	G3T2T3	S1	N	N

Ants, Bees and Wasps

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Colletes titusensis	A Cellophane bee	G1G2	S1S2	N	N

Fish

EXPLANATION

Scientific Name	Common Name	Global	State	Federal	State

		Rank	Rank	Status	Status
Acipenser oxyrinchus oxyrinchus	Atlantic Sturgeon	G3T3	S1	C	SSC
Bairdiella sanctaeluciae	Striped Croaker	G5	S2	SC	N
Ctenogobius pseudofasciatus	Slashcheek Goby	G3G5	S1	N	N
Gobiomorus dormitor	Bigmouth Sleeper	G4	S2	N	N
Microphis brachyurus	Opossum Pipefish	G4G5	S2	SC	N
Rivulus marmoratus	Mangrove Rivulus	G3	S3	SC	SSC

Amphibians

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Rana capito	Gopher Frog	G3	S3	N	SSC

Reptiles

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Alligator mississippiensis	American Alligator	G5	S4	SAT	FT(S/A)
Caretta caretta	Loggerhead	G3	S3	LT	FT
Chelonia mydas	Green Turtle	G3	S2	LE	FE
Crotalus adamanteus	Eastern Diamondback Rattlesnake	G4	S3	N	N
Dermochelys coriacea	Leatherback	G2	S2	LE	FE
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	FT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	ST
Lampropeltis calligaster	Mole Snake	G5	S2S3	N	N
Lampropeltis getula	Common Kingsnake	G5	S2S3	N	N
Lepidochelys kempii	Kemp's Ridley	G1	S1	LE	FE
Pituophis melanoleucus mugitus	Florida Pine Snake	G4T3	S3	N	SSC
Sceloporus woodi	Florida Scrub Lizard	G3	S3	N	N

Birds

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Aphelocoma coerulescens	Florida Scrub-jay	G2	S2	LT	FT
Aramus guarauna	Limpkin	G5	S3	N	SSC
Ardea alba	Great Egret	G5	S4	N	N
Ardea herodias occidentalis	Great White Heron	G5T2	S2	N	N
Athene cunicularia floridana	Florida Burrowing Owl	G4T3	S3	N	SSC
Buteo brachyurus	Short-tailed Hawk	G4G5	S1	N	N
Caracara cheriway	Crested Caracara	G5	S2	LT	FT
Charadrius melodus	Piping Plover	G3	S2	LT	FT
Dendroica discolor paludicola	Florida Prairie Warbler	G5T3	S3	N	N
Egretta caerulea	Little Blue Heron	G5	S4	N	SSC
Egretta rufescens	Reddish Egret	G4	S2	N	SSC
Egretta thula	Snowy Egret	G5	S3	N	SSC
Egretta tricolor	Tricolored Heron	G5	S4	N	SSC
Elanoides forficatus	Swallow-tailed Kite	G5	S2	N	N
Elanus leucurus	White-tailed Kite	G5	S1	N	N
Eudocimus albus	White Ibis	G5	S4	N	SSC
Falco columbarius	Merlin	G5	S2	N	N
Falco peregrinus	Peregrine Falcon	G4	S2	N	N
Falco sparverius paulus	Southeastern American Kestrel	G5T4	S3	N	ST
Fregata magnificens	Magnificent Frigatebird	G5	S1	N	N
Grus canadensis pratensis	Florida Sandhill Crane	G5T2T3	S2S3	N	ST
Haematopus palliatus	American Oystercatcher	G5	S2	N	SSC
Haliaeetus leucocephalus	Bald Eagle	G5	S3	N	N
Hydroprogne caspia	Caspian Tern	G5	S2	N	N

Ixobrychus exilis	Least Bittern	G5	S4	N	N
Laterallus jamaicensis	Black Rail	G4	S2	N	N
Mycteria americana	Wood Stork	G4	S2	LE	FE
Nyctanassa violacea	Yellow-crowned Night-heron	G5	S3	N	N
Nycticorax nycticorax	Black-crowned Night-heron	G5	S3	N	N
Pandion haliaetus	Osprey	G5	S3S4	N	SSC*
Pelecanus occidentalis	Brown Pelican	G4	S3	N	SSC
Peucaea aestivalis	Bachman's Sparrow	G3	S3	N	N
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	FE
Picoides villosus	Hairy Woodpecker	G5	S3	N	N
Platalea ajaja	Roseate Spoonbill	G5	S2	N	SSC
Plegadis falcinellus	Glossy Ibis	G5	S3	N	N
Recurvirostra americana	American Avocet	G5	S2	N	N
Rynchops niger	Black Skimmer	G5	S3	N	SSC
Sternula antillarum	Least Tern	G4	S3	N	ST
Thalasseus maximus	Royal Tern	G5	S3	N	N
Thalasseus sandvicensis	Sandwich Tern	G5	S2	N	N
Vireo altiloquus	Black-whiskered Vireo	G5	S3	N	N

Mammals

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Eubalaena glacialis	North Atlantic Right Whale	G1	S1	LE	FE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Peromyscus polionotus niveiventris	Southeastern Beach Mouse	G5T1	S1	LT	FT

Podomys floridanus	Florida Mouse	G3	S3	N	SSC
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	SSC
Trichechus manatus	Manatee	G2	S2	LE	FE
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	ST*

Natural Communities DESCRIPTION EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Basin swamp		G4	S3	N	N
Beach dune		G3	S2	N	N
Coastal grassland		G3	S2	N	N
Coastal interdunal swale		G3	S2	N	N
Coastal strand		G3	S2	N	N
Depression marsh		G4	S4	N	N
Dome swamp		G4	S4	N	N
Estuarine seagrass bed		G3	S2	N	N
Floodplain marsh		G3	S3	N	N
Hydric hammock		G4	S4	N	N
Mangrove swamp		G5	S4	N	N
Maritime hammock		G3	S2	N	N
Mesic flatwoods		G4	S4	N	N
Mesic hammock		G3	S3?	N	N
Salt marsh		G5	S4	N	N
Scrub		G2	S2	N	N
Scrubby flatwoods		G2	S2?	N	N
Shell mound		G2	S2	N	N
Xeric hammock		G3	S3	N	N

Other Elements

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Bird Rookery		GNR	SNR	N	N
Manatee Aggregation Site		GNR	SNR	N	N

New Search

Essential Fish Habitat Assessment
Port Canaveral Navigation Improvements
Port Canaveral FL

June 2007
Revised March 2008

Prepared for:
Canaveral Port Authority
200 George J. King Boulevard
Cape Canaveral, FL 32920

Prepared by:
Dial Cordy and Associates Inc.
490 Osceola Avenue
Jacksonville Beach, FL 32250

TABLE OF CONTENTS

Page

LIST OF FIGURES III

LIST OF TABLES III

1.0 INTRODUCTION 1

1.1 Project Purpose 1
1.2 Study Area Location 1
1.3 Project Alternatives 4
1.3.1 Recommended Plan 4

2.0 ESSENTIAL FISH HABITAT DESIGNATION 7

2.1 Assessment 7
2.2 Managed Species 9
2.2.1 Crustacea 11
2.2.1.1 Life Histories 11
2.2.1.1.1 Brown Shrimp 11
2.2.1.1.2 Pink Shrimp 11
2.2.1.1.3 White Shrimp 12
2.2.1.1.4 Spiny Lobster 12
2.2.1.2 Summary of Impacts to Shrimps and Spiny Lobsters 13
2.2.2 Habitat Areas of Particular Concern 14
2.2.2.1 Unvegetated Bottom Habitat 14
2.2.2.2 Summary of Impacts to Unvegetated Bottom Habitat 14
2.2.3 South Atlantic Snapper-Grouper Complex 14
2.2.3.1 Life History 15
2.2.3.1.1 Balistidae 15
2.2.3.1.2 Carangidae 15
2.2.3.1.3 Ephippidae 16
2.2.3.1.4 Haemulidae 17
2.2.3.1.5 Labridae 17
2.2.3.1.6 Lutjanidae 18
2.2.3.1.7 Serranidae 18
2.2.3.1.8 Sparidae 19
2.2.3.2 Summary of the Impacts to the Snapper-Grouper Complex Fishes 19
2.2.4 Coastal Migratory Pelagics Complex 20

2.2.4.1 Life History 20
2.2.4.1.1 Coryphaenidae 20
2.2.4.1.2 Rachycentridae 21
2.2.4.1.3 Scombridae 21
2.2.5 Summary of Impacts to the Coastal Migratory Pelagics Complex Fishes 22
2.3 Associated Species 22
2.3.1 Invertebrates 22
2.3.2 Fishes 23
2.3.3 Summary of Impacts to Associated Species 24
3.0 CONCLUSIONS 24
4.0 REFERENCES 25

LIST OF FIGURES

Page
Figure 1 Location Map 2
Figure 2 Study Area 3

LIST OF TABLES

Page
Table 1 Managed Species Identified by the South Atlantic Fishery Management Council That Are Known to Occur in Brevard County, Florida 9

1.0 INTRODUCTION

1.1 Project Purpose

The Canaveral Port Authority (CPA) is currently conducting a feasibility study of potential navigation improvements under the authority granted under Section 203 of the Water Resources Development Act (WRDA), 1986. The study is in response to problems and issues identified by the CPA and Canaveral Pilots Association with regard to ship maneuvering and delays caused by within the existing federal project. The three major problems at Port Canaveral are:

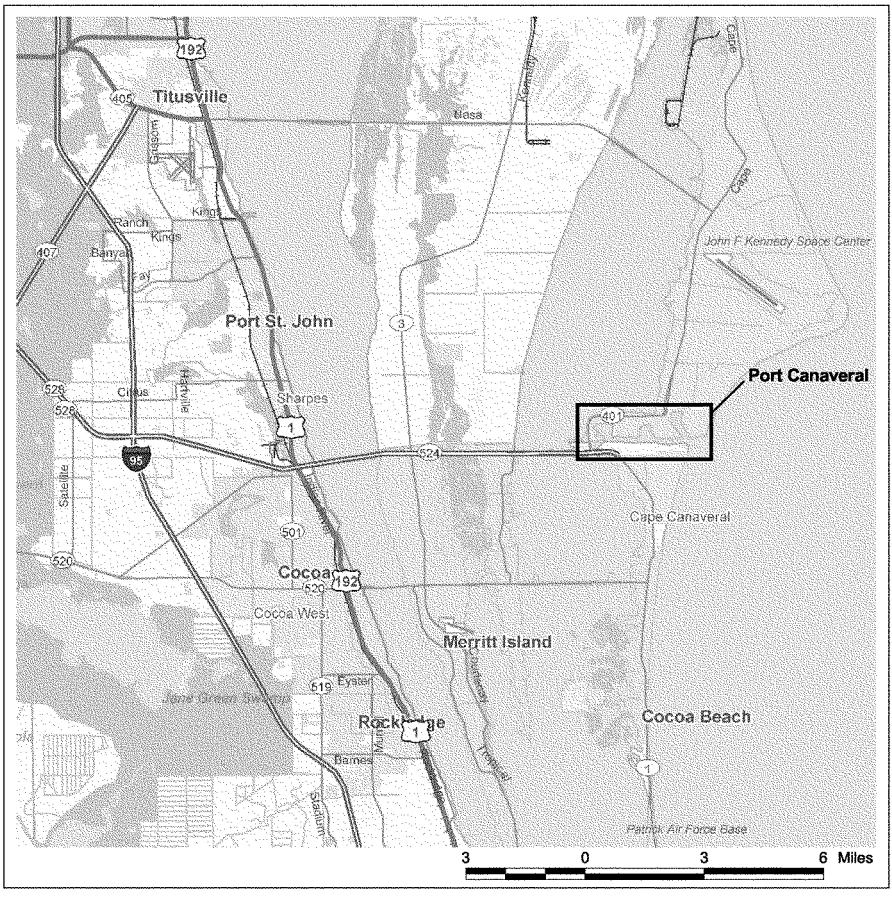
1. Congestion at cargo berths reduces the effectiveness and efficiency of cargo vessels and landside facilities. Given the rapid growth in commodity movements at Port Canaveral, in the very near future a significant proportion of cargo vessels calling at Port Canaveral will have to wait offshore for a berth to become available. Some of these vessels may divert to an alternative port and incur increased transportation costs, if channels are not improved. In addition, landside facilities will stand temporarily idle as vessels wait offshore for an available berth or safe passage through the Federal channel.

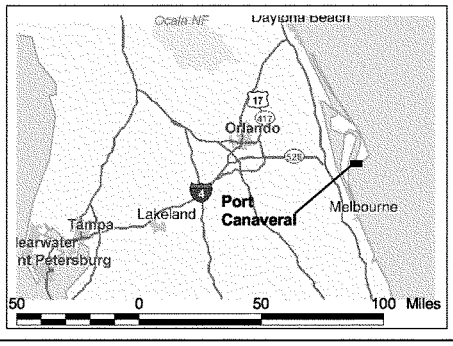
2. The size of cargo vessels calling at Port Canaveral is constrained by existing channel dimensions and configurations. Larger, more efficient vessels could be used for bulk items such as petroleum products, aggregates and cement if channels were improved.

3. The size of cruise ships calling at Port Canaveral is constrained by channel and turning basin dimensions. Increasingly larger cruise ships are calling at Port Canaveral and are beginning to exceed the dimensions for safe use of the existing west turning basin. Passage of large cruise ships through the narrow ship channel leading to the turning basin and cruise ship piers also causes surges at cargo piers that line the channel, which results in cargo vessels having to stop loading and unloading activities while the cruise ships pass. The potential for future cruise ship terminal expansion also cannot be fully exploited under existing channel and turning basin dimensions and configurations.

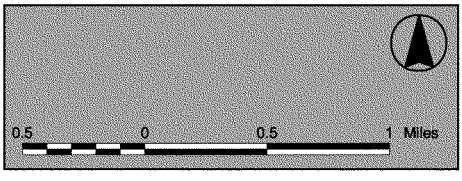
1.2 Study Area Location

Port Canaveral is located in Brevard County on the east coast of Florida, just north of Cape Canaveral and approximately nine miles north of Cocoa Beach (Figure 1). The main port is orientated in an east – west direction, extending from the Atlantic coast to the Banana River. The port is bounded to the north by the Cape Canaveral Air Force Station (CCAFS) and the Banana River, and bounded to the south by the City of Cape Canaveral. The harbor consists of three turning basins (Figure 2). Starting from the east they are: the Trident Turning Basin (TTB), the Middle Turning Basin (MTB), and the West Turning Basin (WTB). The basins are connected by a channel (East Access Channel and West Access Channel) that forms the south





Location Map	
Port Canaveral EFH Assessment	
Scale: 1 inch = 3 miles	Drawn By: MR
Date: September 2007	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 1



Study Area	
Port Canaveral EFH Assessment	
Scale: 1 inch = 0.5 mile	Drawn By: MR
Date: September 2007	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 2

boundary of each basin. Within this channel, a Federally maintained Barge Canal extends from the south side of the MTB, through the Banana River, across Merritt Island, and connects with the Intracoastal Waterway (ICWW) system in the Indian River. Where the Barge Canal enters the Banana River, a 600-foot long Corps of Engineers' lock (Canaveral Lock) separates the tidal harbor from the almost non-tidal river.

1.3 Project Alternatives

The primary objective of the Section 203 Study was to identify and evaluate alternatives that would:

1. Reduce future congestion at Port Canaveral;
2. Accommodate anticipated future growth in number and size of vessel transiting the Port;
3. Improve the efficiency of operations for cargo vessels and cruise ships within the Port complex;
4. Allow for use of the Port by larger, more efficient, cargo vessels and cruise ships;
5. Allow for development of additional terminals/berths without encroaching on the West Turning Basin.

Three alternatives will be evaluated during the NEPA process and include a no action alternative, one alternative that includes operational changes only, and one structural alternative that is the project Recommended Plan. The no action alternative and the operational alternative would have little or no direct effect on essential fish habitat, so the evaluation presented in this report will focus on the Recommended Plan.

1.3.1 Recommended Plan

The following narrative describes the Recommended Plan project features relative to existing conditions and progressing from the Atlantic Ocean entrance channel to the West Basin. Canaveral Harbor channels are comprised of the outer, middle, and inner reaches, the middle turning basin and west access channels, and the west turning basin. The outer reach is oriented on roughly a northwest-southeast alignment. The remainder of the channels is oriented on a generally east-west alignment. Various cut(s) comprise the outer, middle, and inner reaches as described below.

- Outer Reach, Cut 1A: Existing dimensions are 44-ft project depth by 400 ft wide by 11,000 ft long. New dimensions would increase the project depth to 47 ft. Current USACE quarterly condition surveys indicate that the existing water depth at the end of the project and up to 200 ft beyond the end of the project is 47 ft.

- Outer Reach, Cut1B: Existing dimensions are 44-ft project depth by 400 ft wide by 5,500 ft long. New dimensions would increase the project depth to 47 ft.

- Outer Reach, Cut 1: Existing dimensions are 44-ft project depth by 400 ft wide by 12,500 ft long. New dimensions would increase the project depth to 47 ft only for the 5,300-ft long portion of Cut 1 that is seaward of buoys 7/8 (Station 0+00 to Station 53+00). Project depth for the remaining 7,200-ft of Cut 1, from buoys 7/8 to the apex of the channel turn, would increase to 46 ft.

- US Navy Turn Widener: Existing dimensions are 44-ft project depth by 7.7 acres (triangular shaped area) bounded by outer and middle reaches to the north and northeast and the civil turn widener to the southwest. New dimensions would increase the project depth to 46 ft.

- Civil Turn Widener: Existing dimensions are 41-ft project depth by 15.6 acres (irregular shaped area) bounded to the north and northeast by the middle reach and the US Navy turn widener. New dimensions would increase the project depth to 46 ft.

- New 203 Turn Widener: New dimensions are 46-ft project depth by 23.1 acres (irregular shaped area) bounded to the north and northeast by the civil turn widener and Cut 1 of the outer reach.

- Middle Reach: The middle reach extends from the apex of the channel turn westward to the western boundary of the Trident access channel. Existing dimensions are 44-ft project depth by 400 ft wide by 5,658 ft long. New dimensions would increase the project depth to 46 ft and the project width from 400 ft to 500 ft, providing a 100-ft widener of 2,282 ft in length along the north side of the channel for the portion of the middle reach that is inside of the north jetty. The eastern terminus of the 100-ft widener transitions from the existing to the new northern channel boundary over a plan distance of 500 ft. This portion of the project requires that the western "Surge Warning" notification sign structure be relocated northward 100 ft.

- Trident Access Channel and Trident Basin: With exclusive use by US Navy, the Trident Access channel connects the middle reach to the trident basin. Existing dimensions are 44- and 41-ft project depth by irregular shaped areas for the access channel and the basin, respectively. Existing dimensions to remain except as affected by the new 100-ft north side channel widener at the entrance to the Trident access channel.

- Inner Reach, Cut 2 and Cut 3: Existing dimensions are 40-ft project depth by 400 ft wide by 3,344 ft long. New dimensions would increase the project depth to 44 ft and the project width from 400 to 500 ft, providing a 100-ft widener along the entire length of the reach on the north side of the channel. The rip-rap protected shoreline and berm between the middle and trident basins will be relocated northward to accommodate the 100-ft northside channel widener.

- Middle Turning Basin: The middle turning basin has shared use by commercial and military activities. The federal project area encompasses 92.4 acres with project depths of 35 ft in the north and east portions of the basin used exclusively by the military and 39 ft in the remainder of the basin supporting commercial vessel traffic. Because of the somewhat limited room afforded by the present 39-ft federal project boundaries toward the northwest portion of the basin, CPA maintains an irregular shaped central portion of the basin to 39 ft. This provides additional area for maneuvering cargo vessels to and from the North Cargo Pier 1 and ro-ro ramp and enlarges the available area for turning displacement vessels on arrival or departure. The existing 39-ft federal project provides a turning circle diameter of 1200 ft. The new project dimensions for commercial purposes encompass 68.9 acres with a project depth of 43 ft yielding a turning circle diameter on the order of 1422 ft. Approximately 1.9 acres of the new 43-ft project area completes the western end of the north side channel widener in the area adjacent to the inner reach and the US Navy's Poseidon Wharf. As in the inner reach, the rip-rap protected north side shoreline will be relocated northward to accommodate the north side channel widening. The US Navy's mooring dolphin, located east of Poseidon Wharf and no longer used, sits within 25 ft of the new channel boundary and will be removed to eliminate a potential hazard to navigation.

- West Access Channel (east of Station 260+00): Existing dimensions are 39-ft project depth by 400 ft wide by 1,840 ft long. New dimensions would increase the project depth to 43 ft and increase the project width from 400 to 500 ft, providing 100 ft of widening along the entire length of the channel by redefining the northern channel boundary 12 ft north of the existing northern boundary, and widening the channel by 88 ft along the south side and into the barge canal.

- West Turning Basin and West Access Channel, Cut A (west of Station 260+00): The West turning basin has exclusive use by commercial activities and the Coast Guard. The Existing federal basin and Cut A of the west access channel take up 78.6 acres with a project depth of 31 ft as federally maintained and 35 ft as maintained by the CPA. The CPA has also maintained a triangular shaped 35-ft project area adjacent to the northeast shoreline at the entrance to the west turning basin and at the request of the pilots, performed new work dredging beyond present project limits at this location since 2003 to facilitate cruise vessel access to and from the basin and cruise berths. The Existing federal project basin provides a turning circle diameter of 1400 ft. The preferred alternative, comprising 141 acres, will expand the federal project limits in the northern and western portions as needed to support cruise ship access to present and planned terminals and will enlarge the entrance to the west basin providing a new turning circle diameter of 1725 ft. The turning circle and entrance widening will be created by dredging beyond the present federal and CPA project boundaries to the northeast and to the south within the barge canal. Approximately 18.5 acres of existing bank, shoreline, and uplands adjacent to the CPA 35-ft project boundary and 6.9 acres within the existing barge canal will be dredged to the new project depth of 35 ft.

The Recommended Plan will result in dredging or excavation of 4,271,000 million cubic yards of sand, silts, and clays of which all but 455,000 cubic yards is identified for uplands or offshore disposal. The 455,000 cubic yards designated as upland excavation and will be disposed upland for beneficial reuse. The upland excavated material comes from the West Turning Basin corner cut-off and the northside widener from existing grade down to elevation -13 MLLW. The geotechnical investigations show that sands suitable for reuse are generally located at and above elevation -13 feet (MLLW). Although these sands do not appear to be suitable for direct placement on the beach, they can be stockpiled on land for beneficial reuse as construction fill material. Excavated material below -13 feet MLLW is generally not suitable for reuse and would be disposed in the offshore disposal site. In the event that suitable material is found below -13 feet MLLW, it would be placed in the Nearshore Disposal Area.

2.0 ESSENTIAL FISH HABITAT DESIGNATION

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act of 1976 and the 1996 Sustainable Fisheries Act, an Essential Fish Habitat (EFH) assessment is necessary for this project. An EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." *Waters* include aquatic areas and their associated physical, chemical, and biological properties that are use by fishes and may include areas historically used by fishes. *Substrate* includes sediment, hardbottom, structures underlying the waters, and any associated biological communities. *Necessary* means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem. *Spawning, breeding, feeding, or growth to maturity* covers all habitat types used by a species throughout its life cycle. Only species managed under a federal fishery management plan (FMP) are covered (50 C.F.R. 600). The act requires federal agencies to consult on activities that may adversely influence EFH designated in the FMPs. The activities may have direct (e.g., physical disruption) or indirect (e.g., loss of prey species) effects on EFH and may be site-specific or habitat-wide. The adverse result(s) must be evaluated individually and cumulatively.

2.1 Assessment

The most obvious direct impact of the Recommended Plan on managed species in all habitats is the potential for mortality and/or injury of individuals through the dredging and/or rock removal processes. Species in any and all of the project area's habitats are susceptible. Fishes and invertebrates are at risk at any life-history stage; eggs, larvae, juveniles, and even adults may be inadvertently killed, disabled, or undergo physiological stress, which may adversely affect behavior or health. Forms that are less motile, such as juvenile shrimp, are particularly vulnerable (they would be sucked into the dredge apparatus, or otherwise directly removed from their habitat).

Although dredge operations are likely to directly impact individuals of managed species in observable lethal and sublethal ways, dredging and rock removal may have more subtle effects. These subtle effects act on individuals, but may be perceived only at the population level. For example, dredging activities, particularly in linear corridors (such as Port Canaveral channel) may interfere with migration patterns of species that require utilization of both inshore and offshore habitats through ontogeny. This is a particular concern for species that travel along shorelines and bulkheads. Therefore dredging berths and littoral zone habitats is anticipated to have greater effects. These impacts may result in displacement of individuals or disjuncture in the life-cycles of managed species.

Water Column. Impacts to the water column can have widespread effects on marine and estuarine species. Hence, it is recognized as EFH. The water column is a habitat used for foraging, spawning, and migration by both managed species and organisms consumed by managed species. Water quality concerns are of particular importance in the maintenance of this important habitat. During dredging in substrates comprising coarser materials and rock, water quality impacts are expected to be minimal. However, where silt and/or silty sand are to be dredged, water quality impacts are expected to be significant, and take several weeks/months after cessation of dredging activities to return to background levels. Re-suspended materials will interfere with the diversity and concentration of phytoplankton and zooplankton, and therefore affect foraging success and patterns of schooling fishes and other grazers that comprise prey for managed species. Recent efforts to quantify areal impacts of dredging incorporate only the waters directly above dredged substrates. However, due to the physical properties of water and the complex hydraulics operating within the harbor and channels, these efforts greatly underestimate the extent of negative effects of dredging.

Unvegetated Softbottom Habitat. Impacts to populations of managed species will occur due to dredging softbottom habitats, including those that lack seagrasses. Dredging will remove benthic organisms used as prey by managed species and as a result may temporarily impact certain species, such as red drum, that forage largely on such taxa. Dredged habitats are anticipated to recover, in terms of benthic biodiversity and population density, within two years (Taylor et. al 1973, Culter and Mahadevan, 1982; Saloman et. al, 1982).

Sargassum. Sargassum is pelagic brown algae that occurs in large, floating mats on the continental shelf and in the Gulf Stream including the waters off of Cape Canaveral. Sargassum provides valuable habitat for marine species including juvenile sea turtles, sea birds, and a variety of fish species. In the nearshore areas off Port Canaveral, sargassum only occurs in small clumps in the upper portion of ocean waters, and would not likely be adversely affected by dredging or disposal activities.

Live or Hardbottoms. Live or hardbottom habitats are associated with deviations in ocean floor relief and support invertebrate and algal communities with substantial fish assemblages. In the waters off southeast Florida, live bottom is particularly evident at the shelf break, a zone from about 35 to 100 fathoms where the Continental Shelf adjoins the deeper ocean basin. These habitats are not known to occur in the vicinity of Port Canaveral or the Canaveral ODMDS. However, some manmade areas of riprap occur adjacent to the main channel within Port

Canaveral that support algal growth and foraging for juvenile sea turtles (Redfoot 1997; Dial Cordy 2006). A portion of this habitat between the Trident Turning Basin and the Middle Turning Basin would be temporarily displaced during channel widening. The riprap would be replaced and likely recolonized after construction is completed. Additional foraging habitat occurs within the Trident Turning Basin, which is also used for foraging by juvenile sea turtles (Redfoot 1997). Therefore, this habitat would be adversely affected by the project, but effects would only be temporary in nature.

The aquatic communities associated with these different bottom types and the water column have been identified as EFH in accordance with the amendment to the Fishery Management Plans of the South Atlantic Region (SAFMC, 1998). Impacts associated with widening and deepening of the harbor are unavoidable. However, implementing strict management practices to reduce turbidity will minimize the temporary disruption of the water column and sand bottom areas that may provide habitat or contribute to aquatic food chains. These practices along with the construction of new seagrass and hardbottom habitat should mitigate for any direct impacts.

2.2 Managed Species

Thirty-seven of these fish species are listed under the Affected Fishery Management Plans and Fish Stocks of the Comprehensive EFH Amendment (SAFMC, 1998). Consequently, the project area has been designated as EFH for theses fishes, brown shrimp, white shrimp, pink shrimp, and spiny lobster (Table 1). Six coastal migratory pelagic fish species have been included owing to their distribution patterns along the Florida coast (SAFMC, 1998).

The species addressed in this section consist of fishes and invertebrates of both recreational and commercial importance that are managed under the Magnuson-Stevens Fishery Conservation and Management Act (PL94-265).

Table 1 Managed Species Identified by the South Atlantic Fishery Management Council That Are Known to Occur in Brevard County, Florida

Common Name	Taxa
Balistidae	
Gray Triggerfish	*Balistes capriscus*
Queen Triggerfish	*Balistes vetula*
Ocean Triggerfish	*Canthidermis sufflamen*
Carangidae	
Yellow Jack	*Caranx bartholomaei*
Blue Runner	*Caranx crysos*
Crevalle Jack	*Caranx hippos*
Bar Jack	*Caranx rubber*
Greater Amberjack	*Seriola dumerili*
Coryphaenidae	
Dolphin [1]	*Coryphaena hippurus*

Common Name	Taxa
Ephippidae	
Spadefish	*Chaetodipterus faber*
Haemulidae	
Black Margate	*Anisotremus surinamensis*
Porkfish	*Anisotremus virginicus*
Margate	*Haemulon album*
Tomtate	*Haemulon aurolineatum*
Smallmouth Grunt	*Haemulon chrysargyreum*
French Grunt	*Haemulon flavolineatum*
Spanish Grunt	*Haemulon macrostomum*
Cottonwick	*Haemulon melanurum*
Sailors Choice	*Haemulon parra*
White Grunt	*Haemulon plumieri*
Blue Stripe Grunt	*Haemulon sciurus*
Labridae	
Puddingwife	*Halichoeres radiatus*
Hogfish	*Lachnolaimus maximus*
Lutjanidae	
Mutton Snapper	*Lutjanus analis*
Schoolmaster	*Lutjanus apodus*
Gray Snapper	*Lutjanus griseus*
Dog Snapper	*Lutjanus jocu*
Mahogany Snapper	*Lutjanus mahogoni*
Lane Snapper	*Lutjanus synagris*
Yellowtail Snapper	*Ocyurus chrysurus*
Rachycentridae	
Cobia [1]	*Rachycentron canadum*
Scombridae	
Little Tunny [1]	*Euthynnus alletteratus*
King Mackerel [1]	*Scomberomorus cavalla*
Spanish Mackerel [1]	*Scomberomorus maculates*
Cero [1]	*Scomberomorus regalis*
Serranidae	
Black Sea Bass	*Centropristis striata*
Rock Hind	*Epinephelus adscensionis*
Goliath Grouper	*Epinephelus itajara*
Red Grouper	*Epinephelus morio*
Black Grouper	*Mycteroperca bonaci*
Gag	*Mycteroperca microlepis*
Sparidae	
Sheepshead	*Archosargus probatocephalus*
Jolthead Porgy	*Calamus arctifrons*
Invertebrates	
Brown Shrimp	*Farfantepenaeus aztecus*
Pink Shrimp	*Farfantepenaeus duorarum*
White Shrimp	*Litopenaeus setiferus*
Spiny Lobster	*Panulirus argus*

[1] Coastal Migratory Pelagic Fish Species

2.2.1 Crustacea

2.2.1.1 Life Histories

2.2.1.1.1 Brown Shrimp

Brown shrimp larvae occur offshore and migrate from offshore as post-larvae from January through November with peak migration from February through April. Post-larvae move into the estuaries primarily at night on incoming tides. Once in the estuaries, post-larvae seek out the soft silty/muddy substrate common to both vegetated and non-vegetated, shallow estuarine environments. This environment yields an abundance of detritus, algae, and microorganisms that comprise their diet at this developmental stage. Post-larvae have been collected in salinities ranging from zero to 69 ppt with maximum growth reported between 18° and 25°C, peaking at 32°C (Lassuy, 1983). Maximum growth, survival, and efficiency of food utilization has been reported at 26°C (Lassuy, 1983). The density of post-larvae and juveniles is highest among emergent marsh and submerged aquatic vegetation (Howe et al., 1999; Howe and Wallace, 2000), followed by tidal creeks, inner marsh, shallow non-vegetated water, and oyster reefs. The diet of juveniles consists primarily of detritus, algae, polychaetes, amphipods, nematodes, ostracods, chironomid larvae, and mysids (Lassuy, 1983). Although some of their potential prey will initially be lost during dredging activities, recovery will be rapid (Culter and Mahadevan, 1982; Saloman et al., 1982) and they can forage in adjacent areas that have not been impacted as they emigrate offshore. Emigration of sub-adults from the shallow estuarine areas to deeper, open water takes place between May through August, with June and July reported as peak months. The stimulus behind emigration appears to be a combination of increased tidal height and water velocities associated with new and full moons. After exiting the estuaries, adults seek out deeper (18 m), offshore waters in search of silt, muddy sand, and sandy substrates. Adults reach maturity in offshore waters within the first year of life.

2.2.1.1.2 Pink Shrimp

Of the three penaeid shrimp species, pink shrimp is the most prevalent in Florida waters. Consequently, the pink shrimp fishery is the most economically important of all fisheries in Florida. Spawning of pink shrimp occurs in oceanic waters at depths of 4 to 48 m and possibly deeper (Bielsa et al., 1983) where adult females lay demersal eggs. Spawning takes place year round in some areas (e.g., Tortugas Shelf), but peak spawning activity appears to coincide with maximum bottom water temperatures (Bielsa et al., 1983). Recruitment of planktonic post-larvae into estuarine and coastal bay nursery areas occurs in the spring and late fall during flood tides. Post-larvae become benthic at approximately 10 mm TL and prefer areas with a soft sand or mud substrate mixture containing sea grasses and turtle grass (Bielsa et al., 1983;

Howe et al., 1999; Howe and Wallace, 2000). Pink shrimp spend from 2 to 6 months in the nursery ground prior to emigration. During this time there is a dietary shift from nauplii and microplankton to polychaetes, ostracods, caridean shrimps, nematodes, algae, diatoms, amphipods, mollusks, and mysids, regarding post-larvae and juveniles, respectively (Bielsa et al., 1983). Although some of their potential prey will initially be lost during dredging activities, recovery will be rapid (Culter and Mahadevan, 1982; Saloman et al., 1982) and they can forage in adjacent areas that have not been impacted as they emigrate offshore. Emigration from the nursery grounds to offshore occurs year round with a peak during the fall and a smaller peak during the spring. The greatest concentrations of adults have been reported between 9 and 44 m, although some have been found as deep as 110 m in Florida waters. Although detailed dietary studies concerning adults are non-existent, Williams (1955) reported foraminiferans, gastropod shells, squid, annelids, crustaceans, small fishes, plant material, and debris in the stomachs of adults collected in North Carolina estuaries.

2.2.1.1.3 White Shrimp

White shrimp spawn along the South Atlantic coast from March to November, with May and June reported as peak months along the offshore waters of northeast Florida. Spawning takes place in water ≥ 9 m deep and within 9 km from the shore where they prefer salinities of ≥ 27 ppt (Muncy, 1984). The increase in bottom water temperature in the spring is thought to trigger spawning. After the demersal eggs hatch, the planktonic post-larvae live offshore for approximately 15-20 days. During the second post-larval stage, they enter Florida estuaries in April through early May by way of tidal currents and flood tides and become benthic. During this larval stage, the diet consists of zooplankton and phytoplankton. It has been documented that juvenile white shrimp tend to migrate further upstream than do juvenile pink or brown shrimp; as far as 210 km in northeast Florida (Pérez-Fartante, 1969). Juveniles prefer to inhabit shallow estuarine areas with a muddy substrate with loose peat and sandy mud and moderate salinity. Juvenile white shrimp are benthic omnivores (e.g., fecal pellets, detritus, chitin, bryozoans, sponges, corals, algae, annelids) and feed primarily at night. White shrimp usually become sexually mature at age I during the calender year after they hatched. The emigration of sexually mature adults to offshore waters is influenced primarily by body size, age, and environmental conditions. Studies have shown that a decrease in water temperature in estuaries triggers emigration in the south Atlantic (Muncy, 1984). The life span of white shrimp usually does not extend beyond one year.

2.2.1.1.4 Spiny Lobster

The spiny lobster inhabits the coastal waters from North Carolina to Rio de Janeiro, Brazil, including Bermuda and the Gulf of Mexico. The Florida spiny lobster is a valuable species both commercially and recreationally, and supports Florida's second most valuable shellfishery. During its life cycle, the spiny lobster occupies three different habitats (Marx and Herrnkind, 1986). The phyllosoma larvae are planktonic and inhabit the epipelagic zone of the Caribbean,

Gulf of Mexico, and the Straits of Florida. The duration of the phyllosome stage is approximately 6 to 12 months. A brief (several weeks) non-feeding, oceanic phase follows, where the larva metamorphoses into a puerulus offshore. The pueruli migrate to shore by night using specialized abdominal pleopods. Large concentrations of pueruli have been recorded along the southeast Florida coast and the southern shores of the Florida Keys year round, with a peak in the spring and a lesser peak in the fall. In addition, these large concentrations are usually associated with the new and first quarter lunar phases. When suitable inshore substrate is encountered by pueruli, they rapidly settle out of the water column and within days molt into the first juvenile stage. The specific factors that stimulate post-larval settlement is not well understood. Known nursery areas of young benthic larvae and juveniles consist of macroalgae beds along rocky shorelines interspersed with seagrasses where they live a solitary existence (Marx and Herrnkind, 1986). Juveniles larger than 20 mm CL tend to aggregate in biotic (e.g., sponges, small coral heads, sea urchins) and abiotic (ledges) structures in protected bays, including estuaries with high salinity. As adults, spiny lobsters inhabit coral reef crevices, rocky outcroppings, and ledges. Refuge availability plays an important role regarding population distribution because spiny lobsters do not have the ability to construct dens. However, in a study where additional artificial structures were placed in Biscayne Bay, FL, the population was re-distributed, but the number of spiny lobsters in the Bay did not increase (Marx and Herrnkind, 1986). Consequently, the south Florida population may be limited by recruitment, emigration, food, and other factors.

2.2.1.2 Summary of Impacts to Shrimps and Spiny Lobsters

As outlined by SAFMC (1998), EFH-HAPCs for penaeid shrimps include coastal inlets and both state identified overwintering areas and nursery habitats. Seagrass beds common to the bays of Florida are particularly important areas. Essential fish habitats for spiny lobster are varied including nearshore shelf/oceanic waters, shallow, benthic subtidal areas, seagrass beds, soft sediment and both live and hardbottom, sponges, algal communities, mangroves, and the Gulf Stream which it uses for dispersion (SAFMC, 1998).

The project area includes sand bottom and water column that may be used by all three penaeid species and spiny lobster as post-larvae, juvenile, and adults. The project would impact a relatively small area of the sand and the impacts would be minor. The project will cause localized turbidity during construction; however, turbidity would be minimized using the best management practices so that any impacts would be minor and temporary. Penaeid shrimp and spiny lobster would not be affected.

2.2.2 Habitat Areas of Particular Concern

2.2.2.1 Unvegetated Bottom Habitat

Unvegetated bottoms predominate the substrates within the Port Canaveral area. These habitats are important for both migration routes and foraging of managed species. These habitats serve as important foraging areas for species such as red drum.

2.2.2.2 Summary of Impacts to Unvegetated Bottom Habitat

Unvegetated softbottom habitats comprise a significant proportion or the total area proposed for dredging. As long as the areas remained as viable aquatic habitat following dredging, benthic infaunal populations in these areas would re-colonize. Whether the substrate remains viable for benthos may depend on the degree to which light attenuates with the additional depth. Increased depth may not promote the growth of macroalgae and epipsammic algae.

Impacts to benthic infaunal and epifaunal communities would be considered as relatively minimal when examined on a spatial scale. Infaunal communities in particular have very high reproductive potential and recruitment. Adjacent areas that have not been impacted would most likely be the primary source of recruitment to the impacted areas. Previous studies have shown a relatively short recovery time for infaunal communities following dredging (Taylor et. al 1973, Culter and Mahadevan, 1982; Saloman et. al, 1982). Succession of infaunal communities post dredging should begin within days following construction. This initial settlement usually consists of pelagic larval recruits settling within the impact area. Later succession from adjacent non-impacted areas will be more gradual, and involve less opportunistic species. Saloman et. al (1982) stated that communities would be close to pre-dredge conditions within one year and potentially as quickly as 8-9 months. Culter and Mahadevan (1982) found similar results and no long-term effects to benthic communities resulting from dredging activities. Based on these previous studies infaunal communities will most likely be re-established within 1-2 years post dredging.

2.2.3 South Atlantic Snapper-Grouper Complex

Brevard County, Florida is designated as EFH for 37 species of reef fishes (Table 1) that are listed under the Affected Fishery Management Plans and Fish Stocks of the Comprehensive EFH Amendment (SAFMC, 1998). Collectively, these 37 species, representing eight different families, are all members of the 73 species Snapper-Grouper Complex as outlined by SAFMC (1998). A discussion of how these fishes utilize the different inshore habitats follows.

2.2.3.1 Life History

2.2.3.1.1 Balistidae

Brevard County is designated as EFH for three species of triggerfishes (Table 1). Collectively, these triggerfishes inhabit shallow inshore areas (e.g., bays, harbors, lagoons, sandy areas, grassy areas, rubble rock, artificial reefs, or dropoffs adjacent to offshore reefs) to offshore waters as deep as 275 m. These triggerfishes, especially the gray and queen triggerfish are an important component of the reef assemblage of both natural and artificial reefs (Vose and Nelson, 1994). Information regarding balistid reproduction is limited and varied (Thresher, 1984). The basic balistid (e.g., gray triggerfish) spawning behavior involves the production of dermersal, adhesive eggs that are thought to stick to corals and algae near or on the bottom. On the other hand, spawning of both the ocean and queen triggerfish takes place well off the bottom over relatively deep water where pelagic eggs are released. Unfortunately, egg and larval development is poorly understood regarding most species; however, a long (≥ 1 yr) planktonic stage appears common for many species. As juveniles, it has been suggested that they are planktonic, taking refuge among floating masses of *Sargassum* (Johnson and Saloman, 1984). During this stage of development, the diet consists of primarily zooplankton associated with the *Sargassum* or drifting in the water column. The exact timing or the environmental cues that trigger settlement is not well understood. However, juvenile gray triggerfish as small as 16 - 17 cm SL have been reported to colonize hardbottom habitats (Thresher, 1984). After juveniles take on a benthic existence, their diet shifts to benthic fauna including algae, hydroids, barnacles, and polychaetes. All triggerfish feed diurnally and are well adapted to prey upon hard-shell invertebrates, especially adults. The diet of adult ocean triggerfish includes large zooplankton and possibly drifting seagrasses, algae, mollusks, and echinoderms. Adult gray and queen triggerfish feed primarily on sea urchins, but in their absence, will shift to other benthic invertebrates such as crabs, chiton, and sand dollars (Frazer et al., 1991; Vose and Nelson, 1994). All three triggerfishes are commercially important (especially the queen triggerfish) in the aquarium trade and to some extent as a gamefish.

2.2.3.1.2 Carangidae

Brevard County is designated as EFH for five carangids (Table 1) because they utilize the offshore and possibly inshore areas adjacent to the study area. Spawning of the bar jack, yellow jack, blue runner, and the crevalle jack takes place in offshore waters associated with a major current system such as the Gulf Stream from February through September (Berry, 1959). Consequently, these four species have an offshore larval existence. Data indicates that peak spawning months for blue runners is May through July (Shaw and Drullinger, 1990). Although spawning data regarding the greater amberjack doesn't exist, it is assumed that it is similar to the other four species. As young juveniles, crevalle jack migrate into inshore waters at about 20 mm SL whereas blue runners don't migrate into inshore areas until their late juvenile stage (Berry, 1959). Young bar jacks have a tendency to remain offshore and yellow jacks occur

inshore only occasionally as juveniles (Berry, 1959). Based on collections of juveniles regarding these four species, there is some indication that there is a mobile, northward population of developing young in the Gulf Stream that developed from spawning that occurred in more southern waters (Berry, 1959).

As juveniles and sub-adults, blue runners occur singly or in schools while juveniles have a high affinity for *Sargassum* and other floating objects in the Gulf Stream off southeast Florida (Goodwin and Finucane, 1985). Blue runners are a fast growing, long-lived species which attains 75% of its maximum size in its first 3 - 4 years of life (Goodwin and Johnson, 1986). The greater amberjack is a far ranging species that inhabits inlets, shallow reefs, rock outcrops, and wrecks with reef fishes such as snappers, sea bass, grunts, and porgies (Manooch and Potts, 1997a). They are generally restricted to the continental shelf to depths as great as 350 m (Manooch and Haimovici, 1983). Small individuals (< 1 m SL) are usually found in water < 10 m deep while larger individuals frequent waters 18 - 72 m deep (Manooch and Potts, 1997b). Greater amberjack are a fast growing species and are recruited to the headboat fishery in the Gulf by age 4 and fully recruited to the fishery by age 8 (Manooch and Potts, 1997a; Manooch and Potts, 1997b).

All five carangids are popular sport fishes among recreational fishers, but not as popular commercially where they are harvested using handlines, bottom longlines, and in some cases traps and trawls. Some Florida fishers feel that amberjack are being exposed to too much fishing pressure, especially owing to their attraction to reefs which make them an easy target for overfishing (Manooch and Potts, 1997a). However, as of 1997 there is no evidence of overfishing in both the Gulf of Mexico and southeast Florida (Manooch and Potts, 1997b).

2.2.3.1.3 Ephippidae

Brevard County is designated as EFH for the spadefish because as juveniles it inhabits shallow sandy beaches, estuaries, jetties, wharves, and other inshore areas, as well as deeper offshore habitats as adults. Spawning which takes place from May to September involves an offshore migration as far as 64.4 km (Chapman, 1978; Thresher, 1984). Although no data exists regarding egg and larvae development in nature, small individuals (~ 1-2 cm TL) appear inshore in early summer (Walker, 1991). These small juveniles are commonly observed drifting motionless along side vegetation (e.g., *Sargassum*). It has been suggested that they mimic floating debris and vegetation to escape predation. As spadefish mature they move further offshore where large schools will take residence around wrecks, oil and gas platforms, reefs, and occasionally open water. Spadefish are opportunistic feeders, preying upon a variety of items including small crustaceans, worms, hydroids, sponges, sea cucumbers, salps, anemones, and jellyfish. In certain areas, the spadefish is an important game fish.

2.2.3.1.4 Haemulidae

Brevard County is designated as EFH for eleven species of grunts (Table 1). Collectively, these grunts inhabit shallow inshore areas (e.g., estuaries, jetties, piers, seagrass beds), rock outcrops, and offshore waters as deep as 110 m. Although most of the life history data concerning grunts (Cummings et al., 1966; Manooch and Barans, 1982; Darcy, 1983; McFarland et al., 1985; Sedberry, 1985) are from studies of tomtate, white grunt, French grunt, blue stripe grunt, and the margate, the general information can probably be applied to the other species as well. As a reef-dwelling species, grunts are probably similar to other roving benthic predators such as snappers and groupers that migrate to select spawning sites along the outer reef and participate in group spawning at dusk. Some data suggests that spawning takes place over much of the year, while other suggests spawning peaks in later winter and spring (Manooch and Barans, 1982; Darcy, 1983). The eggs are pelagic as well as the planktonic larvae. After this pelagic larval stage that may last several weeks, they settle to the bottom as benthic predators (Darcy, 1983). The juveniles are commonly found in seagrass beds, near mangroves, and other inshore, shallow areas. Studies in the Caribbean regarding French grunt, suggested that fertilization and settlement was associated with the lunar cycle (quarter moon, rather than the full or new moon) and daily tidal cycles (rising and falling tides), respectively (McFarland et al., 1985). Juveniles are diurnal planktivores that tend to feed higher in the water column than adults on amphipods, copepods, decapods, and small fishes (Darcy, 1983; Sedberry, 1985). The transformation to adult involves a change in feeding strategy from diurnal planktivore to nocturnal benthic foraging. Most grunts take refuge near the reef in schools, but at dusk they disperse and forage over the reef, along sandy flats, and grass beds for crustaceans, fishes, mollusks, polychaetes, and ophiuroids. Because of these nocturnal foraging migrations, grunts are a major source of food for higher tropic level, piscivorous fishes. In addition, they are very important to hardbottom reef-related fisheries regarding the energy transfer from sandy expanses to these reefs (Darcy, 1983). Several species of grunt such as the tomtate and white grunt have some commercial and recreational importance. Tomtate are commonly caught by sport fishers from shore, bridges, jetties, and inshore waters by boat. In the southeastern United States, the hook and line fishery is the most important method of commercial harvest regarding tomtate (Darcy, 1983). In addition, tomtate are collected using traps, trawls, and seines off southeast Florida. Commercially, tomtate are usually discarded or cut up and used as bait for the grouper or snapper fishery. Similarly, white grunt are commercially harvested by hook and line along the southeast United States and is also a common sport species.

2.2.3.1.5 Labridae

Brevard County is designated as EFH for two species of wrasse (Table 1). The EFH for both species ranges from shallow reef and patch reefs, areas of hard sand and rock, and/or along areas inshore or offshore of the main reef. The puddingwife appears to be depth restricted as it is rare to find this species in waters deeper than 13.3 m, while the hogfish inhabits areas as

shallow as 3.3 m deep (Thresher, 1980). Reproduction in wrasses involves a complex reproductive system based on protogynous hermaphroditism which features a complex socio-sexual system involving sex reversal, alternate spawning systems and variable color patterns (Thresher, 1980). Both species participate in group (the dominant or terminal male with a harem of females) broadcast spawning that occurs along the outer edge of a patch reef or on an extensive reef complex along the outer shelf during the summer months (Thresher, 1984). Hogfish spawn during the late afternoon or early evening hours, while puddingwife spawning is synchronized with strong tidal or shoreline currents. Although the exact duration of both the planktonic egg and larval stage is unknown, some records suggest that the latter may be as short as one month before the larvae settle out. Newly settled hogfish and puddingwifes use common areas around grass flats and the shallow reef, respectively. The smallest juveniles on record collected on reefs is approximately 10 mm SL. Other data suggests that puddingwife as small as 30 mm SL may be sexually active. As a benthic predator, the diet of adult hogfish consists of mollusks, echinoderms, and small crustaceans (primarily crabs). Owing to their large size, hogfish are popular with sport fishers.

2.2.3.1.6 Lutjanidae

Brevard County is designated as EFH for seven species of snapper (Table 1). Collectively, the EFH of these snappers ranges from shallow estuarine areas (e.g., vegetated sand bottom, mangroves, jetties, pilings, bays, channels, mud bottom) to offshore areas (e.g., hard and live bottom, rocky bottom) as deep as 400 m (Allen, 1985; Bortone and Williams, 1986). Like most snappers, these seven species participate in group spawning, which indicates either an offshore migration or a tendency for larger, mature individuals to take residency in deeper, offshore waters. Data suggests that adults tend to remain in one area. Both the eggs and larvae of these snappers are pelagic (Richards et al., 1994). After an unspecified period of time in the water column, the planktivorous larvae move inshore and become demersal juveniles. The diet of these newly settled juveniles consists of benthic crustaceans and fishes. Juveniles inhabit a variety of shallow, estuarine areas including vegetated sand bottom, bays and seagrass beds. As adults, most are common to deeper offshore areas such as live and hardbottoms and rock rubble. However, adult mutton, gray, and lane snapper also inhabit vegetated sand bottoms with gray snapper less frequently occurring in estuaries and mangroves (Bortone and Williams, 1986). The diet of adult snappers includes a variety fishes, shrimps, crabs, gastropods, cephalopods, worms, and plankton. All seven species are of commercial and/or recreational importance In particular, the mutton, gray, lane, and yellowtail snapper comprise the major portion of Florida's snapper fishery (Bortone and Williams, 1986).

2.2.3.1.7 Serranidae

Brevard County is designated as EFH for six species of sea bass (Table 1). Collectively, the EFH of these sea bass ranges from shallow estuarine areas (e.g., seagrass beds, jetties, mangrove swamps) to offshore waters as deep as 300 m (Heemstra and Randall, 1993; Jory and Iverson, 1989; Mercer, 1989). Like all other serranids, these six species are protogynous

hermaphrodites; functioning initially as females only to undergo a sexual transformation at a later time to become functional males. In addition, like all other serrranids, these six species produce offshore planktonic eggs, moving into shallow, inshore water during their post-larval benthic stage. Juveniles inhabit estuarine, shallow areas such as seagrass beds, bays, harbors, jetties, piers, shell bottom, mangrove swamps, and inshore reefs. Juveniles feed on estuarine dependent prey such as invertebrates, primarily crustaceans, that comprise the majority of their diet at this developmental stage. As sub-adults and adults, they migrate further offshore taking refuge along rocky, hard, or live bottom, on artificial reefs, in crevices, ledges, or caverns associated with rocky reefs. During this stage in their lives, the bulk of their diet consists of fishes, supplemented with crustaceans, crabs, shrimps, and cephalopods. Except for the Goliath grouper, the other species discussed in this section have some importance to commercial and/or recreational fisheries.

2.2.3.1.8 Sparidae

Brevard County is designated as EFH for two species of porgy (Table 1). The EFH regarding both species ranges from shallow inshore waters (e.g., vegetated areas, jetties, piers, hard and rock bottoms), to deeper offshore waters with natural or artificial reefs, offshore gas and oil platforms, or live bottom habitat (Darcy, 1986). Although nothing is known regarding the sexuality of the jolthead porgy, it is most likely a hermaphroditic species which is widely documented in sparids (Thresher, 1984). On the other hand, the sheepshead has been determined to be a protogynous hermaphrodite through histological investigations (Render and Wilson, 1992). Information regarding tropical sparids is limited, but in general, it suggests long spawning seasons. Little is known about spawning behavior, but it is presumed that both the sheepshead and the jolthead porgy produce pelagic eggs some distance off the bottom. Whether or not spawning takes place in pairs or in spawning aggregations has not been documented. Settlement of sheepshead larvae to the bottom occurs at about 25 mm TL (Thresher, 1984). Based on their dentition, both species are well suited for benthic feeding of sessile and motile invertebrates (e.g., copepods, amphipods, mysids, shrimp, bivalves, gastropds) which are bitten off from hard substrates and vegetation. Neither sparid is considered a schooling species, although they will form small groups composed of several individuals occasionally. There is no direct commercial or sport fishery associated with either sparid; however, both are fished in coastal waters. Both species are an important constituent of grassbed communities in shallow water and live bottom communities in deeper water (Darcy, 1986).

2.2.3.2 Summary of the Impacts to the Snapper-Grouper Complex Fishes

The project area includes sand bottom and water column that may be used by these managed fishes and their prey. The project would impact a relatively small area of the sand and rock habitat and the impacts would be minor and short-term. Some possible refuge and related prey may be lost in regards to the impact to the riprap and sand areas; however, this refuge would be re-created by the construction of the riprap. The project will cause localized turbidity during

construction; however, turbidity would be minimized using the best management practices so that any impacts would be minor and temporary. These fishes and possible prey would be temporarily displaced, but should quickly return to the project area.

2.2.4 Coastal Migratory Pelagics Complex

Brevard County, Florida is designated as EFH for six species of coastal migratory pelagic fishes that are listed under the Affected Fishery Management Plans and Fish Stocks of the Comprehensive EFH Amendment (SAFMC, 1998). Collectively, these six species, representing three different families, are all members of the Coastal Migratory Pelagics Fish Species as outlined by SAFMC (1998). The association of these fishes or their prey with hardbottom structure, or inshore waters during some period of their life cycle and their contribution to a reef fishery ecosystem is why they are included in this complex. A discussion of how these fishes utilize the different inshore habitats and the hardbottom and reef communities follows.

2.2.4.1 Life History

2.2.4.1.1 Coryphaenidae

The dolphin is oceanic and distributed worldwide in both tropical and subtropical waters. Data suggest that this species may be involved in northward migrations during the spring and summer with some occasional movements and migrations being controlled by drifting objects in open waters. Spawning which is poorly documented, it thought to take place in oceanic waters where pairing of the sexes occurs (Ditty et al., 1994). Based on the occurrence of young dolphin in the Florida Current, spawning may be almost year round (November - July) with peak activity in January through March (Palko et al., 1982). Owing to the oceanic distribution of this species, its not surprising that both the egg and larval stages are pelagic. Upon hatching, this species experiences rapid growth throughout its life with both sexes reaching sexually maturity within the first year (Palko et al., 1982). In the Straits of Florida, female dolphin begin to mature at 350 mm FL and become fully mature at 550 mm FL. On the other hand, the smallest, mature male on record is 427 mm FL. The maximum life span of dolphin is estimated at 4 years. The diet of dolphin alters throughout its life cycle (Palko et al, 1982). As larvae, they feed primarily on crustaceans, with copepods as the primary prey item. Adult dolphin are opportunistic, top-level predators. They feed upon a variety of fishes (e.g., flyingfish) and crustaceans, especially those species commonly associated with drifting flotsam and *Sargassum* in the Florida Current. As a prized food, dolphin are sought by both commercial and sport fishers. They are most commonly taken using hook and line around the edges of the continental shelf. In southern Florida, based on recreational catches, they appear most frequently March through August and then again September through February (Palko et al., 1982).

2.2.4.1.2 Rachycentridae

Cobia are distributed worldwide in tropical, subtropical, and warm temperate waters where they inhabit estuarine and shelf waters depending of their life stage. They appear to associate with structures such as pilings, wrecks and other forms of vertical relief (e.g. oil and gas platforms) and favor the shade from these structures (Mills, 2000). Cobia spawn offshore where external fertilization takes place in large spawning aggregations; however, the pelagic eggs have been collected at both inshore and offshore stations. Based on past collections of gravid females, spawning takes place from mid May, extending through the end of August off South Carolina (Shaffer and Nakamura, 1989). Consequently, spawning may start slightly early off the southeast coast of Florida. Eggs have been collected in the lower Chesapeake Bay inlets, North Carolina estuaries, in coastal waters 20 - 49 m deep, and near the edge of the Florida Current and the Gulf Stream (Ditty and Shaw, 1992). Ditty and Shaw (1992) suggested that cobia spawn during the day since all the embryos they examined were at similar stages of development. Cobia exhibit rapid growth and may attain a length of 2 m FL and are known to live 10 years (Shaffer and Nakamura, 1989). Although females grow faster than males, they attain sexual maturity later in life. Sexual maturity is attained by males at approximately 52 cm FL during the second year and at approximately 70 cm FL for females during their third year (Shaffer and Nakamura, 1989). They are adaptable to their environment and can utilize a variety of habitats and prey. Cobia are voracious predators that forage primarily near the bottom, but on occasion do take some prey near the surface. Their favorite benthic prey are crabs, and to a much less extent other benthic invertebrates and fishes. No predator studies have been conducted, but dolphin fish have been known to feed on small cobia. Adults may be found solitary or in small groups and are known to associate with rays, sharks, and other larger fishes. Cobia is fished both commercially and recreationally; however, the commercial harvest is mostly incidental in both the hook and line and net fisheries. The recreational harvest is primarily through charter boats, party boats and fishers fishing from piers and jetties. Tagging studies have documented a north-south, spring-fall migration along the southeast United States and an inshore-offshore, spring-fall migration off South Carolina (Ditty and Shaw, 1992).

2.2.4.1.3 Scombridae

Brevard County is designated as EFH for six scombrid species (Table 1). Collectively, the EFH of these epipelagic scombrids ranges from clear waters around coral reefs, and inshore and continental shelf waters (Collette and Nauen, 1983). Spawning of king and Spanish mackerel takes place May through September with peaks in July and August. The cero is thought to spawn year round with peaks in April through October, whereas little tunny spawn from April to November. Batch spawning takes place in tropical and subtropical waters, frequently inshore. The eggs are pelagic and hatch into planktonic larvae. Both king and Spanish mackerel are involved in migrations along the western Atlantic coast. With increasing water temperatures, Spanish mackerel move northward from Florida to Rhode Island between late February and July, and back in the fall (Collette and Nauen, 1983). King mackerel have

been reported to migrate along the western Atlantic coast in large schools; however, there appears to be a resident population in south Florida as this species is available to sport fishers year round (Collette and Nauen, 1983). Although the little tunny is epipelagic, it typically inhabits inshore waters in schools of similar size fish and/or with other scombrids (Collette and Nauen, 1983). The diet of these scombrids consists of primarily fishes and to a lesser extent penaeid shrimp and cephalopods. The fishes that make up the bulk of their diet are small schooling clupeids (e.g., menhaden, alewives, thread herring, anchovies), atherinids, and to a lesser extent jack mackerels, snappers, grunts, and half beaks (Collette and Nauen, 1983). The king and Spanish mackerel are important both commercially and recreationally. The king mackerel is a valued sport fish year round in Florida while the sport fisheries for Spanish mackerel in southern Florida is concentrated in the winter months. The cero is a valued sport fish that is taken primarily by trolling. The little tunny is not of commercial or recreational interest.

2.2.5 Summary of Impacts to the Coastal Migratory Pelagics Complex Fishes

The project area includes sand bottom and water column, that may be, but is rarley used by these managed fishes and their prey. Some possible refuge for related prey may be lost in regards to the impact to the rip-rap and sand areas. The project will cause localized turbidity during construction; however, turbidity would be minimized using the best management practices so that any impacts would be minor and temporary. Possible prey may be temporarily displaced, but should quickly return to the project area and there should be no effect on these pelagic species from the project.

2.3 Associated Species

Associated species consists of living resources that occur in conjunction with the managed species discussed earlier. These living resources would include the primary prey species and other fauna that occupy similar habitats.

2.3.1 Invertebrates

Dredging and removal and replacement of rock associated with widening and deepening would result in direct adverse effects on invertebrate species in the area. Initially this will result in a significant, but localized reduction in the abundance, diversity, and biomass of the immediate fauna. Species affected most are those that have limited capabilities or are incapable in avoiding the dredging activities. The fauna most affected would include predominantly invertebrates such as crustaceans, echinoderms, mollusks, and annelids. However, due to the relatively small area that will be impacted as viewed on a spatial scale, impacts to the benthic community will be minimal due to the relatively short period of recovery regarding infaunal communities following dredging activities (Culter and Mahadevan, 1982; Saloman et al.,

1982). Adjacent areas not impacted would most likely be the primary source of recruitment to the impacted area.

Zooplankton are primarily filter feeders and suspended inorganic particles can foul the fine structures associated with the feeding appendages. Zooplankton that feed by ciliary action (e.g., echinoderm larvae) would also be susceptible to mechanical affects of suspended particles (Sullivan and Hancock, 1977). Zooplankton mortality is assumed from the physical trauma associated with dredging activities (Reine and Clark, 1998). The overall impact on the zooplankton community should be minimal due to the limited extent and transient nature of the sediment plume.

2.3.2 Fishes

The larvae of the managed fish species discussed in this document are hatched from planktonic eggs (excluding the gray triggerfish) and the larvae are also planktonic. The primary source of larval food is microzooplankton with a dietary overlap in many species and specialization (Sale, 1991). Algae is most likely food for only the youngest larval stages of certain species or for those larvae that are very small after hatching, and then only for a short time. The algae-eating larvae eventually switch to animal food while they are still small. At this time, varying life history stages of copepods become the dominant food and to a lesser extent cladocerans, tunicate and gastropod larvae, isopods, amphipods, and other crustacea.

Larval feeding efficiency depends on many factors such as light intensity, temperature, prey evasiveness, food density, larva experience, and olfaction to mention a few (Gerking, 1994). Larval fishes are visual feeders that depend on adequate light levels in the water column which reduces the reaction distance between larval fish and prey. Suspended sediment and dispersion due to dredging activities will increase turbidity levels in the project area temporarily. This will reduce light levels within the water column which may have a short term negative effect regarding feeding efficiency. In addition, turbidity can affect light scattering which will impede fish predation (Benfield and Minello, 1996). However, because the sediment plumes are transient and temporary, and the area to be impacted is relatively small when examined on a spatial scale, the overall impact to the larval fish population and consequently, the adult population should be minimal (Sale, 1991). The majority of larval fish mortality will be attributed to the physical trauma associated with the dredging activities.

Similar to larval fishes, both juvenile and adult fishes are primarily visual feeders. Consequently, the visual effects of turbidity as outlined above will apply. Also, suspended sediment can impair feeding ability by clogging the interraker space of the gill raker or the mucous layer of filter feeding species (Gerking, 1994). However, because these fishes have the ability to migrate away from the dredging activities, the impact of the sediment plumes which are transient and temporary should be minimal. Although few adult fishes have been entrained by dredging operations (McGraw and Armstrong, 1988; Reine and Clark, 1998), most juvenile and adult fishes again have the ability to migrate away from the dredging activities. Consequently, dredging operations would have minimal effects on juvenile and adult fishes in

the area. In addition, the reduction of benthic epifaunal and infaunal prey, and pelagic prey in the immediate area would have little affect on juvenile and adult fishes because they can migrate to adjacent areas that have not been impacted to feed.

In addition to the managed fish species discussed in this document, many other inshore and pelagic fishes in various stages of life occur in the project area (Gilmore, 1977; Vare, 1991; Lindeman and Snyder, 1999). A total of 192 species have been recorded in association with nearshore hardbottom habitats in southeast Florida (Lindeman and Snyder, 1999). In the study conducted by Lindeman and Snyder (1999), 80% of the fishes collected at all sites were early life stages. In addition, eight of the top ten fish species were consistently represented by early life stages, and the use of hardbottom habitats was recorded for newly settled stages of more than 20 species of fishes. This provided evidence that suggested that these nearshore hardbottom habitats along the mainland coast of east Florida may serve as nursery grounds for a wide diversity of juvenile reef fishes. Lindeman and Snyder (1999) estimated that 34 species of fishes used nearshore hardbottom habitats as a nursery. These nearshore hardbottom habitats may actually serve several nursery-related roles such as, 1) a centrally located refuge for incoming early life stages that would exhibit considerably greater mortality if shelter were not available, 2) habitat for juvenile fishes (e.g., gray snapper, blue stripe grunt) that emigrate out of inlets to offshore waters, and 3) an area to promote growth because of the greater availability of prey at these hardbottom habitats.

2.3.3 Summary of Impacts to Associated Species

Many of the fishes associated with nearshore hardbottom habitats as observed in past studies (Gilmore, 1977; Vare, 1991; Lindeman and Snyder, 1999), would be common along Brevard County. The majority of juvenile and adult fishes would be displaced to adjacent habitat during dredging operations, consequently, mortality of these fishes should be minimal. Only those species that produce demersal eggs and that comprise the demersal ichthyofauna could potentially be impacted more heavily than their pelagic counterparts. Mortality of demersal eggs and larvae would be expected from the physical trauma associated with dredging operations and riprap placment. Suspended sediments produced by these operations can affect the feeding activity of pelagics as outlined earlier; however, the impact to these fishes should be minimal due to the limited extent and transient nature of the sediment plume.

3.0 CONCLUSIONS

The proposed Project will impact unvegetated sand bottom, water column, and manmade hardbottom riprap. Significant adverse impacts to those species associated with EFH within the Project area are not expected.

4.0 REFERENCES

Allen, G.R. 1985. FAO species catalogue. Vol. 6. Snappers of the world. An annotated and illustrated catalogue of lutjanid species known to date. No. 125, Vol. 6. 208 pp.

Benfield, M.C. and T.J. Minello. 1996. Relative effects of turbidity and light intensity on reaction distance and feeding of an estuarine fish. Environmental Biology of Fishes 46:211-216.

Berry, F.H. 1959. Young jack crevalles (*Caranx* species) off the southeastern Atlantic coast of the United States. Fishery Bulletin 152(59):417-535.

Bielsa, L.M., W.H. Murdich, and R.F. Labisky. 1983. Species profile: life histories and environmental requirements of coastal fishes and invertebrates (south Florida) -- Pink shrimp. U.S. Fish and Wildlife Service. FWS/OBS-82/11.17. U.S. Army Corps of Engineers, TR EL-82-4. 21 pp.

Bortone, S.A. and J.L. Williams. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (south Florida) -- gray, lane, mutton, and yellowtail snappers. U.S. Fish and Wildlife Service Biological Report 82(11.52). U.S. Army Corps of Engineers, TR EL-82-4. 18 pp.

Chapman, R.W. 1978. Observations of spawning behavior in Atlantic spadefish, *Chaetodipterus faber*. Copeia 1978:336.

Collette, B.B. and C.E. Nauen. 1983. FAO species catalogue. Vol. 2. Scombrids of the world. An annotated and illustrated catalogue of tunas, mackerels, bonitos and related species known to date. No. 125, Vol. 2. 137 pp.

Culter, J.K. and S. Mahadevan. 1982. Long-term effects of beach nourishment on the benthic fauna of Panama City Beach, Florida. U.S. Army Corps of Engineers Coastal Engineering Research Center Miscellaneous Report No. 82-2. 57 pp.

Cummings, W.C., B.D. Brahy, and J.Y. Spires. 1966. Sound production, schooling, and feeding habits of the margate, *Haemulon album*, off north Bimini, Bahamas. Bulletin of Marine Science 16(3):626-640.

Darcy, G.H. 1983. Synopsis of biological data on the grunts *Haemulon aurolineatum* and *H. plumieri* (Pisces: Haemulidae). NOAA Technical Report NMFS Circular 448, 39 pp.

Darcy, G.H. 1986. Synopsis of biological data on the porgies, *Calamus arctifrons* and *C. proridens* (Pisces: Sparidae). NOAA Technical Report NMFS Circular 44, 19 pp.

Ditty, J.G., C.B. Grimes, and J.S. Cope. 1994. Larval development, distribution, and abundance of common dolphin, *Coryphaena hippurus*, and pompano dolphin, *C. equiselis* (Family: Coryphaenidae), in the northern Gulf of Mexico. Fishery Bulletin 92:275-291.

Ditty, J.G. and R.F. Shaw. 1992. Larval development, distribution, and ecology of cobia *Rachycentron canadum* (Family: Rachycentridae) in the northern Gulf of Mexico. Fishery Bulletin 90:668-677.

Frazer, T.K., W.J. Lindberg, and G.R. Stanton. 1991. Predation on sand dollars by gray triggerfish, *Balistes capriscus*, in the northeastern Gulf of Mexico. Bulletin of Marine Science 48(1):159-164.

Gerking, S.D. 1994. Feeding Ecology of Fish. Academic Press, San Diego, CA. 416 pp.

Gilmore, R.G., Jr. 1977. Fishes of the Indian River Lagoon and adjacent waters, Florida. Bulletin of the Florida State Museum of Biological Sciences 22(3):147 pp.

Goodwin, J.M. and J.H. Finucane. 1985. Reproductive biology of blue runner (*Caranx crysos*) from the eastern Gulf of Mexico. Northeast Gulf Science 7(2):139-146.

Goodwin, J.M. and A.G. Johnson. 1986. Age, growth, and mortality of blue runner, *Caranx crysos* from the northern Gulf of Mexico. Northeast Gulf Science 8(2):107-114.

Hackney, C.T., M.H. Posey, S.W. Ross, and A.R. Norris. 1996. A review and synthesis of data on surf zone fishes and invertebrates in the South Atlantic Bight and the potential impacts from beach renourishment. Report to the U.S. Army Corps of Engineers, Wilmington, North Carolina. 111 pp.

Heemstra, P.C. and J.E. Randall. 1993. FAO species catalogue. Vol. 16. Groupers of the world (Family Serranidae, Subfamily Epinephelinae). An annotated and illustrated catalogue of the grouper, rockcod, hind, coral grouper and lyretail species known to date. No. 125, Vol. 16. 382 pp.

Howe, J.C., R.K. Wallace, and F.S. Rikard. 1999. Habitat utilization by postlarval juvenile penaeid shrimps in Mobile Bay, Alabama. Estuaries 22(4):971-979.

Howe, J.C. and R.K. Wallace. 2000. Relative abundance of postlarval and juvenile penaeid shrimps in submerged aquatic vegetation and emergent marsh habitats. Gulf of Mexico Science 2:130-137.

Johnson, A.G. and C.H. Saloman. 1984. Age, growth, and mortality of gray triggerfish, *Balistes capriscus*, from the northeastern Gulf of Mexico. Fishery Bulletin 82(3):485-492.

Jory, D.E. and E.S. Iverson. 1989. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (South Florida) -- black, red, and Nassau groupers. U.S. Fish and Wildlife Service Biological Report 82(11.110). U.S. Army Corps of Engineers, TR EL-82-4. 21 pp.

Lassuy, D.R. 1983. Species profiles: life histories and environmental requirements (Gulf of Mexico) -- brown shrimp. U.S. Fish and Wildlife Service, Division of Biological Services. FWS/OBS-82/11.1. U.S. Army Corps of Engineers, TR EL-82-4. 15 pp.

Lindeman, K.C. and D.B. Snyder. 1999. Nearshore hardbottom fishes of southeast Florida and effects of habitat burial caused by dredging. Fisheries Bulletin 97(3):508-525.

Manooch, C.S. and C.A. Barans. 1982. Distribution, abundance, and age and growth of the tomtate, *Haemulon aurolineatum*, along the southeastern United States coast. Fishery Bulletin 80(1):1-19.

Manooch, C.S. and M. Haimovici. 1983. Foods of greater amberjack, *Seriola dumerili*, and almaco jack, *Seriola rivoliana* (Pisces: Carangidae), from the south Atlantic Bight. The Journal of the Elisha Mitchell Scientific Society 99(1):1-9.

Manooch, C.S. and J.C. Potts. 1997a. Age, growth, and mortality of greater amberjack from the southeastern United States. Fisheries Research 30:229-240.

Manooch, C.S. and J.C. Potts. 1997b. Age, growth, and mortality of greater amberjack, *Seriola dumerili*, from the U.S. Gulf of Mexico headboat fishery. Bulletin of Marine Science 61(3):671-683.

Marx, J.M. and W.F. Herrnkind. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (south Florida) -- spiny lobster. U.S. Fish and Wildlife Service Biological Report 82(11.61). U.S. Army Corps of Engineers, TR EL-82-4. 21 pp.

McFarland, W.N., E.B. Brothers, J.C. Ogden, M.J. Shulman, E.L. Bermingham, and N.M. Kotchian-Prentiss. 1985. Recruitment patterns in young French grunts, *Haemulon flavolineatum* (Family Haemulidae), at St. Croix, Virgin Islands. Fishery Bulletin 83(3):413-426.

McGraw, K.A. and D.A. Armstrong. 1988. Fish Entrainment by Dredges in Grays Harbor, Washington. pp. 113-131. *In*: C.A. Simenstad (ed.). Effects of Dredging on Anadromous Pacific Coast Fishes. Workshop Proceedings, University of Washington Sea Grant, FL.

Mercer, L.P. 1989. Species profile: life histories and environmental requirements of coastal fishes and invertebrates (South Atlantic) -- black sea bass. U.S. Fish and Wildlife Service Biological Report 82(11.99). U.S. Army Corps of Engineers, TR EL-82-4. 16 pp.

Mills, S. 2000. A cobia by any other name. Virginia Marine Resource Bulletin 32(1):2-10.

Muncy, R.J. 1984. Species profile: life histories and environmental requirements of coastal fishes and invertebrates (South Atlantic) -- white shrimp. U.S. Fish and Wildlife Service. FWS/OBS-82/11.27. U.S. Army Corps of Engineers, TR EL-82-4. 19 pp.

Palko, B.J., G.L. Beardsley, and W.J. Richards. 1982. Synopsis of the biological data on dolphin-fishes, *Coryphaena hippurus* Linnaeus and *Corphaena equiselis* Linnaeus. NOAA Technical Report NMFS Circular 443, 28 pp.

Pérez-Farfante, I. 1969. Western Atlantic shrimps of the genus *Penaeus*. Fishery Bulletin 67(3):461-591.

Reine, K.J. and D.G. Clark. 1998. Entrainment by Hydraulic Dredges - A Review of Potential Impacts. U.S. Army Engineer Waterways Experiment Station, Reseach And Development Center, Vicksburg, MS, DOER Tech Notes Collection (TN DOER-E1).

Render, J.H. and C.A. Wilson. 1992. Sexuality of the sheepshead *Archosargus probatocephalus* (Teleostei: Sparidae) from the northern Gulf of Mexico. Copeia 1992:917-919.

Richards, W.J., K.C. Lindeman, J.L. Shultz, J.M. Leis, A. Ropke, M.E. Clarke, and B.H. Comyns. 1994. Preliminary guide to the identification of the early life history stages of lutjanid fishes of the western central Atlantic. NOAA Technical Memorandum NMFS-SEFSC-345, 49 pp.

Sale, P.F. 1991. The Ecology of Fishes on Coral Reefs. Academic Press, Inc., San Diego, CA. 754 pp.

Saloman, C.H., S.P. Naughton, and J.L. Taylor. 1982. Benthic community response to dredging borrow pits, Panama City Beach, Florida. U.S. Army Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, VA, Miscellaneous Report No. 82-3. 138 pp.

Sedberry, G.R. 1985. Food and feeding of the tomtate, *Haemulon aurolineatum* (Pisces, Haemulidae), in the south Atlantic Bight. Fishery Bulletin 83(3):461-466.

Shaffer, R.V. and E.L. Nakamura. 1989. Synopsis of biological data on the cobia *Rachycentron canadum* (Pisces: Rachycentridae). NOAA Technical Report NMFS Circular 82, 21 pp.

Shaw, R.F. and D.L. Drullinger. 1990. Early-life history profiles, seasonal abundance, and distribution of four species of carangid larvae off Louisiana, 1982 and 1983. NOAA Technical Report NMFS Circular 89, 37 pp.

South Atlantic Fishery Management Council (SAFMC). 1998. Final Habitat Plan for the South Atlantic Region: Essential Fish Habitat Requirements for Fishery Management Plans of the South Atlantic Fishery Management Council: The Shrimp Fishery Management Plan, The Red Drum Fishery Management Plan, The Snapper Grouper Fishery Management Plan, The Coastal Migratory Pelagics Fishery Management Plan, The Golden Crab Fishery Management Plan, The Spiny Lobster Fishery Management Plan, The Coral, Coral Reefs, and Live/Hard Bottom Habitat Fishery Management Plan, The Sargassum Habitat Fishery Management Plan, and the Calico Scallop Fishery Management Plan. SAFMC. Charleston, SC, 457 pp.

Sullivan, B.K. and D. Hancock. 1977. Zooplankton and dredging: Research perspectives from a critical review. Water Research Bulletin 13(3):461-468.

Thresher, R.E. 1980. Reef Fish: Behavior and Ecology on the Reef and in the Aquarium. The Palmetto Publishing Company, St. Petersburg, FL. 171 pp.

Thresher, R.E. 1984. Reproduction in Reef Fishes. T.F.H. Publications, Inc., Neptune City, NJ. 399 pp.

U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. 2001. Site Management and Monitoring Plan, Canaveral Ocean Dredged Material Disposal Site. Atlanta, GA and Jacksonville, FL. 26pp.

Vare, C.N. 1991. A survey, analysis, and evaluation of the nearshore reefs situated off Palm Beach County, Florida. M.S. Thesis, Florida Atlantic University, Boca Raton, FL. 165 pp.

Vose, F.E. and W.G. Nelson. 1994. Gray triggerfish (*Balistes capriscus* Gmelin) feeding from artificial and natural substrate in shallow Atlantic waters of Florida. Bulletin of Marine Science 55(2-3):1316-1223.

Walker, S.D. 1991. Reproducing the Atlantic spadefish at the Tulsa Zoo. Seascope 8:1-3.

Williams, A.B. 1955. A contribution to the life histories of commercial shrimps (Penaeidae) in North Carolina. Bulletin of Marine Science of the Gulf and Caribbean 5:116-146.

Section 7 Consultation Documents

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF
Planning Division
Environmental Branch

OCT 22 2007

Mr. David Hankla
U.S. Fish and Wildlife Service
6620 Southpoint Drive, Suite 310
Jacksonville, Florida 32216-0912

Dear Mr. Hankla:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, would like to initiate consultation with your office on the Port Canaveral Improvements Section 203 Feasibility Study. The study is being conducted by the Canaveral Port Authority under authority granted by Section 203 of the Water Resources Development Act of 1986.

In summary, the proposed alternative navigation improvements at Port Canaveral include making no further improvements to the project (no action alternative); deepening ocean access and interior channels to accommodate larger vessels; deepening the turning circles in the west and middle turning basins to accommodate larger vessels; increasing the diameter of the west turning basin to accommodate new larger cruise ships; deepening the widener to accommodate larger cruise ships; and widening interior channels to accommodate larger cruise ships. Dredged material would be taken to the designated Ocean Dredged Material Disposal Site.

The West Indian manatee is known to occur in the vicinity of Port Canaveral. Therefore, the standard manatee protection measures would be implemented for the duration of the project. Widening of the channel would require the modification of an upland area immediately adjacent to the channel, and while unlikely, the eastern indigo snake may be present. An indigo snake protection and education plan would be implemented as a precautionary measure. Based on this information, the Corps has determined that the proposed work may affect but is not likely to adversely affect the manatee or the indigo snake. Please find attached a biological assessment which provides more detailed information on the project. We request your concurrence in this matter pursuant to Section 7 of the Endangered Species Act.

If you require additional information, please contact Mr. Paul Stodola at (904)-232-3271.

Sincerely,

Marie G. Burns
Acting Chief, Planning Division

Enclosure

Copy Furnished:
Mr. Lee Swain, Dial Cordy and Associates Inc., 490 Osceola Avenue, Jacksonville Beach, FLorida 32250

BIOLOGICAL ASSESSMENT
PORT CANAVERAL
NAVIGATION IMPROVEMENTS PROJECT
BREVARD COUNTY, FLORIDA

Submitted to the

U.S. FISH AND WILDLIFE SERVICE

September 2007

(Revised December 2007)

Prepared for:
Canaveral Port Authority
200 George J. King Boulevard
Cape Canaveral, Florida 32920

Prepared by:
Dial Cordy and Associates Inc.
490 Osceola Avenue
Jacksonville Beach, FL 32250

TABLE OF CONTENTS

Page

1.0 DESCRIPTION OF THE PROPOSED ACTION 1

2.0 ACTION AREA 3

3.0 PROTECTED SPECIES INCLUDED IN THIS ASSESSMENT 9

3.1 West Indian Manatee 10

3.2 Eastern Indigo Snake 13

4.0 EFFECT DETERMINATION 13

5.0 LITERATURE CITED 14

Appendix A Standard Manatee Protection Measures

LIST OF FIGURES

Page

Figure 1 Location Map 4

Figure 2 Study Area 5

Figure 3 Project Footprint - West 6

Figure 4 Project Footprint - East 7

Figure 5 Dredged Material Disposal Areas 8

LIST OF TABLES

Table 1 Protective Status of Listed Wildlife Species That May Occur Within the Port Canaveral Expansion Study Area, Brevard County, Florida. 9

Table 2 Canaveral Lock Manatee Sightings, 1997-2006 12

1.0 DESCRIPTION OF THE PROPOSED ACTION

The Canaveral Port Authority (CPA) is currently conducting a feasibility study of potential navigation improvements under the authority granted under Section 203 of the Water Resources Development Act (WRDA), 1986. The study is in response to problems and issues identified by the CPA and Canaveral Pilots Association with regard to ship maneuvering and delays caused by within the existing federal project. The three major problems at Port Canaveral are:

1. Congestion at cargo berths reduces the effectiveness and efficiency of cargo vessels and landside facilities. Given the rapid growth in commodity movements at Port Canaveral, in the very near future a significant proportion of cargo vessels calling at Port Canaveral will have to wait offshore for a berth to become available. Some of these vessels may divert to an alternative port and incur increased transportation costs, if channels are not improved. In addition, landside facilities will stand temporarily idle as vessels wait offshore for an available berth or safe passage through the Federal channel.

2. The size of cargo vessels calling at Port Canaveral is constrained by existing channel dimensions and configurations. Larger, more efficient vessels could be used for bulk items such as petroleum products, aggregates and cement if channels were improved.

3. The size of cruise ships calling at Port Canaveral is constrained by channel and turning basin dimensions. Increasingly larger cruise ships are calling at Port Canaveral and are beginning to exceed the dimensions for safe use of the existing west turning basin. Passage of large cruise ships through the narrow ship channel leading to the turning basin and cruise ship piers also causes surges at cargo piers that line the channel, which results in cargo vessels having to stop loading and unloading activities while the cruise ships pass. The potential for future cruise ship terminal expansion also cannot be fully exploited under existing channel and turning basin dimensions and configurations.

The primary objective of the Section 203 Study was to identify and evaluate alternatives that would:

1. Reduce future congestion at Port Canaveral;
2. Accommodate anticipated future growth in number and size of vessel transiting the Port;
3. Improve the efficiency of operations for cargo vessels and cruise ships within the Port complex;
4. Allow for use of the Port by larger, more efficient, cargo vessels and cruise ships;
5. Allow for development of additional terminals/berths without encroaching on the West Turning Basin.

Three alternatives will be evaluated during the NEPA process and include a no action alternative, one alternative that includes operational changes only, and one structural alternative that is the project Recommended Plan.

The Recommended Plan can generally be described as widening and deepening the Port Canaveral ocean channel, the interior harbor channel and the West Turning Basin. The design depth of the project is -41 MLW. More specifically, proceeding east to west, the project can be broken down into five components as follows:

- Ocean Channel Widening
- North Side Inner Reach Widening
- South Side West Access Channel Widening
- Existing West Access Channel Deepening
- West Turning Basin Expansion (Corner Cut-Off) and Deepening

Ocean Channel Widening. The ocean channel widening is approximately 8,350 feet long and is located entirely on the south side of the channel centered on the bend before entering the harbor. This portion is essentially a widening of the interior angle of the bend. The widening is variable in width to a maximum of 350 feet wide and tapers on both ends. The dredging area is approximately 34 acres. The existing grade is approximately -30 MLW. Dredging to -41 MLW results in approximately 600,000 cy of dredging.

North Side Inner Reach Widening. The north side inner reach widening is an approximate 6,700 feet long strip along the north side of the harbor channel between the Trident Turning Basin and the Middle Turning Basin. This portion of the project basically effects a widening of the channel from 400 feet to 500 feet along a natural, rock revetment shoreline. The dredging area is approximately 110 feet wide with tapered ends. The dredging area is approximately 16 acres. The existing grade slopes from Elevation -40 MLW to +10 MLW. Dredging this strip to -41 MLW results in a dredging volume of approximately 620,000 cy.

South Side West Access Channel Widening. The south side west access channel widening is approximately 4,620 feet long and lies along the south side of the harbor channel along the predominantly commercial and retail business portion of the port. This area is presently the east end of the Barge Canal and is not included in the Corps of Engineers or Canaveral Port Authority dredging programs. The area appears as a "notch" in the harbor channel and the proposed project will widen the channel from 400 feet to 500 feet through to the WTB. The area is two end-to-end rectangular areas 90 feet and 175 feet wide each, summing to approximately 13 acres. The area slopes from an average low elevation of -16 MLW to an average high elevation of -34 MLW. Dredging the area to Elevation -41 results in approximately 190,000 cy of dredging.

Existing West Access Channel Deepening. The existing west access channel deepening is at the west end of the channel and the limit for cruise and cargo shipping. The area is approximately 2,810 feet long and 400 feet wide (the current channel width) and approximately 26 acres in size. This area is maintained by the Canaveral Port Authority to Elevation -35 MLW. Dredging to the -41 MLW elevation results in a dredging volume of approximately 250,000 cy.

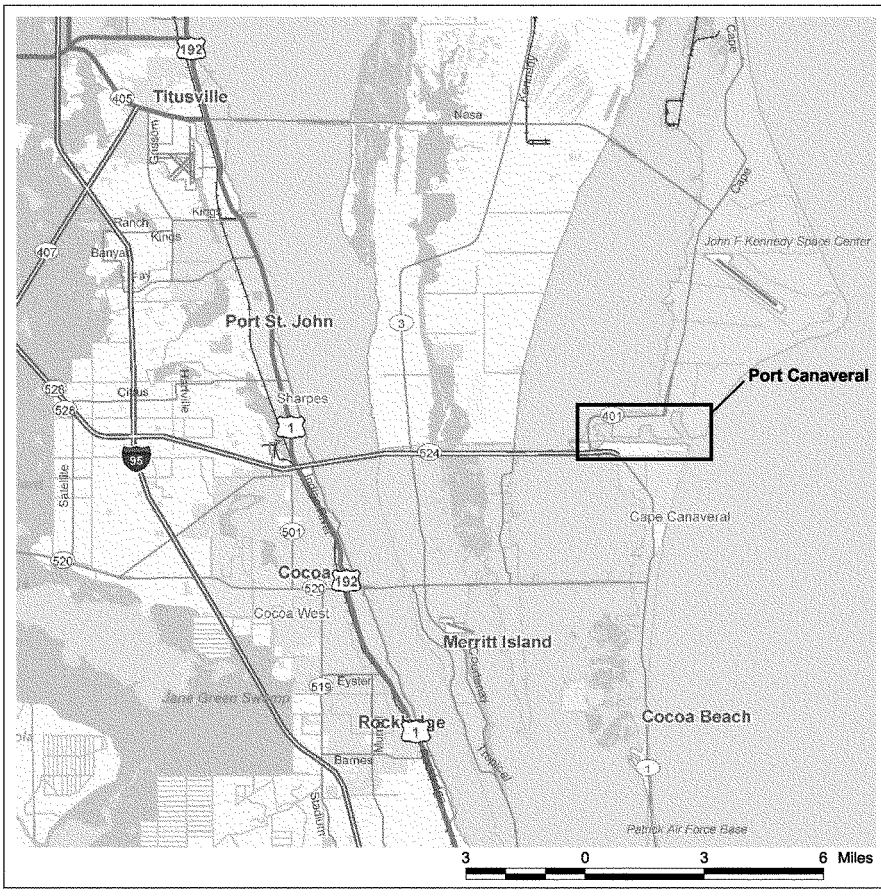
West Turning Basin Expansion (Corner Cut-Off) and Deepening. The west turning basin expansion (corner cut-off) and deepening encompasses the entire basin in two parts defined by required depth. The lower (southerly) approximate one-half of the basin is proposed to be maintained at -41 MLW to accommodate cargo vessels. This area is approximately 52 acres. Approximately 7 acres of this area is not submerged land. The basin is expanded to the east by superimposing a 1,750-foot turning diameter across the entrance of the WTB, which is required for new, larger cruise ships proposed to utilize the WTB. The expansion is into an undeveloped upland area with a natural shoreline. Dredging this area from -35 MLW to -41 MLW, including cutting into the uplands, results in a volume of approximately 1,090,000 cy. Approximately 510,000 cy of this amount is dredging (excavation) of the upland area.

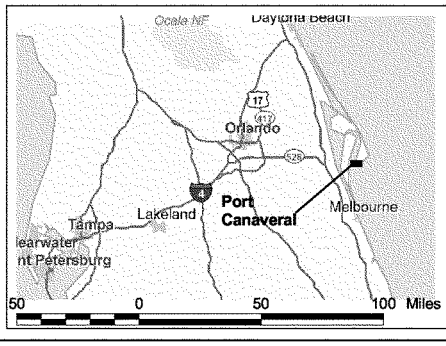
The remaining northerly part of the WTB is approximately 57 acres in size with borders defined as 100 feet offset from any berthing pier and 200 feet offset from a industry and does not require greater than a -35 MLW elevation at this time. The Canaveral Port Authority currently maintains this area at Elevation -35 MLW. This area does not represent new project dredging and is simply proposed to shift to federal maintenance at the same -35 MLW elevation.

Dredging associated with deepening and widening of the channel will likely be performed by clamshell dredge. All dredged material will be placed in the authorized Canaveral Offshore Dredged Material Disposal Site (ODMDS) and is centered 4.5 miles offshore of Cocoa Beach or three authorized upland disposal sites located just north of the project area. If any beach quality sand is identified during the dredging process, it may be placed in the authorized nearshore disposal area. Since 1974, approximately 22.6 million cy of dredged material from the entrance channel and various basins within the harbor has been disposed in the ODMDS (USEPA and USACE 2001).

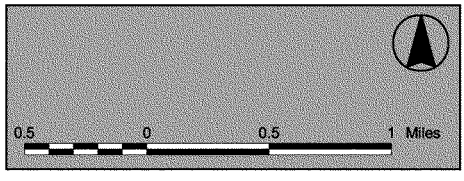
2.0 ACTION AREA

Port Canaveral is located in Brevard County on the east coast of Florida, just north of Cape Canaveral and approximately nine miles north of Cocoa Beach (Figure 1). The main port is orientated in an east–west direction, extending from the Atlantic coast to the Banana River. The port is bounded to the north by the Cape Canaveral Air Force Station (CCAFS) and the Banana River, and bounded to the south by the City of Cape Canaveral. The harbor consists of three turning basins (Figure 2). Starting from the east they are: the Trident Turning Basin (TTB), the Middle Turning Basin (MTB), and the West Turning Basin (WTB). The basins are connected by a channel (East Access Channel and West Access Channel) that forms the south boundary of each basin. Within this channel, a Federally maintained Barge Canal extends from the south side of the MTB, through the Banana River, across Merritt Island, and connects with the Intracoastal Waterway (ICWW) system in the Indian River. Where the Barge Canal enters the Banana River, a 600-foot long Corps of Engineers' lock (Canaveral Lock) separates the tidal harbor from the almost non-tidal river. The project footprint is displayed in Figures 3 and 4. The ODMDS, upland, and nearshore dredged material disposal areas are shown in Figure 5.





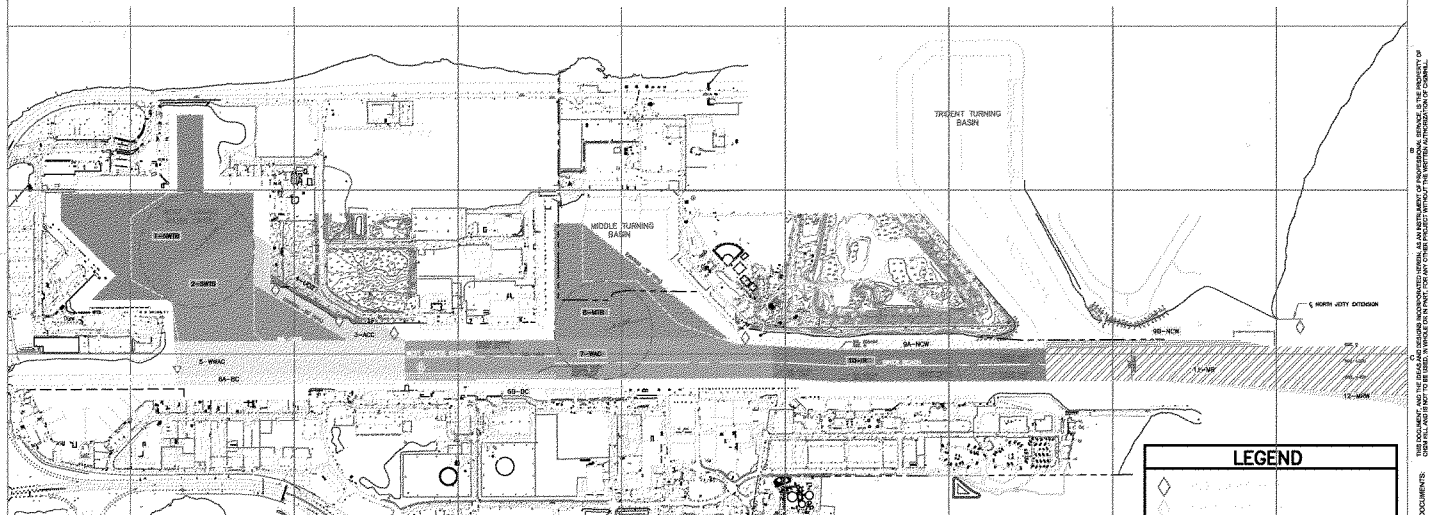
Location Map	
Port Canaveral Biological Assessment	
Scale: 1 inch = 3 miles	Drawn By: MR
Date: September 2007	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 1



Study Area	
Port Canaveral Biological Assessment	
Scale: 1 inch = 0.5 mile	Drawn By: MR
Date: September 2007	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 2

LEGEND

- 1–NWTB MAINTAINED (M) = −35' MLLW, INCR. = 0
- 2–SWTB MAINTAINED (M) = −35' MLLW, INCR. −35' TO −43'
- 3–ACC MAINTAINED (M) = N/A, INCR. −13'/−35' TO −43' (1st INCR. −13'/−35' TO −35')
- 4–UCC MAINTAINED (M) = +10.5' MLLW, INCR. +10.5' TO −43' (1st INCR. +10.5' TO −13') (2nd INCR. −13' TO −35')
- 5–WWAC MAINTAINED (M) = −35' MLLW, INCR. −35 TO −43'
- 6A–BC MAINTAINED (M) = N/A, INCR. ACTUAL TO −35', −35' TO −43'
- 6B–BC MAINTAINED (M) = N/A, INCR. ACTUAL TO −35', −35' TO −44'
- 7–WAC MAINTAINED (M) = −39' MLLW, INCR. −39' TO −44'
- 8–MTB MAINTAINED (M) = −39' MLLW, INCR. −39' TO −44'
- 9A–NCW MAINTAINED (M) = N/A, INCR. ? TO −44', (1st INCR. ? TO −40')
- 9B–NCW MAINTAINED (M) = N/A, INCR. ? TO −48', (1st INCR. ? TO −40')
- 10–IR MAINTAINED (M) = −40' MLLW, INCR. −40' TO −44'
- 11–MR MAINTAINED (M) = −44' MLLW, INCR. −44' TO −46' (EXTENDS EAST TO STA. 53+00)
- 12–MRW MAINTAINED (M) = N/A (APPROX. −30' COE SURVEY) INCR. ?(−30') TO −46', (1st INCR. ?(−30') TO −44')
- 13–OR MAINTAINED (M) = −44' MLLW, INCR. −44' TO −48'



LEGEND

NOTES:

1. FLORIDA STATE PLANE COORDINATE GRID SHOWN, EAST ZONE, BASED ON NORTH AMERICAN DATUM 1983 (NAD83).
2. STATIONS AND RANGES REFER TO THE CANAVERAL HARBOR GRID SYSTEM.
3. TOPOGRAPHIC VERTICAL CONTROL IS BASED ON FEET, FORT CANAVERAL, NEAR LOW WATER (NLW) HYDROGRAPHIC VERTICAL CONTROL IS BASED ON FEET, NEAR LOWER LOW WATER (NLLW).
4. MORGAN AND EKLUND, INC. COMPILED HYDROGRAPHIC AND TOPOGRAPHIC DATA FROM VARIOUS SOURCES INCLUDING THE U.S.A.C.E., CPA COMMISSIONED SURVEYS, AND MORGAN AND EKLUND, INC. SURVEYS.
5. TOPO SURVEY SHOWN ON THE UPLANDS EAST OF WEST TURNING BASIN AND EAST OF THE MIDDLE TURNING BASIN IS OBTAINED FROM THE 2000 AERIAL TOPOGRAPHY COMMISSIONED BY CPA.
6. TOPO SURVEY SHOWN ALONG THE ROCK EMBANKMENT ON BOTH SIDES OF THE TRIDENT BASIN IS FROM THE SURVEY FOR CHANNEL IMPROVEMENTS BY ALLEN ENGINEERING, INC. DATED MARCH 4, 2003.

DREDGING INCREMENTS PLAN AREAS

PRELIMINARY

NOT FOR CONSTRUCTION

DSGN				
DR				
CHK				
APVD	NO.	DATE	REVISION	BY APVD

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

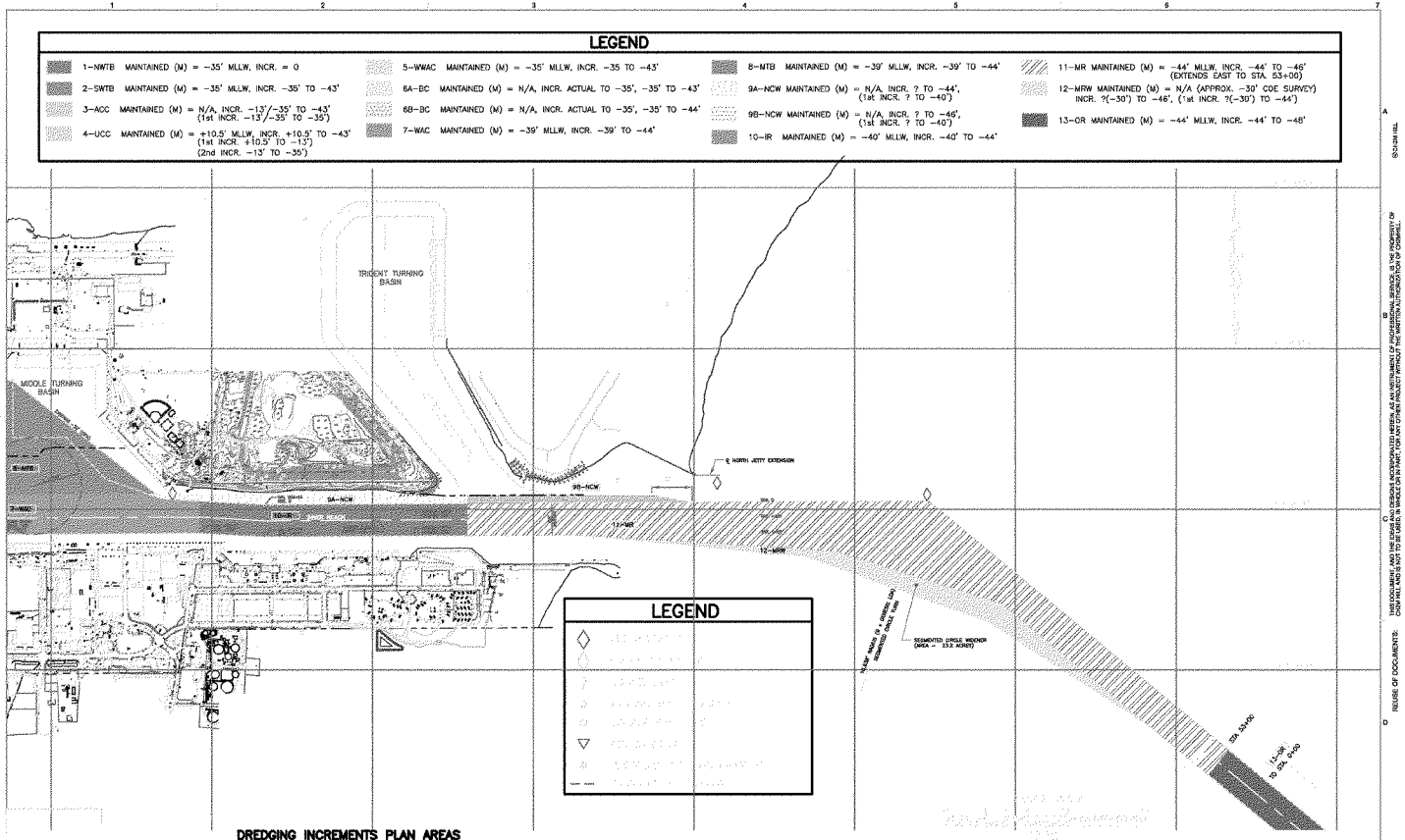
CH2MHILL
445 CHALLENGER RD., SUITE 130
CAPE CANAVERAL, FLORIDA 32920
LB 0002934 AA C000688

Proposed Report Supplied
Port Canaveral Biological Assessment
Report

DATE
PROJ

REUSE OF DOCUMENTS: THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF CH2M HILL AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF CH2M HILL.

©CH2M HILL



DREDGING INCREMENTS PLAN AREAS

PRELIMINARY

NOT FOR CONSTRUCTION

DRGN
DR
CHK
APVD

NO. DATE REVISION BY APVD

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

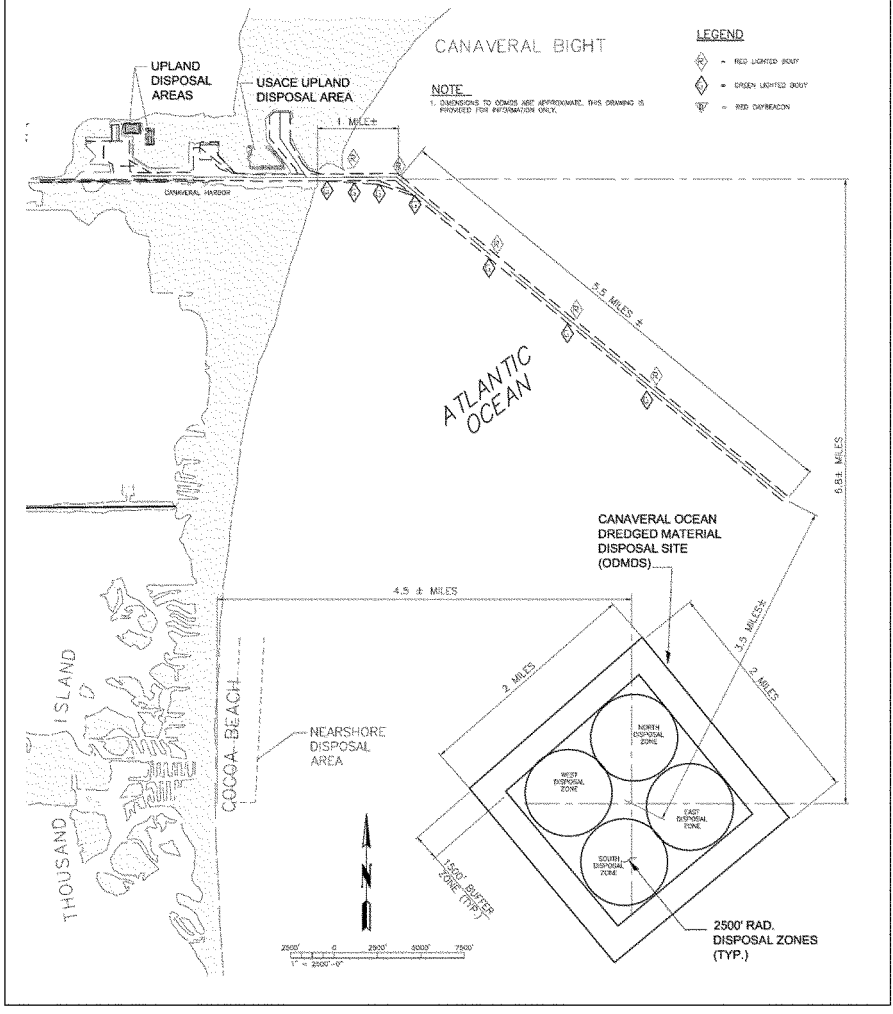
CH2MHILL
445 CHALLENGER RD., SUITE 120
CAPE CANAVERAL, FLORIDA 32920
LB 0002934 AA C000866

Proposed Project Report
Port Canaveral Deepwater Assessment
Figure 4

DATE
PROJ

REUSE OF DOCUMENTS: THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF CH2M HILL AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF CH2M HILL.

8/31/2011 RLL



Dredged Material Disposal Sites	
Port Canaveral Section 203 Study	
Scale: as shown	Drawn By: MR
Date: December 2007	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 5

3.0 PROTECTED SPECIES INCLUDED IN THIS ASSESSMENT

A Florida Natural Areas Inventory (FNAI) Species Summary for Brevard County was obtained to review the listed fauna that could potentially occur within this geographic region. In addition to the FNAI, existing reports from Cape Canaveral Air Force Station (CCAFS) and Port Canaveral (Port) were reviewed for potential protected species that may occur within the action area. Five terrestrial species were identified that could potentially occur within the action area. These species include the gopher tortoise (*Gopherus polyphemus*), Florida scrub jay (*Aphelocoma coerulescens*), eastern indigo snake (*Drymarchon corais couperi*), bald eagle (*Haliaeetus leucocephalus*), and the southeastern beach mouse (*Peromyscus polionotus niviventris*). In addition to the terrestrial species, seven marine species were identified as potentially utilizing terrestrial beach habitats and nearshore waters within the action area. These species include the loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*), Kemp's ridley (*Lepidochelys kempii*), and green sea turtles (*Chelonia mydas*). The protected species and their listing status are provided in Table 1.

Table 1 Protective Status of Listed Wildlife Species That May Occur Within the Port Canaveral Expansion Study Area, Brevard County, Florida.

Species	*State Listing**	*Federal Listing*
West Indian Manatee	LE	LE
Green Sea Turtle	LE, LT	LE
Loggerhead Sea Turtle	LT	LT
Leatherback Sea Turtle	LE	LE
Kemp's Ridley Sea Turtle	LE	LE
Atlantic Right Whale	LE	LE
Gopher Tortoise	SSC	None
Florida Scrub Jay	T	T
Southeastern Beach Mouse	T	T
Eastern Indigo Snake	T	T
Bald Eagle	T	T

Source: Florida's Endangered Species, Threatened Species and Species of Special Concern, Official Lists. FGFWFC 1997.
* E=Endangered, SSC=Species of Special Concern, and T=Threatened

The sea turtles also utilize the rock outcrops within the harbor for foraging. A separate study is being conducted to determine the extent of this utilization. The West Indian manatee (*Trichechus manatus latirostris*) is also known to occur in waters of Brevard County including Port Canaveral and to utilize the Port waters for passage from the Atlantic Ocean to the Banana River.

The North Atlantic right whale (*Eubalaena glacialis*) also may occur within the action area and the Port has initiated consultation with the National Marine Fisheries Service under a separate Biological Assessment concerning the effects of the proposed action on this species as well as effects on swimming sea turtles.

3.1 West Indian Manatee

Of the listed and protected species under USFWS jurisdiction occurring in the project area, the Port believes that the West Indian manatee (*Trichecus manatus*) may be affected by the implementation of the proposed project. The waters along the coast of Brevard County are designated critical habitat for the Florida manatee, and the project area is located within this designated habitat (50 CFR 17.95).

The Federal government has recognized the threats to the continued existence of the Florida manatee for more than 30 years. The West Indian manatee was first listed as an endangered species in 1967 under the Endangered Species Preservation Act of 1966 (16 U.S.C. 668aa(c)) (32 FR 48:4001). The Endangered Species Conservation Act of 1969 (16 U.S.C. 668aa(c)) continued to recognize the West Indian manatee as an endangered species (35 FR 16047), and the West Indian manatee was also among the original species listed as endangered pursuant to the Endangered Species Act of 1973. Critical habitat was designated for the manatee in 1976. The justification for listing as endangered included impacts to the population from harvesting for flesh, oil, and skins as well as for sport, loss of coastal feeding grounds from siltation, and the volume of injuries and deaths resulting from collisions with the keels and propellers of powerboats. Manatees are also protected under the provisions of the Marine Mammal Protection Act of 1972, as amended (16 U.S.C. 1361 *et seq.*) and have been protected by Florida law since 1892. Florida provided further protection in 1978 by passing the Florida Marine Sanctuary Act designating the state as a manatee sanctuary and providing signage and speed zones in Florida's waterways.

The manatee occurs throughout the southeastern United States. The only year-round populations of manatees occur throughout the coastal and inland waterways of peninsular Florida and Georgia (Hartman 1974). During the summer months, manatees may range as far north along the East Coast of the U.S. as Rhode Island, west to Texas, and, rarely, east to the Bahamas, (FWS 1996, Lefebvre *et al.* 1989). There are reports of occasional manatee sightings from Louisiana, southeastern Texas, and the Rio Grande River mouth (Gunter 1941, Lowery 1974).

In Florida, manatees are commonly found from the Georgia/Florida border south to Biscayne Bay on the east coast and from Wakulla River south to Cape Sable on the west coast (Hartman 1974, Powell and Rathbun 1984). Manatees are also found throughout the waterways in the Everglades and in the Florida Keys. Although temperatures are suitable for manatees in the Florida Keys, the low number of manatees has been attributed to the lack of fresh water (Beeler and O'Shea 1988). Manatees also occur in Lake Okeechobee.

In warmer months (April to November), the distribution of manatees along the east coast of Florida tends to be greater around the St. Johns River, the Banana and Indian rivers to Jupiter Inlet, and Biscayne Bay. On the west coast of Florida, larger numbers of manatees are found at the Suwannee, Crystal and Homosassa rivers, Tampa Bay, Charlotte Harbor/Matlacha Pass/San Carlos Bay area, the Caloosahatchee River and Estero Bay area, the Ten Thousand

Islands, and the inland waterways of the Everglades. On the west coast, manatees winter at Crystal River, Homosassa Springs, and other warm mineral springs (Powell and Rathbun 1984, Rathbun *et al.*1990). In the winter, higher numbers of manatees are seen on the east coast at the natural warm waters of Blue Spring and near man-made warm water sources on or near the Indian River Lagoon, at Titusville, Vero Beach, Ft. Pierce, Riviera Beach, Port Everglades, Ft. Lauderdale, and throughout Biscayne Bay and nearby rivers and canals (FWS 1996, FWS 2001). They also aggregate near industrial warm water outflows in Tampa Bay, the warmer waters of the Caloosahatchee and Orange rivers (from the Ft. Myers power plant), and in inland waters of the Everglades and Ten Thousand Islands.

The Florida manatees inhabit rivers, bays, canals, estuaries, and coastal areas rich in seagrass and other vegetation. They can live in fresh, saline (salt), and brackish water. They move freely between salinity extremes. Manatees may be found in any waterway over 3.25 ft. (1 m) deep and connected to the coast. They prefer water above 70 degrees F (21 degrees C). Manatees rarely venture into deep ocean waters. However, there are reports of manatees in locations as far offshore as the Dry Tortugas Islands, approximately 50 mi. (81 km) west of Key West, Florida. The patchy distribution of manatees throughout all their ranges is due to the distribution of suitable habitat: plentiful aquatic plants and a freshwater source.

Manatees are herbivores that feed opportunistically on a wide variety of submerged, floating, and emergent vegetation. Shallow grass beds with ready access to deep channels are the preferred feeding areas in coastal and riverine habitats. Bengtson (1983) estimated the annual mean consumption rate for manatees feeding in the upper St. Johns River at 4% to 9% of their body weight per day depending on season.

Brevard County is one of the most utilized areas in Florida by manatees due to the presence of a warm water refuge and abundant foraging opportunities. Within Brevard County, manatees frequently use waters within or near the study area including the Banana River and Intracoastal Waterway, especially during the spring and fall.

Brevard County also has one of the highest manatee mortality rates in the state, due to the high concentration of manatees combined with the popularity of recreational boating along the eastern coast of Florida. In 2006, the FWC reported 87 manatee deaths in Brevard County (the State total was 417), with 22 caused by watercraft injury. In 2005, the FWC reported 57 manatee deaths in Brevard County (the State total was 396), with 6 caused by watercraft injury.

The Corps operates a lock facility at the western end of Canaveral Harbor that allows vessel traffic to access the Banana River through the Port. Corps manatee sighting data within the lock facility since 1997 (Table 2), shows that the facility is heavily used by manatees, with lulls during the cold winter months of December, January, and February (USACE, unpublished data).

Table 2 Canaveral Lock Manatee Sightings, 1997-2006

	Year									
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	0	78	84	16	5	8	1	24	10	42
February	0	8	234	19	36	126	15	54	10	143
March	0	108	168	428	143	84	277	57	39	315
April	0	256	650	655	385	369	500	308	331	597
May	0	128	741	560	426	232	571	616	598	920
June	0	222	702	392	424	349	411	658	388	1031
July	0	108	805	464	539	355	544	657	446	844
August	0	106	663	557	618	304	626	578	596	0
September	0	118	555	319	299	222	452	188	544	0
October	424	52	623	654	299	290	610	414	0	687
November	167	73	338	426	46	335	324	177	0	320
December	190	189	115	100	72	59	101	79	0	405

The Brevard County Manatee Protection Plan (BCMPP) was adopted by the Brevard County Commission in 2003. The plan includes recommendations, regulations, and enforcement measures to protect the manatee and its habitat within the County. The plan also includes the establishment of a Port Canaveral special planning area, which provides special protection measures for the Port (excluding the Federal facilities within the Port) due to its unique features, function, and location. The plan provides for specifications regarding bulkhead and dock facilities, fender and standoff requirements, stormwater outfall specifications, education and awareness guidelines, and coordination with private industry regarding normal operations.

Potential impacts to the manatee resulting from the proposed project would occur from dredging and in-water construction activities and through vessel interaction with facility operations. As has been the case with previous Port operations, the Port will adopt standard manatee protection measures in the project design to eliminate or reduce potential. Adopted measures will include:

Construction-related measures

The Port will stop all in-water construction-related activities if a manatee is observed within 50 feet of the activity. The activity will not resume until the manatee has departed the activity area of its own volition. Standard manatee protection measures (Appendix A) will be incorporated into the construction requirements.

Project Design

The Port will design and place any outfall from stormwater treatment ponds to minimize adverse impacts to manatees. The outfalls would also be grated to prevent manatees from entering.

Operational measures

Any vessel moored to, or otherwise contiguous with, the wharf will observe a minimum 4-foot standoff distance from the wharf to prevent manatee crushing.

Conclusion.

The Port has determined that the proposed project is likely to affect, but not likely to adversely affect, the manatee within the project area. The Port believes that the manatee protection measures incorporated into project construction, design, and operations discussed in this assessment will diminish the effect of the project on protected species within the project area.

3.2 Eastern Indigo Snake

The eastern indigo snake occurs in most of Florida and much of southern Georgia. It may be found in habitats ranging from mangrove swamps and wet prairies to xeric pinelands and scrub (Moler 1992). The indigo snake may be found wintering in gopher tortoise burrows and will prey on small vertebrates including fish, frogs, toads, lizards, snakes, small turtles, birds, and small mammals. The species prefers to search for prey along the edges of wetlands where much of its prey tends to congregate. The main threat to the indigo snake is loss and fragmentation of habitat. As regulations for protecting wetlands have become stricter and more costly, the pressure of increased population in Florida has led to increased development of upland areas, including habitat for the indigo snake. The indigo snake was not identified as being present within the project area including the CCAFS area, although gopher tortoise habitat is currently present on the CCAFS site. A survey conducted in 2006 yielded active gopher tortoise burrows; however, no indigo snakes were sighted during the survey. Therefore, it is not likely that the indigo snake would be adversely affected by the proposed project. However, as standard procedure, precautions will be taken during construction. Instructions on identifying the species, steps to avoid the animal if encountered, and information regarding penalties for intentional harm will be included in construction documents.

4.0 EFFECT DETERMINATION

The Port has determined that the proposed navigations improvements is not likely to adversely affect listed species within the action area and requests concurrence from FWS.

5.0 LITERATURE CITED

Beeler, I.E. and T.J. O' Shea. 1988. Distribution and mortality of the West Indian manatee *(Trichechus manatus)* in the southeastern United States: a compilation and review of recent information. Report prepared by the U.S. Fish and Wildlife Service for the U.S. Army Corps of Engineers. PB 88-207 980/AS. National Technical Information Service; Springfield, Virginia.

Bengston, J.L. 1983. Estimating food consumption of free-ranging manatees in Florida. Journal of Wildlife Management. 47(4):1186-1192.

Brevard County. 2003. Manatee Protection Plan. Brevard County, FL. 232 pp.

Hartman, D.S. 1974. Distribution, status, and conservation of the manatee in the United States. U.S. Fish and Wildlife Service, National Fish and Wildlife Laboratory contract report No. 14-16-0008-748. NTIS publication No. PB81-140725, pp. 1-246.

Gunter, G. 1941. Occurrence of the manatee in the United States, with records from Texas. Journal of Mammalogy 22: 60-64.

Lefebvre, L.W., T.J. O'Shea, G.B. Rathbun, and R.C. Best. 1989. Distribution, status, and biogeography of the West Indian manatee. Pages 567-610 *in* C.A. Wood, ed. Biogeography of the West Indies. Sandhill Crane Press; Gainesville, Florida.

Lowery, J.H., Jr. 1974. The mammals of Louisiana and its adjacent waters. Louisiana University Press.

Moler, P.E. 1992. *Rare and Endangered Biota of Florida. Volume III. Amphibians and Reptiles.* University Press of Florida. Gainesville, Florida. 291 pp.

Powell, J.A. and G.B. Rathbun. 1984. Distribution and abundance of manatees along the northern coast of the Gulf of Mexico. Northeast Gulf Science 7(1): 1-28.

Rathburn, G.B., J.P. Reid, and G. Carowan. 1990. Distribution and movement patterns of manatees (*Trichechus manatus*) in Northwestern peninsular Florida. Florida Marine Research Publication No. 48. 33pp.

U.S. Fish and Wildlife Service. 2001. Florida Manatee Recovery Plan, Third Revision.

U.S. Fish and Wildlife Service. 1996. Florida Manatee Recovery Plan, Second Revision.

APPENDIX A

STANDARD MANATEE PROTECTION MEASURES

STANDARD MANATEE CONDITIONS FOR USE DURING CONSTRUCTION OF A PROJECT

The permittee shall ensure that:

1. The contractor instructs all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees.

2. All construction personnel will be advised that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972, the Endangered Species Act of 1973, and the Florida Manatee Sanctuary Act of 1978. The permittee and/or contractor may be held responsible for any manatee harmed, harassed, or killed as a result of construction activities.

3. Siltation barriers will be made of material in which manatees cannot become entangled, are properly secured, and are regularly monitored to avoid manatee entrapment. Barriers must not block manatee entry to or exit from essential habitat.

4. All vessels associated with the project will operate at "no wake/idle" speeds at all times while in water where the draft of the vessel provides less than four feet clearance from the bottom and that vessels will follow routes of deep water whenever possible.

5. If manatees are seen within 100 yards of the dredging area, all appropriate precautions shall be implemented to ensure protection of the manatees. These precautions shall include operating all equipment in such a manner that moving equipment does not come any closer than 50 feet of any manatee. Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment.

6. Any collision with and/or injury to a manatee will be reported immediately to the "Manatee Hotline" (1-800-DIAL FMP) and to the U.S. Fish and Wildlife Service, Jacksonville Field Office (904-791-2580) for north Florida and to the Vero Beach Field Office (407-562-3909) for south Florida.

7. A minimum of ___ 3 feet by 4 feet temporary manatee awareness construction signs labeled "Manatee Habitat – Idle Speed in Construction Area" shall be installed and maintained at prominent locations within the construction area/docking facility prior to initiation of construction. One temporary sign will be located prominently adjacent to the construction permit and, if required, a second temporary construction sign will be installed in a location prominently visible to water related construction crews. A temporary construction sign criteria sheet is enclosed. Temporary signs will be removed by the permittee upon completion of construction.

8. The contractor will maintain a log detailing sightings, collisions, or injuries to manatees should they occur during the contract period. Following project completion, a report summarizing incidents and sightings will be submitted to the Florida Department of Natural Resources (DNR) Marine Mammal Section, 100 Eighth Avenue, Southeast, St. Petersburg, Florida 33701-5095; the U.S. Fish and Wildlife Service, Jacksonville Field Office, 3100 University Boulevard, South, Suite 120, Jacksonville, Florida 32216 for north Florida; and the U.S. Fish and Wildlife Service Office, P.O. Box 2676, Vero Beach, Florida 39230 for south Florida.

STANDARD MANATEE CONDITIONS FOR MANATEE AWARENESS SIGNS

The permittee shall ensure that:

1. Permanent manatee awareness signs (___) will be installed and maintained at docking and launching facilities within 1-year of issuance of the permit. The location of the "Caution Manatee Area" sign and "Information Display" signs will be noted on the attached permit drawings.

   The permanent "Caution Manatee Area" signs will be 3 feet by 4 feet, 125 gauge 61TS aluminum, covered with white, engineer grade, reflective sheeting; black painted lettering; black screened design; and orange, engineer grade, reflective tape border. These 3 feet wide by 4 feet long signs shall conform to the Florida Uniform Waterway Marking System in accordance with F.S. 327.40-1. The installation of the signs shall be made in accordance with DNR specification for such signs. Sign criteria are attached to this permit.

2. A notarized verification letter stating that permanent signs have been installed at designated locations shall be forwarded to the Corps of Engineers, Jacksonville District Office as soon as they are installed. Signs and pilings remain the responsibility of the owner(s) and are to be maintained for the life of the docking and launching facility in a manner acceptable to the Corps of Engineers.

3. A permanent "Information Display" (consisting of two signs, "Manatee Basics for Boaters: and West Indian Manatee Fact Sheet") will be installed prior to mooring occupancy at a prominent location to increase the awareness of boaters using the facility of the presence of manatees and of the need to minimize the threat of boats to these animals. The number of Information Displays required will depend on the docking facility design. One Information Display is required at each boat ramp (if applicable). Information Display locations will be as shown on the attached drawings. Information displays remain the responsibility of the owner(s) and are to be maintained for the life of the docking facility in a manner acceptable to the Corps of Engineers.

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

OCT 23 2007

Planning Division
Environmental Branch

Mr. David M. Bernhart
Chief, Protected Species Management Branch
National Marine Fisheries Service
263 13th Avenue South
Saint Petersburg, Florida 33701

Dear Mr. Bernhart:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, would like to initiate consultation with your office on the Port Canaveral Improvements Section 203 Feasibility Study. The study is being conducted by the Canaveral Port Authority under authority granted by Section 203 of the Water Resources Development Act of 1986.

In summary, the proposed alternative navigation improvements at Port Canaveral include making no further improvements to the project (no action alternative); deepening ocean access and interior channels to accommodate larger vessels; deepening the turning circles in the west and middle turning basins to accommodate larger vessels; increasing the diameter of the west turning basin to accommodate new larger cruise ships; deepening the widener to accommodate larger cruise ships; and widening interior channels to accommodate larger cruise ships. Dredged material would be taken to the designated Ocean Dredged Material Disposal Site (ODMDS).

There are several species of sea turtles that are known to occur in the project area. Per the National Marine Fisheries Service Regional Biological Opinion, a hopper dredge would not be used to perform any of the work at Port Canaveral. Several species of whales, including the northern right whale, may be encountered in the vicinity of the ODMDS. Appropriate measures will be taken to protect these species. Based on this information, the Corps has determined that the proposed work may affect but is not likely to adversely affect sea turtles and whales, or any species under the jurisdiction of the National Marine Fisheries Service. Please find attached a biological assessment which provides more detailed information on the project. We request your concurrence in this matter pursuant to Section 7 of the Endangered Species Act.

If you require additional information, please contact Mr. Paul Stodola at (904) 232-3271.

Sincerely,

Marie G. Burns
Acting Chief, Planning Division

Enclosure

Copy Furnished:
Mr. Lee Swain, Dial Cordy and Associates, Inc., 490 Osceola Avenue, Jacksonville Beach, Florida 32250

BIOLOGICAL ASSESSMENT
PORT CANAVERAL
NAVIGATION IMPROVEMENTS PROJECT
BREVARD COUNTY, FLORIDA

Submitted to the

NATIONAL MARINE FISHERIES SERVICE

September 2007

(Revised December 2007)

Prepared for:
Canaveral Port Authority
200 George J. King Boulevard
Cape Canaveral, Florida 32920

Prepared by:
Dial Cordy and Associates Inc.
490 Osceola Avenue
Jacksonville Beach, FL 32250

TABLE OF CONTENTS

Page

1.0 DESCRIPTION OF THE PROPOSED ACTION 1

2.0 ACTION AREA 3

3.0 PROTECTED SPECIES INCLUDED IN THIS ASSESSMENT 9

3.2 Sea Turtles 10

3.2.1 Green Sea Turtle (*Chelonia mydas*) 10

3.2.2 Loggerhead Turtle (*Caretta caretta*) 12

3.2.3 Kemp's Ridley Turtle (*Lepidochelys kempii*) 18

3.2.4 Leatherback Turtle (*Dermochelys coriacea*) 21

3.2.5 Site Specific Sea Turtle Information 23

3.3 Right Whale (*Eubalaena glacialis*) 25

4.0 EFFECT DETERMINATION 26

5.0 LITERATURE CITED 27

LIST OF FIGURES

Page

Figure 1 Location Map 4
Figure 2 Study Area 5
Figure 3 Project Footprint - West 6
Figure 4 Project Footprint – East 7
Figure 5 Dredged Material Disposal Areas 8

LIST OF TABLES

Page

Table 1 Protective Status of Listed Wildlife Species That May Occur Within the Port Canaveral Expansion Study Area, Brevard County, Florida. 9
Table 2 Green Sea Turtle Nesting Data for Brevard County, 1988-2005 11
Table 3 Loggerhead Sea Turtle Nesting Data for Brevard County, 1988-2005 13
Table 4 Leatherback Sea Turtle Nesting Data for Brevard County, 1988-2005 22

1.0 DESCRIPTION OF THE PROPOSED ACTION

The Canaveral Port Authority (CPA) is currently conducting a feasibility study of potential navigation improvements under the authority granted under Section 203 of the Water Resources Development Act (WRDA), 1986. The study is in response to problems and issues identified by the CPA and Canaveral Pilots Association with regard to ship maneuvering and delays caused by within the existing federal project. The three major problems at Port Canaveral are:

1. Congestion at cargo berths reduces the effectiveness and efficiency of cargo vessels and landside facilities. Given the rapid growth in commodity movements at Port Canaveral, in the very near future a significant proportion of cargo vessels calling at Port Canaveral will have to wait offshore for a berth to become available. Some of these vessels may divert to an alternative port and incur increased transportation costs, if channels are not improved. In addition, landside facilities will stand temporarily idle as vessels wait offshore for an available berth or safe passage through the Federal channel.
2. The size of cargo vessels calling at Port Canaveral is constrained by existing channel dimensions and configurations. Larger, more efficient vessels could be used for bulk items such as petroleum products, aggregates and cement if channels were improved.
3. The size of cruise ships calling at Port Canaveral is constrained by channel and turning basin dimensions. Increasingly larger cruise ships are calling at Port Canaveral and are beginning to exceed the dimensions for safe use of the existing west turning basin. Passage of large cruise ships through the narrow ship channel leading to the turning basin and cruise ship piers also causes surges at cargo piers that line the channel, which results in cargo vessels having to stop loading and unloading activities while the cruise ships pass. The potential for future cruise ship terminal expansion also cannot be fully exploited under existing channel and turning basin dimensions and configurations.

The primary objective of the Section 203 Study was to identify and evaluate alternatives that would:

1. Reduce future congestion at Port Canaveral;
2. Accommodate anticipated future growth in number and size of vessel transiting the Port;
3. Improve the efficiency of operations for cargo vessels and cruise ships within the Port complex;
4. Allow for use of the Port by larger, more efficient, cargo vessels and cruise ships;
5. Allow for development of additional terminals/berths without encroaching on the West Turning Basin.

Three alternatives will be evaluated during the NEPA process and include a no action alternative, one alternative that includes operational changes only, and one structural alternative that is the project Recommended Plan. The evaluation presented in this report will focus on the Recommended Plan.

The Recommended Plan can generally be described as widening and deepening the Port Canaveral ocean channel, the interior harbor channel and the West Turning Basin. The design depth of the project is -41 MLW. More specifically, proceeding east to west, the project can be broken down into five components as follows:

- Ocean Channel Widening
- North Side Inner Reach Widening
- South Side West Access Channel Widening
- Existing West Access Channel Deepening
- West Turning Basin Expansion (Corner Cut-Off) and Deepening

Ocean Channel Widening. The ocean channel widening is approximately 8,350 feet long and is located entirely on the south side of the channel centered on the bend before entering the harbor. This portion is essentially a widening of the interior angle of the bend. The widening is variable in width to a maximum of 350 feet wide and tapers on both ends. The dredging area is approximately 34 acres. The existing grade is approximately -30 MLW. Dredging to -41 MLW results in approximately 600,000 cy of dredging.

North Side Inner Reach Widening. The north side inner reach widening is an approximate 6,700 feet long strip along the north side of the harbor channel between the Trident Turning Basin and the Middle Turning Basin. This portion of the project basically effects a widening of the channel from 400 feet to 500 feet along a natural, rock revetment shoreline. The dredging area is approximately 110 feet wide with tapered ends. The dredging area is approximately 16 acres. The existing grade slopes from Elevation -40 MLW to +10 MLW. Dredging this strip to -41 MLW results in a dredging volume of approximately 620,000 cy.

South Side West Access Channel Widening. The south side west access channel widening is approximately 4,620 feet long and lies along the south side of the harbor channel along the predominantly commercial and retail business portion of the port. This area is presently the east end of the Barge Canal and is not included in the Corps of Engineers or Canaveral Port Authority dredging programs. The area appears as a "notch" in the harbor channel and the proposed project will widen the channel from 400 feet to 500 feet through to the WTB. The area is two end-to-end rectangular areas 90 feet and 175 feet wide each, summing to approximately 13 acres. The area slopes from an average low elevation of -16 MLW to an average high elevation of -34 MLW. Dredging the area to Elevation -41 results in approximately 190,000 cy of dredging.

Existing West Access Channel Deepening. The existing west access channel deepening is at the west end of the channel and the limit for cruise and cargo shipping. The area is approximately 2,810 feet long and 400 feet wide (the current channel width) and approximately 26 acres in size. This area is maintained by the Canaveral Port Authority to Elevation -35 MLW. Dredging to the -41 MLW elevation results in a dredging volume of approximately 250,000 cy.

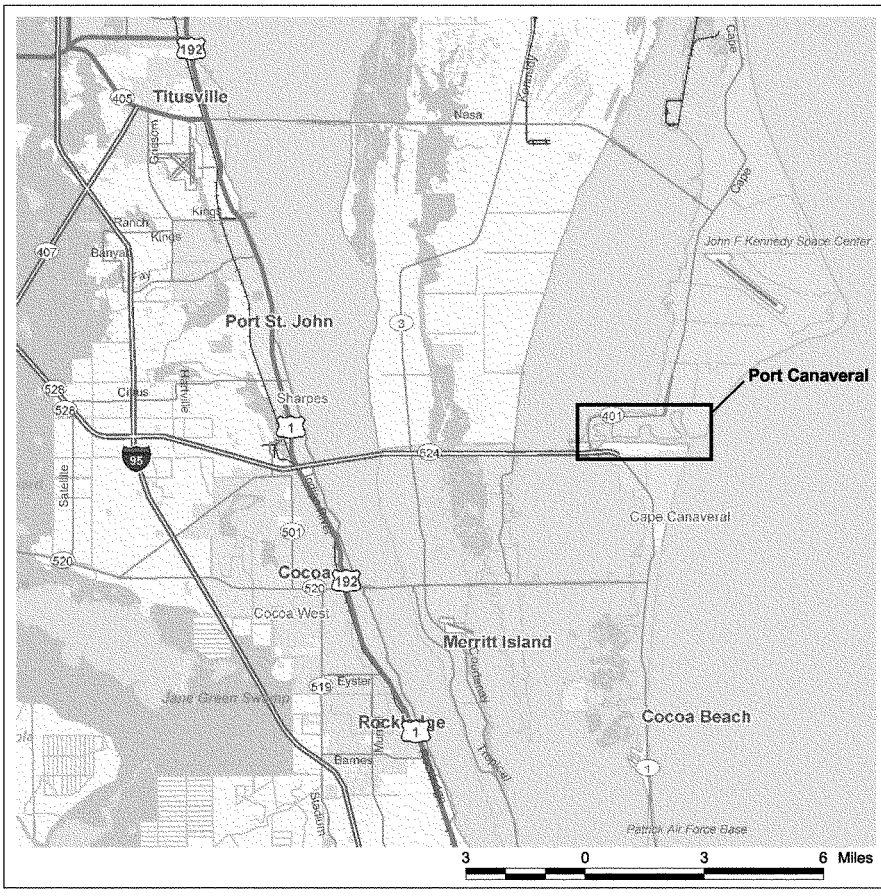
West Turning Basin Expansion (Corner Cut-Off) and Deepening. The west turning basin expansion (corner cut-off) and deepening encompasses the entire basin in two parts defined by required depth. The lower (southerly) approximate one-half of the basin is proposed to be maintained at -41 MLW to accommodate cargo vessels. This area is approximately 52 acres. Approximately 7 acres of this area is not submerged land. The basin is expanded to the east by superimposing a 1,750-foot turning diameter across the entrance of the WTB, which is required for new, larger cruise ships proposed to utilize the WTB. The expansion is into an undeveloped upland area with a natural shoreline. Dredging this area from -35 MLW to -41 MLW, including cutting into the uplands, results in a volume of approximately 1,090,000 cy. Approximately 510,000 cy of this amount is dredging (excavation) of the upland area.

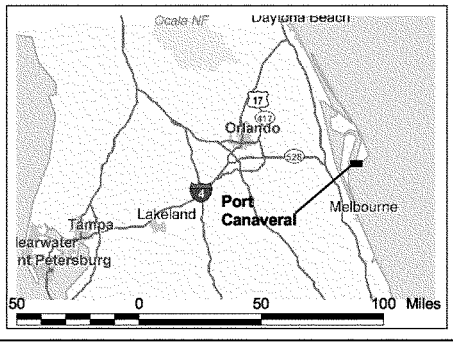
The remaining northerly part of the WTB is approximately 57 acres in size with its borders defined as 100 feet offset from any berthing pier and 200 feet offset from a industry and does not require greater than a -35 MLW Elevation at this time. The Canaveral Port Authority currently maintains this area at Elevation -35 MLW. This area does not represent new project dredging and is simply proposed to shift to federal maintenance at the same -35 MLW elevation.

Dredging associated with deepening and widening of the channel will likely be performed by clamshell dredge. All dredged material will be placed in the authorized Canaveral Offshore Dredged Material Disposal Site (ODMDS) and is centered 4.5 miles offshore of Cocoa Beach or three authorized upland disposal sites located just north of the project area. If any beach quality sand is identified during the dredging process, it may be placed in the authorized nearshore disposal area. Since 1974, approximately 22.6 million cy of dredged material from the entrance channel and various basins within the harbor has been disposed in the ODMDS (USEPA and USACE 2001).

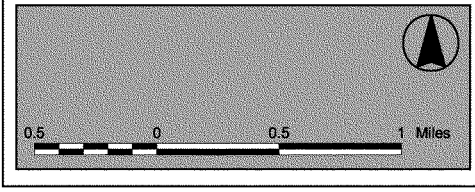
2.0 ACTION AREA

Port Canaveral is located in Brevard County on the east coast of Florida, just north of Cape Canaveral and approximately nine miles north of Cocoa Beach (Figure 1). The main port is orientated in an east – west direction, extending from the Atlantic coast to the Banana River. The port is bounded to the north by the Cape Canaveral Air Force Station (CCAFS) and the Banana River, and bounded to the south by the City of Cape Canaveral. The harbor consists of three turning basins (Figure 2). Starting from the east they are: the Trident Turning Basin (TTB), the Middle Turning Basin (MTB), and the West Turning Basin (WTB). The basins are connected by a channel (East Access Channel and West Access Channel) that forms the south boundary of each basin. Within this channel, a Federally maintained Barge Canal extends from the south side of the MTB, through the Banana River, across Merritt Island, and connects with the Intracoastal Waterway (ICWW) system in the Indian River. Where the Barge Canal enters the Banana River, a 600-foot long Corps of Engineers' lock (Canaveral Lock) separates the tidal harbor from the almost non-tidal river. The footprint of the recommended plan is graphically displayed in Figures 3 and 4. The ODMDS, upland, and nearshore dredged material disposal areas are shown in Figure 5.

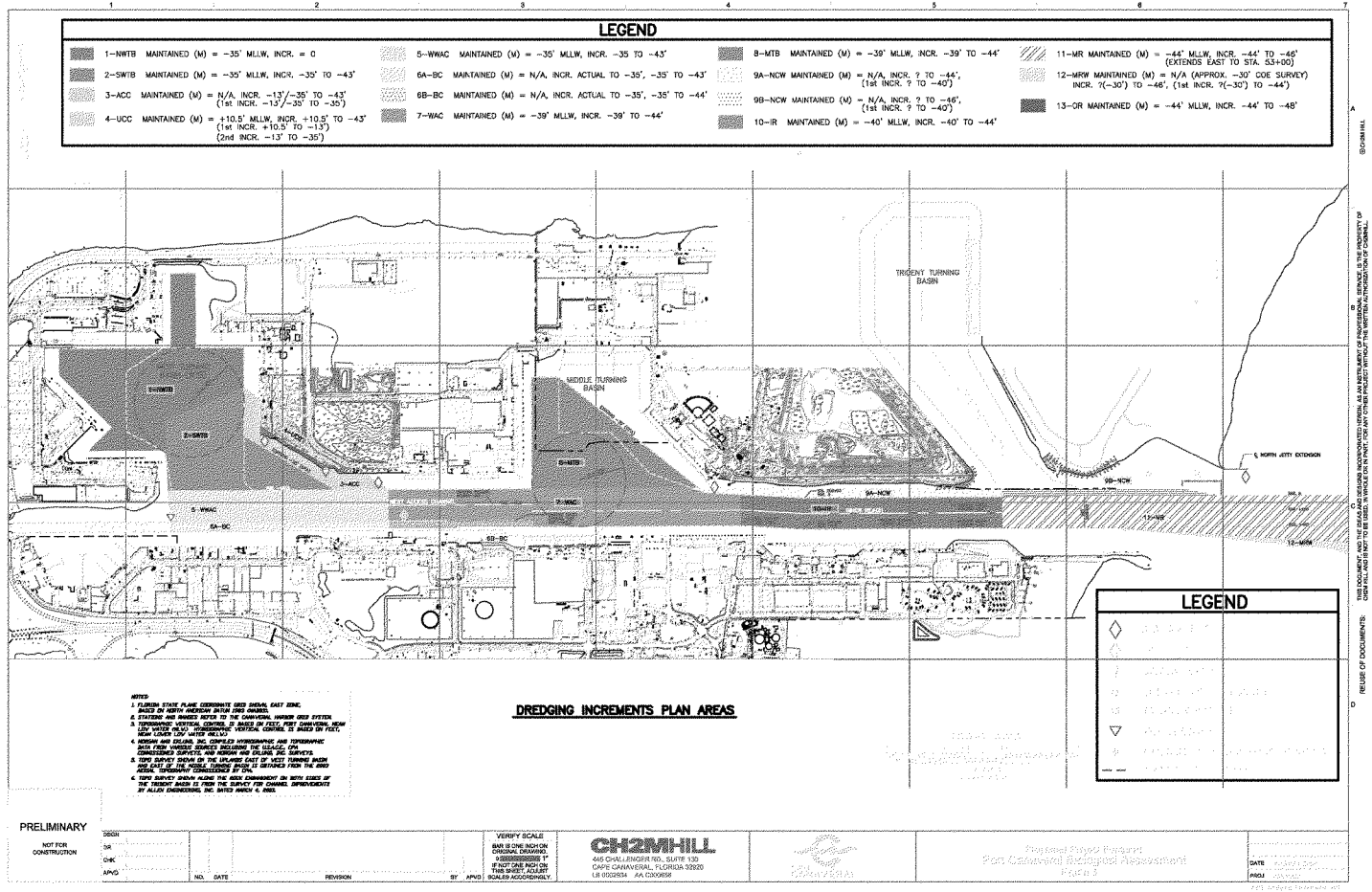




Location Map	
Port Canaveral Biological Assessment	
Scale: 1 inch = 3 miles	Drawn By: MR
Date: September 2007	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 1



Study Area	
Port Canaveral Biological Assessment	
Scale: 1 inch = 0.5 mile	Drawn By: MR
Date: September 2007	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 2



NOTES:
1. FLORIDA STATE PLANE COORDINATE GRID SHOWN, EAST ZONE. BASED ON NORTH AMERICAN DATUM 1983 (NAD83).
2. STATIONS AND OFFSETS SHOWN ARE TO THE CANAVERAL HARBOR GRID SYSTEM.
3. SOUNDINGS AND ELEVATIONS SHOWN IS BASED ON FEET, MEAN CANAVERAL HARBOR LOW WATER DATUM (MLLW). HORIZONTAL VERTICAL CONTROL IS BASED ON FEET, MEAN LOWER LOW WATER (MLLW).
4. MORGAN AND DELANO, INC. COMPILED HYDROGRAPHIC AND TOPOGRAPHIC DATA FROM VARIOUS SOURCES INCLUDING THE USACE, EPA COMMISSIONED SURVEYS, AND MORGAN AND DELANO, INC. SURVEYS.
5. TOPO SURVEY SHOWN ON THE UPLANDS EAST OF WEST TURNING BASIN AND EAST OF THE MIDDLE TURNING BASIN IS DISTANCES FROM THE BIKO AND BIKP MONUMENTS ON THE JETTY.
6. TOPO SURVEY SHOWN ALONG THE SIDES EMBANKMENT ON BOTH SIDES OF THE TRIDENT BASIN IS FROM THE SURVEY FOR CHANNEL IMPROVEMENTS BY ALLEN ENGINEERING, INC. DATED MARCH 4, 2005.

DREDGING INCREMENTS PLAN AREAS

PRELIMINARY
NOT FOR CONSTRUCTION

DESIGN
DR
CHK
APVD

NO.	DATE	REVISION	BY	APVD

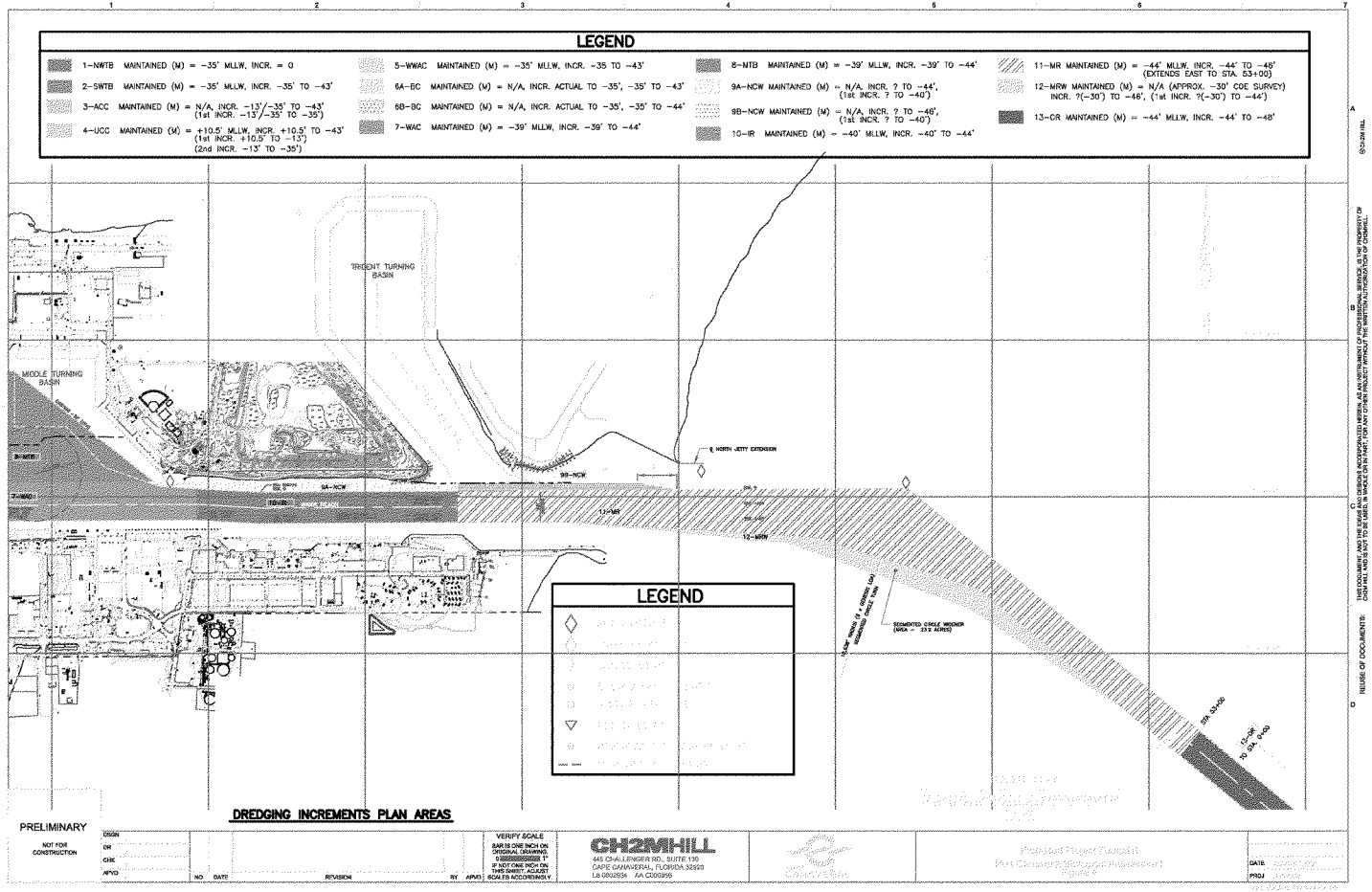
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

CH2MHILL
445 CHALLENGER RD., SUITE 130
CAPE CANAVERAL, FLORIDA 32920
LB 0002934 AA C3000856

Tentative Plans
Port Canaveral Entrance Reevaluation
Part II

DATE
PROJ

© CH2M HILL
THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF CH2M HILL AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF CH2M HILL.
REUSE OF DOCUMENTS:



DREDGING INCREMENTS PLAN AREAS

PRELIMINARY

NOT FOR CONSTRUCTION

DSGN
DR
CHK
APVD

NO DATE REVISION BY APVD

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

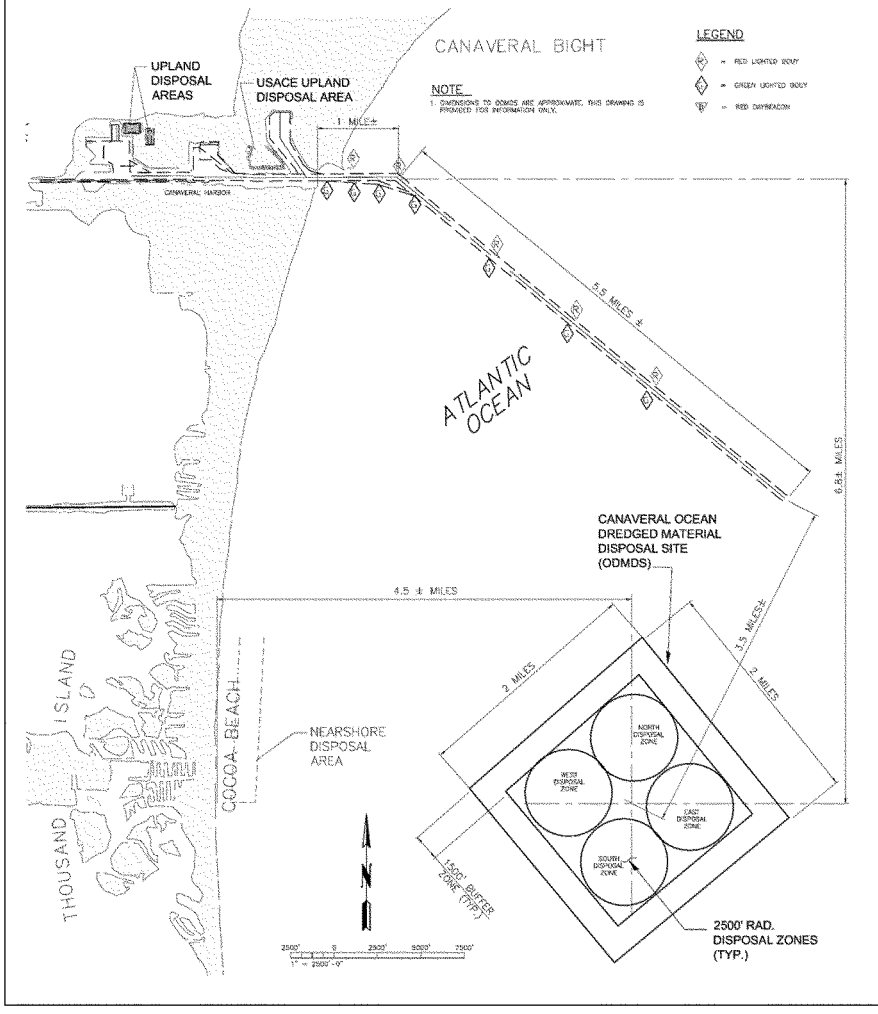
CH2MHILL
445 CHALLENGER RD., SUITE 130
CAPE CANAVERAL, FLORIDA 32920
LB 0002934 AA C000995

DATE
PROJ

THESE DOCUMENTS, AND THE IDEAS & DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENTS OF PROFESSIONAL SERVICE, IS THE PROPERTY OF CH2M HILL AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF CH2MHILL.

RELEASE OF DOCUMENTS:

© CH2M HILL



Dredged Material Disposal Sites	
Port Canaveral Section 203 Study	
Scale: as shown	Drawn By: MR
Date: December 2007	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 5

3.0 PROTECTED SPECIES INCLUDED IN THIS ASSESSMENT

A Florida Natural Areas Inventory (FNAI) Species Summary for Brevard County was obtained to review the listed fauna that could potentially occur within this geographic region. In addition to the FNAI, existing reports from Cape Canaveral Air Force Station (CCAFS) and Port Canaveral (Port) were reviewed for potential protected species that may occur within the action area. Five terrestrial species were identified that could potentially occur within the action area. These species include the gopher tortoise (*Gopherus polyphemus*), Florida scrub jay (*Aphelocoma coerulescens*), eastern indigo snake (*Drymarchon corais couperi*), bald eagle (*Haliaeetus leucocephalus*), and the southeastern beach mouse (*Peromyscus polionotus niviventris*). The West Indian manatee (*Trichechus manatus latirostris*) is also known to occur in waters of Brevard County including Port Canaveral and to utilize the Port waters for passage from the Atlantic Ocean to the Banana River. A separate Biological Assessment was prepared addressing these species and was submitted under separate cover to the U.S. Fish and Wildlife Service.

Six species were identified as potentially utilizing marine habitats and nearshore waters within the action area. These species include the loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*), Kemp's ridley (*Lepidochelys kempii*), and green sea turtles (*Chelonia mydas*). The sea turtles also utilize the rock outcrops within the harbor for foraging. The North Atlantic right whale (*Eubalaena glacialis*) is also present in the nearshore waters. The protected species and their listing status are provided in Table 1.

Table 1 Protective Status of Listed Wildlife Species That May Occur Within the Port Canaveral Expansion Study Area, Brevard County, Florida.

Species	*State Listing**	*Federal Listing*
West Indian Manatee	LE	LE
Green Sea Turtle	LE, LT	LE
Loggerhead Sea Turtle	LT	LT
Leatherback Sea Turtle	LE	LE
Kemp's Ridley Sea Turtle	LE	LE
Atlantic Right Whale	LE	LE
Gopher Tortoise	SSC	None
Florida Scrub Jay	T	T
Southeastern Beach Mouse	T	T
Eastern Indigo Snake	T	T
Bald Eagle	T	T

Source: Florida's Endangered Species, Threatened Species and Species of Special Concern, Official Lists. FGFWFC 1997.
* E=Endangered, SSC=Species of Special Concern, and T=Threatened

3.2 Sea Turtles

3.2.1 Green Sea Turtle (*Chelonia mydas*)

Distribution. Green turtles are distributed circumglobally. In the western Atlantic they range from Massachusetts to Argentina, including the Gulf of Mexico and Caribbean, but are considered rare north of Cape Hatteras (Wynne and Schwartz, 1999). Several major nesting assemblages have been identified and studied in the western Atlantic (Peters 1954; Carr and Ogren, 1960; Carr *et al.*, 1978). Most green turtle nesting in the continental United States occurs on the Atlantic Coast of Florida (Ehrhart 1979). Green turtles are the largest of the hard-shelled sea turtles. Adult male green turtles are smaller than adult females whose lengths range from 92 to 110 cm (36 to 43 in.) and weights range from 119 to 182 kg (200 to 300 lbs). Their heads are small compared to other sea turtles and the biting edge of their lower jaws is serrated.

Green turtles have a more tropical distribution than loggerhead turtles; they are generally found in waters between the northern and southern 20°C isotherms (Hirth 1971). Green turtles, like most other sea turtles, are distributed more widely in the summer when warmer water temperatures allow them to migrate north along the Atlantic coast of North America. In the summer, green turtles are found around the U.S. Virgin Islands, Puerto Rico, and continental North America from Texas to Massachusetts. Immature greens can be distributed in estuarine and coastal waters from Long Island Sound, Chesapeake Bay, and the North Carolina sounds south throughout the tropics (Musick and Limpus, 1997). In the United States, green turtles nest primarily along the Atlantic Coast of Florida, the U.S. Virgin Islands, and Puerto Rico. In the winter, as water temperatures decline, green turtles that are found north of Florida begin to migrate south into subtropical and tropical water.

Status and Population Trends. The green turtle was protected under the ESA in 1978; breeding populations off the coast of Florida and the Pacific coast of Mexico are listed as endangered, all other populations are listed as threatened. Recent population estimates for the western Atlantic area are not available. However, there is evidence that green turtle nesting has been on the increase during the past decade. Recently, green turtle nesting occurred on Bald Head Island, North Carolina just east of the mouth of the Cape Fear River, on Onslow Island, and on Cape Hatteras National Seashore. Increased nesting has also been observed along the Atlantic Coast of Florida, on beaches where only loggerhead nesting was observed in the past (Pritchard 1997). Certain Florida nesting beaches where most green turtle nesting activity occurs have been designated index beaches. Index beaches were established to standardize data collection methods and effort on key nesting beaches. The pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the six years of regular monitoring since establishment of the index beaches in 1989. A nesting summary for Brevard County in which the proposed project resides is found in Table 2. The majority of sea turtle nesting activity occurred during the summer months of June, July and August, with nesting activity occurring as early as March and as late as September.

Table 2 Green Sea Turtle Nesting Data for Brevard County, 1988-2005

Year	Beach Length (km)	Green Turtle Nests
1988	77.9	134
1989	97.4	246
1990	98.3	841
1991	98.5	214
1992	101.0	1232
1993	100.1	116
1994	102.8	1720
1995	103.4	171
1996	105.2	1351
1997	110.0	259
1998	108.0	2764
1999	108.0	125
2000	108.0	3907
2001	115.2	193
2002	115.2	4316
2003	115.2	705
2004	103.2	1494
2005	115.2	4878

Natural History. While nesting activity is obviously important in determining population distributions, the remaining portion of the green turtle's life is spent on the foraging grounds. Some of the principal feeding pastures in the western Atlantic Ocean include the upper west coast of Florida, the northwestern coast of the Yucatan Peninsula, the south coast of Cuba, the Mosquito Coast of Nicaragua, the Caribbean Coast of Panama, and scattered areas along Colombia and Brazil (Hirth 1971). Juvenile green sea turtles occupy pelagic habitats after leaving the nesting beach. Pelagic juveniles are assumed to be omnivorous, but with a strong tendency toward carnivory during early life stages. At approximately 20 to 25 cm carapace length, juveniles leave pelagic habitats and enter benthic foraging areas, shifting to a chiefly herbivorous diet (Bjorndal 1997). Post-pelagic green turtles feed primarily on sea grasses and benthic algae but also consume jellyfish, salps, and sponges. In the western Atlantic region, the summer developmental habitat encompasses estuarine and coastal waters as far north as Long Island Sound, Chesapeake Bay, and North Carolina sounds, and south throughout the tropics (Musick and Limpus, 1997). Like loggerheads and Kemp's ridleys, green sea turtles that use northern waters during the summer must return to southern waters in autumn, or face the risk of cold stunning.

Threats. The greatest threat to this species is the loss of its nesting habitat. Throughout the tropical and subtropical distribution of this species, beaches are eroded, armored, renourished, or converted for residential or commercial purposes. Green turtles are also threatened by

fibropapilloma disease; incidental takes in commercial or recreational fishing gear; and poaching (although poaching is infrequent in the United States). Green turtles are harvested in some nations for food, leather, and jewelry. Green turtles are also threatened by natural causes including hurricanes; predation by fire ants, raccoons, and opossums; and poaching of eggs and nesting females.

Anthropogenic impacts to the green turtle population are similar to those for other sea turtle species. Sea sampling coverage in the pelagic driftnet, pelagic longline, scallop dredge, southeast shrimp trawl, and summer flounder bottom trawl fisheries has recorded takes of green turtles. In addition, the NMFS/Northeast Fisheries Science Center (NEFSC) is conducting a review of bycatch levels and patterns in all fisheries in the western Atlantic for which observer data is available. Bycatch estimates will be made for all fisheries for which sample sizes are sufficiently large to permit reasonable statistical analysis. This will be compiled into an assessment report. Until that analysis is completed, the only information on the magnitude of takes available for fisheries in the action area are unextrapolated numbers of observed takes from the sea sampling data. Preliminary sea sampling data summary (1994-1998) shows the following total take of green turtles: one (anchored gillnet), two (pelagic driftnet), and two (pelagic longline). Stranding reports indicate that between 200-300 green turtles strand annually from a variety of causes (Sea Turtle Stranding and Salvage Network, unpublished data). As with the other species, fishery mortality accounts for a large proportion of annual human-caused mortality outside the nesting beaches, while other activities like dredging, pollution, and habitat destruction account for an unknown level of other mortality.

Critical Habitat. In 1998, NMFS designated the waters surrounding the islands of Culebra, Puerto Rico as critical habitat for the green turtle. This area supports major seagrass beds and reefs that provide forage and shelter habitat. The action area does not comprise critical habitat for green turtles.

3.2.2 Loggerhead Turtle (*Caretta caretta*)

Distribution. Loggerhead turtles occur throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans and are the most abundant species of sea turtle occurring in U.S. waters. Loggerheads concentrate their nesting in the north and south temperate zones and subtropics, but generally avoid nesting in tropical areas of Central America, northern South America, and the Old World (NRC 1990). The largest known nesting aggregation of loggerhead turtles occurs on Masirah and Kuria Muria Islands in Oman (Ross and Barwani, 1982). In the western Atlantic, most loggerhead turtles nest from North Carolina to Florida and along the gulf coast of Florida. The best scientific and commercial data available on the genetics of loggerhead turtles suggests there are four major subpopulations of loggerheads in the northwest Atlantic: (1) a northern nesting subpopulation that occurs from North Carolina to northeast Florida, about 29° N (approximately 7,500 nests in 1998); (2) a south Florida nesting subpopulation, occurring from 29° N on the east coast to Sarasota on the west coast (approximately 83,400 nests in 1998); (3) a Florida panhandle nesting subpopulation, occurring at Eglin Air Force Base and the beaches near Panama City, Florida (approximately 1,200 nests in 1998); and (4) a Yucatán nesting subpopulation, occurring on the eastern

Yucatán Peninsula, Mexico (Márquez 1990) (approximately 1,000 nests in 1998, according to TEWG, 2000). This biological opinion will focus on the northwest Atlantic subpopulations of loggerhead turtles, which occur in the action area. A nesting summary for Brevard County in which the action is proposed is included in Table 3. The majority of sea turtle nesting activity occurred during the summer months of June, July and August, with nesting activity occurring as early as March and as late as September. Between 1988 and 2005, County-wide loggerhead nesting ranged from a low of 13,181 in 1988 to a high of 34,596 in 1998 (Table 3). There were 19,339 documented loggerhead nests in 2005.

Table 3 Loggerhead Sea Turtle Nesting Data for Brevard County, 1988-2005

Year	Beach Length (km)	Loggerhead Turtle Nests
1988	77.9	13181
1989	97.4	19589
1990	98.3	27673
1991	98.5	28279
1992	101.0	25555
1993	100.1	20600
1994	102.8	28029
1995	103.4	31653
1996	105.2	28742
1997	110.0	25221
1998	108.0	34596
1999	108.0	34134
2000	108.0	32910
2001	115.2	26198
2002	115.2	23492
2003	115.2	22994
2004	103.2	15678
2005	115.2	19339

Although NMFS and FWS have not completed the administrative processes necessary to formally recognize populations or subpopulations of loggerhead turtles, these sea turtles are generally grouped by nesting locations. Based on the most recent reviews of the best scientific and commercial data on the population genetics of loggerhead sea turtles and analyses of their population trends (TEWG, 1998; TEWG 2000), NMFS and FWS treat these loggerhead turtle nesting aggregations as distinct subpopulations whose survival and recovery is critical to the survival and recovery of the species. Further, any action that appreciably reduced the likelihood that one or more of these nesting aggregations would survive and recover would appreciably reduce the species' likelihood of survival and recovery in the wild. Consequently, this biological opinion will focus on the four nesting aggregations of loggerhead turtles identified in the preceding paragraph (which occur in the action area) and treat them as subpopulations for the purposes of this analysis. Natal homing to the nesting

beach provides the genetic barrier between these subpopulations, preventing recolonization from turtles from other nesting beaches. The importance of maintaining these subpopulations in the wild is shown by the many examples of extirpated nesting assemblages in the world. In addition, recent fine-scale analysis of mtDNA work from Florida rookeries indicate that population separations begin to appear between nesting beaches separated by more than 50-100 km of coastline that does not host nesting (Francisco *et al.* 2000) and tagging studies are consistent with this result (Richardson 1982, Ehrhart 1979, LeBuff 1990, CMTTP: in NMFS SEFSC 2001). Nest site relocations greater than 100 km occur, but generally are rare (Ehrhart 1979; LeBuff 1974, 1990; CMTTP; Bjorndal *et al.* 1983: *in* NMFS SEFSC 2001).

The loggerhead turtles in the action area are likely to represent differing proportions of the four western Atlantic subpopulations. Although the northern nesting subpopulation produces about 9% of the loggerhead nests, they comprise more of the loggerhead sea turtles found in foraging areas from the northeastern U.S. to Georgia: between 25 and 59 percent of the loggerhead turtles in this area are from the northern subpopulation (NMFS SEFSC 2001; Bass *et al.*, 1998; Norrgard, 1995; Rankin-Baransky, 1997; Sears 1994, Sears *et al.*, 1995). In the Carolinas, the northern subpopulation is estimated to make up from 25% to 28% of the loggerheads (NMFS SEFSC 2001; Bass *et al.* 1998, 1999). About ten percent of the loggerhead turtles in foraging areas off the Atlantic coast of central Florida are from the northern subpopulation (Witzell *et al.*, in prep). In the Gulf of Mexico, most of the loggerhead turtles in foraging areas will be from the South Florida subpopulation, although the northern subpopulation may represent about 10% of the loggerhead sea turtles in the Gulf (Bass pers. comm). In the Mediterranean Sea, about 45 - 47 percent of the pelagic loggerheads are from the South Florida subpopulation and about two percent are from the northern subpopulation, while only about 51% originated from Mediterranean nesting beaches (Laurent *et al.*, 1998). In the vicinity of the Azores and Madiera Archipelagoes, about 19% of the pelagic loggerheads are from the northern subpopulation, about 71% are from the South Florida subpopulation, and about 11% are from the Yucatán subpopulation (Bolten *et al.*, 1998).

Natural History. Loggerhead turtles originating from the western Atlantic nesting aggregations are believed to lead a pelagic existence in the North Atlantic Gyre for as long as 7-12 years. Turtles in this life history stage are called "pelagic immatures" and are best known from the eastern Atlantic near the Azores and Madeira and have been reported from the Mediterranean as well as the eastern Caribbean (Bjorndal *et al.*, in press). Stranding records indicate that when pelagic immature loggerheads reach 40-60 cm SCL they recruit to coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic and Gulf of Mexico.

Benthic immatures have been found from Cape Cod, Massachusetts, to southern Texas, and occasionally strand on beaches in northeastern Mexico. Large benthic immature loggerheads (70-91 cm) represent a larger proportion of the strandings and in-water captures (Schroeder *et al.*, 1998) along the south and western coasts of Florida as compared with the rest of the coast, but it is not known whether the larger animals actually are more abundant in these areas or just more abundant within the area relative to the smaller turtles. Benthic immature loggerheads foraging in northeastern U.S. waters are known to migrate southward in the fall

as water temperatures cool (Epperly *et al.*, 1995; Keinath, 1993; Morreale and Standora, 1999; Shoop and Kenney, 1992), and migrate northward in spring. Given an estimated age at maturity of 21-35 years (Frazer and Ehrhart, 1985; Frazer and Limpus, 1998), the benthic immature stage must be at least 10-25 years long. NMFS SEFSC 2001 analyses conclude that juvenile stages have the highest elasticity and maintaining or decreasing current sources of mortality in those stages will have the greatest impact on maintaining or increasing population growth rates.

Like other sea turtles, the movements of loggerheads are influenced by water temperature. Since they are limited by water temperatures, sea turtles do not usually appear on the summer foraging grounds until June, but are found in Virginia as early as April. The large majority leaves the Gulf of Maine by mid-September but may remain in these areas until as late as November and December. Loggerhead sea turtles are primarily benthic feeders, opportunistically foraging on crustaceans and mollusks (Wynne and Schwartz, 1999). Under certain conditions they may also scavenge fish, particularly if they are easy to catch (e.g., caught in nets) (NMFS and USFWS, 1991).

Adult female loggerheads in the western Atlantic come ashore to nest primarily from North Carolina southward to Florida. Additional nesting assemblages occur in the Florida Panhandle and on the Yucatán Peninsula. Non-nesting, adult female loggerheads are reported throughout the U.S. and Caribbean Sea; however, little is known about the distribution of adult males who are seasonally abundant near nesting beaches during the nesting season. Aerial surveys suggest that loggerheads (benthic immatures and adults) in U.S. waters are distributed in the following proportions: 54% in the southeast U.S. Atlantic, 29% in the northeast U.S. Atlantic, 12% in the eastern Gulf of Mexico, and 5% in the western Gulf of Mexico (TEWG 1998).

Threats. Loggerhead sea turtles face a number of human-related threats in the marine environment, including oil and gas exploration, development, and transportation; marine pollution; trawl, purse seine, hook and line, gill net, pound net, longline, and trap fisheries (see below); underwater explosions; dredging, offshore artificial lighting; power plant entrapment; entanglement in debris; ingestion of marine debris; marina and dock construction and operation; boat collisions; and poaching.

Although loggerhead turtles are most vulnerable to pelagic longlines during their pelagic, immature life history stage, there is some evidence that benthic immatures may also be captured, injured, or killed by pelagic fishery operations. Recent studies have suggested that not all loggerhead turtles follow the model of circumnavigating the North Atlantic Gyre as pelagic immatures, followed by permanent settlement into benthic environments. Some may not totally circumnavigate the North Atlantic. In addition, some of these turtles may either remain in the pelagic habitat in the North Atlantic longer than hypothesized or they may move back and forth between pelagic and coastal habitats (Witzell in prep.). Any loggerhead turtles that follow this developmental model would be adversely affected by shark gill nets and shark bottom longlines set in coastal waters, in addition to pelagic longlines.

On their nesting beaches in the U.S., loggerhead turtles are threatened with beach erosion, armoring, and nourishment; artificial lighting; beach cleaning; increased human presence; recreational beach equipment; exotic dune and beach vegetation; predation by fire ants, raccoons, armadillos, opossums; and poaching. Elimination/control of these threats are especially important because, from a global perspective, the southeastern U.S. nesting aggregation is critical to the survival of this species: it is second in size only to the nesting aggregations in the Arabian Sea off Oman and represents about 35 and 40 percent of the nests of this species. The status of the Oman nesting beaches has not been evaluated recently, but they are located in a part of the world that is vulnerable to extremely disruptive events (e.g. political upheavals, wars, and catastrophic oil spills), the resulting risk facing this nesting aggregation and these nesting beaches is cause for considerable concern (Meylan *et al.*, 1995).

Loggerhead turtles also face numerous threats from weather and coastal processes. For example, there is a significant overlap between hurricane seasons in the Caribbean Sea and northwest Atlantic Ocean (June to November) and loggerhead turtle nesting season (March to November); hurricanes can have potentially disastrous effects on the survival of eggs in sea turtle nests. In 1992, Hurricane Andrew affected turtle nests over a 90-mile length of coastal Florida; all of the eggs were destroyed by storm surges on beaches that were closest to the eye of this hurricane (Milton *et al.*, 1992). On Fisher Island near Miami, Florida, 69% of the eggs did not hatch after Hurricane Andrew, probably because they were drowned by the storm surge. Nests from the northern subpopulation were destroyed by hurricanes, which made landfall in North Carolina in the mid to late 1990's. Sand accretion and rainfall that result from these storms can appreciably reduce hatchling success. These natural phenomena probably have significant, adverse effects on the size of specific year classes; particularly given the increasing frequency and intensity of hurricanes in the Caribbean Sea and northwest Atlantic Ocean.

Status and Population Trends. The loggerhead turtle was listed as threatened under the ESA on July 28, 1978. The most recent work updating what is known regarding status and trends of loggerhead sea turtles is contained in NMFS SEFSC 2001. The recovery plan for this species (NMFS and USFWS 1991) state that southeastern U.S. loggerheads can be considered for delisting if, over a period of 25 years, adult female populations in Florida are increasing and there is a return to pre-listing annual nest numbers totaling 12,800 for North Carolina, South Carolina, and Georgia combined. This equates to approximately 3,100 nesting females per year at 4.1 nests per female per season. NMFS SEFSC 2001 concludes, "...nesting trends indicate that the numbers of females associated with the South Florida subpopulation are increasing. Likewise, nesting trend analyses indicate potentially increasing nest numbers in the northern subpopulation" (TEWG 2000). However, NMFS SEFSC 2001 also cautions that given the uncertainties in survival rates (of the different life stages, particularly the pelagic immature stage), and the stochastic nature of populations, population trajectories should not be used now to quantitatively assess when the northern subpopulation may achieve 3,100 nesting females.

Several published reports have presented the problems facing long-lived species that delay sexual maturity in a world replete with threats from a modern, human population (Crouse *et al.*, 1987, Crowder *et al.*, 1994, Crouse 1999). In general, these reports concluded that animals that delay sexual maturity and reproduction must have high, annual survival as juveniles through adults to ensure that enough juveniles survive to reproductive maturity and then reproduce enough times to maintain stable population sizes. This general tenet of population ecology originated in studies of sea turtles (Crouse *et al.*, 1987, Crowder *et al.*, 1994, Crouse 1999). Heppell *et al.* (in prep.) specifically showed that the growth of the loggerhead sea turtle population was particularly sensitive to changes in the annual survival of both juvenile and adult sea turtles and that the adverse effects of the pelagic longline fishery on loggerheads from the pelagic immature phase appeared critical to the survival and recovery of the species. Crouse (1999) concluded that relatively small changes in annual survival rates of both juvenile and adult loggerhead sea turtles would adversely affect large segments of the total loggerhead sea turtle population.

The four major subpopulations of loggerhead sea turtles in the northwest Atlantic, northern, south Florida, Florida panhandle, and Yucatán are all subject to fluctuations in the number of young produced annually because of natural phenomena like hurricanes as well as human-related activities. Although sea turtle nesting beaches are protected along large expanses of the northwest Atlantic coast (in areas like Merrit Island, Archie Carr, and Hobe Sound National Wildlife Refuges), other areas along these coasts have limited or no protection and probably cause fluctuations in sea turtle nesting success. Sea turtles nesting in the southern and central counties of Florida can be affected by beach armoring, beach renourishment, beach cleaning, artificial lighting, predation, and poaching (NMFS & FWS 1991).

As discussed previously, the survival of juvenile loggerhead sea turtles is threatened by a completely different set of threats from human activity once they migrate to the ocean. Pelagic immature loggerhead sea turtles from these four subpopulations circumnavigate the North Atlantic over several years (Carr 1987, Bjorndal 1994). During that period, they are exposed to a series of long-line fisheries that include an Azorean long-line fleet, a Spanish long-line fleet, and various fleets in the Mediterranean Sea (Aguilar *et al.*, 1995, Bolten *et al.*, 1994, Crouse 1999). Based on their proportional distribution, the capture of immature loggerhead sea turtles in long-line fleets in the Azores and Madiera Archipelagoes and the Mediterranean Sea will have a significant, adverse effect on the annual survival rates of juvenile loggerhead sea turtles from the western Atlantic subpopulations, with a disproportionately large effect on the northern subpopulation that may be significant at the population level.

In waters off coastal U.S., a suite of fisheries in Federal and State waters threatens the survival of juvenile loggerhead sea turtles. Loggerhead turtles are captured, injured, or killed in shrimp fisheries off the Atlantic coast; along the southeastern Atlantic coast, loggerhead turtle populations are declining where shrimp fishing is intense off the nesting beaches (NRC 1990). Conversely these nesting populations do not appear to be declining where nearshore shrimping effort is low or absent. The management of shrimp harvest in the Gulf of Mexico demonstrates the correlation between shrimp trawling and impacts to sea turtles. Waters out to 200nm are closed to shrimp fishing off of Texas each year for approximately a three-month

period (mid- May through mid-July) to allow shrimp to migrate out of estuarine waters; sea turtle strandings decline dramatically during this period (NMFS, STSSN unpublished data). Loggerhead sea turtles are captured in fixed pound-net gear in the Long Island Sound, in pound-net gear and trawls in summer flounder and other finfish fisheries in the mid-Atlantic and Chesapeake Bay, in gill net fisheries in the mid-Atlantic and elsewhere, in fisheries for monkfish and for spiny dogfish, and in northeast sink gillnet fisheries. Witzell (1999) compiled data on capture rates of loggerhead and leatherback turtles in U.S. longline fisheries in the Caribbean and northwest Atlantic; the cumulative takes of these fisheries approach those of the U.S. shrimp fishing fleet (Crouse 1999, NRC 1990).

Based on the data available, it is not possible to estimate the size of the loggerhead population in the U.S. or its territorial waters. There is, however, general agreement that the number of nesting females provides a useful index of the species' population size and stability at this life stage. Nesting data collected on index nesting beaches in the U.S. from 1989-1998 represent the best dataset available to index the population size of loggerhead turtles. However, an important caveat for population trends analysis based on nesting beach data is that this may reflect trends in adult nesting females, but it may not reflect overall population growth rates. Given this, between 1989 and 1998, the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,016-89,034 annually, representing, on average, an adult female population of 44,780 [(nests/4.1) * 2.5]. On average, 90.7% of the nests were from the South Florida subpopulation, 8.5% were from the northern subpopulation, and 0.8% were from the Florida Panhandle subpopulation. There is limited nesting throughout the Gulf of Mexico west of Florida, but it is not known to what subpopulation they belong. Based on the above, there are only an estimated 3,800 nesting females in the northern loggerhead subpopulation. The status of this population, based on number of loggerhead nests, has been classified as stable or declining (TEWG 2000). Another consideration adding to the vulnerability of the northern subpopulation is that NMFS scientists estimate, using genetics data from Texas, South Carolina, and North Carolina in combination with juvenile sex ratios from those states, that the northern subpopulation produces 65% males, while the Florida subpopulation is estimated to produce 80% females (NMFS SEFSC 2001, Part I).

Critical Habitat. No critical habitat has been designated for loggerhead turtles.

3.2.3 Kemp's Ridley Turtle (*Lepidochelys kempii*)

Status and Population Trends. Of the seven extant species of sea turtles of the world, the Kemp's ridley has declined to the lowest population level. The Recovery Plan for the Kemp's Ridley Sea Turtle (*Lepidochelys kempi*) (USFWS and NMFS 1992) contains a description of the natural history, taxonomy, and distribution of the Kemp's ridley turtle. Kemp's ridleys nest in daytime aggregations known as *arribadas*. The primary arribada in the Gulf of Mexico is at Rancho Nuevo, a stretch of beach in Mexico. Most of the population of adult females nest in this single locality (Pritchard 1969). When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals (Hildebrand 1963). By the early 1970's, the world population estimate of mature female Kemp's ridleys had been reduced to 2,500-5,000 individuals. The population

declined further through the mid-1980s. Recent observations of increased nesting suggest that the decline in the ridley population has stopped and there is cautious optimism that the population is now increasing.

After unprecedented numbers of Kemp's ridley carcasses were reported from Texas and Louisiana beaches during periods of high levels of shrimping effort, NMFS established a team of population biologists, sea turtle scientists, and managers, known as the Turtle Expert Working Group (TEWG) to conduct a status assessment of sea turtle populations. Analyses conducted by the group have indicated that the Kemp's ridley population is in the early stages of recovery; however, strandings in some years have increased at rates higher than the rate of increase in the Kemp's population (TEWG 1998).

The TEWG (1998) developed a population model to evaluate trends in the Kemp's ridley population through the application of empirical data and life history parameter estimates chosen by the TEWG. Model results identified three trends in benthic immature Kemp's ridleys. Benthic immatures are those turtles that are not yet reproductively mature but have recruited to feed in the nearshore benthic environment where they are available to nearshore mortality sources that often result in strandings. Benthic immature ridleys are estimated to be 2-9 years of age and 20-60 cm in length. Increased production of hatchlings from the nesting beach beginning in 1966 resulted in an increase in benthic ridleys that leveled off in the late 1970s. A second period of increase followed by leveling occurred between 1978 and 1989 as hatchling production was further enhanced by the cooperative program between the U.S. Fish and Wildlife Service (FWS) and Mexico's Instituto Nacional de Pesca to increase the nest protection and relocation program in 1978. A third period of steady increase, which has not leveled off to date, has occurred since 1990 and appears to be due to the greatly increased hatchling production and an apparent increase in survival rates of immature turtles beginning in 1990 due, in part, to the introduction of turtle excluder devices (TEDs). Adult ridley numbers have now grown from a low of approximately 1,050 adults producing 702 nests in 1985, to greater than 3,000 adults producing 1,940 nests in 1995 and about 3,400 nests in 1999.

The TEWG (1998) was unable to estimate the total population size and current mortality rates for the Kemp's ridley population. However, the TEWG listed a number of preliminary conclusions. The TEWG indicated that the Kemp's ridley population appears to be in the early stage of exponential expansion. Over the period 1987 to 1995, the rate of increase in the annual number of nests accelerated in a trend that would continue with enhanced hatchling production and the use of TEDs. Nesting data indicated that the number of adults declined from a population that produced 6,000 nests in 1966 to a population that produced 924 nests in 1978 and a low of 702 nests in 1985. This trajectory of adult abundance tracks with trends in nest abundance from an estimate of 9,600 in 1966 to 1,050 in 1985. The TEWG estimated that in 1995 there were 3,000 adult ridleys. The increased recruitment of new adults is illustrated in the proportion of neophyte, or first time nesters, which has increased from 6% to 28% from 1981 to 1989 and from 23% to 41% from 1990 to 1994. The population model in the TEWG projected that Kemp's ridleys could reach the intermediate recovery goal identified in the Recovery Plan of 10,000 nesters by the year 2020 if the assumptions of age to sexual maturity and age specific survivorship rates plugged into their model are correct. It

determined that the data reviewed suggested that adult Kemp's ridley turtles were restricted somewhat to the Gulf of Mexico in shallow near shore waters, and benthic immature turtles of 20-60 cm straight line carapace length are found in nearshore coastal waters including estuaries of the Gulf of Mexico and the Atlantic.

The TEWG (1998) identified an average Kemp's ridley population growth rate of 13% per year between 1991 and 1995. Total nest numbers have continued to increase. However, the 1996 and 1997 nest numbers reflected a slower rate of growth, while the increase in the 1998 nesting level has been much higher and decreased in 1999. The population growth rate does not appear as steady as originally forecasted by the TEWG, but annual fluctuations, due in part to irregular inter-nesting periods, are normal for other sea turtle populations. Also, as populations increase and expand, nesting activity would be expected to be more variable.

The area surveyed for ridley nests in Mexico was expanded in 1990 due to destruction of the primary nesting beach by Hurricane Gilbert. The TEWG (1998) assumed that the increased nesting observed particularly since 1990 was a true increase, rather than the result of expanded beach coverage. Because systematic surveys of the adjacent beaches were not conducted prior to 1990, there is no way to determine what proportion of the nesting increase documented since that time is due to the increased survey effort rather than an expanding ridley nesting range. As noted by TEWG, trends in Kemp's ridley nesting even on the Rancho Nuevo beaches alone suggest that recovery of this population has begun but continued caution is necessary to ensure recovery and to meet the goals identified in the Kemp's Ridley Recovery Plan.

Natural History. Juvenile Kemp's ridleys use northeastern and mid-Atlantic coastal waters of the U.S. Atlantic coastline as primary developmental habitat during summer months, with shallow coastal embayments serving as important foraging grounds. Post-pelagic ridleys feed primarily on crabs, consuming a variety of species, including *Callinectes* sp., *Ovalipes* sp., *Libinia* sp., and *Cancer* sp. Mollusks, shrimp, and fish are consumed less frequently (Bjorndal, 1997). Juvenile ridleys migrate south as water temperatures cool in fall, and are predominantly found in shallow coastal embayments along the Gulf Coast during fall and winter months.

Ridleys found in mid-Atlantic waters are primarily post-pelagic juveniles averaging 40 centimeters in carapace length, and weighing less than 20 kilograms (Klinger and Musick 1995). Next to loggerheads, they are the second most abundant sea turtle in Virginia and Maryland waters, arriving in these areas during May and June, and migrating to more southerly waters from September to November (Keinath *et al.*, 1987; Musick and Limpus, 1997). In the Chesapeake Bay, ridleys frequently forage in shallow embayments, particularly in areas supporting submerged aquatic vegetation (Lutcavage and Musick, 1985; Bellmund *et al.*, 1987; Keinath *et al.*, 1987; Musick and Limpus, 1997). The juvenile population in Chesapeake Bay is estimated to be 211 to 1,083 turtles (Musick and Limpus, 1997).

Research being conducted by Texas A&M University has resulted in the intentional live-capture of hundreds of Kemp's ridleys at Sabine Pass and the entrance to Galveston Bay. Between 1989 and 1993, Galveston NMFS Laboratory staff tracked 50 of these turtles using

satellite and radio telemetry. The tracking study was designed to characterize sea turtle habitat and to identify small and large-scale migration patterns. Preliminary analysis of the data collected during these studies suggests that subadult Kemp's ridleys stay in shallow, warm, nearshore waters in the northern Gulf of Mexico until cooling waters force them offshore or south along the Florida coast (Renaud, NMFS Galveston Laboratory, pers. comm.).

Threats. Observations in the northeast otter trawl fishery, pelagic longline fishery, and southeast shrimp and summer flounder bottom trawl fisheries have recorded takes of Kemp's ridley turtles. As with loggerheads, a large number of Kemp's ridleys are taken in the southeast shrimp fishery each year. Kemp's ridleys were also affected by the apparent large-mesh gillnet interaction that occurred in spring off of North Carolina. A total of five Kemp's ridley carcasses were recovered from the same North Carolina beaches where 277 loggerhead carcasses were found. This is expected to be a minimum count of the number of Kemp's ridleys that were killed or seriously injured as a result of the fishery interaction since it is unlikely that all carcasses washed ashore. Stranding events illustrate the vulnerability of Kemp's ridley and loggerhead turtles to the impacts of human activities in nearshore Gulf of Mexico waters as well (TEWG 1998). While many of the stranded turtles observed in recent years in Texas and Louisiana have been incidentally taken in the shrimp fishery, other sources of mortality, such as those observed in the northeastern and southeastern Atlantic zones, exist in these waters.

Critical Habitat. No critical habitat has been designated for the Kemp's ridley turtle.

3.2.4 Leatherback Turtle (*Dermochelys coriacea*)

Species Description and Distribution. The leatherback is the largest living turtle. Leatherback sea turtles are widely distributed throughout the oceans of the world, and are found throughout waters of the Atlantic, Pacific, Caribbean, and the Gulf of Mexico.

Leatherback turtles undertake the longest migrations of any other sea turtle and exhibit the broadest thermal tolerances (NMFS and USFWS 1998). Leatherback turtles are able to inhabit intensely cold waters for a prolonged period of time because leatherbacks are able to maintain body temperatures several degrees above ambient temperatures. Leatherback turtles are typically associated with continental shelf habitats and pelagic environments, and are sighted regularly in offshore waters (>328 ft). Leatherback turtles regularly occur in deep waters (>328 ft), and an aerial survey study in the north Atlantic Ocean sighted leatherback turtles in water depths ranging from 3 to 13,618 ft, with a median sighting depth of 131.6 ft (CeTAP 1982). This same study found leatherbacks in waters ranging from 7 to 27.2°C. Leatherback nesting data for Brevard County is included in Table 4.

Table 4 Leatherback Sea Turtle Nesting Data for Brevard County, 1988-2005

Year	Beach Length (km)	Leatherback Turtle Nests
1988	77.9	0
1989	97.4	1
1990	98.3	0
1991	98.5	3
1992	101.0	2
1993	100.1	1
1994	102.8	5
1995	103.4	4
1996	105.2	16
1997	110.0	11
1998	108.0	30
1999	108.0	43
2000	108.0	22
2001	115.2	61
2002	115.2	18
2003	115.2	68
2004	103.2	25
2005	115.2	68

Life History Information. Although leatherbacks are a long lived species (> 30 years), they are somewhat faster to mature than loggerheads, with an estimated age at sexual maturity reported as about13-14 years for females, and an estimated minimum age at sexual maturity of 5-6 years, with 9 years reported as a likely minimum (Zug and Parham 1996).

Leatherback sea turtles are predominantly distributed pelagically where they feed on jellyfish such as *Stomolophus, Chryaora,* and *Aurelia.* Leatherbacks are deep divers, with recorded dives to depths in excess of 1000 m, but they may come into shallow waters if there is an abundance of jellyfish nearshore. They also occur annually in places such as Cape Cod and Narragansett bays during certain times of the year, particularly the fall.

Listing status. The leatherback was listed as endangered on June 2, 1970 and a recovery plan was issued in 1998. Leatherback turtles are included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, which effectively bans trade.

Population status and trends. Globally, leatherback turtle populations have been decimated worldwide. The global leatherback turtle population was estimated to number approximately 115,000 adult females in 1980 (Pritchard 1982), but only 34,500 in 1995 (Spotila *et al.* 1996). The decline can be attributed to many factors including fisheries as well as intense

exploitation of the eggs (Ross 1979). On some beaches nearly 100% of the eggs laid have been harvested. Spotila *et al.* (1996) record that adult mortality has also increased significantly, particularly as a result of driftnet and longline fisheries.

The status of the Atlantic population is not clear. In 1996, it was reported to be stable, at best (Spotila 1996), but numbers in the Western Atlantic at that writing were reported to be on the order of 18,800 nesting females. According to Spotila, the Western Atlantic population currently numbers about 15,000 nesting females, whereas current estimates for the Caribbean (4,000) and the Eastern Atlantic (i.e. off Africa, numbering ~ 4,700) have remained consistent with numbers reported by Spotila *et al.* in 1996. Between 1989 and 1995, marked leatherback returns to the nesting beach at St. Croix averaged only 48.5%, but that the overall nesting population grew (McDonald, et. al 1993). This is in contrast to a Pacific nesting beach at Playa Grande, Costa Rica, where only 11.9% of turtles tagged in 1993-94 and 19.0% of turtles tagged in 1994-95 returned to nest over the next five years. Characterizations of this population suggest that it has a very low likelihood of survival and recovery in the wild under current conditions.

Spotila *et al.* (1996) describe a hypothetical life table model based on estimated ages of sexual maturity at both ends of the species= natural range (5 and 15 years). The model concluded that leatherbacks maturing in 5 years would exhibit much greater population fluctuations in response to external factors than would turtles that mature in 15 years. Furthermore, the simulations indicated that leatherbacks could maintain a stable population only if both juvenile and adult survivorship remained high, and that if other life history stages (i.e. egg, hatchling, and juvenile) remained static, stable leatherback populations could not withstand an increase in adult mortality above natural background levels without decreasing.

Threats. The primary threats to leatherback turtles are entanglement in fishing gear (e.g., gillnets, longlines, lobster pots, weirs), boat collisions, and ingestion of marine debris (NMFS and USFWS 1997). The foremost threat is the number of leatherback turtles killed or injured in fisheries. Spotila, *et al.* (2000) states that a conservative estimate of annual leatherback fishery-related mortality (from longlines, trawls and gillnets) in the Pacific during the 1990s is 1,500 animals. He estimates that this represented about a 23% mortality rate (or 33% if most mortality was focused on the East Pacific population). As noted above, leatherbacks normally live at least 30 years, usually maturing at about 12-13 years. Such long-lived species cannot withstand such high rates of anthropogenic mortality.

3.2.5 Site Specific Sea Turtle Information

Sea turtles use the habitats offshore of Brevard County to different degrees during different stages of their life cycle. During the summer months hatchlings utilize this habitat as a corridor to deeper waters farther off the coast. Juvenile and sub-adult turtles use the nearshore and offshore habitats as a foraging area, while adult turtles are present year round with seasonally high abundances during the breeding season.

Green turtles are found in a variety of habitats in the waters in and adjacent to Brevard County depending on their developmental stage (Redfoot 1997). After hatching, they utilize the pelagic habitat where they spend the next two to three years of their lives (Frazer and Ehrhart 1985; Carr 1987) and subsequently take up residence as juveniles and subadults in coastal lagoons, estuaries, and near-shore reefs (Redfoot 1997). They eventually migrate to foraging habitats and migrate to nesting beaches to reproduce.

Juvenile green sea turtles have been documented to forage in the Port since the early 1990s where the algal communities associated with granite riprap boulders serve as one of their primary sources of food and is likely what attracts them into the Port (Dial Cordy 2007). In particular, waters within the Trident Turning Basin were previously identified as foraging areas for juvenile sea turtles (Ehrhart and Redfoot 1994; Ehrhart and Redfoot 1997; Redfoot 1997; Redfoot and Ehrhart 2002; Ehrhart and Redfoot 2005; Ehrhart and Redfoot 2006; Dial Cordy 2007). In addition to the Trident Turning Basin, many areas within Port Canaveral (including the riprap area that may be affected by the proposed project) are rocky riprap areas similar to those found in the Trident Turning Basin, and have potential as foraging habitat for juvenile green turtles.

Surveys of turtle presence along the riprap areas within the Port were conducted in August 2005, February 2006 and June 2006 (Dial Cordy 2007). During the surveys in August 2005 and February 2006 the majority of juvenile sea turtles were observed along the riprap between the Main Turning Basin and Trident Turning Basin , it has been previously shown that significant numbers of sea turtles also use the Trident basin for foraging, and this area was not available for observation during these surveys. While there is likely to be some exchange between this assemblage and other developmental habitats, we are not aware of any extensive areas of suitable habitat immediately adjacent to Port Canaveral, and turtles may remain resident in the Port for considerable lengths of time. Some turtles in previous studies have been caught over 20 times over a period of up to 12 years (Dial Cordy 2007). Based on these past and present observations it should be assumed that many of the turtles observed utilizing the riprap areas along the main Port channel also use the riprap foraging areas in the adjacent Trident Turning Basin. This additional foraging habitat is available to support juvenile turtle populations in the Port during the time between removal of the existing riprap and the time that the new riprap would be recolonized by algal species (Dial Cordy 2007).

Re-colonization of the riprap by the algal communities should begin quickly after re-placement of new riprap along the shoreline. Previous studies have shown rapid colonization (<2 weeks) of marine algal species on bare rock substrates (Littler et. al 1987). These early successional species will allow more mature successional species to colonize these rock riprap areas. Adjacent algal communities will play a role in helping to recolonize the now bare rock substrates and these habitats should start rebounding quickly following placement of riprap. Therefore, it is not likely that the proposed project would have a significant impact on foraging juvenile sea turtles.

Dredging is not expected to have a direct affect on sea turtles. Hydraulic dredging is not known to take turtles, so no dredging blackout period would be required (NMFS and USACE 2003). No blackout date would likely be in effect for clamshell dredging, as well. Hopper

dredging is not permitted for use in the project area. The majority of the dredged material would be placed in the authorized Canaveral ODMDS, although some of the material suitable for construction or other beneficial use will be temporarily stockpiled on three authorized upland disposal areas located north of the project area. If any beach quality sand is encountered during the dredging process, it may be placed in the authorized nearshore disposal area contingent on approval from the appropriate agencies.

Potential Impacts. The potential for the proposed project to adversely affect juvenile sea turtles is due to the loss of foraging habitat within Canaveral Harbor. However, there is a substantial amount of additional foraging habitat within the harbor, and the proposed action would only temporarily remove a section of the habitat. Therefore, the proposed action is likely to affect but not likely to adversely affect sea turtles.

3.3 Right Whale (*Eubalaena glacialis)*

Geographic Range. The North Atlantic right whale has been listed as endangered under the Endangered Species Act (ESA) since 1972. The western stock of the North Atlantic right whale population ranges from wintering and calving grounds in the coastal waters of the southeastern United States to summer feeding and nursery grounds in New England waters and northward to the Bay of Fundy and the Scotian Shelf. Offshore surveys flown off the coast of Florida and southeastern Georgia from 1996 to 2001 had three sightings in 1996, one in 1997, 13 in 1998, six in 1999, 11 in 2000, and six in 2001. The western North Atlantic population size was estimated to be 291 individuals in 1998 (NMFS 2005).

Habitat/Behavior. The North Atlantic right whale primarily occurs in coastal or shelf waters. Five areas of "high use" were identified in the Recovery Plan and include coastal Florida and Georgia, from the Sebastian Inlet, Florida to the Altamaha River, Georgia, and this area was designated as critical habitat in 1994. Known wintering occurs along the southeastern U.S. coast, where calving occurs from December through March. Gestation lasts from 357 to 396 days in southern right whales (NMFS 2005), and weaning has been reported to last 8 to 17 months. Calf production over the past 20 years has averaged around 11 individuals per year (NMFS 2005). The calving interval for right whales is between 2 and 7 years, with a mean period of 3.12 to 3.67 years. The 2005-2006 calving season resulted in the birth of 19 calves, five of which were to new mothers (Georgia Environmental Policy Institute 2006).

Threats. Ship collisions and fishing gear entanglements are the most common anthropogenic causes of mortality in the western North Atlantic right whale. Other potential threats include habitat degradation, noise, contamination, underwater bombing activities, climate and ecosystem change, and commercial exploitation (NMFS 2005).

The greatest known current cause of right whale mortality in the western North Atlantic is collision with ships (NMFS 2005). Of the 45 confirmed deaths of right whales between 1970 and 1999, 16 are known to have been caused by ship strikes and two additional collisions were determined to be possibly fatal (Knowlton and Kraus 2001). In the period between 1999 and 2003, 18 verified right whale mortalities occurred, of which five were due to ship strikes

(Cole, *et al* 2005). None of the incidents occurred in the area near Port Canaveral. Only one of the incidents occurred in the Jacksonville area (January 2003) and the death was most likely caused by gear ingestion. Recently, however, there have been two documented right whale deaths in the Jacksonville region. One calf died as a result of lacerations from a large propeller (first reported off Jacksonville on January 10, 2006), and a second calf died from entanglement in line and gillnet gear (reported off Jacksonville Beach on January 21, 2006). A severed fluke was recovered east of Jacksonville, leading authorities to believe that a third right whale calf died, but no carcass has been recovered (Georgia Environmental Policy Institute 2006). Genetic sampling is currently underway to determine the lineage of the probable fatality. Additional non-fatal incidents recently occurred off Amelia Island (January 10, 2006) and Cumberland Island, GA (March 11, 2006).

The entanglement death prompted NMFS to issue a temporary ruling prohibiting gillnet fishing in southeast waters from Savannah to Sebastian Inlet between February 15 and March 31, 2006. It is unknown whether or not this ban will be extending during future years.

Potential Impacts. The potential for the proposed project to adversely affect the North Atlantic right whale would occur from cargo and cruise ship traffic associated with the Port. However, the current and projected ship traffic would not increase in response to the proposed action. In fact, it is likely that the amount of time ships spend in the designated critical habitat area in the nearshore area would decrease as a result of more efficient operations.

4.0 EFFECT DETERMINATION

The Port has determined that the proposed navigations improvements is not likely to adversely affect listed species within the action area and requests concurrence from NMFS.

5.0 LITERATURE CITED

Aguilar, R., J. Mas, and X. Pastor. 1995. Impact of Spanish swordfish longline fisheries on the loggerhead sea turtle, *Caretta caretta*, population in the western Mediterranean. U.S. Dep. Commer. NOAA Tech. Memo. NMFS-SEFSC-361:1-6.

Bass, A.L., S.P. Epperly, J. Braun, D.W. Owens, and R.M. Patterson. 1998. Natal origin and sex ratios of foraging sea turtles in Pamlico-Albemarle Estuarine Complex. U.S. Dep. Commer. NOAA Tech. Memo. NMFS-SEFSC-415:137-138.

Bass, A.L. 1999. Genetic analysis of juvenile loggerheads captured at the St. Lucie Power Plant. A report to National Marine Fisheries Service and Quantum Resources, Inc.

Bellmund, S. A.; Musick, J. A.; Klinger, R. C.; Byles, R. A.; Keinath, J. A. and Barnard, D. E., 1987. Ecology of sea turtles in Virginia. The Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, VA; 1987, Special Scientific Report No. 119, 48p.

Bjorndal, K.A. 1997. Foraging ecology and nutrition of sea turtles. Pages 199-233 *In*: Lutz, P.L. and J.A. Musick, eds., The Biology of Sea Turtles. CRC Press, New York. 432 pp.

Bjorndal, K.A., A.B. Bolten, J. Gordon, and J.A. Camiñas. 1994. *Caretta caretta* (loggerhead) growth and pelagic movement. Herp. Rev. 25:23-24.

Bolten, A.B., K.A. Bjorndal, and H.R. Martins. 1994. Life history model for the loggerhead sea turtle (*Caretta caretta*) populations in the Atlantic: Potential impacts of a longline fishery. U.S. Dep. Commer. NOAA Tech. Memo. NMFS-SWFSC-201:48-55.

Bolten, A.B., K.A. Bjorndal, H.R. Martins, T. Dellinger, M.J. Biscoito, S.E. Encalada, and B.W. Bowen. 1998. Transatlantic development migrations of loggerhead sea turtles demonstrated by mtDNA sequence analysis. Ecol. Applic. 8:1-7.

Bowen, B.W., J.C. Avise, J.I. Richardson, A.B. Meylan, D. Margaritoulis, and S.R. Hopkins-Murphy. 1993. Population structure of loggerhead sea turtles (*Caretta caretta*) as indicated by mitochondrial DNA haplotypes. Evol. 48:1820-1828.

Carr, A. 1987. New perspectives on the pelagic stage of sea turtle development. Conserv. Biol. 1: 103-121.

Carr, A.F., M.H. Carr, and A.B. Meylan. 1978. The ecology and migrations of sea turtles. The western Caribbean green turtle colony. Bull. Amer. Mus. Nat. Hist. 162(1): 1-46.

Carr, A.F. and L. Ogren. 1960. The ecology and migrations of sea turtles. The green turtle in the Caribbean Sea. Bull. Amer. Mus. Nat. Hist. 131(1): 1-48.

Christian, E.A., and J.B. Gaspin. 1974. Swimmer safe standards from underwater explosions. Navy Science Assistance Program Project no. PHP-11-73.

Cole, T.V.N., D.L. Hartley, R.L. Merrick. 2005. Mortality and serious injury determinations for large whale stocks along the eastern seaboard of the Unites States, 1999-2003. *U.S. Dep. Commer., Northeast Fish Sci. Cent. Ref. Doc.* 05-08. 18pp.

Crouse, D.T. 1999. The consequences of delayed maturity in a human-dominated world. In: Musick, J. A. Editor, Life in the Slow Lane: Ecology and Conservation of Long-Lived Marine Animals, American Fisheries Society Symposium 23. American Fisheries Society, Bethesda, MD. 260 pp.; 1999, p. 195-202.

Crouse, D.T., L.B. Crowder, and H. Caswell. 1987. A stage-based population model for loggerhead sea turtles and implications for conservation. Ecol. 68:1412-1423.

Crowder, L.B., D.T. Crouse, S.S. Heppell. and T.H. Martin. 1994. Predicting the impact of turtle excluder devices on loggerhead sea turtle populations. Ecol. Applic. 4:437-445.

Dial Cordy and Associates Inc. 2007. Port Canaveral Sea Turtle Foraging Report, Port Canaveral Navigation Improvements, Port Canaveral, FL

Ehrhart, L.M. 1979. A survey of marine turtle nesting at Kennedy Space Center, Cape Canaveral Air Force Station, North Brevard County, Florida, 1-122. Unpublished report to the Division of Marine Fisheries, St. Petersburg, Florida, Florida Department of Natural Resources.

Ehrhart, L. M. and W.E. Redfoot. 1994. Assessment of green turtle relative abundance and behavior in Cape Canaveral AFS Port Area, Trident Submarine Basin. Final Report to USAE Waterways Experiment Station, Coastal Ecology Group, Environmental Laboratory. 40 pp.

Ehrhart, L.M., W.E. Redfoot, and D.A. Bagley. 1996. A study of the population ecology of in-water marine turtle populations on the east-central Florida coast from 1982-96. Comprehensive final report to NOAA, the National Marine Fisheries Service, pp. 163

Ehrhart, L. M. and W.E. Redfoot. 1997. Assessment of the species composition of marine algae utilized by juvenile green turtles in the Trident Submarine Basin, Cape Canaveral Air Force Station, Florida. Final Report to USAE Waterways Experiment Station, Coastal Ecology Group, Environmental Laboratory. 41 pp

Ehrhart, L.M. and W.E. Redfoot. 2002. The structure, size, and feeding ecology of the unique juvenile green turtle population utilizing the Trident Turning Basin, Cape Canaveral Air Force Station, Florida as developmental habitat. Comprehensive Report to Specpro Inc. 37 pp.

Ehrhart, L.M. and W.E. Redfoot. 2005. Final Report: Assessment of the Status and Population Dynamics of Marine Turtles in the Trident Submarine Basin at Port Canaveral, Florida in 2003 and 2004.

Ehrhart, L.M., W.E. Redfoot. 2006. Final Report to Patrick Air Force Base Environmental Planning. Assessment of the Status and Population Dynamics of Marine Turtles in the Trident Submarine Basin at Port Canaveral, Florida in 2004 and 2005. Prepared for the United States Air Force, Patrick Air Force Base. Air Force Contract No. FA252104P0269.

Epperly, S.P., J. Braun, A.J. Chester, F.A. Cross, J. Merriner, and P.A. Tester. 1995. Winter distribution of sea turtles in the vicinity of Cape Hatteras and their interactions with the summer flounder trawl fishery. Bull. Mar. Sci. 56(2):519-540.

Frazer, N.B., and L.M. Ehrhart. 1985. Preliminary growth models for green, *Chelonia mydas*, and loggerhead, *Caretta caretta*, turtles in the wild. Copeia 1985:73-79.

Frazer, N.B., C.J. Limpus, and J.L. Greene. 1994. Growth and age at maturity of Queensland loggerheads. U.S. Dep. of Commer. NOAA Tech. Mem. NMFS-SEFSC-351: 42-45.

Hirth, H.F. 1971. Synopsis of biological data on the green sea turtle, *Chelonia mydas*. FAO Fisheries Synopsis No. 85: 1-77.

Keinath, J.A. 1993. Movements and behavior of wild and head-started sea turtles. Ph.D. Diss. College of William and Mary, Gloucester Point, VA., 206 pp.

Keinath, J.A; Musick, J. A.; Byles, R. A. 1987. Aspects of the biology of Virginia's sea turtles: 1979-1986. Virginia J. Sci.; 1987, v. 38, no. 2, p. 81

Klinger, R. C.; Musick, J. A. 1985. Age and growth of loggerhead turtles (Caretta caretta) from Chesapeake Bay. Copeia; 1995, v. 1995, no. 1, p. 204-209.

Knowlton, A.R. and S.D. Kraus. 2001. Mortality and serious injury of the northern right whales (*Eubalaena glacialis*) in the western North Atlantic Ocean. The Journal of Cetacean Research and Management Special Issue 2:193-208.

Konya, C. J. 2001. Recommendations for blasting at Port Everglades Harbor. Prepared for US Army Corps of Engineers, Jacksonville District. Precision Blasting Services. Montville, Ohio. 45 pp.

Last, P.R. and J.D. Stevens. 1994. Sharks and Rays of Australia. CSIRO Australia, East Melbourne, Australia, 513 p. + 84 pl.

Laurent, L.; P. Casale; M.N. Bradai; B.J. Godley; G. Gerosa, A.C. Broderick, W. Schroth, B. Schierwater, A.M. Levy, D. Freggii, E.M. Abd El-Mawla, D.A. Hadoud, H.E. Gomati, M. Domingo, M. Hadjichristophorou, L. Kornaraky, F. Demirayak, and Ch. Gautier. 1998. Molecular resolution of marine turtle stock composition in fishery bycatch: a case study in the Mediterranean. Molecular Ecol. 7:1529-1542.

Littler, M.M; D. S. Littler.; J.N. Norris; and K.E. Buchler. 1987. Recolonization of Algal Communities Following the Grounding of the Freighter Wellwood on Molasses Reef, Key Largo National Marine Sanctuary. Phase 2: Suvey of Algae and Experimental Design. Report to NOAA U.S. Department of Commerce. NOAA Technical Memoranda Series NOS/MEMD 15

Lutcavage, M.; Musick, J. A. 1985. Aspects of the biology of sea turtles in Virginia. COPEIA; (1985), no. 2, pp. 449-456

Márquez-M., R. 1990. FAO Species Catalogue, Vol. 11. Sea Turtles of the World, An Annotated and Illustrated Catalogue of Sea Turtle Species Known to Date. FAO Fisheries Synopsis, 125(11): 81 pp.

Meylan, A., B. Schroeder, and A. Mosier. 1995. Sea turtle nesting activity in the state of Florida. Fla. Mar. Res. Publ. 52:1-51.

Milton, S. L.; Leone-Kabler, S.; Schulman, A. A.; Lutz, P. L. 1994. Effects of Hurricane Andrew on the sea turtle nesting beaches of South Florida. Bulletin of Marine Science; v. 54, no. 3, p. 974-981.

Morreale, S.J., and E.A. Standora. 1998. Vying for the same resources: potential conflict along migratory corridors. U.S. Dep. Commer. NOAA Tech. Memo. NMFS-SEFSC-415:69.

Musick, J.A. and C.J. Limpus. 1997. Habitat utilization and migration in juvenile sea turtles. Pp. 137-164 *In*: Lutz, P.L., and J.A. Musick, eds., The Biology of Sea Turtles. CRC Press, New York. 432 pp.

National Research Council (NRC). 1990. Decline of the Sea Turtles: Causes and Prevention. Committee on Sea Turtle Conservation. Natl. Academy Press, Washington, D.C. 259 pp.

NMFS. 1997. Endangered Species Act Section 7 Consultation on the Continued Hopper Dredging of Channels and Borrow Areas in the Southeastern United States. Biological Opinion. September 25.

National Marine Fisheries Service (2005) Recovery Plan for the North Atlantic Right Whale (*Eubalaena glacialis*) Prepared by National Marine Fisheries Service, Silver Spring, Maryland.

NMFS Southeast Fisheries Science Center (SEFSC). 2001. Stock assessments of loggerhead and leatherback sea turtles and an assessment of the impact of the pelagic longline fishery on the loggerhead and leatherback sea turtles of the Western North Atlantic. U.S. Department of Commerce, National Marine Fisheries Service, Miami, FL, SEFSC Contribution PRD-00/01-08; Parts I-III and Appendices I-V1.

NMFS and U.S. Fish and Wildlife Service (USFWS). 1991. Recovery plan for U.S. population of loggerhead turtle. National Marine Fisheries Service, Washington, D.C. 64 pp.

NMFS and USFWS. 1992. Recovery Plan for Kemp's Ridley Sea Turtle (*Lepidochelys kempii*). National Marine Fisheries Service, Washington, D.C. 40pp.

NMFS and USFWS. 1995. Status Reviews for Sea Turtles Listed under the Endangered Species Act of 1973. National Marine Fisheries Service, Silver Spring, Maryland.

Norrgard, J. 1995. Determination of stock composition and natal origin of a juvenile loggerhead sea turtle population (*Caretta caretta*) in Chesapeake Bay using mitochondrial DNA analysis. M.A. Thesis. College of WIlliam and Mary, Williamsburg, Va., 47pp.

Peters, J.A. 1954. The amphibians and reptiles of the coast and coastal sierra of Michoacan, Mexico. Occ. Pap. Mus. Zool. 554:1-37.

Pritchard, P.C.H. 1997. Evolution, phylogeny and current status. Pp. 1-28 *In*: The Biology of Sea Turtles. Lutz, P., and J.A. Musick, eds. CRC Press, New York. 432 pp.

Rankin-Baransky, K.C. 1997. Origin of loggerhead turtles (*Caretta caretta*) in the western North Atlantic as determined by mt DNA analysis. M.S. Thesis, Drexel University, Philadelphia Pa.

Redfoot, W. E. 1997. Population Structure and Feeding Ecology of Green Turtles Utilizing the Trident Submaring Basin, Cape Canaveral, Florida as Developmental Habitat, Master Thesis, University of Central Florida, Orlando, FL.

Ross, J.P., and M.A. Barwani. 1982. Historical decline of loggerhead, ridley, and leatherback sea turtles. In K.A. Bjorndal (ed.), Biology and Conservation of Sea Turtles. Smithsonian Inst. Press, Washington, D.C. 583 pp.

Schroeder, B.A., A.M. Foley, B.E. Witherington, and A.E. Mosier. 1998. Ecology of marine turtles in Florida Bay: Population structure, distribution, and occurrence of fibropapilloma U.S. Dep. Commer. NOAA Tech. Memo. NMFS-SEFSC-415:265-267.

Sears, C.J. 1994. Preliminary genetic analysis of the population structure of Georgia loggerhead sea turtles. U.S. Dep. Commer. NOAA Tech. Memo. NMFS-SEFSC-351:135-139.

Sears, C.J., B.W. Bowen, R.W. Chapman, S. B. Galloway, S.R. Hopkins-Murohy, and C.M. Woodley. 1995. Demographic composition of the feeding population of juvenile loggerhead sea turtles (*Caretta caretta*) off Charleston, South Carolina: Evidence from mitochondrial DNA markers. Mar. Biol. 123:869-874.

Shoop, C.R. and R.D. Kenney. 1992. Seasonal distributions and abundance of loggerhead and leatherback sea turtles in waters of the northeastern United States. Herpetol. Monogr. 6: 43-67.

Spotila, J.R., A.E. Dunham, A.J. Leslie, A.C. Steyermark, P.T. Plotkin, and F.V. Paladino. 1996. Worldwide population decline in *Dermochelys coriacea*: are leatherback turtles going extinct? Chelonian Conservation and Biology 2(2):209-222.

Spotila, J.R., R.D. Reina, A.C. Steyermark, P.T. Plotkin, and F.V. Paladino. 2000. Pacific leatherback turtles face extinction. Nature 405:529-530.

Turtle Expert Working Group (TEWG). 1998. An assessment of the Kemp's ridley (*Lepicochelys kempii*) and loggerhead (*Caretta caretta*) sea turtle populations in the Western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-409. 96 pp.

Turtle Expert Working Group (TEWG). 2000. Assessment update for the Kemp's ridley and loggerhead sea turtle populations in the western North Atlantic. U.S. Dep. Commer. NOAA Tech. Mem. NMFS-SEFSC-444, 115 pp.

Witzell, W.N. 1999. Distribution and relative abundance of sea turtles caught incidentally by the U.S. pelagic longline fleet in the western North Atlantic Ocean, 1992-1995. Fisheries Bulletin. 97:200-211.

Wynne, K. and M. Schwartz. 1999. Guide to marine mammals and turtles of the U.S. Atlantic and Gulf of Mexico. Rhode Island Sea Grant, Narragansett. 115pp

Zug, G.R. and J.F. Parham. 1996. Age and growth in leatherback turtles, *Dermochelys coriacea* (Testudines: Dermochelyidae): a skeletochronological analysis. Chelonian Conservation and Biology 2(2):244-249.

Port Canaveral Sea Turtle Foraging Report
Brevard County, Florida

August 2007

Prepared for:
Canaveral Port Authority
200 George J. King Blvd.
Cape Canaveral, FL 32920

Prepared by:
Dial Cordy and Associates Inc.
490 Osceola Ave.
Jacksonville Beach, FL 32250

DC&A Project No. 05-850

TABLE OF CONTENTS

Page

LIST OF FIGURES III

LIST OF TABLES III

1.0 INTRODUCTION 1

1.1 Study Purpose 1

1.2 Study Area Location 1

1.3 Background 1

2.0. METHODOLOGY 4

2.1 Algal Community Study 4

2.2 Sea Turtle Survey 4

3.0 RESULTS 6

3.1 Algal Community 6

3.2 Sea Turtle Distribution 9

4.0 SUMMARY 10

5.0 LITERATURE CITED 11

Appendix A Algal List

Appendix B Inwater Research Group Reports

LIST OF FIGURES

Page

Figure 1 Location Map 2
Figure 2 Study Area 3
Figure 3 Algal Survey Locations 5
Figure 4 Survey Transects 8

LIST OF TABLES

Page

Table 1 Algae Families Collected From Port Canaveral Rip-Rap Habitat Summer 2005 and Winter 2006 7
Table 2 Observation Data for Port Canaveral Sea Turtle Census, August 2005 and September 2006 9

1.0 INTRODUCTION

1.1 Study Purpose

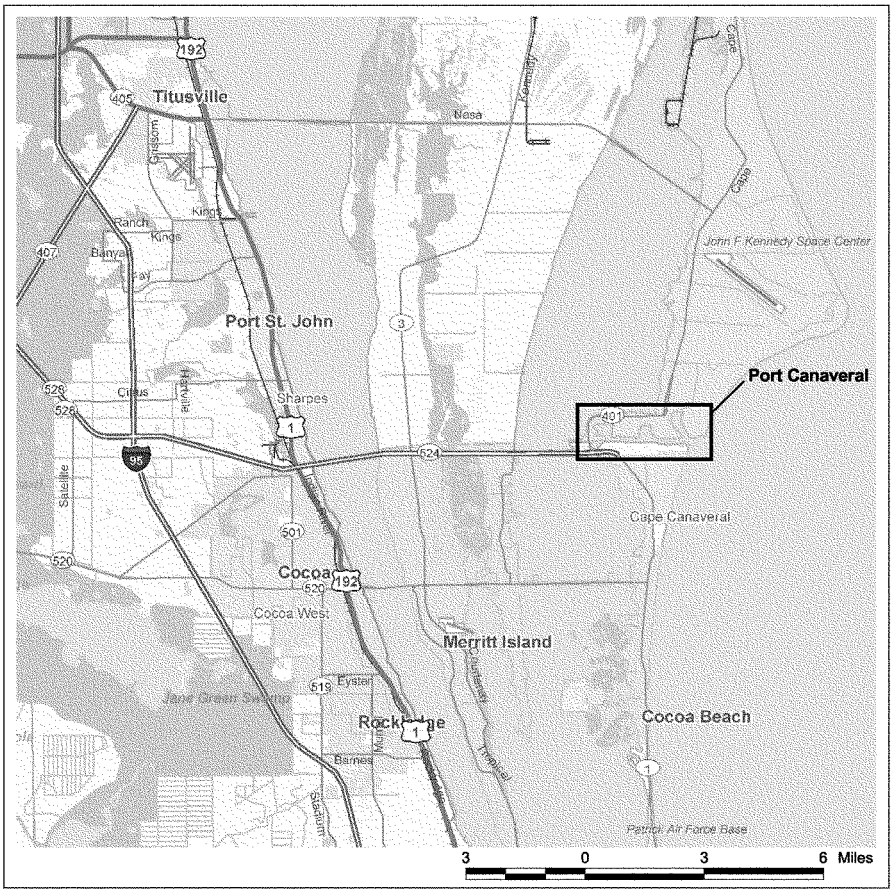
The Canaveral Port Authority (CPA) is currently conducting a feasibility study of potential navigation improvements under the authority granted under Section 203 of the Water Resources Development Act (WRDA), 1986. The study is in response to problems and issues identified by the CPA and Canaveral Pilots Association with regard to ship maneuvering within the existing federal project. Dial Cordy and Associates Inc. (DC&A) was contracted by the CPA to conduct a study to determine the potential impact to the juvenile sea turtle population within the study area from the proposed port improvements identified in the current Section 203 Study.

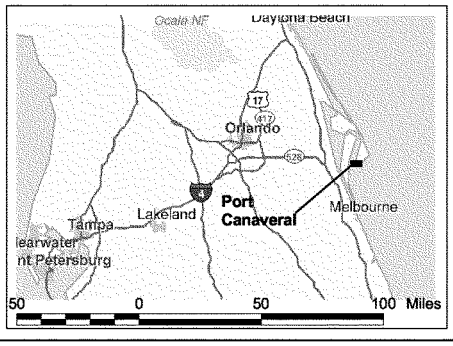
1.2 Study Area Location

Port Canaveral is located in Brevard County on the east coast of Florida, approximately nine miles north of Cocoa Beach (Figure 1). The main port is orientated in an east – west direction, extending from the Atlantic coast to the Banana River. The port is bounded to the north by the Cape Canaveral Air Force Station (CCAFS) and the Banana River, and bounded to the south by the City of Cape Canaveral. The harbor consists of three turning basins (Figure 2). Starting from the east they are: the Trident Turning Basin (TTB), the Middle Turning Basin (MTB), and the West Turning Basin (WTB). The basins are connected by a channel (East Access Channel and West Access Channel) that forms the south boundary of each basin. Within this channel, a Federally maintained Barge Canal extends from the south side of the MTB, through the Banana River, across Merritt Island, and connects with the Intracoastal Waterway (ICWW) system in the Indian River. Where the Barge Canal enters the Banana River, a 600-foot long Corps of Engineers' lock (Canaveral Lock) separates the tidal harbor from the almost non-tidal river.

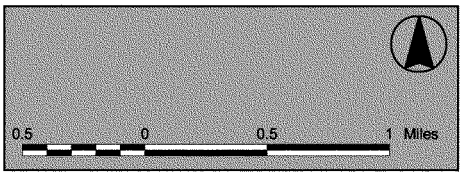
1.3 Background

The Atlantic and Gulf of Mexico coastal waters of the United States are utilized by five species of marine turtles during parts of their life histories. All five are protected under the Endangered Species Act of 1973. Of these, the green turtle (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempi*), Leatherback, (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricata*) are classified as endangered in Florida waters; and the loggerhead (*Caretta caretta*) is classified as threatened (Dial Cordy 2006; Redfoot 1997). Sea turtles use the habitats offshore of Brevard County to different degrees during different stages of their life cycle. During the summer months hatchlings utilize this habitat as a corridor to deeper waters farther off the coast. Juvenile and sub-adult turtles use the inshore and offshore habitats as a foraging areas, while adult turtles are present year round with seasonally high abundances during the breeding season.





Location Map	
Port Canaveral Sea Turtle Foraging study	
Scale: 1 Inch = 3 miles	Drawn By: MR
Date: September 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 1



Study Area	
Port Canaveral Sea Turtle Foraging study	
Scale: 1 inch = 0.5 mile	Drawn By: MR
Date: September 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 2

Green turtles are found in a variety of habitats in the waters in and adjacent to Brevard County depending on their developmental stage (Redfoot 1997). After hatching, they utilize the pelagic habitat where they spend the next two to three years of their lives (Frazer and Ehrhart 1985; Carr 1987) and subsequently take up residence as juveniles and subadults in coastal lagoons, estuaries, and near-shore reefs (Redfoot 1997). They eventually migrate to foraging habitats and migrate to nesting beaches to reproduce.

The waters within Port Canaveral, particualry the Trident Turning Basin, were previously identified as foraging areas for juvenile sea turtles, particularly green turtles (Redfoot 1997). Algae, which grows on the rocky riprap areas in the basin, is the major component of the green turtles diet within the Trident Turning Basin. Many areas within Port Canaveral (including the riprap area that may be affected by the proposed project) are rocky riprap areas similar to those found in the Trident Turning Basin, and have potential as foraging habitat for juvenile green turtles. This study was conducted to specifically determine the extent of habitat and utilization by the species.

2.0. METHODOLOGY

2.1 Algal Community Study

Algal community surveys and sample collections were conducted in August 2005 and February 2006. Five survey locations were randomly established along the approximately 2,500-foot area of rip rap adjacent to the U. S. Air Force property on the northern shore of the main channel (Figure 3). The position of each survey location was marked with a Differential Geographical Positioning System (DGPS) with accuracy of less than 1 meter.

At each survey location, a diver established a transect from the waters edge to the seaward edge of the rip rap. Along each transect, algal abundance and distribution was documented by photographing 0.25 m^2 quadrats along the depth gradient (shallow [approximately 1 meter from waters edge], mid depth, and deep [approximately 1 m from deep edge of rock]).

Additionally, along each transect, a 10cm x 10cm area at each depth station (i.e. shallow, mid, and deep) a scraping was collected and samples sent to a lab for analysis. The analysis determined the species of algae and other marine species present and identified them to the lowest practical identification level. In total, 15 samples were collected for each of the two surveys (i.e. 5 transects x 3 depth stations).

2.2 Sea Turtle Survey

Sea turtle surveys were conducted by the Inwater Research Group Inc. (IRG) August 27-29, 2005 and February 11-13, 2006 using methodology developed by IRG and accepted by the

Survey Location

300 0 300 600 Feet

Algal Survey Locations	
Port Canaveral Sea Turtle Foraging study	
Scale: 1 inch = 300 feet	Drawn By: MR
Date: September 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 3

Florida Department of Environmental Protection (FDEP) and the National Marine Fisheries Service (NMFS). The methodology entailed subjecting each survey site to repetitive censusing, using observers in an elevated tower on a small boat. This technique allows for the calculation of observations per transect kilometer (an index of turtle abundance which can be used to directly compare different sites within a single area or sites over time). Data recorded for each siting included turtle species and size, whether the turtle was observed on the surface or underwater, proximity to the transect line, and activity (i.e., foraging, swimming, etc.) Locations of the turtles were recorded using GPS.

Five specific sites of probable sea turtle utilization within the Port were surveyed (Figure 4). Site 1 was the 988 meter riprap rock habitat along the north side of the entrance channel between the middle and east turning basins. Site 2 was the 266-meter riprap area on the south side of the channel at Jetty Park. Site 3 was the 98-meter stretch of riprap on the south side of the channel in the vicinity of marker 19. Site 4 was the 258-meter riprap shoreline on the north side of the channel just west of the west turning basin. Site 5 consisted of a 3,490 meter transect down the middle of the main channel.

An additional survey was conducted on June 6 and 7, 2007 to identify additional areas within Canaveral Harbor that had the potential to support juvenile sea turtle foraging. The survey crew examined additional rocky habitat for algal growth and the presence of juvenile sea turtles.

3.0 RESULTS

3.1 Algal Community

Algae were present along the entire length and depth of the rip-rap within the surveyed portion of the basin. In fact, algae maintained 100 percent cover on the majority of the area. Algae collected along the 988 m north side of the channel entrance was identified only to the family level due to the large amount of material and high complexity (Table 1). Redfoot's analysis of algal species in the adjacent Trident submarine basin (1997) yielded a number of species that most likely are also represented at the current survey site including *Gelidium americanum, Hypnea cervicornis, Polysiphonia subtilissima, Solieria filiformis, Ulva lactuca, Centroceras clavulatum, Cladophora catenata, Amphiroa rigida var. antillana,* and *Enteromorpha compressa.*

There were only minor variations in algal community between summer and winter. Algal species of the families Rhodomeleaceae and Ulvaceae were present on the winter that were not present during the summer sampling event. During the June 2007 survey, an additional total of 1952 meters of riprap rock shoreline were examined in areas not previously examined in prior surveys. Similar algal species were present along this riprap area, although no algal samples were obtained for identification. Sea turtles were also observed foraging along these additional areas.

Table 1 Algae Families Collected From Port Canaveral Rip-Rap Habitat Summer 2005 and Winter 2006.

Station	Shallow	Mid-Depth	Deep
August 2005			
1	None	Hypneaceae	Caulerpaceae Hypneaceae
2	Corallinaceaea Ceramiaceae Cladophoraceae Hypneaceae	Ceramiaceae Gelidiaceae Hypneaceae	Hypneaceae
3	Corallinaceaea Ceramiaceae Hypneaceae	Caulerpaceae Gelidiaceae Hypneaceae	Hypneaceae
4	Hypneaceae	Caulerpaceae Gelidiaceae Corallinaceaea Ceramiaceae Hypneaceae	Cladophoraceae Hypneaceae
5	Caulerpaceae Hypneaceae Corallinaceaea	Ceramiaceae Hypneaceae Corallinaceaea	Hypneaceae
February 2006			
1	Caulerpaceae Cladophoraceae Ceramiaceae Hypneaceae Rhodomelaceae	Hypneaceae Rhodomelaceae	Ceramiaceae Corallinaceaea Hypneaceae Rhodomelaceae
2	Corallinaceaea Hypneaceae Rhodomelaceae	Ceramiaceae Cladophoraceae Corallinaceaea Hypneaceae Rhodomelaceae	Ceramiaceae Cladophoraceae Hypneaceae Rhodomelaceae
3	Cladophoraceae Corallinaceaea Hypneaceae Rhodomelaceae	Cladophoraceae Ceramiaceae Hypneaceae Rhodomelaceae Ulvaceae	Cladophoraceae Ceramiaceae Hypneaceae Rhodomelaceae Ulvaceae
4	Cladophoraceae Hypneaceae Rhodomelaceae	Ceramiaceae Corallinaceaea Hypneaceae Rhodomelaceae	Cladophoraceae Corallinaceaea Rhodomelaceae Ulvaceae
5	Caulerpaceae Cladophoraceae Ceramiaceae Hypneaceae Rhodomelaceae	Cladophoraceae Ceramiaceae Corallinaceaea Hypneaceae Rhodomelaceae	Cladophoraceae Hypneaceae Rhodomelaceae Ulvaceae

Sea Turtle Survey Transects	
Port Canaveral Sea Turtle Foraging study	
Scale: 1 inch = 2,000 feet	Drawn By: MR
Date: September 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 4

3.2 Sea Turtle Distribution

Sea turtles were mainly observed along transect 1, which paralleled the riprap shoreline between the MTB and TTB. In the fall 2005, 200 individuals were observed along the 980 m transect on 30 repetitions and yielded an average of 6.8 turtles/kilometer (Table 2). Nine individuals were observed along transect 2 on the southside of the channel on 27 repetitions. Five turtles were observed along transect 3 (31 repetitions), and 3 turtles were observed along transect 5 (3 repetitions). Respectively transects 2, 3, and 5 had averages of 1.25 turtles/kilometer, 1.64 turtles/kilometer and 0.29 turtles/kilometer. No turtles were observed during 31 repetitions along transect 4.

In the spring 2006, 111 turtles were observed along transect 1 (36 repetitions) for an average of 3.21 turtles/kilometer, and six turtles were observed along transect 2 (38 repetitions) or 0.593 turtles/kilometer (Table 2). No other turtles were observed.

During the June 2007 survey, turtles were observed along both the North Jetty and the South Jetty, with eight turtles being observed along the North Jetty and 25 turtles observed along the South Jetty or 0.39 turtles/kilometer and 1.18 turtles/kilometer respectively (Table 2).

Table 2 Observation Data for Port Canaveral Sea Turtle Census, August 2005 and September 2006

Transect	Length (meters)	No. of Repetitions	Total Turtles Observed	Turtles (observations) per kilometer
August 2005				
1	980	30	200	6.80
2	266	27	9	1.25
3	98	31	5	1.64
4	258	31	0	0
5	3490	3	3	0.29
February 2006				
1	980	36	111	3.21
2	266	38	6	0.593
3	98	18	0	0
4	258	23	0	0
5	3490	4	0	0
June 2007				
North Jetty	740	28	8	0.39
South Jetty	590	36	25	1.18

4.0 SUMMARY

Green turtles are found in a variety of habitats in the waters in and adjacent to Brevard County depending on their developmental stage (Witherington and Ehrhart 1989; Ehrhart et al., 1996; Redfoot 1997). After hatching, they utilize the pelagic habitat where they spend the next two to three years of their lives (Frazer and Ehrhart 1985; Carr 1987) and subsequently take up residence as juveniles and subadults in coastal lagoons, estuaries, and near-shore reefs (Ehrhart et al., 1996; Redfoot 1997). They eventually migrate to foraging habitats and to nesting beaches to reproduce.

Research on juvenile green sea turtles that began in the 1990s has documented that algal communities on riprap areas within Port Canaveral are important foraging grounds for these turtles (Ehrhart and Redfoot 1994; Ehrhart and Redfoot 1997; Redfoot 1997; Redfoot and Ehrhart 2002; Ehrhart and Redfoot 2005; Ehrhart and Redfoot 2006). Most of the previous studies have centered on the extensive riprap areas present within the Trident Turning Basin. This study shows that the area directly adjacent to the Trident Turning Basin has similar algal cover and is also heavily utilized by these juvenile turtles within the Port. During the surveys in August 2005 and February 2006 the majority of juvenile sea turtles were observed along the riprap between the Main Turning Basin and Trident Turning Basin , it has been previously shown that significant numbers of sea turtles also use the Trident basin for foraging, and this area was not available for observation during these surveys (Redfoot 1997; Redfoot and Ehrhart 2000; Ehrhart and Redfoot 2006). While there is likely to be some exchange between this assemblage and other developmental habitats, we are not aware of any extensive areas of suitable habitat immediately adjacent to Port Canaveral, and turtles may remain resident in the Port for considerable lengths of time. Some turtles in previous studies have been caught over 20 times over a period of up to 12 years (pers. communication Bagley). Based on these past and present observations it should be assumed that many of the turtles observed utilizing the riprap areas along the main Port channel also use the riprap foraging areas in the adjacent Trident Turning Basin. This additional foraging habitat is available to support juvenile turtle populations in the Port during the time between removal of the existing riprap and the time that the new riprap would be recolonized by algal species.

Re-colonization of the riprap by the algal communities should begin quickly after re-placement of new riprap along the shoreline. Previous studies have shown rapid colonization (<2 weeks) of marine algal species on bare rock substrates (Littler et. al 1987). These early successional species will allow more mature successional species to colonize these rock riprap areas. Adjacent algal communities will play a role in helping to recolonize the now bare rock substrates and these habitats should start rebounding quickly following placement of riprap.

Therefore, it is not likely that the proposed project would have a significant impact on foraging juvenile sea turtles.

5.0 LITERATURE CITED

Carr, A. 1987. New Perspectives on the pelagic stage of sea turtle development. Conservation Biology 1(2): 103-121.

Dial Cordy and Associates Inc. 2006. Environmental Baseline Report, Port Canaveral Navigation Improvements, Port Canaveral, FL

Ehrhart, L. M. and W.E. Redfoot. 1994. Assessment of green turtle relative abundance and behavior in Cape Canaveral AFS Port Area, Trident Submarine Basin. Final Report to USAE Waterways Experiment Station, Coastal Ecology Group, Environmental Laboratory. 40 pp.

Ehrhart, L.M., W.E. Redfoot, and D.A. Bagley. 1996. A study of the population ecology of in-water marine turtle populations on the east-central Florida coast from 1982-96. Comprehensive final report to NOAA, the National Marine Fisheries Service, pp. 163

Ehrhart, L. M. and W.E. Redfoot. 1997. Assessment of the species composition of marine algae utilized by juvenile green turtles in the Trident Submarine Basin, Cape Canaveral Air Force Station, Florida. Final Report to USAE Waterways Experiment Station, Coastal Ecology Group, Environmental Laboratory. 41 pp

Ehrhart, L.M. and W.E. Redfoot. 2002. The structure, size, and feeding ecology of the unique juvenile green turtle population utilizing the Trident Turning Basin, Cape Canaveral Air Force Station, Florida as developmental habitat. Comprehensive Report to Specpro Inc. 37 pp.

Ehrhart, L.M. and W.E. Redfoot. 2005. Final Report: Assessment of the Status and Population Dynamics of Marine Turtles in the Trident Submarine Basin at Port Canaveral, Florida in 2003 and 2004.

Ehrhart, L.M., W.E. Redfoot. 2006. Final Report to Patrick Air Force Base Environmental Planning. Assessment of the Status and Population Dynamics of Marine Turtles in the Trident Submarine Basin at Port Canaveral, Florida in 2004 and 2005. Prepared for the United States Air Force, Patrick Air Force Base. Air Force Contract No. FA252104P0269.

Frazer, N.B. and L.M. Ehrhart. 1985. Preliminary growth models for green (*Chelonia mydas)* and loggerhead (*Caretta caretta)* turtles in the wild. Copeia 1985: 73-79.

Littler, M.M; D. S. Littler.; J.N. Norris; and K.E. Buchler. 1987. Recolonization of Algal Communities Following the Grounding of the Freighter Wellwood on Molasses Reef, Key Largo National Marine Sanctuary. Phase 2: Suvey of Algae and Experimental Design. Report to NOAA U.S. Department of Commerce. NOAA Technical Memoranda Series NOS/MEMD 15

Redfoot, W. E. 1997. Population Structure and Feeding Ecology of Green Turtles Utilizing the Trident Submaring Basin, Cape Canaveral, Florida as Developmental Habitat, Master Thesis, University of Central Florida, Orlando, FL.

Redfoot, W. E., and L. M. Ehrhart. 2000. The feeding ecology of juvenile green turtles utilizing the Trident Basin, Port Canaveral, Florida as developmental habitat. Page 33 (abstract) in F. A. Abreu-Grobois, R. Briseno-Duenas, R. Marquez, and L. Sarti, compilers. Proceedings of the 18th International Symposium on Sea Turtle Biology and Conservation. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SEFSC-436.

Witherington, B.E. and L.M. Ehrhart. 1989. Hypothermic stunning and mortality of marine turtles in the Indian River Lagoon System, Florida. Copeia 1989(3):696-703.

APPENDICES

APPENDIX A

Algal List

August 2005

Station	Date	Taxa
MPC1	Aug-05	Hypneaceae (LPIL)
MPC2	Aug-05	Hypneaceae (LPIL)
MPC2	Aug-05	Ceramiaceae (LPIL)
MPC2	Aug-05	Gelidiaceae (LPIL)
MPC3	Aug-05	Hypneaceae (LPIL)
MPC3	Aug-05	Caulerpaceae (LPIL)
MPC3	Aug-05	Gelidiaceae (LPIL)
MPC4	Aug-05	Caulerpaceae (LPIL)
MPC4	Aug-05	Corallinaceae (LPIL)
MPC4	Aug-05	Hypneaceae (LPIL)
MPC4	Aug-05	Ceramiaceae (LPIL)
MPC4	Aug-05	Gelidiaceae (LPIL)
MPC5	Aug-05	Hypneaceae (LPIL)
MPC5	Aug-05	Corallinaceae (LPIL)
MPC5	Aug-05	Ceramiaceae (LPIL)
DPC1	Aug-05	Caulerpaceae (LPIL)
DPC1	Aug-05	Hypneaceae (LPIL)
DPC2	Aug-05	Hypneaceae (LPIL)
DPC3	Aug-05	Hypneaceae (LPIL)
DPC4	Aug-05	Hypneaceae (LPIL)
DPC4	Aug-05	Cladophoraceae (LPIL)
DPC5	Aug-05	Hypneaceae (LPIL)
SPC1	Aug-05	**No live Algae***
SPC2	Aug-05	Corallinaceae (LPIL)
SPC2	Aug-05	Ceramiaceae (LPIL)
SPC2	Aug-05	Cladophoraceae (LPIL)
SPC2	Aug-05	Hypneaceae (LPIL)
SPC3	Aug-05	Corallinaceae (LPIL)
SPC3	Aug-05	Hypneaceae (LPIL)
SPC3	Aug-05	Ceramiaceae (LPIL)
SPC4	Aug-05	Hypneaceae (LPIL)
SPC5	Aug-05	Hypneaceae (LPIL)
SPC5	Aug-05	Caulerpaceae (LPIL)
SPC5	Aug-05	Corallinaceae (LPIL)

February 2006

Station	Date	Taxa
PC1-S	Feb-06	Caulerpaceae (LPIL)
PC1-S	Feb-06	Hypneaceae (LPIL)
PC1-S	Feb-06	Rhodomelaceae (LPIL)
PC1-S	Feb-06	Ceramiaceae (LPIL)
PC1-S	Feb-06	Cladophoraceae (LPIL)
PC1-Mid	Feb-06	Rhodomelaceae (LPIL)
PC1-Mid	Feb-06	Hypneaceae (LPIL)
PC1-Deep	Feb-06	Ceramiaceae (LPIL)
PC1-Deep	Feb-06	Hypneaceae (LPIL)
PC1-Deep	Feb-06	Rhodomelaceae (LPIL)
PC1-Deep	Feb-06	Corallinaceae (LPIL)
PC2-S	Feb-06	Corallinaceae (LPIL)
PC2-S	Feb-06	Rhodomelaceae (LPIL)
PC2-S	Feb-06	Hypneaceae (LPIL)
PC2-Mid	Feb-06	Corallinaceae (LPIL)
PC2-Mid	Feb-06	Hypneaceae (LPIL)
PC2-Mid	Feb-06	Ceramiaceae (LPIL)
PC2-Mid	Feb-06	Cladophoraceae (LPIL)
PC2-Mid	Feb-06	Rhodomelaceae (LPIL)
PC2-Deep	Feb-06	Rhodomelaceae (LPIL)
PC2-Deep	Feb-06	Ceramiaceae (LPIL)
PC2-Deep	Feb-06	Hypneaceae (LPIL)
PC2-Deep	Feb-06	Cladophoraceae (LPIL)
PC3-S	Feb-06	Cladophoraceae (LPIL)
PC3-S	Feb-06	Rhodomelaceae (LPIL)
PC3-S	Feb-06	Corallinaceae (LPIL)
PC3-S	Feb-06	Hypneaceae (LPIL)
PC3-Mid	Feb-06	Ceramiaceae (LPIL)
PC3-Mid	Feb-06	Rhodomelaceae (LPIL)
PC3-Mid	Feb-06	Ulvaceae (LPIL)
PC3-Mid	Feb-06	Cladophoraceae (LPIL)
PC3-Mid	Feb-06	Hypneaceae (LPIL)
PC3-Deep	Feb-06	Hypneaceae (LPIL)

Station	Date	Taxa
PC3-Deep	Feb-06	Hypneaceae (LPIL)
PC3-Deep	Feb-06	Cladophoraceae (LPIL)
PC3-Deep	Feb-06	Rhodomelaceae (LPIL)
PC3-Deep	Feb-06	Ceramiaceae (LPIL)
PC3-Deep	Feb-06	Ulvaceae (LPIL)
PC4-S	Feb-06	Cladophoraceae (LPIL)
PC4-S	Feb-06	Hypneaceae (LPIL)
PC4-S	Feb-06	Rhodomelaceae (LPIL)
PC4-Mid	Feb-06	Corallinaceae (LPIL)
PC4-Mid	Feb-06	Hypneaceae (LPIL)
PC4-Mid	Feb-06	Rhodomelaceae (LPIL)
PC4-Mid	Feb-06	Ceramiaceae (LPIL)
PC4-Deep	Feb-06	Cladophoraceae (LPIL)
PC4-Deep	Feb-06	Rhodomelaceae (LPIL)
PC4-Deep	Feb-06	Ulvaceae (LPIL)
PC4-Deep	Feb-06	Corallinaceae (LPIL)
PC5-S	Feb-06	Corallinaceae (LPIL)
PC5-S	Feb-06	Hypneaceae (LPIL)
PC5-S	Feb-06	Ceramiaceae (LPIL)
PC5-S	Feb-06	Rhodomelaceae (LPIL)
PC5-S	Feb-06	Cladophoraceae (LPIL)
PC5-Mid	Feb-06	Rhodomelaceae (LPIL)
PC5-Mid	Feb-06	Corallinaceae (LPIL)
PC5-Mid	Feb-06	Cladophoraceae (LPIL)
PC5-Mid	Feb-06	Ceramiaceae (LPIL)
PC5-Deep	Feb-06	Rhodomelaceae (LPIL)
PC5-Deep	Feb-06	Ulvaceae (LPIL)
PC5-Deep	Feb-06	Hypneaceae (LPIL)
PC5-Deep	Feb-06	Cladophoraceae (LPIL)

APPENDIX B

Inwater Research Group Reports

IRG
A NON-PROFIT CORPORATION
INWATER RESEARCH GROUP INC.

September 5, 2005

Dial Cordy and Associates, Inc.
490 Osceola Avenue
Jacksonville Beach, FL 32250
Attn: Mr. R. Steve Dial

SUBJECT: CANAVERAL SECTION 203 PROJECT SEA TURTLE CENSUS

Dear Mr. Dial:

This letter and enclosures transmits Inwater Research Group's (IRG) Results of initial censusing of sea turtle populations in Port Canaveral. This work was undertaken in support of the Section 203 study for the Canaveral channel widening project. The work was performed on August 27-29, 2005.

IRG identified five sites inside Port Canaveral for sea turtle censusing. Site #1 was the main area of interest – the riprap rock habitat along the north side of the entrance channel between the middle and east turning basins. This is the shoreline segment that would have to be disturbed to construct the project. The other sites were chosen to provide information on comparative turtle abundance in other areas of similar habitat, and in the main channel itself. Site #2 is a riprap area 266 meters long on the south side of the channel at Jetty Park. Site #3 is a short (98 meter) stretch of riprap on the south side of the channel in the vicinity of marker 19. Site #4 is a 258 meter long riprap shoreline on the north side of the channel just west of the west turning basin. Site #5 consisted of a transect run down the mainline of the channel for a stretch of 3490 meters. The site locations are graphically presented in the attachments.

IRG subjected all these sites to repetitive visual censusing, using observers in an elevated tower on a small boat. This technique allows for the calculation of an index of turtle abundance, observations per transect kilometer, which can be used to directly compare the different sites in the Port with each other, or a single site over time. Because the index results from the mean of a large number of observations, statistical significance testing will be possible from the data. A synopsis of the data is presented in the table below.

Site #	Transect length	# Of repetitions	Total turtles observed	Obs. per kilometer
1	980 m	30	200	6.80
2	266 m	27	9	1.25
3	98 m	31	5	1.64
4	258 m	31	0	0
5	3490 m	3	3	0.29

Data recorded for each turtle observation included the species and size class of the turtle, whether the turtle was observed on the surface or underwater, how far off the transect line the turtle was observed, and if the turtle was actively feeding when observed. GPS coordinates were also recorded for each sighting. A spreadsheet containing the full data set for all observations is included in the attachments.

It is evident from the results that turtles were considerably more abundant at Site #1 than at the other riprap habitat sites adjacent to the main channel in the Port. The habitat at sites 1,2, and 3 appeared quite similar, with algae covered rock sloping steeply into water over 2 meters deep. Site 4 had a much narrower band of submerged riprap and the adjacent water was considerably shallower, less than 1 meter.

Our discussions with the University of Central Florida (UCF) sea turtle research program indicate that UCF has conducted some capture operations at our Site #1. We hope that a careful examination of their records may allow us to correlate our abundance data with their capture data. This would allow us to provide estimates of abundance for additional areas within the Trident basin, if desired.

IRG appreciates the opportunity to work with Dial Cordy on this project. Please do not hesitate to contact the Principal Investigator for this project, Dr. Jonathan Gorham, at (321) 243-2211 with any questions or if you require additional information.

Sincerely,

Michael Bressete
President

Enclosures

CANAVERAL SEA TURTLE CENSUS DATA
TRANSECT LOCATION 1 - NORTH SIDE OF CHANNEL BETWEEN MIDDLE AND EAST BASINS
TRANSECT LENGTH 960 METERS

RUN #	DATE	SPECIES	JUVENILE/ ADULT	INSHORE OR OFFSHORE SIDE	DISTANCE	SURFACE OR UNDERWATER	FEEDING?	WAYPOINT #	LAT/LON
1	8/27/2005	CM	JUVENILE	INSHORE	10'	UNDERWATER	NO	840	N28.41062 W80.59358
1	8/27/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	841	N28.41051 W80.59408
1	8/27/2005	CM	JUVENILE	INSHORE	15'	UNDERWATER	NO	842	N28.41056 W80.59658
1	8/27/2005	CM	JUVENILE	INSHORE	15'	UNDERWATER	NO	843	N28.41056 W80.59667
1	8/27/2005	CM	JUVENILE	INSHORE	25'	UNDERWATER	NO	844	N28.41057 W80.59743
1	8/27/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	845	N28.41056 W80.59773
1	8/27/2005	CM	JUVENILE	INSHORE	2'	SURFACE	NO	846	N28.41057 W80.59888
1	8/27/2005	CM	JUVENILE	INSHORE	20'	UNDERWATER	NO	847	N28.41054 W80.59945
1	8/27/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	848	N28.41053 W80.59951
1	8/27/2005	CM	JUVENILE	INSHORE	40'	SURFACE	NO	849	N28.41047 W80.60054
1	8/27/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	850	N28.41050 W80.60089
1	8/27/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	YES	851	N28.41059 W80.60212
2	8/27/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	853	N28.41061 W80.59348
2	8/27/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	854	N28.41049 W80.59413
2	8/27/2005	CM	JUVENILE	INSHORE	15'	UNDERWATER	NO	855	N28.41054 W80.59604
2	8/27/2005	CM	JUVENILE	INSHORE	20'	UNDERWATER	NO	856	N28.41052 W80.59666
2	8/27/2005	CM	JUVENILE	INSHORE	15'	SURFACE	NO	857	N28.41058 W80.59764
2	8/27/2005	CM	JUVENILE	INSHORE	25'	UNDERWATER	NO	858	N28.41054 W80.59858
2	8/27/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	859	N28.41052 W80.59930
2	8/27/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	860	N28.41051 W80.59950
2	8/27/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	861	N28.41050 W80.59959
2	8/27/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	862	N28.41056 W80.60175
3	8/27/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	863	N28.41063 W80.59359
3	8/27/2005	CM	JUVENILE	INSHORE	25'	UNDERWATER	NO	864	N28.41055 W80.59599
3	8/27/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	865	N28.41056 W80.59837
3	8/27/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	866	N28.41050 W80.59955
3	8/27/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	867	N28.41049 W80.60080
3	8/27/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	868	N28.41050 W80.60104
3	8/27/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	NO	869	N28.41058 W80.60223
3	8/27/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	870	N28.41062 W80.60273
4	8/27/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	872	N28.41054 W80.59388
4	8/27/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	873	N28.41050 W80.59501
4	8/27/2005	CM	JUVENILE	INSHORE	20'	UNDERWATER	NO	874	N28.41057 W80.59621
5	8/27/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	875	N28.41059 W80.60197
5	8/27/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	876	N28.41054 W80.60147
5	8/27/2005	CM	JUVENILE	INSHORE	25'	UNDERWATER	NO	877	N28.41053 W80.59949
5	8/27/2005	CM	JUVENILE	INSHORE	15'	SURFACE	NO	878	N28.41054 W80.59711
5	8/27/2005	CM	JUVENILE	INSHORE	10'	SURFACE	NO	879	N28.41056 W80.59572
5	8/27/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	880	N28.41045 W80.59511

5	8/27/2005	CM	JUVENILE	INSHORE	25'	UNDERWATER	NO	881	N28.41049 W80.59448
6	8/27/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	NO	882	N28.41049 W80.60150
6	8/27/2005	CM	JUVENILE	INSHORE	15'	UNDERWATER	NO	883	N28.41057 W80.59697
6	8/27/2005	CM	JUVENILE	INSHORE	10'	SURFACE	NO	884	N28.41058 W80.59674
6	8/27/2005	CM	JUVENILE	INSHORE	40'	SURFACE	NO	885	N28.41049 W80.59575
6	8/27/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	886	N28.41050 W80.59424
6	8/27/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	887	N28.41059 W80.59384
7	8/28/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	892	N28.41054 W80.59726
7	8/28/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	893	N28.41052 W80.59402
8	8/28/2005	CM	JUVENILE	INSHORE	18'	UNDERWATER	NO	894	N28.41056 W80.59371
8	8/28/2005	CM	JUVENILE	INSHORE	12'	SURFACE	NO	895	N28.41055 W80.59704
8	8/28/2005	CM	JUVENILE	INSHORE	12'	SURFACE	NO	896	N28.41056 W80.59719
8	8/28/2005	CM	JUVENILE	INSHORE	12'	SURFACE	NO	897	N28.41057 W80.59729
8	8/28/2005	CM	JUVENILE	INSHORE	12'	SURFACE	NO	898	N28.41058 W80.59745
8	8/28/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	899	N28.41057 W80.59853
9	8/28/2005	CM	JUVENILE	INSHORE	40'	UNDERWATER	NO	902	N28.41056 W80.59372
9	8/28/2005	CM	JUVENILE	INSHORE	40'	SURFACE	YES	903	N28.41050 W80.59393
9	8/28/2005	CM	JUVENILE	INSHORE	45'	SURFACE	NO	904	N28.41042 W80.59487
9	8/28/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	905	N28.41046 W80.59522
9	8/28/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	NO	906	NO DATA
9	8/28/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	907	N28.41052 W80.59549
9	8/28/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	908	N28.41054 W80.59630
9	8/28/2005	CM	JUVENILE	INSHORE	15'	SURFACE	NO	909	N28.41052 W80.59692
9	8/28/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	910	N28.41055 W80.59744
9	8/28/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	911	N28.41054 W80.59751
10	8/28/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	912	N28.41052 W80.60036
10	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	913	N28.41057 W80.59780
10	8/28/2005	CM	JUVENILE	INSHORE	20'	UNDERWATER	YES	914	N28.41059 W80.59609
10	8/28/2005	CM	JUVENILE	INSHORE	20'	UNDERWATER	YES	915	N28.41059 W80.59603
10	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	916	N28.41058 W80.59568
10	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	917	N28.41056 W80.59562
10	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	918	N28.41050 W80.59417
11	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	919	N28.41053 W80.59381
11	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	920	N28.41052 W80.59385
11	8/28/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	921	N28.41056 W80.59645
11	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	922	N28.41056 W80.59768
11	8/28/2005	CM	JUVENILE	INSHORE	40'	SURFACE	NO	923	N28.41057 W80.59804
12	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	924	N28.41062 W80.60226
12	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	925	N28.41056 W80.59926
12	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	926	N28.41059 W80.59908
12	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	927	N28.41061 W80.59901
12	8/28/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	YES	928	N28.41060 W80.59719
12	8/28/2005	CM	JUVENILE	INSHORE	10'	UNDERWATER	NO	929	N28.41062 W80.59703
12	8/28/2005	CM	JUVENILE	INSHORE	5'	UNDERWATER	NO	930	NO DATA
12	8/28/2005	CM	JUVENILE	INSHORE	20'	UNDERWATER	NO	931	N28.41061 W80.59679

12	8/28/2005	CM	JUVENILE	INSHORE	5'	UNDERWATER	NO	932	N28.41061 W80.59670
12	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	933	N28.41059 W80.59621
12	8/28/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	YES	934	N28.41056 W80.59590
12	8/28/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	935	N28.41071 W80.59349
13	8/28/2005	CM	JUVENILE	INSHORE	20'	UNDERWATER	YES	937	N28.41059 W80.59614
13	8/28/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	NO	938	N28.41057 W80.59689
13	8/28/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	YES	939	N28.41057 W80.59700
13	8/28/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	YES	940	N28.41058 W80.59784
13	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	941	N28.41058 W80.59895
13	8/28/2005	CM	JUVENILE	INSHORE	40'	SURFACE	NO	942	N28.41046 W80.60073
13	8/28/2005	CM	JUVENILE	INSHORE	40'	UNDERWATER	YES	943	N28.41053 W80.60148
13	8/28/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	944	N28.41059 W80.60194
14	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	945	N28.41058 W80.60174
14	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	946	N28.41053 W80.59944
14	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	947	N28.41056 W80.59896
14	8/28/2005	CM	JUVENILE	INSHORE	40'	UNDERWATER	NO	948	N28.41055 W80.59798
14	8/28/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	949	N28.41055 W80.59655
14	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	950	N28.41054 W80.59569
15	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	951	N28.41078 W80.59340
15	8/28/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	952	N28.41073 W80.59350
15	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	953	N28.41043 W80.59532
15	8/28/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	954	N28.41055 W80.59694
15	8/28/2005	CM	JUVENILE	INSHORE	45'	UNDERWATER	YES	955	N28.41052 W80.59866
15	8/28/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	956	N28.41052 W80.59955
15	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	957	N28.41053 W80.60133
15	8/28/2005	CM	JUVENILE	INSHORE	40'	UNDERWATER	YES	958	N28.41055 W80.60174
15	8/28/2005	CM	JUVENILE	INSHORE	45'	UNDERWATER	NO	959	N28.41062 W80.60263
16	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	960	N28.41050 W80.59965
16	8/28/2005	CM	JUVENILE	INSHORE	25'	UNDERWATER	NO	961	N28.41056 W80.59861
16	8/28/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	962	N28.41058 W80.59795
16	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	963	N28.41057 W80.59723
16	8/28/2005	CM	JUVENILE	INSHORE	40'	UNDERWATER	NO	964	N28.41042 W80.59492
16	8/28/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	965	N28.41069 W80.59355
16	8/28/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	966	N28.41073 W80.59352
16	8/28/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	967	N28.41080 W80.59347
17	8/28/2005	CM	JUVENILE	INSHORE	25'	SURFACE	YES	973	N28.41069 W80.60261
17	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	974	N28.41047 W80.59983
17	8/28/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	975	N28.41060 W80.59885
17	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	976	N28.41058 W80.59787
17	8/28/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	NO	977	N28.41057 W80.59583
17	8/28/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	978	N28.41055 W80.59388
17	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	979	N28.41058 W80.59375
17	8/28/2005	CM	JUVENILE	INSHORE	25'	UNDERWATER	NO	980	N28.41071 W80.59356
18	8/28/2005	CM	JUVENILE	INSHORE	50'	SURFACE	NO	982	N28.41067 W80.59343
18	8/28/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	983	N28.41054 W80.59423

18	8/28/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	984	N28.41048 W80.59525
18	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	986	N28.41049 W80.59934
19	8/28/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	NO	987	N28.41063 W80.60287
19	8/28/2005	CM	JUVENILE	INSHORE	15'	UNDERWATER	NO	988	N28.41060 W80.59818
19	8/28/2005	CM	JUVENILE	INSHORE	20'	UNDERWATER	NO	989	N28.41060 W80.59806
19	8/28/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	990	N28.41059 W80.59586
19	8/28/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	NO	991	N28.41061 W80.59572
19	8/28/2005	CM	JUVENILE	INSHORE	40'	UNDERWATER	YES	992	N28.41061 W80.59567
19	8/28/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	993	N28.41054 W80.59531
19	8/28/2005	CM	JUVENILE	INSHORE	5'	SURFACE	NO	994	N28.41057 W80.59423
19	8/28/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	995	N28.41059 W80.59399
19	8/28/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	996	N28.41068 W80.59367
20	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	997	N28.41073 W80.59344
20	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	998	N28.41072 W80.59351
20	8/28/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	NO	999	N28.41069 W80.59368
20	8/28/2005	CM	JUVENILE	INSHORE	25'	UNDERWATER	NO	1000	N28.41064 W80.59389
20	8/28/2005	CM	JUVENILE	INSHORE	40'	SURFACE	YES	1001	N28.41060 W80.59568
20	8/28/2005	CM	JUVENILE	INSHORE	40'	SURFACE	YES	1002	N28.41060 W80.59575
20	8/28/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	1003	N28.41060 W80.59644
20	8/28/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	1004	N28.41060 W80.59748
20	8/28/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	1005	N28.41059 W80.59776
20	8/28/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	1006	N28.41061 W80.59786
20	8/28/2005	CM	JUVENILE	INSHORE	25'	UNDERWATER	YES	1007	N28.41063 W80.59823
20	8/28/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	1008	N28.41060 W80.60133
21	8/29/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	YES	1011	N28.41049 W80.60073
21	8/29/2005	CM	JUVENILE	INSHORE	15'	UNDERWATER	NO	1012	N28.41054 W80.59811
21	8/29/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	1013	N28.41053 W80.59737
21	8/29/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	1014	N28.41042 W80.59416
22	8/29/2005	CM	JUVENILE	INSHORE	10'	SURFACE	NO	1015	N28.41050 W80.59969
22	8/29/2005	CM	JUVENILE	INSHORE	5'	UNDERWATER	NO	1016	N28.41050 W80.59985
23	8/29/2005	CM	JUVENILE	INSHORE	40'	SURFACE	NO	1017	N28.41057 W80.60319
23	8/29/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	1018	N28.41049 W80.60072
23	8/29/2005	CM	JUVENILE	INSHORE	25'	UNDERWATER	YES	1019	N28.41049 W80.60035
23	8/29/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	1020	N28.41053 W80.59950
23	8/29/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	1021	N28.41058 W80.59776
23	8/29/2005	CM	JUVENILE	INSHORE	45'	SURFACE	NO	1022	N28.41058 W80.59608
23	8/29/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	1023	N28.41064 W80.59356
23	8/29/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	1024	N28.41071 W80.59346
23	8/29/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	1025	N28.41078 W80.59339
24	8/29/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	1033	N28.41058 W80.59679
24	8/29/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	1034	N28.41053 W80.59935
24	8/29/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	1035	N28.41052 W80.59943
24	8/29/2005	CM	JUVENILE	INSHORE	25'	UNDERWATER	NO	1036	N28.41047 W80.59980
24	8/29/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	YES	1037	N28.41052 W80.60071
24	8/29/2005	CM	JUVENILE	INSHORE	5'	SURFACE	NO	1038	N28.41052 W80.60100

24	8/29/2005	CM	JUVENILE	INSHORE	50'	SURFACE	NO	1039	N28.41052 W80.60124
25	8/29/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	YES	1041	N28.41062 W80.60201
25	8/29/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	1042	N28.41048 W80.60044
25	8/29/2005	CM	JUVENILE	INSHORE	25'	SURFACE	NO	1043	N28.41051 W80.59826
25	8/29/2005	CM	JUVENILE	INSHORE	40'	UNDERWATER	YES	1044	N28.41054 W80.59775
25	8/29/2005	CM	JUVENILE	INSHORE	45'	UNDERWATER	NO	1045	N28.41051 W80.59698
25	8/29/2005	CM	JUVENILE	INSHORE	40'	SURFACE	NO	1047	N28.41051 W80.59574
26	8/29/2005	CM	JUVENILE	INSHORE	40'	SURFACE	NO	1048	N28.41049 W80.59552
26	8/29/2005	CM	JUVENILE	INSHORE	40'	UNDERWATER	NO	1049	N28.41075 W80.59332
26	8/29/2005	CM	JUVENILE	INSHORE	40'	SURFACE	NO	1050	N28.41048 W80.59404
26	8/29/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	1051	N28.41055 W80.59876
26	8/29/2005	CM	JUVENILE	INSHORE	25'	UNDERWATER	NO	1052	N28.41053 W80.59921
26	8/29/2005	CM	JUVENILE	INSHORE	25'	UNDERWATER	NO	1053	N28.41049 W80.59953
26	8/29/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	1054	N28.41049 W80.59960
27	8/29/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	1055	N28.41046 W80.60006
27	8/29/2005	CM	JUVENILE	INSHORE	45'	SURFACE	NO	1056	N28.41053 W80.59926
28	8/29/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	NO	1057	N28.41056 W80.59864
28	8/29/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	1058	N28.41056 W80.59403
28	8/29/2005	CM	JUVENILE	INSHORE	40'	UNDERWATER	NO	1059	N28.41054 W80.59701
28	8/29/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	1060	N28.41055 W80.59730
29	8/29/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	1061	N28.41050 W80.60037
29	8/29/2005	CM	JUVENILE	INSHORE	40'	UNDERWATER	NO	1062	N28.41047 W80.60037
29	8/29/2005	CM	JUVENILE	INSHORE	5'	SURFACE	NO	1063	N28.41053 W80.59932
30	8/29/2005	CM	JUVENILE	INSHORE	30'	SURFACE	NO	1064	N28.41059 W80.59720
30	8/29/2005	CM	JUVENILE	INSHORE	35'	SURFACE	NO	1065	N28.41076 W80.59344
30	8/29/2005	CM	JUVENILE	INSHORE	30'	UNDERWATER	NO	1066	N28.41047 W80.59511

CANAVERAL SEA TURTLE CENSUS DATA
TRANSECT LOCATION 2 - SOUTH SIDE OF CHANNEL AT JETTY PARK
TRANSECT LENGTH 266 METERS

RUN #	DATE	SPECIES	JUVENILE/ ADULT	INSHORE OR OFFSHORE SIDE	DISTANCE	SURFACE OR UNDERWATER	FEEDING?	WAYPOINT #	LAT/LON
1	8/27/2005	CM	JUVENILE	INSHORE	20'	SURFACE	NO	852	N28.40900 W80.59253
2	8/27/2005								
3	8/27/2005	CM	JUVENILE	OFFSHORE	300'	SURFACE	NO	871	N28.40876 W80.59204
4	8/27/2005								
5	8/27/2005								
6	8/28/2005	CM	JUVENILE	INSHORE	40'	SURFACE	NO	900	N28.40896 W80.59252
7	8/28/2005	CM	JUVENILE	INSHORE	5'	UNDERWATER	YES	901	N28.40886 W80.59273
8	8/28/2005								
9	8/28/2005	CM	JUVENILE	INSHORE	45'	SURFACE	NO	936	NO DATA
10	8/28/2005								
11	8/28/2005								
12	8/28/2005								
13	8/28/2005								
14	8/28/2005								
15	8/28/2005								
16	8/28/2005								
17	8/28/2005								
18	8/29/2005	CM	JUVENILE	INSHORE	40'	SURFACE	NO	1046	N28.41051 W80.59574
18	8/29/2005	CM	JUVENILE	INSHORE	40'	SURFACE	NO	1047	N28.41049 W80.59552
19	8/29/2005	CM	JUVENILE	INSHORE	45'	UNDERWATER	NO	1031	N28.40896 W80.59341
19	8/29/2005	CM	JUVENILE	INSHORE	45'	UNDERWATER	NO	1032	N28.40896 W80.59349
20	8/29/2005								
21	8/29/2005								
22	8/29/2005								
23	8/29/2005								
24	8/29/2005								
25	8/29/2005								
27	8/29/2005								

CANAVERAL SEA TURTLE CENSUS DATA
TRANSECT LOCATION 3 - SOUTH SIDE OF CHANNEL NEAR MARKER 19
TRANSECT LENGTH 98 METERS

RUN #	DATE	SPECIES	JUVENILE/ADULT	INSHORE OR OFFSHORE SIDE	DISTANCE	SURFACE OR UNDERWATER	FEEDING?	WAYPOINT #	LAT/LON
1	8/27/2005								
2	8/27/2005								
3	8/27/2005								
4	8/27/2005								
5	8/27/2005								
6	8/27/2005								
7	8/28/2005								
8	8/28/2005								
9	8/28/2005								
10	8/28/2005								
11	8/28/2005								
12	8/28/2005								
13	8/28/2005								
14	8/28/2005								
15	8/28/2005								
16	8/28/2005								
17	8/28/2005								
18	8/29/2005								
19	8/29/2005	CM	JUVENILE	OFFSHORE	20'	UNDERWATER	NO	1009	N28.40907 W80.62006
20	8/29/2005								
21	8/29/2005								
22	8/29/2005								
23	8/29/2005	CM	JUVENILE	INSHORE	35'	UNDERWATER	NO	1010	N28.40910 W80.61977
24	8/29/2005	CM	JUVENILE	INSHORE	40'	SURFACE	NO	1028	N28.40884 W80.59450
24	8/29/2005	CM	JUVENILE	INSHORE	40'	UNDERWATER	NO	1029	N28.40887 W80.59443
24	8/29/2005	CM	JUVENILE	INSHORE	40'	UNDERWATER	NO	1030	N28.40895 W80.59398
25	8/29/2005								
26	8/29/2005								
27	8/29/2005								
28	8/29/2005								
29	8/29/2005								
30	8/29/2005								
31	8/29/2005								

CANAVERAL SEA TURTLE CENSUS DATA
TRANSECT LOCATION 4 - NORTH SIDE OF CHANNEL WEST OF WEST TURNING BASIN
TRANSECT LENGTH 258 METERS

RUN #	DATE	SPECIES	JUVENILE/ ADULT	INSHORE OR OFFSHORE SIDE	DISTANCE	SURFACE OR UNDERWATER	FEEDING?	WAYPOINT #	LAT/LON
1	8/27/2005								
2	8/27/2005								
3	8/27/2005								
4	8/27/2005								
5	8/27/2005								
6	8/27/2005								
7	8/27/2005								
8	8/28/2005								
9	8/28/2005								
10	8/28/2005								
11	8/28/2005								
12	8/28/2005								
13	8/28/2005								
14	8/28/2005								
15	8/28/2005								
16	8/28/2005								
17	8/28/2005								
18	8/28/2005								
19	8/29/2005								
20	8/29/2005								
21	8/29/2005								
22	8/29/2005								
23	8/29/2005								
24	8/29/2005								
25	8/29/2005								
26	8/29/2005								
27	8/29/2005								
28	8/29/2005								
29	8/29/2005								
30	8/29/2005								
31	8/29/2005								

CANAVERAL SEA TURTLE CENSUS DATA
TRANSECT LOCATION 5 - CENTERLINE OF CHANNEL
TRANSECT LENGTH 3490 METERS

RUN #	DATE	SPECIES	JUVENILE /ADULT	INSHORE OR OFFSHORE SIDE	DISTANCE	SURFACE OR UNDERWATER	FEEDING?	WAYPOINT #	LAT/LON
1	8/27/2005	CM	JUVENILE	NORTH SIDE	300'	SURFACE	NO	889	N28.41016 W80.60247
1	8/27/2005	CM	JUVENILE	NORTH SIDE	200"	SURFACE	NO	890	N28.41003 W80.61365
2	8/28/2005								
3	8/29/2005	CC	JUVENILE	SOUTH SIDE	50'	SURFACE	NO	1057	N28.41056 W80.59403

IRG
A NON-PROFIT CORPORATION
INWATER RESEARCH GROUP INC.

RECEIVED
APR 3 2006
DIAL CORDY AND ASSOCIATES INC

March 18, 2006

Dial Cordy and Associates, Inc.
490 Osceola Avenue
Jacksonville Beach, FL 32250
Attn: Mr. R. Steve Dial

SUBJECT: CANAVERAL SECTION 203 PROJECT SEA TURTLE CENSUS – WINTER 2006

Dear Mr. Dial:

This letter and enclosures transmits Inwater Research Group's (IRG) Results of censusing of sea turtle populations in Port Canaveral for the winter 2006 period. This work was undertaken in support of the Section 203 study for the Canaveral channel widening project. The work was performed on February 11-13 2006.

IRG has identified five sites inside Port Canaveral for sea turtle censusing. Site #1 is the main area of interest – the riprap rock habitat along the north side of the entrance channel between the middle and east turning basins. This is the shoreline segment that would have to be disturbed to construct the project. The other sites were chosen to provide information on comparative turtle abundance in other areas of similar habitat, and in the main channel itself. Site #2 is a riprap area 266 meters long on the south side of the channel at Jetty Park. Site #3 is a short (98 meter) stretch of riprap on the south side of the channel in the vicinity of marker 19. Site #4 is a 258 meter long riprap shoreline on the north side of the channel just west of the west turning basin. Site #5 comprises a transect run down the mainline of the channel for a stretch of 3490 meters. The site locations are graphically presented in the attachments.

IRG subjected all these sites to repetitive visual censusing, using observers in an elevated tower on a small boat. This technique allows for the calculation of an index of turtle abundance; observations per transect kilometer, which can be used to directly compare the different sites in the Port with each other, or a single site over time. Because the index results from the mean of a large number of observations, statistical significance testing will be possible from the data. A synopsis of the data is presented in the table below.

Site #	Transect length	# Of repetitions	Total turtles observed	Turtles per kilometer
1	980 m	36	111	3.21
2	266 m	38	6	0.593
3	98 m	18	0	0
4	258 m	23	0	0
5	3490 m	4	0	0

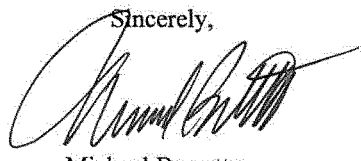
A spreadsheet containing the full data set for all observations and a graphical presentation of turtle observations are included as attachments.

It is evident from the results that turtles were considerably more abundant at Site #1 than at the other riprap habitat sites adjacent to the main channel in the Port. The habitat at sites 1,2, and 3 appeared quite similar, with algae covered rock sloping steeply into water over 2 meters deep. Site 4 had a much narrower band of submerged riprap and the adjacent water was considerably shallower, less than 1 meter.

Results of the winter 2006 sampling were consistent with the results of summer 2005 sampling in the relative abundance of turtles between sites, with site #1 showing considerably greater abundance. The number of turtles sighted per kilometer of transect at all sites was considerably less than the summer 2006 sampling. Some of this difference may be attributable to the somewhat rougher and more turbid conditions encountered in the winter sampling effort. Underwater visibility and surface chop primarily affects the ability of observers to spot turtles below the surface. A considerably smaller proportion of the total turtles observed in this winter were observed underwater as compared to summer sampling. If only turtles observed on the surface for both winter and summer sampling are considered, there is still a significantly lesser abundance in the winter sample.

IRG appreciates the opportunity to work with Dial Cordy on this project. Please do not hesitate to contact the principal Investigator for this project, Dr. Jonathan Gorham, at (321) 243-2211 with any questions or if you require additional information.

Sincerely,



Michael Bresette
President

Enclosures

CANAVERAL SEA TURTLE CENSUS DATA
TRANSECT LOCATION 1 - NORTH SIDE OF CHANNEL BETWEEN MIDDLE AND EAST BASINS
TRANSECT LENGTH 960 METERS

RUN #	DATE	SPECIES	JUVENILE/ADULT	INSHORE OR OFFSHORE SIDE	DISTANCE	SURFACE OR UNDERWATER	FEEDING?	WAYPOINT #	LAT/LONG
1	2/11/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1338	N28.41060 W80.59673
1	2/11/2006	CM	JUVENILE	INSHORE	15	UNDERWATER	NO	1339	N28.41053 W80.59945
1	2/11/2006	CM	JUVENILE	INSHORE	25	SURFACE	NO	1340	N28.41051 W80.60088
2	2/11/2006	CM	JUVENILE	INSHORE	30	SURFACE	NO	1341	N28.41060 W80.60283
2	2/11/2006	CM	JUVENILE	INSHORE	10	SURFACE	NO	1342	N28.41052 W80.59950
2	2/11/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1343	N28.41058 W80.59924
2	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1344	N28.41057 W80.59685
2	2/11/2006	CM	JUVENILE	INSHORE	45	SURFACE	NO	1345	N28.41087 W80.59341
3	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1346	N28.41056 W80.59674
4	2/11/2006								
5	2/11/2006	CM	JUVENILE	INSHORE	10	SURFACE	NO	1347	N28.41064 W80.59374
5	2/11/2006	CM	JUVENILE	INSHORE	10	SURFACE	NO	1348	N28.41052 W80.59960
5	2/11/2006	CM	JUVENILE	INSHORE	12	UNDERWATER	NO	1349	N28.41052 W80.60099
5	2/11/2006	CM	JUVENILE	INSHORE	10	UNDERWATER	NO	1350	N28.41058 W80.60150
5	2/11/2006	CM	JUVENILE	INSHORE	10	SURFACE	NO	1351	N28.41063 W80.60264
6	2/11/2006	CM	JUVENILE	INSHORE	15'	SURFACE	NO	1352	N28.41050 W80.60076
6	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1353	N28.41050 W80.60060
6	2/11/2006	CM	JUVENILE	INSHORE	10	SURFACE	NO	1354	N28.41057 W80.59915
6	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1355	N28.41058 W80.59699
6	2/11/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1356	N28.41050 W80.59530
6	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1357	N28.41078 W80.59352
7	2/11/2006	CM	JUVENILE	INSHORE	25	SURFACE	NO	1359	N28.41054 W80.59792
7	2/11/2006	CM	JUVENILE	INSHORE	30	SURFACE	NO	1360	N28.41058 W80.60328
8	2/11/2006	CM	JUVENILE	INSHORE	25	UNDERWATER	YES	1361	N28.41059 W80.60188
8	2/11/2006	CM	JUVENILE	INSHORE	0	SURFACE	NO	1362	N28.41057 W80.60149
8	2/11/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1363	N28.41057 W80.59798
9	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1365	N28.41051 W80.59977
9	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1366	N28.41059 W80.59824
9	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1367	N28.41059 W80.59775
10	2/11/2006	CM	JUVENILE	INSHORE	25	SURFACE	NO	1369	N28.41061 W80.59670
10	2/11/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1370	N28.41059 W80.59906
10	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1371	N28.41057 W80.59940
10	2/11/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1372	N28.41052 W80.60038
10	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1373	N28.41067 W80.60267
11	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1374	N28.41057 W80.60154
11	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1375	N28.41052 W80.60063
11	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1376	N28.41059 W80.59781
11	2/11/2006	CM	JUVENILE	INSHORE	15'	SURFACE	YES	1377	N28.41060 W80.59670
12	2/11/2006	CM	JUVENILE	INSHORE	10'	SURFACE	NO	1379	N28.41059 W80.59569
12	2/11/2006	CM	JUVENILE	INSHORE	3	SURFACE	NO	1380	N28.41061 W80.59846
12	2/11/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1381	N28.41059 W80.59912
12	2/11/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1382	N28.41050 W80.60028
13	2/11/2006	CM	JUVENILE	INSHORE	15'	SURFACE	NO	1383	N28.41053 W80.60051
13	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1384	N28.41054 W80.59974

13	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1385	N28.41058 W80.59722
14	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1386	N28.41058 W80.59576
14	2/11/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1387	N28.41059 W80.59666
14	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1388	N28.41061 W80.59772
14	2/11/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1389	N28.41058 W80.59857
15	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1390	N28.41058 W80.60144
15	2/11/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1391	N28.41050 W80.60027
15	2/11/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1392	N28.41059 W80.59817
15	2/11/2006	CM	JUVENILE	INSHORE	30	SURFACE	NO	1393	N28.41057 W80.59658
16	2/12/2006	CM	JUVENILE	INSHORE	30	SURFACE	NO	1395	N28.41058 W80.59570
16	2/12/2006	CM	JUVENILE	INSHORE	30	SURFACE	NO	1396	N28.41054 W80.59942
17	2/12/2006	CM	JUVENILE	INSHORE	30	SURFACE	NO	1397	N28.41057 W80.59947
17	2/12/2006	CM	JUVENILE	INSHORE	25	SURFACE	NO	1398	N28.41061 W80.59855
17	2/12/2006	CM	JUVENILE	INSHORE	50	SURFACE	NO	1399	N28.41060 W80.59666
17	2/12/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1400	N28.41091 W80.59351
18	2/12/2006	CM	JUVENILE	INSHORE	20	UNDERWATER	NO	1401	N28.41062 W80.59891
18	2/12/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1402	N28.41066 W80.60233
18	2/12/2006	CM	JUVENILE	INSHORE	25	SURFACE	NO	1403	N28.41066 W80.60262
19	2/12/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1404	N28.41059 W80.60139
19	2/12/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1405	N28.41057 W80.60105
19	2/12/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1406	N28.41059 W80.59814
19	2/12/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1407	N28.41056 W80.59692
19	2/12/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1408	N28.41050 W80.59512
19	2/12/2006	CM	JUVENILE	INSHORE	20'	SURFACE	YES	1409	N28.41081 W80.59345
20	2/12/2006	CM	JUVENILE	INSHORE	15	SURFACE	YES	1410	N28.41053 W80.59976
21	2/12/2006	CM	JUVENILE	INSHORE	12	SURFACE	NO	1411	N28.41053 W80.60084
21	2/12/2006	CM	JUVENILE	INSHORE	25	UNDERWATER	NO	1412	N28.41054 W80.59707
22	2/12/2006	CM	JUVENILE	INSHORE	30	SURFACE	NO	1413	N28.41054 W80.59697
23	2/12/2006	CM	JUVENILE	INSHORE	25	SURFACE	NO	1414	N28.41061 W80.59669
23	2/12/2006	CM	JUVENILE	INSHORE	20'	SURFACE	NO	1415	N28.41062 W80.59875
23	2/12/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1416	N28.41062 W80.59881
23	2/12/2006	CM	JUVENILE	INSHORE	20	UNDERWATER	YES	1417	N28.41062 W80.59907
23	2/12/2006	CM	JUVENILE	INSHORE	30	SURFACE	NO	1418	N28.41059 W80.60334
24	2/12/2006	CM	JUVENILE	INSHORE	20'	SURFACE	NO	1419	N28.41057 W80.60108
24	2/12/2006	CM	JUVENILE	INSHORE	20	UNDERWATER	NO	1420	N28.41049 W80.59528
24	2/12/2006	CM	JUVENILE	INSHORE	12	SURFACE	NO	1421	N28.41055 W80.59403
24	2/12/2006	CM	JUVENILE	INSHORE	12	SURFACE	NO	1422	N28.41056 W80.59398
25	2/12/2006	CM	JUVENILE	INSHORE	25	SURFACE	NO	1423	N28.41067 W80.60276
26	2/12/2006	CM	JUVENILE	INSHORE	25	SURFACE	NO	1424	N28.41059 W80.60288
26	2/12/2006	CM	JUVENILE	INSHORE	25	SURFACE	NO	1425	N28.41052 W80.60156
26	2/12/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1426	N28.41052 W80.59625
27	2/12/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1428	N28.41060 W80.60211
27	2/12/2006	CM	JUVENILE	INSHORE	5	SURFACE	NO	1429	N28.41055 W80.60155
28	2/12/2006	CM	JUVENILE	INSHORE	25	SURFACE	NO	1430	N28.41047 W80.59969
28	2/12/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1431	N28.41048 W80.59414
29	2/12/2006	CM	JUVENILE	INSHORE	5	SURFACE	NO	1433	N28.41058 W80.59721
29	2/12/2006	CM	JUVENILE	INSHORE	0	SURFACE	NO	1434	N28.41058 W80.59758
29	2/12/2006	CM	JUVENILE	INSHORE	35'	SURFACE	NO	1435	N28.41049 W80.60004
30	2/13/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1436	N28.41056 W80.59552

30	2/13/2006	CM	JUVENILE	INSHORE	15	SURFACE	YES	1437	N28.41056 W80.59892
30	2/13/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1438	N28.41056 W80.59908
30	2/13/2006	CM	JUVENILE	INSHORE	30	SURFACE	NO	1439	N28.41052 W80.59953
30	2/13/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1440	N28.41051 W80.60080
31	2/13/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1441	N28.41060 W80.59671
31	2/13/2006	CM	JUVENILE	INSHORE	5	SURFACE	NO	1442	N28.41053 W80.59409
32	2/13/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1443	N28.41075 W80.59359
32	2/13/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1444	N28.41058 W80.59683
32	2/13/2006	CM	JUVENILE	INSHORE	5	SURFACE	NO	1445	N28.41060 W80.59893
33	2/13/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1446	N28.41049 W80.60021
33	2/13/2006	CM	JUVENILE	INSHORE	0	SURFACE	NO	1447	N28.41055 W80.59948
33	2/13/2006	CM	JUVENILE	INSHORE	10	SURFACE	NO	1448	N28.41049 W80.59463
34	2/13/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1449	N28.41055 W80.60100
34	2/13/2006	CM	JUVENILE	INSHORE	20	UNDERWATER	NO	1450	N28.41055 W80.60127
35	2/13/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1451	N28.41057 W80.59904
36	2/13/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1452	N28.41053 W80.59452
36	2/13/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1453	N28.41052 W80.59460
36	2/13/2006	CM	JUVENILE	INSHORE	20	SURFACE	NO	1454	N28.41049 W80.59496
36	2/13/2006	CM	JUVENILE	INSHORE	15	SURFACE	NO	1455	N28.41058 W80.59849

CANAVERAL SEA TURTLE CENSUS DATA
TRANSECT LOCATION 2 - SOUTH SIDE OF CHANNEL ALONG JETTY PARK
TRANSECT LENGTH 266 METERS

RUN #	DATE	SPECIES	JUVENILE/ADULT	INSHORE OR OFFSHORE SIDE	DISTANCE	SURFACE OR UNDERWATER	FEEDING?	WAYPOINT #	LAT/LONG
1	2/11/2006								
2	2/11/2006								
3	2/11/2006								
4	2/11/2006								
5	2/11/2006								
6	2/11/2006	CM	JUVENILE	INSHORE	25	SURFACE	NO	1358	N28.40883 W80.59454
7	2/11/2006								
8	2/11/2006								
9	2/11/2006	CM	JUVENILE	INSHORE	20	UNDERWATER	NO	1364	N28.40875 W80.59459
10	2/11/2006	CM	JUVENILE	INSHORE	10	SURFACE	NO	1368	N28.40885 W80.59302
11	2/11/2006								
12	2/11/2006	CM	JUVENILE	INSHORE	5	SURFACE	NO	1378	N28.40885 W80.59386
13	2/11/2006								
14	2/11/2006								
15	2/11/2006								
16	2/11/2006	CM	JUVENILE	OFFSHORE	5	UNDERWATER	NO	1394	N28.40886 W80.59246
17	2/11/2006								
18	2/12/2006								
19	2/12/2006								
21	2/12/2006								
22	2/12/2006								
23	2/12/2006								
24	2/12/2006								
25	2/12/2006								
26	2/12/2006								
27	2/12/2006	CM	JUVENILE	INSHORE	30	SURFACE	NO	1432	N28.40873 W80.59470
28	2/12/2006								
29	2/12/2006								
30	2/12/2006								
31	2/13/2006								
32	2/13/2006								
33	2/13/2006								
34	2/13/2006								
35	2/13/2006								
36	2/13/2006								
37	2/13/2006								
38	2/13/2006								

CANAVERAL SEA TURTLE CENSUS DATA
TRANSECT LOCATION 3 - SOUTH SIDE OF CHANNEL BY MARKER 19
TRANSECT LENGTH 98 METERS

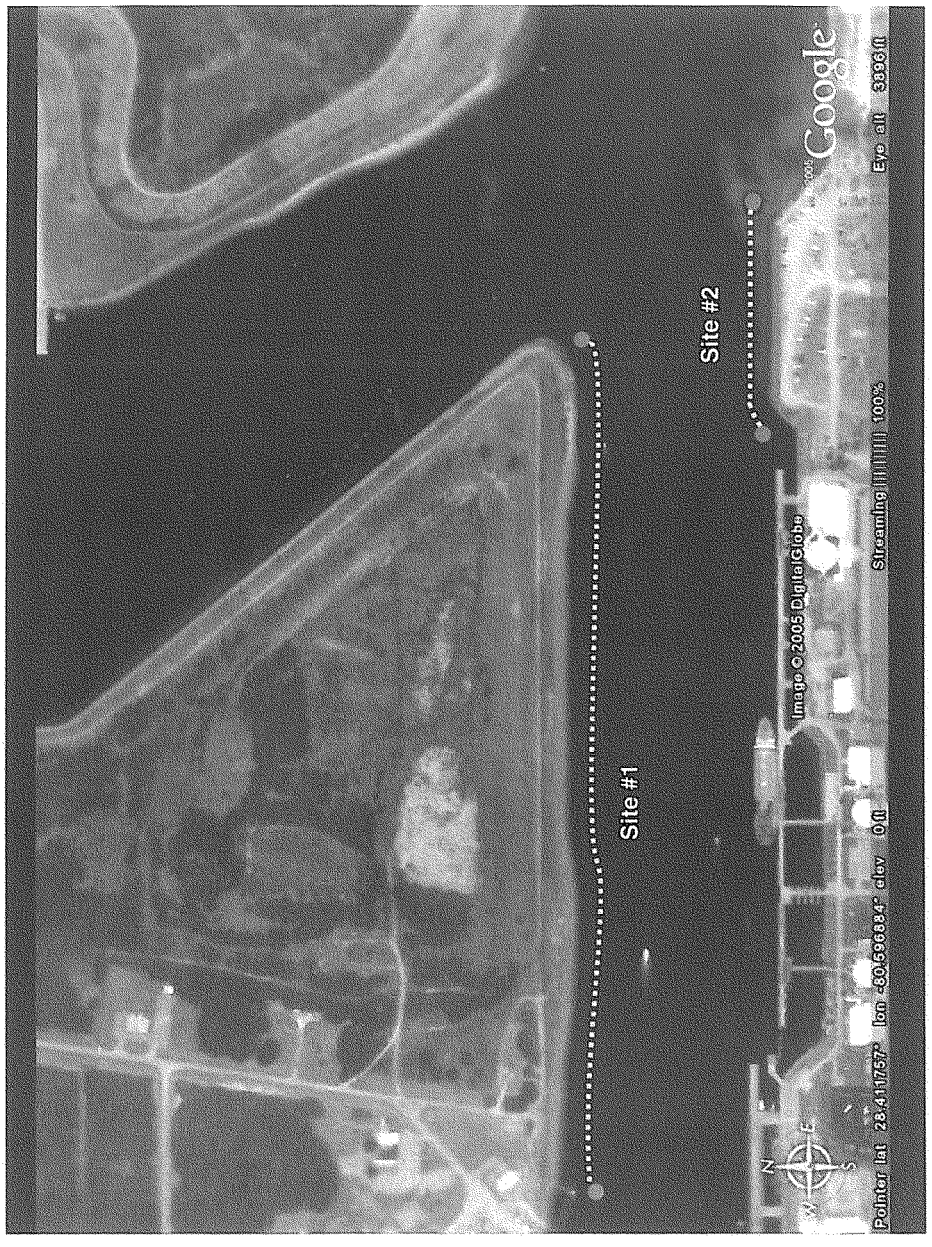
RUN #	DATE	SPECIES	JUVENILE/ADULT	INSHORE OR OFFSHORE SIDE	DISTANCE	SURFACE OR UNDERWATER	FEEDING?	WAYPOINT #	LAT/LONG
1	2/11/2006								
2	2/11/2006								
3	2/11/2006								
4	2/11/2006								
5	2/11/2006								
6	2/12/2006								
7	2/12/2006								
8	2/12/2006								
9	2/13/2006								
10	2/13/2006								
11	2/13/2006								
12	2/13/2006								
13	2/13/2006								
14	2/13/2006								
15	2/13/2006								
16	2/13/2006								
17	2/13/2006								
18	2/13/2006								

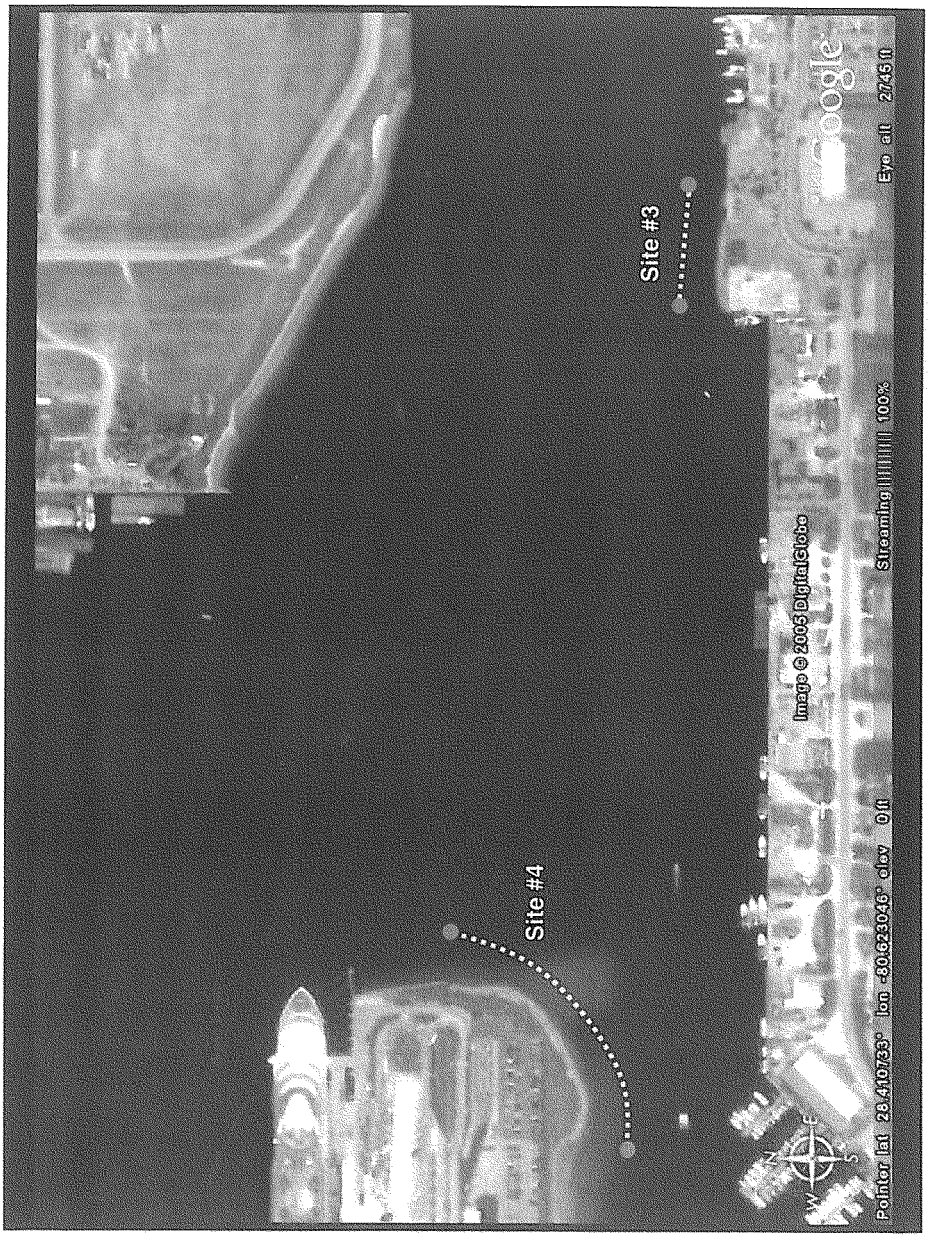
CANAVERAL SEA TURTLE CENSUS DATA
TRANSECT LOCATION 4 - NORTH SIDE OF CHANNEL JUST WEST OF WEST BASIN
TRANSECT LENGTH 258 METERS

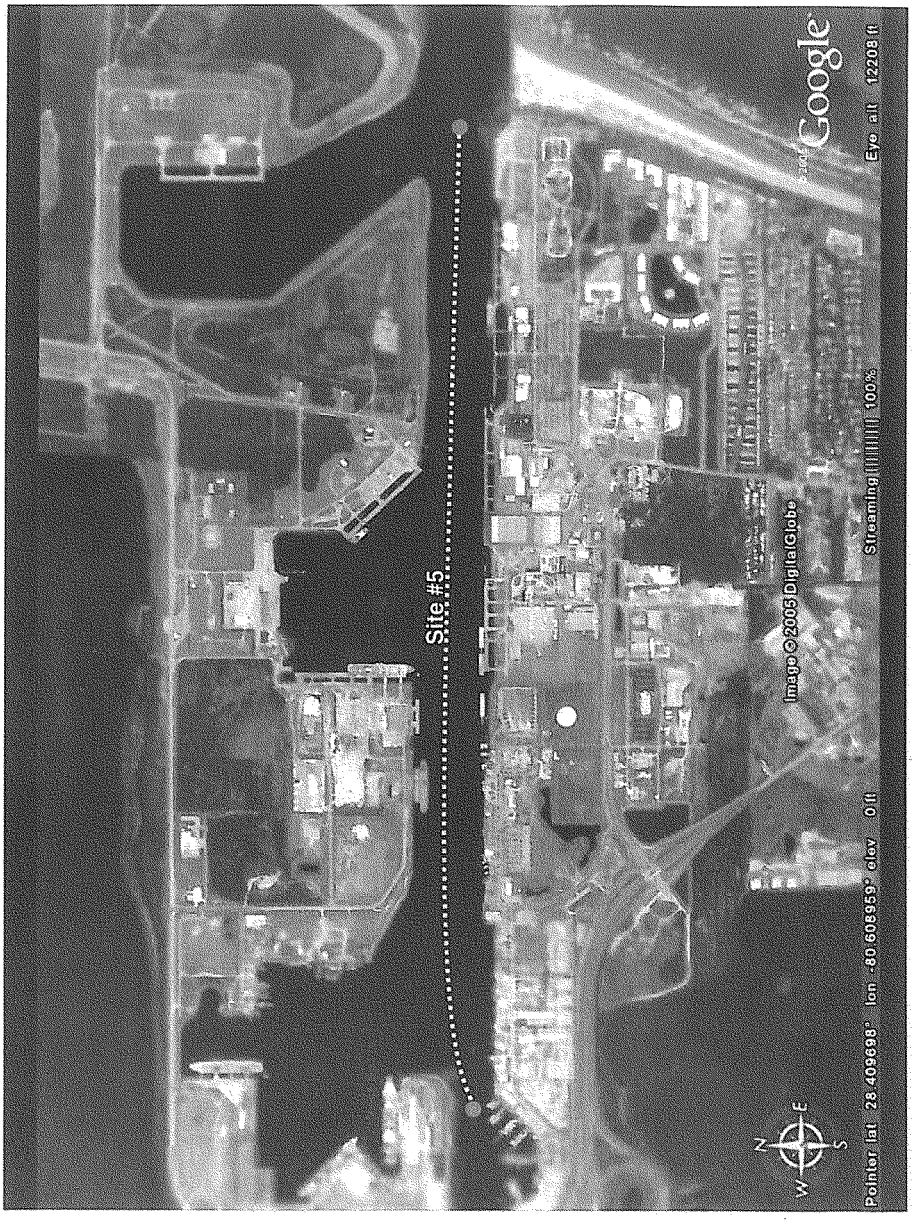
RUN #	DATE	SPECIES	JUVENILE/ADULT	INSHORE OR OFFSHORE SIDE	DISTANCE	SURFACE OR UNDERWATER	FEEDING?	WAYPOINT #	LAT/LONG
1	2/11/2006								
2	2/11/2006								
3	2/11/2006								
4	2/11/2006								
5	2/11/2006								
6	2/11/2006								
7	2/11/2006								
8	2/11/2006								
9	2/11/2006								
10	2/11/2006								
11	2/11/2006								
12	2/12/2006								
13	2/12/2006								
14	2/12/2006								
15	2/12/2006								
16	2/12/2006								
17	2/12/2006								
18	2/13/2006								
19	2/13/2006								
20	2/13/2006								
21	2/13/2006								
22	2/13/2006								
23	2/13/2006								

CANAVERAL SEA TURTLE CENSUS DATA
TRANSECT LOCATION 5 - CENTERLINE OF CHANNEL
TRANSECT LENGTH 3490 METERS

RUN #	DATE	SPECIES	JUVENILE/ADULT	INSHORE OR OFFSHORE SIDE	DISTANCE	SURFACE OR UNDERWATER	FEEDING?	WAYPOINT #	LAT/LONG
1	2/11/2006								
2	2/11/2006								
3	2/12/2006								
4	2/13/2006								


Site #1
Site #2
Image © 2005 DigitalGlobe
Google
Pointer lat 28.411757° lon -80.696884° elev 0m
Streaming 100%
Eye alt 3896 ft


Site #3
Site #4
Image © 2005 DigitalGlobe
Streaming 100%
Google
Eye alt 2745 ft


Site #5
Image © 2005 DigitalGlobe
Google
Pointer lat 28.409898° lon -80.608959° elev 0 ft
Streaming 100%
Eye alt 12208 ft

RECEIVED
AUG - 9 2007
DIAL CORDY AND ASSOCIATES INC

June 30, 2007

Dial Cordy and Associates, Inc.
490 Osceola Avenue
Jacksonville Beach, FL 32250
Attn: Mr. Lee Swain

SUBJECT: CANAVERAL SECTION 203 PROJECT SEA TURTLE CENSUS
2007 SUPPLEMENTAL SURVEYS

Dear Mr. Swain:

This letter and enclosures transmits Inwater Research Group's (IRG) results of June 2007 censusing of sea turtle populations in Port Canaveral. This work was undertaken in support of the Section 203 study for the Canaveral channel widening project. The work was performed on June 6 and 7, 2007.

IRG had previously identified five sites inside Port Canaveral for sea turtle censusing. Site #1 was the main area of interest – the riprap rock habitat along the north side of the entrance channel between the middle and east turning basins. This is the shoreline segment that would have to be disturbed to construct the project. The other sites were chosen to provide information on comparative turtle abundance in other areas of similar habitat, and in the main channel itself. These results were transmitted in prior reports, and indicated that sea turtles, primarily juvenile green sea turtles, were considerably more abundant at Site #1 than at the other rock riprap habitats within the Port.

The objective of the June 2007 census effort was to look for any other areas of rock substrate habitat in the vicinity that had not been examined in prior efforts, and to determine the abundance of sea turtles on those habitats. Abundance was assessed using the same methodology used for the earlier work, so the data would be directly comparable.

Two new sites were identified and censused. The North Jetty Site consisted of a rock riprap shoreline along the north side of the entrance channel 740 meters in length. The South Jetty Site was a similar segment 590 meters in length on the south side of the entrance channel.

IRG subjected these sites to repetitive visual censusing, using observers in an elevated tower on a small boat. This technique allows for the calculation of an index of turtle abundance, observations per transect kilometer, which can be used to directly compare

the different sites in the Port with each other, or a single site over time. Because the index results from the mean of a large number of observations, statistical significance testing will be possible from the data. A synopsis of the data is presented in the table below.

Site #	Transect length	# Of repetitions	Total turtles observed	Turtles per kilometer
North Jetty	740 m	28	8	0.39
South Jetty	590 m	36	25	1.18

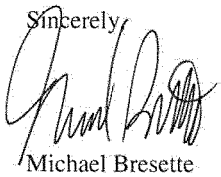
A spreadsheet containing the full data set for all observations and a graphical presentation of turtle observation locations are included as attachments.

Compared to the summer 2005 observation of 6.80 turtles per transect kilometer at Site #1 (the shoreline segment proposed for relocation), both the North Jetty and South Jetty sites showed a relatively low abundance. The habitat at the North Jetty and South Jetty sites appeared quite similar to the habitat at Site #1, with algae covered rock sloping steeply into water over 2 meters deep.

With the addition of the North and South Jetty Sites, we have examined a total of 1952 meters of riprap rock shoreline in the Port that is suitable turtle habitat (as evidenced by the presence of turtles and suitable forage), in addition to the 980 meter long Site #1. If the habitat provided by Site #1 were temporarily removed in the process of channel relocation, these other shoreline segments would be available as refugia. There is also a large extent of similar habitat available within the Trident Basin, where researchers from the University of Central Florida have been working for many years and have documented a high abundance of juvenile green turtles.

IRG appreciates the opportunity to work with Dial Cordy on this project. Please do not hesitate to contact the Principal Investigator for this project, Dr. Jonathan Gorham, at (321) 243-2211 with any questions or if you require additional information.

Sincerely,



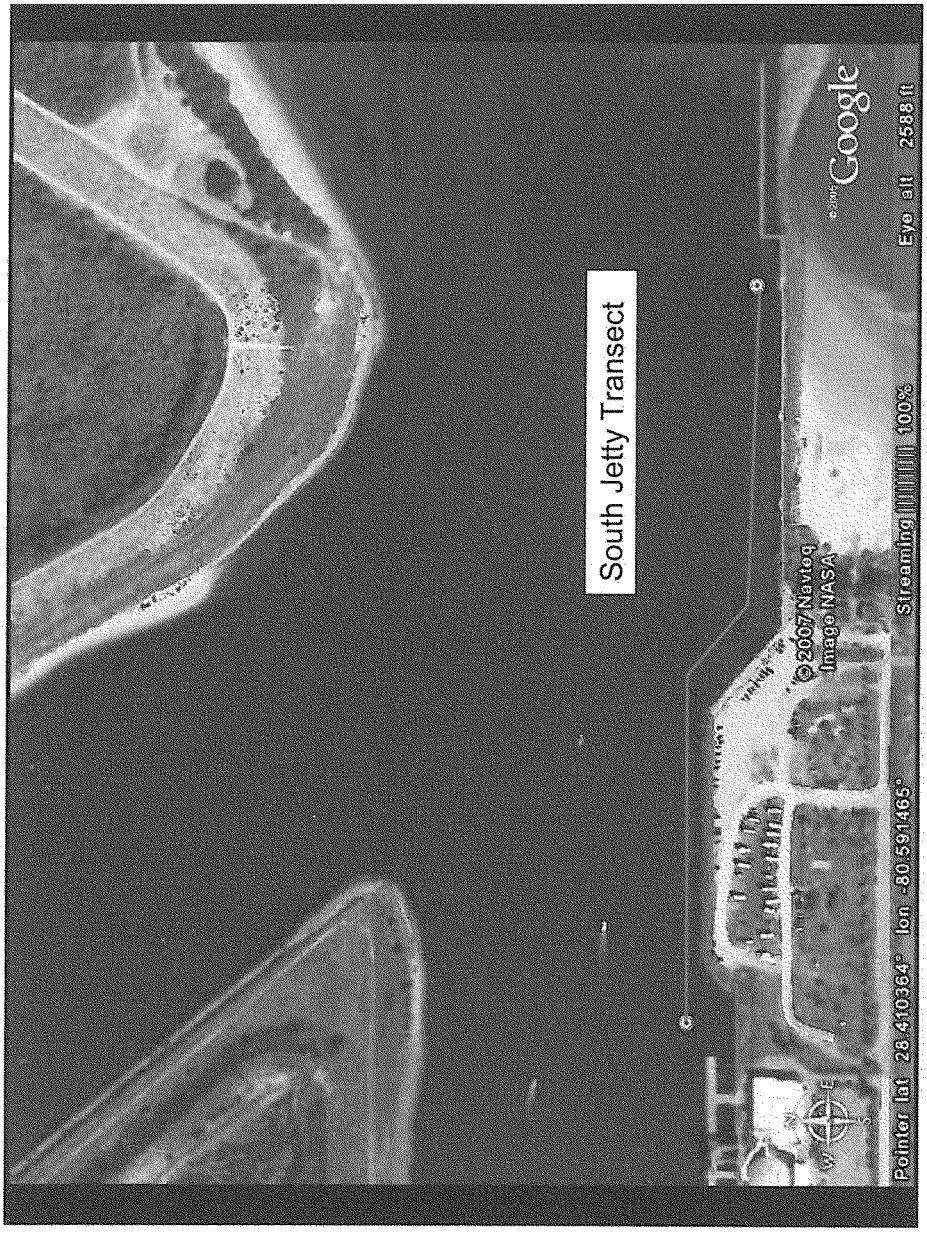
Michael Bresette
President

Enclosures

North Jetty Transect
© 2007 Navteq
Image NASA
Google
Streaming 100%
Pointer lat 28.410841° lon -80.587416°
Eye alt 3090 ft

CANAVERAL SEA TURTLE CENSUS DATA - 2007
NORTH JETTY TRANSECT LOCATION - NORTH SIDE OF ENTRANCE CHANNEL
TRANSECT LENGTH 740 METERS

RUN #	DATE	SPECIES	JUVENILE/ ADULT	INSHORE OR OFFSHORE SIDE	DISTANCE	SURFACE OR UNDERWATER	FEEDING ?	WAYPOINT #	LATITUDE/LONGITUDE
1	6/6/2007								
2	6/6/2007								
3	6/6/2007								
4	6/6/2007	CM	JUV	IN	40FT	SURFACE	NO	4095	N28 24.662 W80 35.040
5	6/6/2007								
6	6/6/2007								
7	6/6/2007								
8	6/6/2007								
9	6/6/2007	CC	SUBADULT	OFF	5FT	UNDERWATER	NO	4100	N28 24.700 W80 35.220
10	6/6/2007								
11	6/6/2007	CM	JUV	IN	6FT	SURFACE	NO	4102	N28 24.704 W80 35.217
12	6/6/2007	CC	SUBADULT	OFF	40FT	SURFACE	NO	4103	N28 24.713 W80 35.162
13	6/6/2007								
14	6/6/2007								
15	6/6/2007								
16	6/6/2007								
17	6/6/2007								
18	6/6/2007								
19	6/6/2007								
20	6/6/2007								
21	6/6/2007	CM	JUV	IN	25FT	SURFACE	NO	4119	N28 24.661 W80 35.032
22	6/7/2007	CM	JUV	IN	20FT	SURFACE	NO	4120	N28 24.652 W80 34.980
23	6/7/2007	CM	JUV	IN	30FT	SURFACE	NO	4122	N28 24.709 W80 35.147
24	6/7/2007	CM	JUV	IN	15 FT	SURFACE	NO	4123	N28 24.657 W80 35.005
25	6/7/2007								
26	6/7/2007								
27	6/7/2007								
28	6/7/2007								


South Jetty Transect
© 2007 Navteq
Image NASA
Google
Pointer lat 28.410364° lon -80.591465°
Streaming 100%
Eye alt 2588 ft

CANAVERAL SEA TURTLE CENSUS DATA - 2007
SOUTH JETTY TRANSECT LOCATION - SOUTH SIDE OF ENTRANCE CHANNEL
TRANSECT LENGTH 590 METERS

RUN #	DATE	SPECIES	JUVENILE /ADULT	INSHORE OR OFFSHORE SIDE	DISTANCE	SURFACE OR UNDERWATER	FEEDING?	WAYPOINT #	LATITUDE/LONGITUDE
1	6/6/2007								
2	6/6/2007								
3	6/6/2007	CM	JUV	IN	10FT	SURFACE	NO	4096	N28 24.531 W80 35.542
4	6/6/2007	CM	JUV	IN	5FT	SURFACE	NO	4093	N28 24.522 W80 35.523
5	6/6/2007	CM	JUV	IN	10FT	SURFACE	NO	4091	N28 24.529 W80 35.535
5	6/6/2007	CM	JUV	IN	10FT	SURFACE	NO	4092	N28 24.527 W80 35.531
6	6/6/2007	CM	JUV	IN	15FT	SURFACE	NO	4097	N28 24.501 W80 35.495
6	6/6/2007	CM	JUV	IN	25FT	SURFACE	NO	4098	N28 24.499 W80 35.479
6	6/6/2007	CM	JUV	IN	10FT	SURFACE	NO	4099	N28 24.501 W80 35.352
7	6/6/2007								
8	6/6/2007								
9	6/6/2007								
10	6/6/2007	CM	JUV	IN	5FT	SURFACE	NO	4101	N28 24.499 W80 35.371
11	6/6/2007								
12	6/6/2007								
13	6/6/2007								
14	6/6/2007								
15	6/6/2007								
16	6/6/2007								
17	6/6/2007								
18	6/6/2007	CM	JUV	IN	5FT	SURFACE	NO	4104	N28 24.534 W80 35.580
19	6/7/2007	CM	JUV	IN	5FT	SURFACE	NO	4108	N28 24.531 W80 35.586
20	6/7/2007								
21	6/7/2007	CM	JUV	IN	5FT	SURFACE	NO	4109	N28 24.532 W80 35.605
21	6/7/2007	CM	JUV	IN	10FT	SURFACE	NO	4110	N28 24.534 W80 35.523
22	6/7/2007								
23	6/7/2007								
24	6/7/2007	CM	JUV	IN	15FT	SURFACE	NO	4111	N28 24.534 W80 35.558

25	6/7/2007	CM	JUV	IN	5FT	SURFACE	NO	4112	N28 24.499 W80 35.328
26	6/7/2007	CC	SUBADULT	IN	5FT	SURFACE	NO	4113	N28 24.533 W80 35.553
26	6/7/2007	CM	JUV	OFF	5FT	SURFACE	NO	4114	N28 24.500 W80 35.480
27	6/7/2007	CM	JUV	IN	10FT	SURFACE	NO	4115	N28 24.531 W80 35.649
28	6/7/2007	CC	SUBADULT	IN	15FT	SURFACE	NO	4116	N28 24.515 W80 35.495
29	6/7/2007	CM	JUV	IN	20FT	SURFACE	NO	4117	N28 24.535 W80 35.593
29	6/7/2007	CM	JUV	IN	20FT	SURFACE	NO	4118	N28 24.504 W80 35.374
30	6/7/2007								
31	6/7/2007	CC	SUBADULT	IN	20FT	UNDERWATER	YES	4121	N28 24.534 W80 35.547
32	6/7/2007	CM	JUV	IN	20FT	SURFACE	NO	4124	N28 24.501 W80 35.353
33	6/7/2007	CM	JUV	IN	25FT	SURFACE	NO	4125	N28 24.505 W80 35.341
34	6/7/2007	CM	JUV	IN	20FT	SURFACE	NO	4126	N28 24.535 W80 35.554
35	6/7/2007								
36	6/7/2007	CM	JUV	IN	20FT	SURFACE	NO	4127	N28 24.510 W80 35.495

Cultural Resource Reports and Correspndence

TECHNICAL MEMORANDUM

A Cultural Resources Assessment of Proposed Navigation Improvements Canal Port Authority of Port Canaveral Brevard County, Florida

Lee Terzis, Senior Project Archaeologist
June 28, 2006
(Revised and updated December 5, 2007)

PBS&J Project Number: 091845.00
Project Location: Township 24 South, Range 37 East, Sections 10 and 11 in Port Canaveral, Florida
Project Description: The Canal Port Authority proposes to enlarge the Canaveral Barge Canal to a width of 500 feet in selected locations, and to remove land composed of dredge spoil to expand the West Turning Basin.

Introduction and Project Setting

PBS&J, on behalf of Dial Cordy and Associates, Inc. and the Canal Port Authority of Port Canaveral, conducted a reconnaissance-level cultural resources assessment of properties adjacent to the Canaveral Barge Canal on March 30 and 31, 2006. The tracts are located in Township 24 South, Range 37 East, Sections 10 and 11 in Port Canaveral, on the 7.5 minute Cape Canaveral, Florida Quadrangle (Figure 1). The Canal Port Authority proposes to enlarge the Canaveral Barge Canal to a width of 500 feet in selected locations, and to remove land composed of dredge spoil to expand the West Turning Basin. Lee Terzis served as field archaeologist and principal investigator for the project.

The purpose of a reconnaissance-level assessment is to define the probability that cultural resources may be present and preliminarily document any resources encountered in accordance with the provisions contained in 36 CFR 60.4 ("Criteria for Evaluation"). The assessment and evaluation consisted of a review of related source materials, photo documentation of the subject tracts, and a visual examination of the project area.

The project was designed to comply with 36 CFR. Part 800 ("Protection of Historic Properties") of the National Historic Preservation Act of 1966, as amended, applicable local ordinances, Section 267.061, *Florida Statutes*, Chapter 1A-46, *Florida Administrative Code* and reporting standards outlined in the Florida Division of

Historical Resources (FDHR) *Cultural Resources Management Standards & Operational Manual* (2003).

The Area of Potential Effect (APE) for the purposes of this assessment includes the Canaveral Barge Canal and lands bordering it to the north and south (Figure 2). Submerged areas potentially impacted by the proposed canal dredging east of the historic Atlantic shoreline were not specifically evaluated during this investigation.

Previous Investigations

A review of Florida Department of Environmental Protection (FDEP) data, including the original 1859 government survey plat map and modern aerial photographs, clearly demonstrate that the construction of the port facilities and canal in the early 1960s and subsequent filling-in of the Banana River with dredge spoil have significantly altered the project area over time (Figure 3).

An initial review of pertinent Florida Master Site File (FMSF) data revealed that CCAFS is listed as a National Historic Landmark (NHL) for its vital contribution to the nation's space program. Specifically, the significant structures on the base included in the NHL designation consist of the launch complexes (5, 6, 13, 14, 19, 26 and 34) and the Mission Control Center. However, these structures are located well to the north of the APE and will not be affected by the proposed canal improvements.

Initial FMSF research also showed that one archaeological site was previously recorded adjacent to the project area. Site 8BR1641 is located on a relict sandy ridge paralleling the old Banana River shoreline. The site was originally discovered in January, 1992, when Mobile Corps of Engineers archaeologists noted the presence of gray midden soils containing shell and ceramics. Surface collections and limited shovel testing produced shell, bone, possible grinding tool fragments, and ceramics dating to the Orange Period (4,000 to 2,500 BP) (Seckinger and Nielsen n.d. in Cantley et al 1993:212). Late in 1992, archeologists conducted shovel testing and surface collection. This effort produced coquina shell, chert flakes and ceramics from the Malabar II Period (1,200 to 500 BP) (Cantley et al 1993). Additional excavations completed in 1999 by Archaeological Consultants, Inc., and in 2006 by PBS&J, confirmed that the site boundary was circa 100 meters north of the canal shoreline (Deming and Horvath 1999:124; Stickler 2006) (Figure 4).

Results of Fieldwork

A pedestrian inspection was conducted along the northern edge of the Canaveral Barge Canal on CCAFS land west of the Trident Submarine Turning Basin (see Figure 2). This

area has been heavily impacted by development, beginning with the construction of the old A1A corridor that once extended north-south through what is now CCAFS land (Figure 5). Subsequent disturbances included the original dredging of the canal in the 1960s, the erection of a fence and riprap, and the placement of a Trident submarine conning tower as a marker (Figure 6). Across the canal to the south is a commercial docking complex for cruise ships and other vessels (Figure 7).

The only substantial land parcel within the APE is a restricted USCG facility adjacent to the West Turning Basin (see Figure 2). The land that comprises this parcel is composed entirely of dredge spoil removed to create the Canaveral Barge Canal in the 1960s. Therefore, this parcel has no potential to contain significant cultural resources. Physical access to the parcel was not permitted due to security reasons, although a photograph of the tract was taken from a distance (Figure 8).

Summary and Recommendations

PBS&J, on behalf of Dial Cordy and Associates, Inc. and the Canal Port Authority of Port Canaveral, conducted a reconnaissance-level cultural resources assessment of lands adjacent to the Canaveral Barge Canal on March 30 and 31, 2006. The Canal Port Authority plans to dredge the canal and to make other safety and navigation improvements (Figure 4).

It is our opinion that dredging of the canal as currently proposed will not impact any significant cultural resources on the subject tracts included in this assessment, and that the project will have no adverse effect on archaeological or historical properties listed or eligible for listing in the National Register of Historic Places, or otherwise of historical or archaeological value.

References

Cantley, Charles E., Joe Joseph, and Leslie Raymer
1993 *Historic Properties Survey of Cape Canaveral Air Force Station, Florida.* U.S. Army Corps of Engineers, Mobile, Alabama.

Deming, Joan and Elizabeth A. Horvath
1999 *Phase II Test Excavation Report: Sixteen Archaeological Sites, Cape Canaveral Air Station, Brevard County.* Submitted to 45th Space Wing, Patrick Air Force Base, Florida by Archaeological Consultants, Inc., Sarasota, Florida.

Levy, R. S., D. F. Barton, and T. B. Riordan
1984 *An Archaeological Survey of Cape Canaveral Air Force Station, Brevard County, Florida.* Submitted to the Southeast Regional Office, National Park Service, Atlanta, Georgia by Resource Analysts, Bloomington, Indiana.

Stickler, Justin
2006 *A Phase 1 Archaeological Assessment of the NOTU Site, 8BR1641, Brevard County, Florida.* Prepared for the Economic Development Commission of Florida's Space Coast and submitted to 45th Space Wing CES/CEVP, Patrick Air Force Base, Florida.

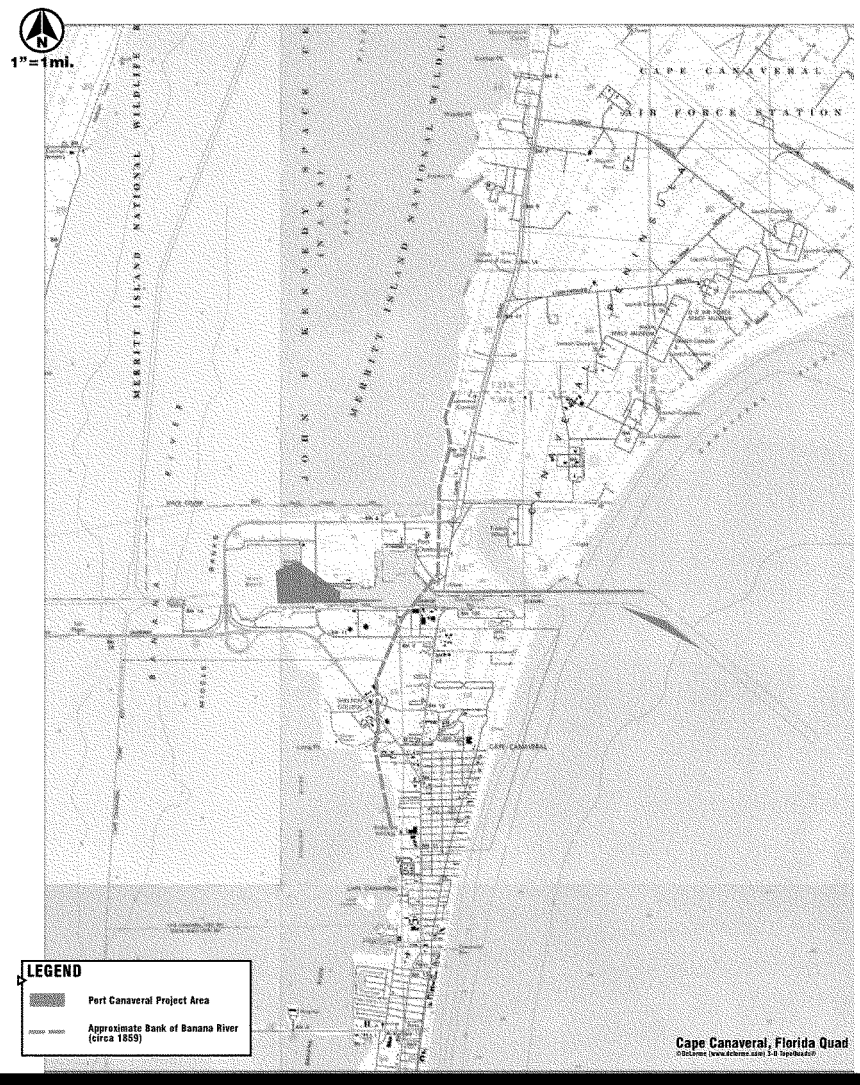


Figure 1 **Project Location Map**

PBSJ

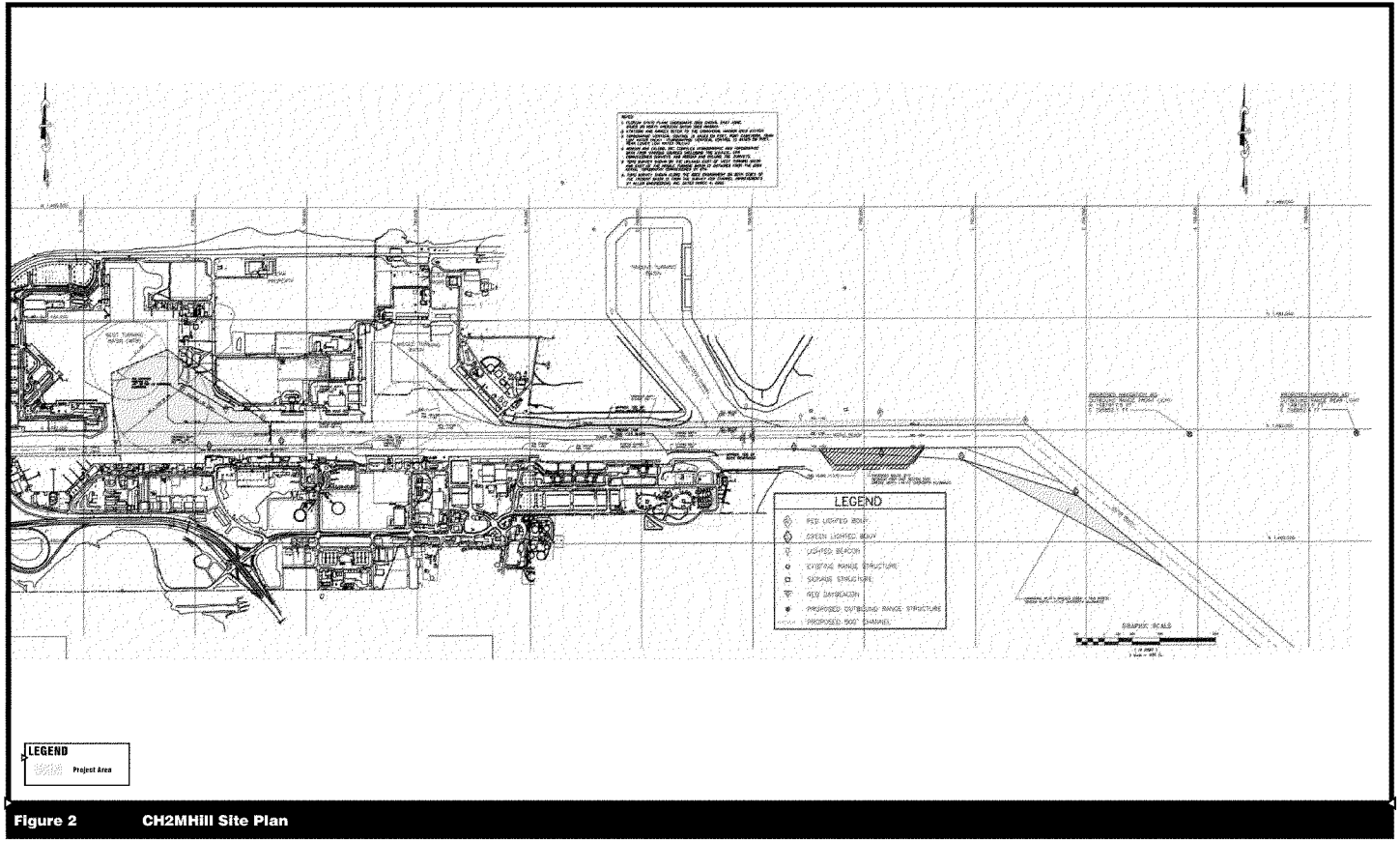


Figure 2 **CH2MHill Site Plan**

PBSJ

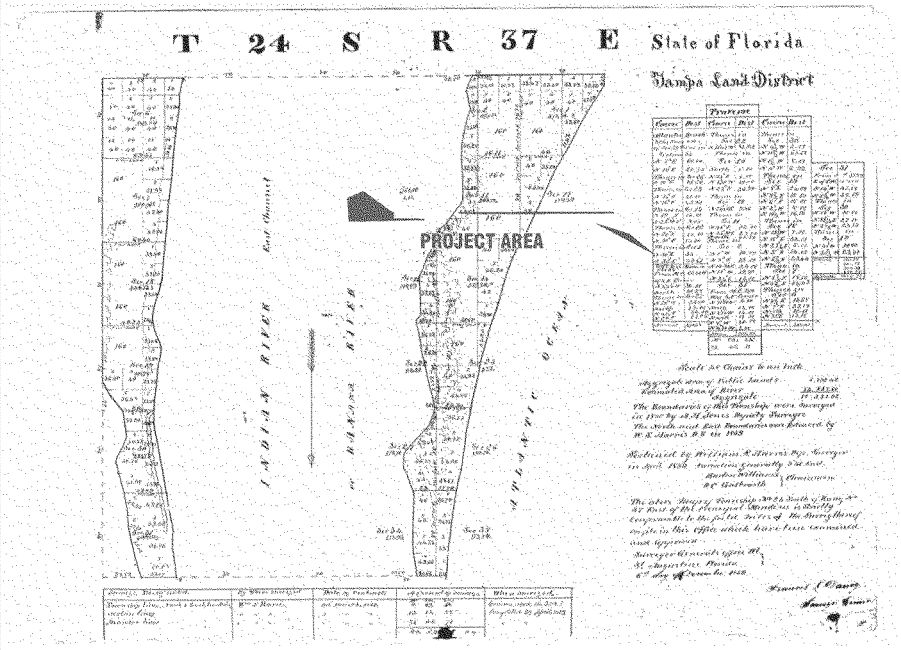


Figure 3 **Historic Plat Map**

PBSJ

Figure 4 **Port Canaveral Project Area**

PBSJ

Figure 5. CCAFS land, view south to the canal.

Figure 6. CCAFS land, view to the northwest.

Figure 7. CCAFS land, view to the east.

Figure 8. USCG property, view to the southwest.

PBS&J

An employee-owned company

December 5, 2007

Mr. Fred Gaske
Director and State Historic Preservation Officer
Florida Division of Historical Resources
R.A. Gray Building
Tallahassee, Florida 32399-0250

Attention: Ms. Laura Kammerer

Subject: Technical Memorandum: A Cultural Resources Assessment of Proposed Navigation Improvements, Canal Port Authority of Port Canaveral, Brevard County, Florida

PBS&J Project Number: 091845.00
County: Brevard
Project Description: The Canal Port Authority proposes to enlarge the Canaveral Barge Canal to a width of 500 feet in selected locations, and to remove land composed of dredge spoil to expand the West Turning Basin.

Dear Mr. Gaske:

In accordance with the provisions contained in Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, 36 CFR, Part 800, PBS&J on behalf of Dial Cordy and Associates, Inc. and the Canal Port Authority of Port Canaveral, is seeking your concurrence that the subject project will have no effect on any archaeological or historical sites or properties listed, or eligible for listing, in the *National Register of Historic Places*, or otherwise of historical or archaeological value.

This office has performed a cultural resources assessment of the subject tract. Based upon our assessment, we are of the opinion that this area does not contain any sites that are eligible for listing in the *National Register of Historic Places*, or otherwise of historical or archaeological value.

Lee Terzis served as the principal investigator for this assessment. Ms. Terzis' technical memorandum, entitled *A Cultural Resources Assessment of Proposed Navigation*

Improvements, Canal Port Authority of Port Canaveral, Brevard County, Florida, is attached for your review and consideration.

This report applies strictly to this project as defined herein, and does not apply if any of the parameters should change. Any future projects within this area would be subject to any and all pertinent federal and state laws, rules and regulations. If you have any questions about the subject project, please do not hesitate to contact Ms. Terzis or me.

Sincerely,

POST, BUCKLEY, SCHUH & JERNIGAN, INC.

Daniel T. Penton
Senior Program Archaeologist

Attachment

xc: Steve Dial, Dial Cordy and Associates, Inc.
Lee Swain, Dial Cordy and Associates, Inc.

RECEIVED
DEC 18 2007
PBS & J TALLAHASSEE

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Daniel Penton
Post, Buckley, Schuh, and Jernigan, Inc.
1901 Commonwealth Lane
Tallahassee, Florida 32303

December 14, 2007

Re: DHR No.: 2007-8692
Technical Memorandum: A Cultural Resources Assessment of Proposed Navigation Improvements, Canal Port Authority of Port Canaveral, Brevard County, Florida

Dear Mr. Penton:

Our office reviewed the referenced investigations report in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, its implementing regulations (36 CFR Part 800), and Chapters 267, *Florida Statutes*. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties, listed, or eligible for listing, in the National Register of Historic Places, assessing the project's effects, and considering alternatives to avoid or reduce adverse effects.

In June 2006, Post, Buckley, Schuh, and Jernigan conducted a cultural resources assessment reconnaissance level survey of the barge canal navigation improvements project area on behalf of Dial Cordy and Associates, Inc. for the Port Canaveral Canal Port Authority. No cultural resources were identified within the project area of potential effect during the investigation.

Based on the information provided, in is the opinion of this office that there are no historic properties located within the project area of potential effect. Because of the nature of the proposed improvements, it is unlikely that such properties would be affected. The technical memorandum is consistent with the requirements of 1A-46, *Florida Administrative Code.*

If you have any questions concerning our comments, please contact Laura Kammerer, Deputy State Historic Preservation Officer for Review and Compliance, at 850-245-6333 or lkammerer@dos.state.fl.us. Thank you for your interest in protecting Florida's historic properties.

Sincerely,

Frederick P. Gaske, Director, and
State Historic Preservation Officer

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ Director's Office (850) 245-6300 • FAX: 245-6436
☐ Archaeological Research (850) 245-6444 • FAX: 245-6452
☒ Historic Preservation (850) 245-6333 • FAX: 245-6437
☐ Historical Museums (850) 245-6400 • FAX: 245-6433

☐ South Regional Preservation Office (561) 416-2115 • FAX: 416-2149
☐ North Regional Preservation Office (850) 245-6445 • FAX: 245-6435
☐ Central Regional Preservation Office (813) 272-3843 • FAX: 272-2340

Mid-Atlantic Technology
and Environmental Research, Inc.

13 February 2008

Lee Swain
Vice President
Dial Cordy Associates, Inc.
490 Osceola Avenue
Jacksonville Beach, FL 32250

Re: **Management Summary**: Submerged Cultural Resource Survey of Entrance Channel Widener and Channel Improvement, Port Canaveral, Florida

Dear Mr. Swain:

Mid-Atlantic Technology (M-AT) has completed the field investigations portion of the above referenced project. The remote sensing portion of the investigations was conducted on 11 December 2008. Two remote sensing devices were used: a Geometrics 881 cesium marine magnetometer, and Marine Sonic 600-kHz side-scan sonar. Each instrument was interfaced with a Starlink Differential Global Positioning System. HYPACK MAX™ navigation software also was interfaced with the DGPS system, being used to develop the survey lines and maintain vessel track during data collection.

Data was collected along parallel lines spaced at 50-foot (15-meter) intervals. Magnetic data, along with corresponding positioning data, was recorded at ½-second sample intervals (or approximately every 4 feet along a track line at 5 knots) using HYPACK data acquisition software. Acoustic data was recorded with Sea Scan PC acoustic data acquisition software using an onboard PC computer system.

The primary investigations concentrated on the proposed turn widener at the south side of the entrance channel. We also conducted side scan sonar investigations along each side of the harbor west past the large turning basin.

Magnetic data was contoured at 1-nanotesla intervals and reduced to pole. The contour map was then overlaid on either the sonar mosaic for comparison analysis or geo-referenced color aerial photographs (or sonar mosaic) taken in 2000.

Nine survey lines space at 50-foot intervals were conducted across the turn widener. Several small magnetic and acoustic anomalies were identified within the proposed turn widener. However, all the targets directly within the footprint of the widener appear to be associated with modern debris, and have little or no potential to be associated with a significant submerged cultural resource.

Just to the south of the widener two targets were identified that initially had characteristics that had the potential to be associated with significant submerged cultural resources. These are located at the following Florida East State Plane Coordinates:

Cape1a: 791547 E 1491271 N

Cape1b: 791467 E 1481234 N

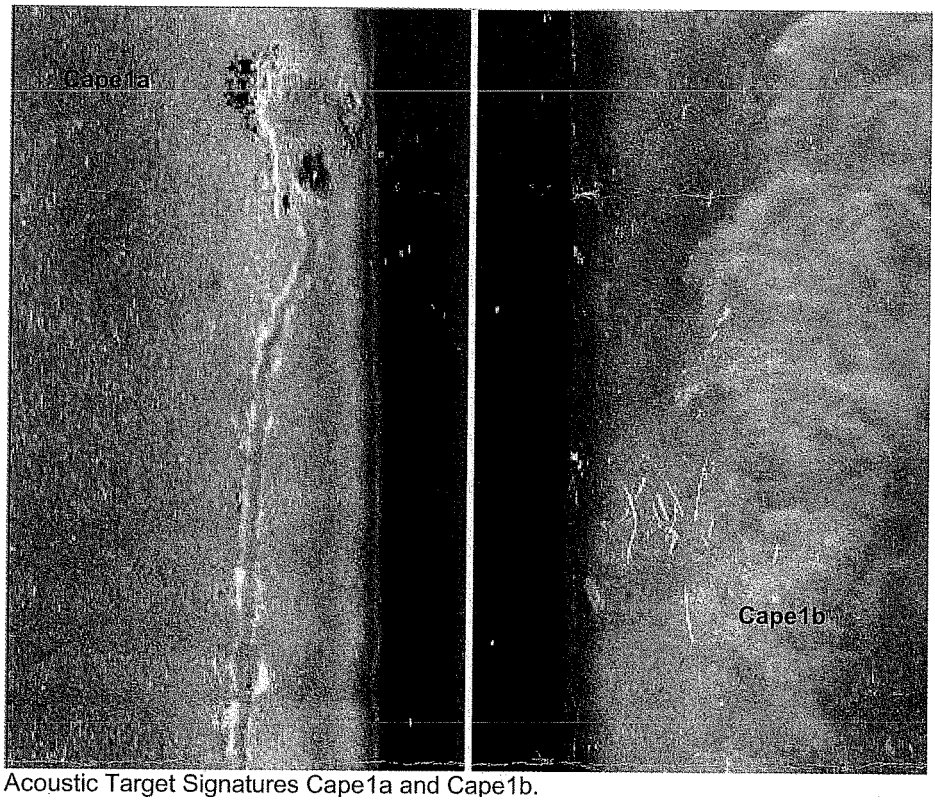
On 28 January 2008 M-AT conducted underwater investigations to identify the nature of the materials creating the acoustic and magnetic anomalies at **Cape1a** and **Cape1b** along the south side of the turn widener.

Both Cape1a and Cape1b were identified as modern construction debris including sections of 2½ -inch wire rope and 3-inch angle iron.

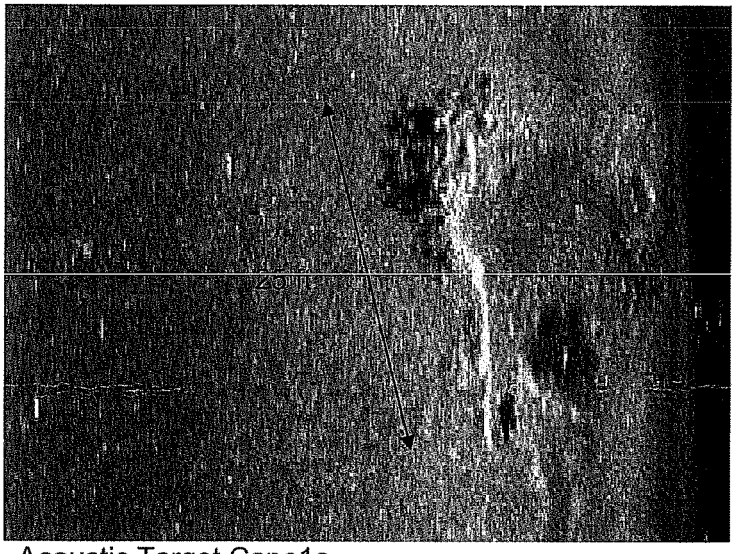
No additional archaeological investigations or mitigation are recommended for the proposed navigation channel improvement at Port Canaveral.

Sincerely,

Wes Hall
President
Enclosure



Acoustic Target Signatures Cape1a and Cape1b.



Acoustic Target Cape1a.

Acoustic Target Cape1b.

Quick map including magnetic contour map of turn widener. The largest magnetic anomaly is a dredge pipe with two anchors and mooring buoys.

Port Canaveral Improvements
Section 203 Feasibility Study
Draft Fish and Wildlife Coordination Act Report

U. S. Fish & Wildlife Service
North Florida Field Office
6620 Southpoint Drive South, Suite 310
Jacksonville, FL 32216-0958

17 September 2007

TABLE OF CONTENTS

Page

LIST OF FIGURES IV

LIST OF TABLES V

1.0 INTRODUCTION 1

2.0 AUTHORIZATION 1

3.0 PROJECT HISTORY AND SERVICE INVOLVEMENT 1

4.0 DESCRIPTION OF RECOMMENDED PLAN 1

5.0 AFFECTED ENVIRONMENT AND FISH & WILDLIFE RESOUCES 9

5.1 Biotic Communities 9
5.1.1 Uplands 9
5.1.2 Wetlands 9
5.1.3 Beaches and Dunes 11
5.1.4 Nearshore Hardgrounds 11
5.1.5 Seagrass Beds 11
5.1.6 Unvegetated Benthic Habitats 13
5.1.7 Open Water 13
5.1.8 Submerged Rock/Rip-Rap Habitats within the Port/Harbor 13
5.2 Essential Fish Habitat 14
5.3 Federally-listed Species in Project Area and Vicinity 14
5.3.1 West Indian Manatee 14
5.3.2 North Atlantic Right Whale 15
5.3.3 Southeastern Beach Mouse 15
5.3.4 Piping Plover 15
5.3.5 Sea Turtles 15
5.3.6 Eastern Indigo Snake 16
5.4 State-listed Species in Project Area and Vicinity 16

6.0 IMPACTS TO FISH AND WILDLIFE RESOURCES AND HABITATS 18

6.1 Preferred Alternative/Recommended Plan 18
6.1.1 Direct Impacts 18
6.1.2 Indirect Impacts 18
6.1.3 Cumulative Impacts 20
6.2 Other Alternatives 20
6.3 No Action Alternative 21

7.0 RECOMMENDATIONS OF THE U.S. FISH AND WILDLIFE SERVICE 21
7.1 Alternative Plans 21
7.2 Fish and Wildlife Resources and Protection/Conservation Measures 21
7.2.1 Manatees and Sea Turtles 21
7.2.2 Other Protected Species 23
7.3 Water Quality 23
8.0 SUMMARY OF POSITION OF THE U.S. FISH AND WILDLIFE SERVICE 24
9.0 LITERATURE CITED 25

LIST OF FIGURES

Page
Figure 1: Project Location....2
Figure 2: Study Area....3
Figure 3: Recommended Plan - West....5
Figure 4: Recommended Plan - East....6
Figure 5; Land Use and Habitat Types in Project Area....10
Figure 6: Seagrass Occurence....12
Figure 7: Gopher Tortoise Burrows and Habitat....17
Figure 8: Potential Terrestrial Impacts....19

LIST OF TABLES

Page

Table 1: Project Component Acreages....8
Table 2: Natural Upland and Wetland Communities in Project Area and Vicinity....9

1.0 INTRODUCTION

The Canaveral Port Authority (CPA) has proposed to widen and deepen the ocean channel, interior harbor channel, and West Turning Basin of Port Canaveral, under the authority granted by Section 203 of the 1983 Water Resources Development Act (WRDA). The project is proposed in response to problems and issues identified by the CPA and Canaveral Pilots Association with regard to ship maneuvering within the existing Federal project.

2.0 AUTHORIZATION

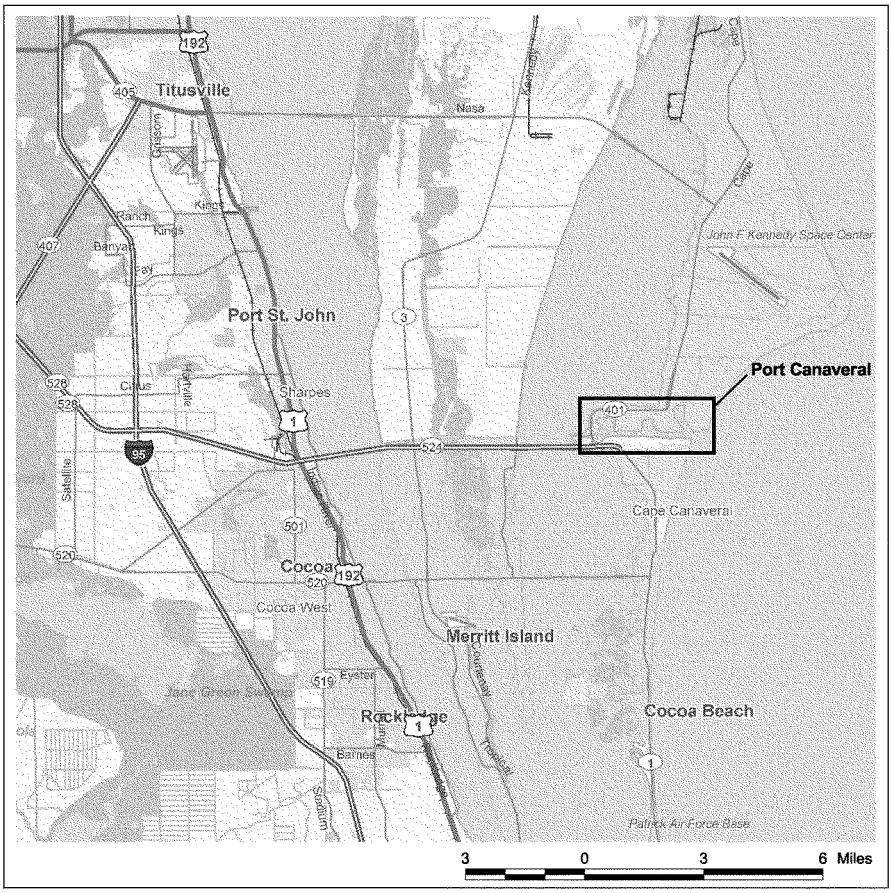
This report is submitted by the U.S. Fish and Wildlife Service (Service) in accordance with the Fish and Wildlife Coordination Act (FWCA) and constitutes the final report of the Secretary of the Interior as required by Section 2(b) of the FWCA. This FWCA Report evaluates the possible adverse effects of the proposed project on fish and wildlife resources, excluding federally listed species, and is submitted in accordance with provisions of the FWCA and the U.S. Endangered Species Act.

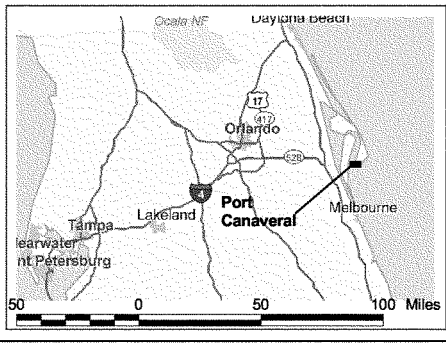
3.0 PROJECT HISTORY AND SERVICE INVOLVEMENT

The CPA and its consultants initiated coordination with the Service and NOAA Fisheries-Habitat Conservation Division on 14 December 2005 during a meeting at the FWS Jacksonville Field Office. Subsequently, the CPA initiated consultation with NOAA Fisheries-Protected Resources Division via a letter dated 14 April 2006, and with State of Florida resource agencies (i.e., Florida Department of Environmental Protection and Florida Fish and Wildlife Conservation Commission) via a letter also dated 14 April 2006. No further coordination has taken place with the Service.

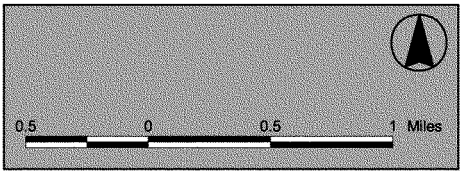
4.0 DESCRIPTION OF RECOMMENDED PLAN

Port Canaveral is located in Brevard County on the east coast of Florida, approximately nine miles north of Cocoa Beach (Figure 1). The Port is orientated in an east–west direction, extending from the Banana River in the east to the Atlantic coast. The Port is bounded to the north by the Cape Canaveral Air Force Station (CCAFS) and the Banana River, and bounded on the south by the City of Cape Canaveral. The harbor consists of three turning basins (Figure 2). Starting from the east they are the Trident Turning Basin (TTB), the Middle Turning Basin (MTB), and the West Turning Basin (WTB). The basins are connected by a channel (i.e., East Access Channel, or "Inner Reach" as noted in Section 4.0; and West Access Channel) that forms the south boundary of each basin. Within this channel, a federally maintained Barge Canal extends from the south side of the MTB, through the Banana River, across Merritt Island, and connects with the Intracoastal Waterway (ICWW) system in the Indian River. Where the Barge Canal enters the Banana River, a 600-foot long Corps of Engineers' lock (Canaveral Lock) separates the tidal harbor from the almost non-tidal river.





Project Location		
Draft Fish and Wildlife Coordination Act Report Port Canaveral, FL		
	Scale: 1 inch = 3 miles	Drawn By: MR
	Date: August 2007	Approved By: LS
	J05-850	Figure 1



Study Area		
Draft Fish and Wildlife Coordination Act Report Port Canaveral, FL		
	Scale: 1 inch = 0.5 mile	Drawn By: MR
	Date: August 2007	Approved By: LS
	J05-850	Figure 2

The CPA has identified three major problems associated with Port Canaveral, and has summarized them as follows:

1. Congestion at cargo berths reduces the effectiveness and efficiency of cargo vessels and landside facilities. Given the rapid growth in commodity movements at Port Canaveral, in the very near future a significant proportion of cargo vessels calling at Port Canaveral will have to wait offshore for a berth to become available. Some of these vessels may divert to an alternative port and incur increased transportation costs, if channels are not improved. In addition, landside facilities will stand temporarily idle as vessels wait offshore for an available berth or safe passage through the Federal channel.

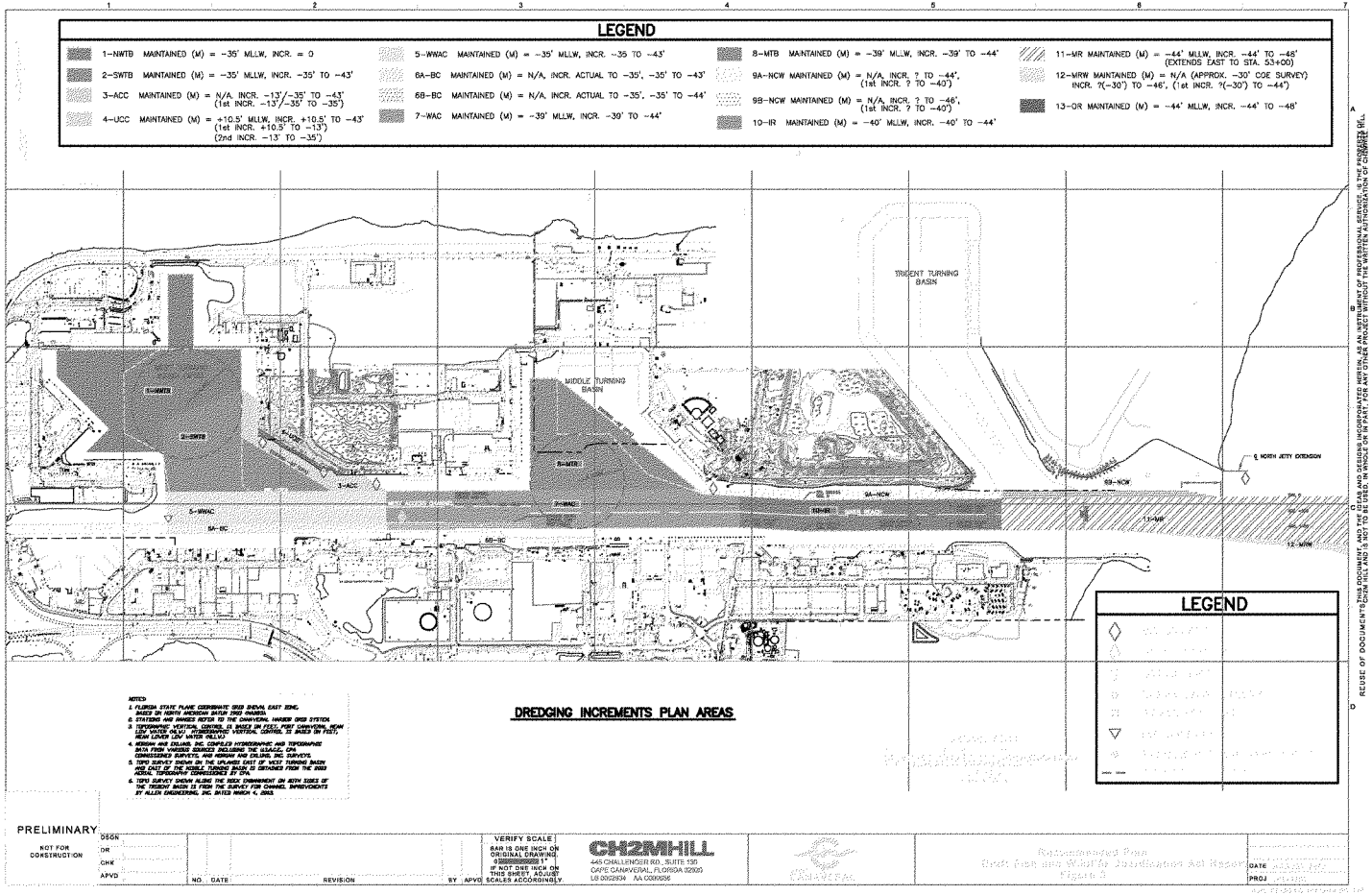
2. The size of cargo vessels calling at Port Canaveral is constrained by existing channel dimensions and configurations. Larger, more efficient vessels could be used for bulk items such as petroleum products, aggregates, and cement if channels were improved.

3. The size of cruise ships calling at Port Canaveral is constrained by channel and turning basin dimensions. Increasingly larger cruise ships are calling at Port Canaveral and are beginning to exceed the dimensions for safe use of the existing West Turning Basin. Passage of large cruise ships through the narrow ship channel leading to the turning basin and cruise ship piers also causes surges at cargo piers that line the channel, which results in cargo vessels having to stop loading and unloading activities while the cruise ships pass. The potential for future cruise ship terminal expansion also cannot be fully exploited under existing channel and turning basin dimensions and configurations.

The plan proposed by the Corps and Port for alleviating the conditions above is detailed below. This description is based on Figures 3 and 4, created by CH2M Hill, the Port's engineering consultant. Maximum possible dredge depths were assumed, although the actual selected plan may involve shallower design depths. However, the plan below will be referred to in this document as the "preferred" or "recommended" plan. Component reference numbers in parentheses in the plan below refer to project elements in the aforementioned figures.

The project can generally be described as widening and deepening the Port Canaveral ocean channel, the interior harbor channel and the West Turning Basin. The design depths of the project are -46 MLW for the ocean channels, -44 MLW for the central portions of the harbor, and -43 MLW for the western portions. More specifically, proceeding east to west, the project can be broken down into ten elements as follows:

- Ocean Channel Deepening
- Ocean Channel Widening
- North Side Inner Reach Widening and Deepening
- Inner Reach Deepening
- Middle Turning Basin Deepening
- West Access Channel Deepening
- South Side West Access Channel Widening
- Existing West Access Channel Deepening
- West Turning Basin Expansion (Corner Cut-Off) and Deepening
- Addition of North West Basin to Federal Project (no Deepening)



NOTES:
1. FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, BASED ON NORTH AMERICAN DATUM 1983 (NAD83).
2. STATIONING AND DEPTHS REFER TO THE CHANNEL CENTERLINE.
3. ELEVATIONS ARE REFERENCED TO MEAN LOW WATER (MLW) IN FEET, POST CONVERSION, MEAN LOW WATER (MLW) IS APPROXIMATELY 0.5 FEET, NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88) VERTICAL CONTROL IS BASED ON MEAN LOWER LOW WATER (MLLW).
4. HERSHEY AND DELUNA, INC. COMPILED HYDROGRAPHIC AND TOPOGRAPHIC DATA FROM VARIOUS SOURCES INCLUDING THE USACE, EPA COMMISSIONED SURVEYS, AND HERSHEY AND DELUNA, INC. SURVEYS.
5. TOPO SURVEY SHOWN ON THE UPLANDS EAST OF WEST TURNING BASIN AND EAST OF THE MIDDLE TURNING BASIN IS OBTAINED FROM THE 2009 AECOM TOPOGRAPHIC SURVEY.
6. TOPO SURVEY SHOWN ALONG THE SOUTH EMBANKMENT ON BOTH SIDES OF THE TRIDENT BASIN IS FROM THE SURVEY FOR CHANNEL IMPROVEMENTS BY ALLEN ENGINEERING, INC. DATED MARCH 4, 2008.

DREDGING INCREMENTS PLAN AREAS

PRELIMINARY
NOT FOR CONSTRUCTION

DSGN
DR
CHK
APVD

NO.	DATE	REVISION	BY	APVD

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

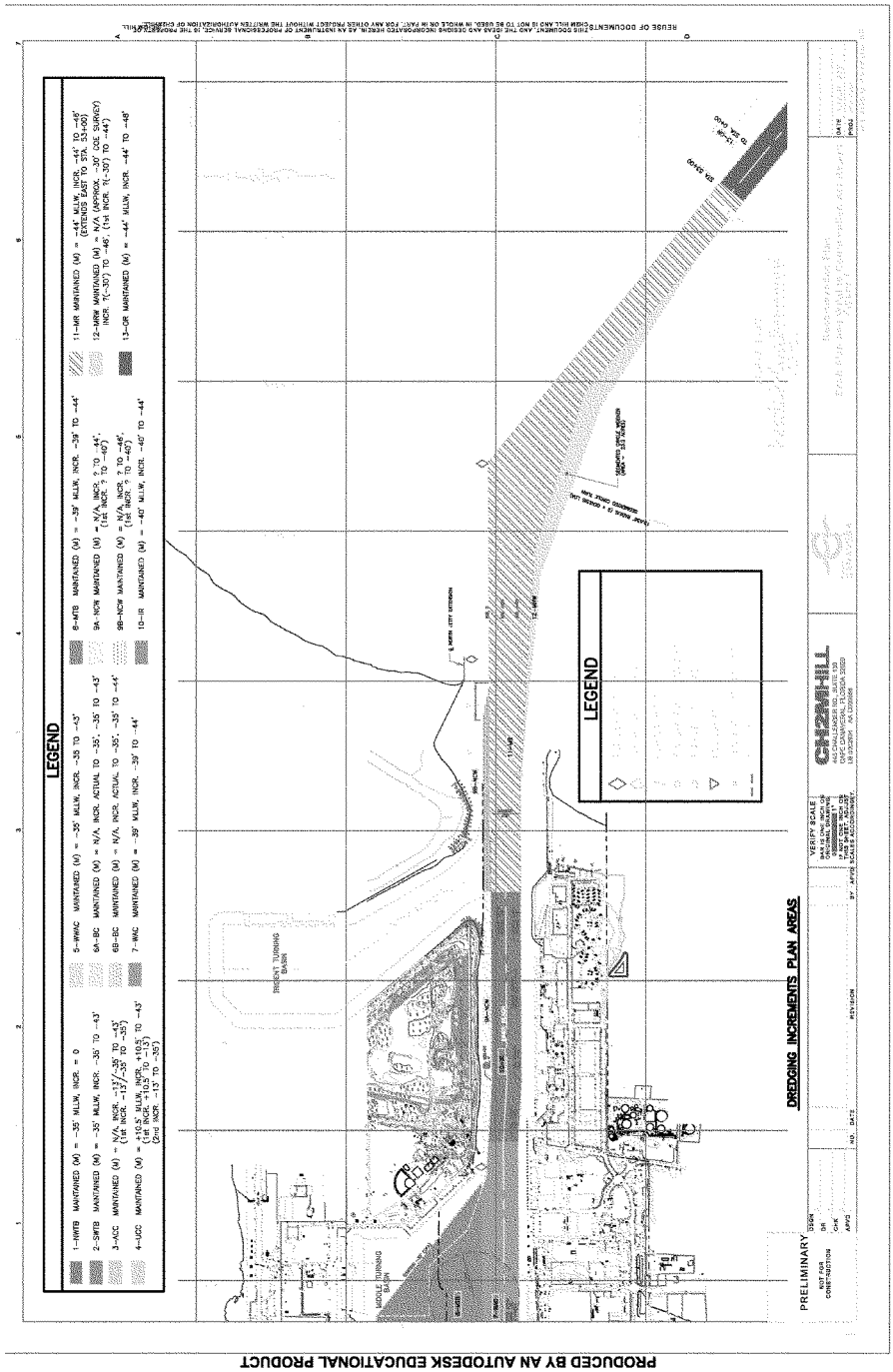
CH2MHILL
445 CHALLENGER RD., SUITE 130
CAPE CANAVERAL, FLORIDA 32920
LB 0002934 AA C000626

Submitted Plan
Dredge Plan and Work to Coordination and Report
Figure 3

DATE
PROJ

REUSE OF DOCUMENTS: THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF CH2M HILL AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF CH2M HILL.

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



Ocean Channel Deepening. The outermost ocean channel reaches will be deepened from -44 MLW to -48 MLW [Component 13-OR, in Figure legend but abbreviated on plan].

Ocean Channel Widening. The ocean channel widening is approximately 8,350 feet long and is located entirely on the south side of the channel centered on the bend before entering the harbor. This portion is essentially a widening of the interior angle of the bend [Component 12-MRW]. The widening is variable in width to a maximum of 350 feet wide and tapers on both ends. The dredging area for the widener is approximately 34 acres. The existing grade is approximately -30 MLW where the widener will be expanded, and the channel reaches immediately adjacent to it are currently authorized at -44 MLW [Component 11-MR]. The bend and adjacent channel reaches will all be dredged to -46 MLW.

North Side Inner Reach Widening and Deepening. The north side inner reach widening is an approximately 6,700-foot-long strip along the north side of the harbor channel from just east of the entrance of the Trident Turning Basin to the southeast corner of the Middle Turning Basin [Components 9A-NCW and 9B-NCW]. This portion of the project basically effects a widening of the channel from 400 feet to 500 feet along a natural, rock revetment shoreline. The dredging area is approximately 110 feet wide with tapered ends. The dredging area is approximately 16 acres. The existing grade slopes from Elevation -40 MLW to +10 MLW. Proposed depth is -44 MLW.

Inner Reach Deepening. The inner reach will be dredged from -40 MLW to -44 MLW [Component 10-IR].

Middle Turning Basin Deepening. The Middle Turning Basin will be dredged from -39 MLW to -44 MLW [Component 8-MTB].

West Access Channel Deepening. The west access channel (adjacent to the Middle Turning Basin) will be deepened from -39 MLW to -44 MLW [Component 7-WAC].

South Side West Access Channel Widening. The south side west access channel widening is approximately 4,620 feet long and lies along the south side of the harbor channel along the predominantly commercial and retail business portion of the Port [Components 6B-BC and 6A-BC]. This area is presently the east end of the barge canal and is not included in the Corps of Engineers or Canaveral Port Authority dredging programs. The proposed project will extend the Federal project to the south into this barge canal area, i.e., widening the channel from 400 feet to 500 feet, through to the point even with the southwest corner of the West Turning Basin. The area comprises two end-to-end rectangular areas 90 feet and 175 feet wide each, together encompassing 13 acres. The area slopes from an average low elevation of -16 MLW to an average high elevation of -34 MLW. Dredging to -44 MLW (east section) and -43 MLW (east section) is proposed.

Existing Western West Access Channel Deepening. The existing west access channel deepening is at the west end of the channel and the western limit for cruise and cargo shipping. The area is approximately 2,810 feet long and 400 feet wide (the current channel width), and approximately 26 acres in size [Component 5-WWAC]. This area is maintained by the Canaveral Port Authority to elevation -35 MLW. Dredging to the -43 MLW elevation is proposed.

West Turning Basin Expansion (Corner Cut-Off) and Deepening. The West Turning Basin expansion (corner cut-off) and deepening encompasses the entire basin in two parts defined by required depth. The lower (southerly) approximate one-half of the basin is proposed to be maintained at -43 MLW to accommodate cargo vessels [Components 2-SWTB, 3-ACC, and 4-UCC]. This area is approximately 52 acres. Approximately seven acres of this area is undeveloped upland area with a natural shoreline [Component 4-UCC]. A new turning basin will be formed superimposing a 1,750-foot turning diameter across the entrance of the WTB, which is required for new, larger cruise ships proposed to utilize the WTB. Dredging the submerged areas from that range in depth from -13 and -35 MLW to -43 MLW is proposed.

Addition of North West Basin to Federal Project. The remaining northerly part of the WTB [Component 1-NWTB] is approximately 57 acres in size with its borders defined as 100 feet offset from any berthing pier and 200 feet offset from any industry, and does not require greater than a -35 MLW elevation at this time. The Canaveral Port Authority currently maintains this area at elevation -35 MLW. This area does not represent new project dredging and is simply proposed to shift to Federal maintenance at the same -35 MLW elevation.

Material Disposal. All dredged material will be placed in the authorized Canaveral Offshore Dredged Material Disposal Site (ODMDS), which is centered 4.5 miles offshore of Cocoa Beach.

Mitigation. No compensatory mitigation for impacts to habitats or fish and wildlife has been proposed.

The following summary table is for dredging the entire project to elevations as described above. All areas are approximate and based on Morgan and Ecklund (2007).

Table 1: Project Component Acreages

PROJECT COMPONENTS	AREA acres)
13-OR	201
12-MRW and 11-MR	165
10-IR	31
9A-NCW and 9B-NCW	16
8-MTB	40
7-WAC	46
6B-BC and 6A-BC	11
5-WWAC	26
2-SWTB, 3-ACC, and 4-UCC	53
1-NWTB	0
TOTAL*	**587**

*area calculated based on toe-of-slope to toe-of-slope

5.0 AFFECTED ENVIRONMENT AND FISH & WILDLIFE RESOUCES

5.1 Biotic Communities

5.1.1 Uplands

Uplands in the project area include developed and undeveloped areas. Upland communities not considered natural communities make up the vast majority of the study area. These land use categories include those land uses normally associated with port facilities such as industrial and upland spoil disposal areas.

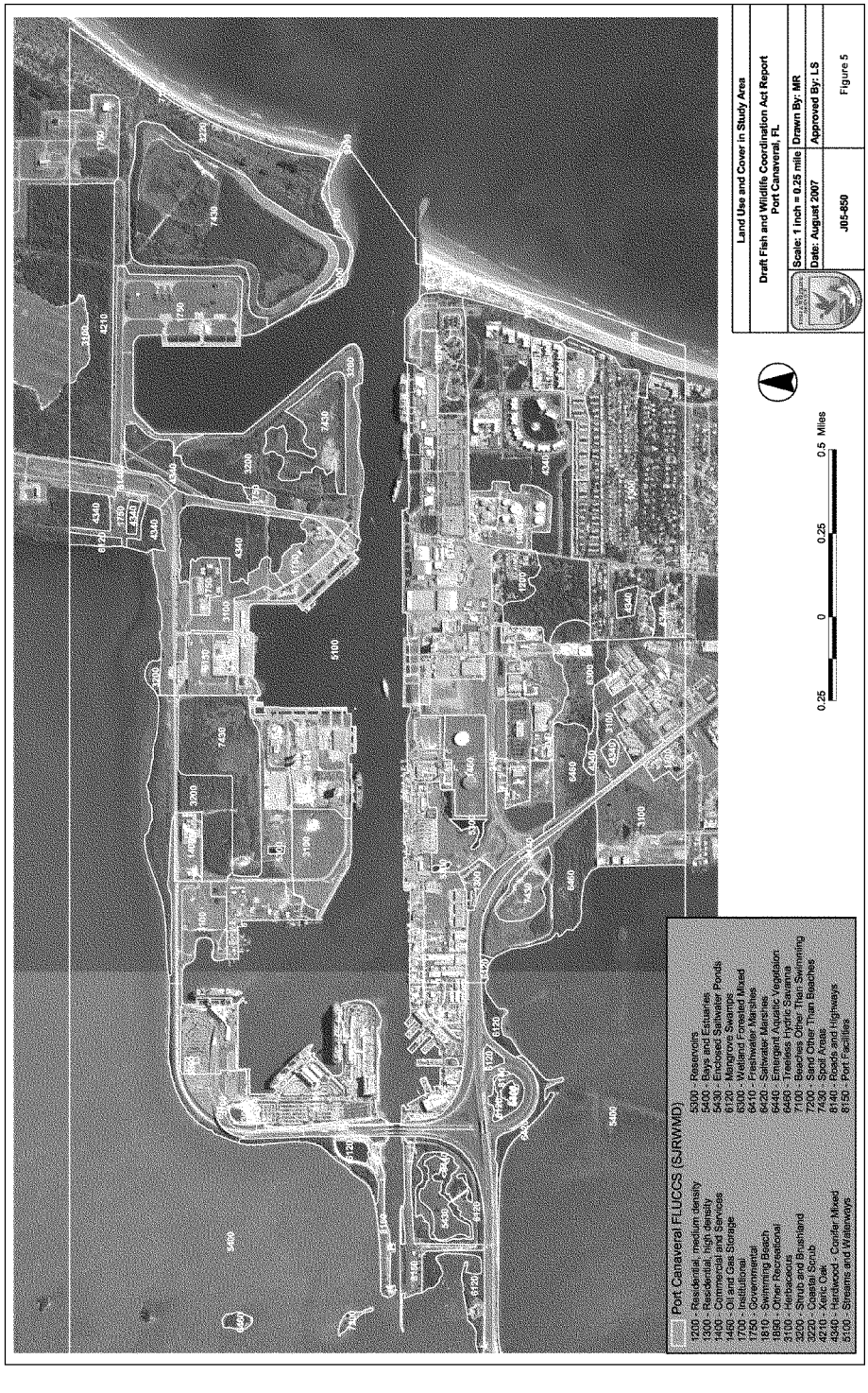
Natural upland communities within the study area are limited. There are a few isolated areas containing mixed hardwoods and conifers (Florida Land Use Cover and Forms Classification System, or "FLUCFCS" code 4340, as seen in **Figure 5**) including slash pine (*Pinus elliottii*), scrub oaks (*Quercus* spp.), Australian pine (*Casuarina equisetifolia*), Brazilian pepper (*Schinus terebenthifolius*), and cabbage palm (*Sabal palmetto*) within the study area. Areas of herbaceous rangeland (FLUCFCS 3100) and shrub and brushland (FLUCFCS 3200) are more common and may be occasionally inundated by water, but not enough to lead to hydric soils. They contain typical coastal grasses, sedges, rushes, and herbaceous species such as *Panicum* spp., natal grasses, clovers, and wiregrass (*Aristida stricta*). Saw palmetto (*Serenoa repens*) is also found scattered throughout this vegetative community (Dial Cordy and Associates 2006a). Table 2 provides a list and description of natural upland (as well as wetland) land cover for the study area.

Table 2: Natural Upland and Wetland Communities in Project Area and Vicinity

	LAND USE CATEGORY	HABITAT DESCRIPTION
Natural Upland Communities	3100	Herbaceous Rangeland
	3200	Shrub and Brushland
	4340	Mixed Hardwood-Conifer
Natural Wetland Communities	6120	Mangrove Swamp
	6300	Mixed Wetland Forest
	6420	Saltwater Marsh
	6460	Treeless Hydric Savanna

5.1.2 Wetlands

Wetland habitats within the study area are limited primarily to the western perimeter adjacent to the ICWW (Figure 5; Table 2). These wetlands are either mangrove swamps comprising white and black mangroves (FLUCFCS 6120), Brazilian pepper (FLUCFCS 6300), or saltwater marsh habitat (FLUCFCS 6420) vegetated with cordgrass (*Spartina alternifolia*), needlerush (*Juncus roemerianus*), saltgrass (*Distichlis spicata*), and other salt-tolerant species. Treeless hydric savannah (FLUCFCS 6460) occurs south of the Port facilities and is dominated by wiregrass and cutthroat grass (*Paspalum abscissum*) (Dial Cordy and Associates 2006a).


Port Canaveral FLUCCS (SJRWMD)
1200 - Residential, medium density
1300 - Residential, high density
1400 - Commercial and Services
1460 - Oil and Gas Storage
1700 - Institutional
1750 - Cemeteries
1810 - Swimming Beach
1890 - Other Recreational
3100 - Herbaceous
3200 - Shrub and Brushland
3220 - Coastal Scrub
4210 - Xeric Oak
4340 - Hardwood - Conifer Mixed
5100 - Streams and Waterways
5300 - Reservoirs
5400 - Bays and Estuaries
5430 - Enclosed Saltwater Ponds
6120 - Mangrove Swamps
6170 - Mixed Wetland Hardwood
6410 - Freshwater Marshes
6420 - Saltwater Marshes
6440 - Emergent Aquatic Vegetation
6460 - Treeless Hydric Savanna
7100 - Beaches Other Than Swimming
7200 - Sand Other Than Beaches
7430 - Spoil Areas
8140 - Roads and Highways
8150 - Port Facilities
0.25 0 0.25 0.5 Miles
Land Use and Cover in Study Area
Draft Fish and Wildlife Coordination Act Report
Port Canaveral, FL
Scale: 1 inch = 0.25 mile
Drawn By: MR
Date: August 2007
Approved By: LS
J05-850
Figure 5

5.1.3 Beaches and Dunes

The high-energy beach is a challenging environment for animal and plant life. Species diversity is typically low, although species adapted to sandy beaches may be highly abundant. Typical beach fauna in the proposed project area includes the mole crab (*Emerita talpoida*), surf clam (*Donax variabilis*) and ghost crab (*Ocypode quadrata*). These and other beach infauna provide forage for a wide variety of shorebirds such as plovers (*Charadrius* spp.), willets (*Catoptrophorous semipalmatus*), and ruddy turnstones (*Arenaria interpres*). Drift algae and sargassum stranded on the beach may support large numbers of insects and other invertebrate life. As elevation increases, conditions become less severe for the establishment of plant life. Tendrils of various plants extend down the beach, notably the beach morning glory *Ipomoea pes-capre*. As the dune crest is approached, other salt tolerant plants are found such as sea oats (*Uniola paniculata*), sea rocket (*Cakile* sp.) and beach elder (*Iva imbricata*) (Dial Cordy and Associates 2006a). Sparsely vegetated beaches are preferred nesting habitat for the least tern (*Sterna antillarum*), listed as a threatened species by the State of Florida. The sea oat zone high on the dune provides habitat for another threatened species, the southeastern beach mouse (*Peromyscus polionotus niveiventris*). Beaches in Brevard County also provide nesting habitat for sea turtles.

5.1.4 Nearshore Hardgrounds

Continental Shelf Associates Inc. ("CSA" 1989) previously identified a well-developed line of rock outcroppings running approximately 10 miles from Patrick Air Force Base (R-59) south to Paradise Beach Park (R-110). The rock had low relief at the northern and southern ends, with well-defined ledges of 2-3 feet of vertical relief in the middle between R-78 and R-93 (USACE 1996). The rock outcrops comprise lithified coquina rock of the Pleistocene Anastasia Formation (CSA 1989). The coquina rock provides a substrate for the sabellariid polychaete worm *Phragmatopoma lapidosa.* These sabellariid worm reefs provide important functions of dissipating and absorbing wave energy, thus, giving the shoreline some protection against erosion, and providing habitat for marine organisms. In the nearshore area off Brevard County, worm rock ranges from large, dense patches to small, isolated patches along the sides of rock ledges. It was estimated that worm rock composes approximately 5-10 percent of the 32 acres of rock outcrop in the nearshore area of Brevard County. The rock and worm rock reefs provide habitat for a number of crustaceans, fish, macroalgae, sponges, and other invertebrates. The most recent comprehensive study of the nearshore habitat along Brevard County was conducted by CSA (1989) and provides detailed species list.

5.1.5 Seagrass Beds

No seagrass has been identified within the harbor or ocean channel, but there are some shallower areas where they may exist. The waters west of the Port in the Banana River State Aquatic Preserve support large areas of, and small, isolated patches of, seagrass adjacent to upland islands or other physical structures (Figure 6).

Indian River Lagoon Seagrass (FDEP/FMRI, 1999)
Patchy Seagrass Coverage
Continuous Seagrass Coverage
0.25 0 0.25 0.5 Miles
Seagrass Occurence Map
Draft Fish and Wildlife Coordination Act Report
Port Canaveral, FL
Scale: 1 inch = 0.25 mile
Drawn By: MR
Date: August 2007
Approved By: LS
J05-850
Figure 6

5.1.6 Unvegetated Benthic Habitats

Oceanic Nearshore. Unvegetated benthic habitats with sandy substrates occur along most of the nearshore area not occupied by worm rock habitat. Substrates predominately comprise medium to fine grain sands and may provide habitat for a variety of benthic organisms including annelids, bivalves, and gastropods such as penaeid shrimp (e.g., *Panaeus setiferus*), box crabs (*Hepatus epheliticus*), and seastars (*Luidia clathrata*).

Harbor and Channel. Sediments with the Port have been characterized in recent years; the most recent study (Anamar 2005) evaluated sediments within the West Turning Basin and entrance channel for disposal at the offshore dredged material disposal site (ODMDS). Sediments in the harbor and channel comprised mainly sand or silt/clay, with small amounts of gravel.

Inshore Waterways. The shallow, softbottom, unvegetated communities of the ICWW and Banana River house benthic communities interspersed with macrophytic algae. Common in such inshore, softbottom communities are macro-algae species such as *Caulerpa* sp., *Udotea* sp., *Penicillus* sp., *Halimeda* sp., *Dictyota* sp., and *Padina* sp. The most common fauna within these communities consist of several taxa of polychaete worms, oligochaetes, mollusks, sipunculans, peracarid crustaceans, platyhelminthes, and nemerteans.

5.1.7 Open Water

Surface water resources within the study area consist of marine and estuarine systems. The inshore waters are classified by the State of Florida as Class II Waters. Aquatic preserves are designated as Class II waters, and include the Banana River Aquatic Preserve and the Merritt Island National Wildlife Refuge. Class II waters are suitable for shellfish harvesting in addition to uses approved under Class III waters designation (recreation and propagation of fish and wildlife resources).

The open waters of the harbor serve as migratory habitat for the West Indian manatee to traverse from the Atlantic coastal waters to the Banana River, which provides foraging and sanctuary for the species. Sea turtles also are known to transit through the harbor's waters.

5.1.8 Submerged Rock/Rip-Rap Habitats within the Port/Harbor

The riprap along the channel walls on the northern boundary of the Port provides excellent foraging habitat for juvenile sea turtles. The 980 meters of riprap located between the Middle and Trident Turning Basins, in particular, appears to be heavily used for foraging. In surveys conducted in late August 2005 and February 2006, 200 and 111 individuals, respectively, were observed foraging along this portion of the harbor (Dial Cordy and Associates 2006a). The highest number of juvenile sea turtles observed at any other location during these surveys was nine, at a 266-meter stretch of riprap along the south side of the channel at Jetty Park. One of the unusual features of the riprap between the Middle and Trident Turning Basins is the diverse algal community on the riprap. A study is currently underway to characterize the algal makeup of the harbor.

5.2 Essential Fish Habitat

Essential Fish Habitat (EFH) is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity". Only species managed under a Federal fishery management plan (FMP) have habitats designated as EFH (50 C.F.R. 600). The act requires Federal agencies to consult on activities that may have direct (*e.g.*, physical disruption) or indirect (*e.g.*, loss of prey species) adverse influence on EFH. Said adverse activities on EFH may be site-specific or habitat-wide, and must be evaluated individually and cumulatively.

The South Atlantic Fisheries Management Council, or "SAFMC", has designated seagrass, unvegetated sand bottom, nearshore hardbottom, offshore reef, and water column as EFH (SAFMC 1998). The seagrass habitats of South Florida have also been designated as Habitat Areas of Particular Concern (EFH-HAPC), and the nearshore bottom and offshore reef habitats of Central Florida have also been designated as Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPC).

Essential fish habitats that will be impacted by the proposed project include unvegetated sand substrates and the water column. NOAA Habitat Conservation Division may request further coordination with the applicant regarding impacts to EFH and any necessary compensatory mitigation.

5.3 Federally-listed Species in Project Area and Vicinity

5.3.1 West Indian Manatee

The Federal government has recognized the threats to the continued existence of the West Indian manatee (*Trichechus manatus*) manatee for nearly 40 years. The manatee was first listed as an endangered species in 1967 under the Endangered Species Preservation Act of 1966 (16 U.S.C. 668aa(c)) (32 FR 48:4001). The Endangered Species Conservation Act of 1969 (16 U.S.C. 668aa(c)) continued to recognize the West Indian manatee as an endangered species (35 FR 16047), and the West Indian manatee was also among the original species listed as endangered pursuant to the Endangered Species Act of 1973. Manatees are also protected under the provisions of the Marine Mammal Protection Act of 1972 (MMPA), as amended (16 U.S.C. 1361 et seq.) and have been protected by Florida law for over a century (since 1892).

Brevard County is one of the most utilized areas in Florida by manatees due to the presence of a warm water refuge and abundant foraging opportunities. Within Brevard County, manatees frequently use waters within or near the study area including the Banana River and Intracoastal Waterway, especially during the spring and fall. Brevard County also has one of the highest manatee mortality rates in the state due to the high concentration of manatees combined with the popularity of recreational boating along the eastern coast of Florida (Dial Cordy and Associates 2006a).

Details pertaining to the West Indian manatee will be further discussed under ESA Section 7 consultation with the applicant.

5.3.2 North Atlantic Right Whale

The "Southeastern U.S. Critical Habitat Area" for the endangered North Atlantic right whale (*Balaena glacialis*) extends from Sebastian Inlet, Florida (at the Brevard and Indian River county line) to the Altamaha River estuary in Georgia. Details pertaining to the right whale may be further addressed by the NOAA/Protected Species Division under separate cover (i.e., via ESA Section 7 consultation).

5.3.3 Southeastern Beach Mouse

The southeastern beach mouse (*Peromyscus polionotus neveiventris*) is listed as threatened. Beach mice primarily use coastal dune communities, frequently comprising sea oats (*Uniola paniculata*), for habitat. Grasslands and open sandy areas in the fore-dune area may also be utilized (Humphrey 1992). This subspecies was originally endemic to coastal dunes along the Florida coast from Ponce Inlet (Volusia County) to Hollywood Beach (Broward County). Decline in beach mouse populations has been attributed to loss of habitat due to coastal development and beach erosion. Southeastern beach mice were recently identified at CCAFS north of Port Canaveral in association with the North Jetty Permanent Sand-Tightening Project (Dynamac 2002).

Details pertaining to the southeastern beach mouse will be further discussed under separate cover (i.e., ESA Section 7 consultation) with the applicant.

5.3.4 Piping Plover

The piping plover (*Charadrius melodus*) is a threatened migratory shore bird protected under the Migratory Bird Treaty Act as well as the ESA. Piping plovers migrate to the Florida coast in September and are found through March, and nest on open sand, gravel, or shell-covered beaches above the high tide line and are often found on the accreting ends of barrier islands and along coastal inlets (USFWS 1995). Foraging areas include intertidal beaches, mudflats, sandflats, lagoons, and salt marshes, where they feed on invertebrates such as marine worms, insect larvae, crustaceans, and mollusks. Within Brevard County piping plovers have been observed along beaches (Dial Cordy and Associates 2006a).

5.3.5 Sea Turtles

Five species of sea turtle are found in the waters offshore of Brevard County, and of these, three have been documented as nesting on County beaches. The loggerhead (*Caretta caretta*) is responsible for the vast majority of the nesting in Brevard County, although data suggest increasing numbers of green (*Chelonia mydas*) and leatherback turtles (*Dermochelys coriacea*) nesting statewide. The green sea turtle and leatherback sea turtle are both listed under the U.S. Endangered Species Act, 1973 and Chapter 370, F.S. The loggerhead turtle is listed as a threatened species.

Sea turtles use the habitats offshore of Brevard County to different degrees during different stages of their life cycle. During the summer months hatchlings utilize this habitat as a corridor to deeper waters farther off the coast. Juvenile and sub-adult turtles use the offshore habitats as a foraging area and to travel to inshore areas, while adult turtles are present year round with seasonally high abundances during the breeding season.

Details pertaining to sea turtles may be further addressed by the NOAA/Protected Species Division under separate cover (i.e., via ESA Section 7 consultation).

5.3.6 Eastern Indigo Snake

The eastern indigo snake (*Drymarchon corais couperi)* is listed as threatened. Its range includes all Florida and southeast Georgia. Individuals occur in hardwood forests, moist hammocks, pine flatwoods, prairies, and around cypress ponds. Because it seeks refuge in gopher tortoise burrows in some parts of Florida the indigo is also called the "gopher snake." The habitat identified as gopher tortoise habitat (see below) is one of the habitats in the project area where this subspecies may be found, although none have been reported from the area.

5.4 State-listed Species in Project Area and Vicinity

The gopher tortoise (*Gopherus polyphemus*) is listed as a species of special concern by the State of Florida. This tortoise utilizes sandy, well-drained habitats including dunes, scrub, and pine flatwoods, although it has been noted to occupy poorly drained habitat in Brevard County. Habitat within the study area suitable for gopher tortoise utilization is limited to areas north of the harbor within the CCAFS. A recent survey (Dial Cordy and Associates 2006b) reported four burrows on the CCAFS between the Middle and Trident Turning Basins (50% of habitat was surveyed utilizing random pedestrian transects); see Figure 7.

The least tern (*Stern antillarum*) is a small member of the gull family (Laridae), listed by Florida as a threatened species and protected federally under the Migratory Bird Treaty Act. Least terns breed along the east coast of the United States from Massachusetts to Florida, with the Florida populations returning each year in April. The breeding season lasts through the summer. Least terns traditionally choose open sandy substrates to form breeding colonies. Least terns forage along coastal areas feeding on small fishes, as well as some crustaceans and insects. Within Brevard County least terns are known to nest on sandbars and spoil areas along the coastal area.

Gopher Tortoise Burrow Location
Gopher Tortoise Survey
Suitable Gopher Tortoise Habitat
Surveyed Area
0.25
0
0.25
0.5 Miles
Gopher Tortoise Burrows and Habitat
Draft Fish and Wildlife Coordination Act Report
Port Canaveral, FL
Scale: 1 inch = 0.25 mile
Drawn By: MR
Date: August 2007
Approved By: LS
J05-850
Figure 7

6.0 IMPACTS TO FISH AND WILDLIFE RESOURCES AND HABITATS

6.1 Preferred Alternative/Recommended Plan

6.1.1 Direct Impacts

Direct impacts associated with the preferred alternative include possible impacts to both fish and wildlife and their habitats.

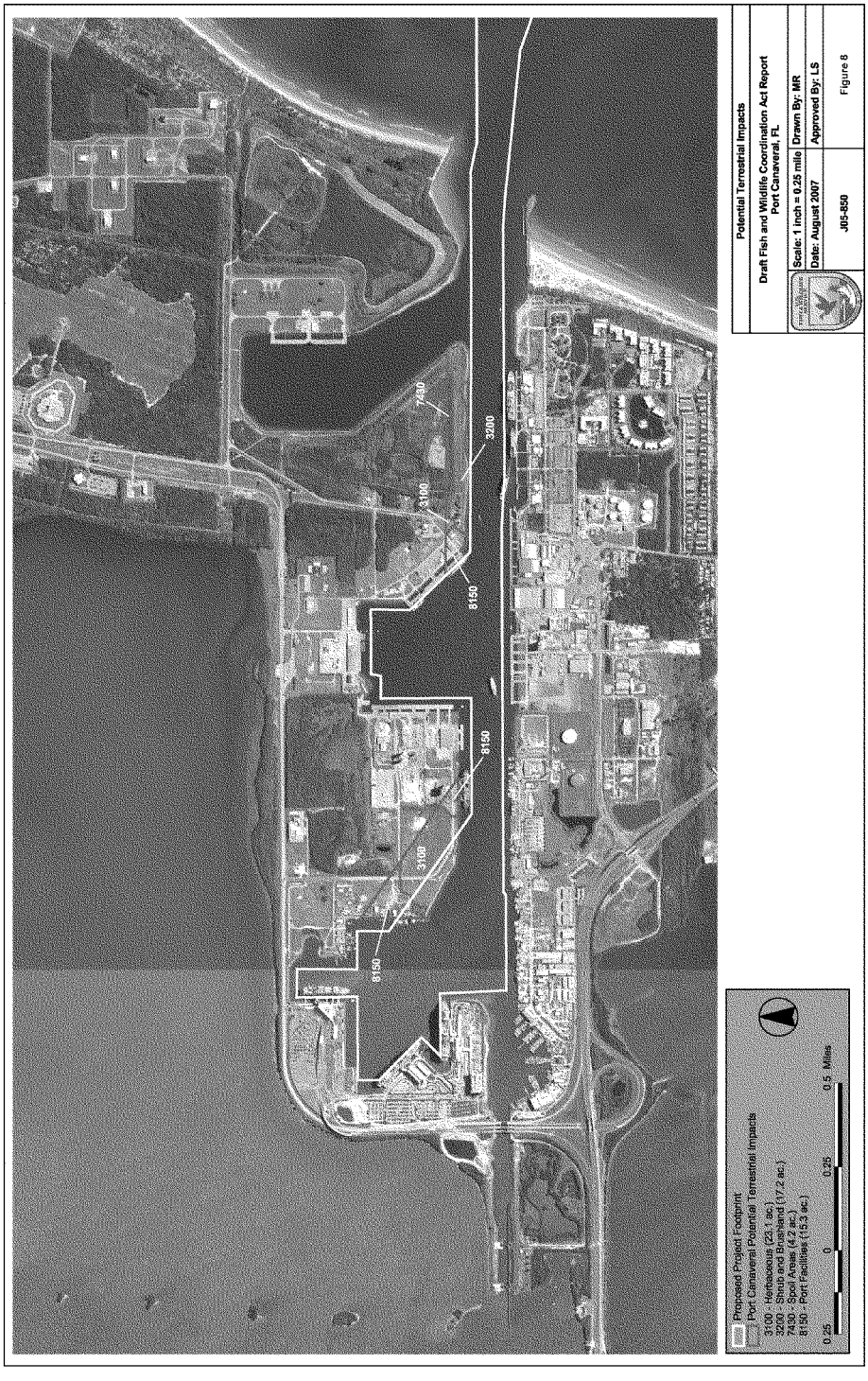
Marine habitats. Over 600 acres of reportedly unvegetated benthic habitats will be impacted within the harbor/port and offshore from the Port. These impacts will remove benthic infaunal communities as well as invertebrate communities residing on marine substrates. These communities are important as forage sources for more mobile marine species. The Service also suspects that there may be some seagrass in shallower portions of the Port that could also be affected by the proposed construction, but no such areas have been identified. Other direct impacts in the marine environment include rock/rip-rap habitats providing forage resources (algae) on the north side of the inner channel between the Trident Basin and the Middle Turning Basin. These algal communities are important for small fishes and invertebrates as well as the sea turtles that are known to feed on the algae. Finally, impacts to water quality will be apparent within the immediate dredging areas, and are likely to occur outside designated areas. Phytoplankton productivity will be decreased in the dredge areas and wherever turbidity occurs.

Terrestrial habitats. Up to 44.5 acres of direct impacts to terrestrial habitats may be incurred as a result of the proposed plan (see Figure 8). The most notable of these impacts is to habitat that is, or has been, utilized by gopher tortoises to the west of the entrance to the Trident Turning Basin.

Fish & Wildlife. Marine construction projects involve risks of direct impacts (i.e., death, injury, or harassment) to larger, slower moving species, such as sea turtles and manatees that may be present in the vicinity of construction vessels, equipment, and operations. The Service and NOAA-Protected Species Division will address possible impacts to these species through ESA Section 7 coordination in other correspondence. Direct impacts to other wildlife and fish also include the possible death or injury to individuals during construction activities and/or the temporary displacement of individuals of more motile species. Species that could be impacted include sharks, rays, various other fishes, and invertebrates. As noted above, gopher tortoises could be directly impacted. In addition, those species known to use their burrows such as the eastern indigo snake could be killed or injured.

6.1.2 Indirect Impacts

Indirect, or secondary, impacts/effects are those impacts that are reasonably foreseeable and caused by a project, but occur at a different time or place. One such impact due to the proposed project could involve temporary decreases in water quality, i.e., turbidity plumes, that may affect nearby seagrass beds. Sparse seagrass beds have been located immediately to the west of the Port near the barge canal in the Banana River.


Proposed Project Footprint
Port Canaveral Potential Terrestrial Impacts
3100 - Herbaceous (22.1 ac.)
3200 - Shrubland (10.7 ac.)
7430 - Spoil Areas (4.2 ac.)
8150 - Port Facilities (15.3 ac.)
0.25 0 0.25 0.5 Miles
3100
3200
7430
8150
8150
8150
Potential Terrestrial Impacts
Draft Fish and Wildlife Coordination Act Report
Port Canaveral, FL
Scale: 1 inch = 0.25 mile
Drawn By: MR
Date: August 2007
Approved By: LS
J05-850
Figure 8

Suspended material that settles on seagrasses not only affects the grasses themselves, but the entire community including periphyton, zooplankton, and macroinvertebrates and small fishes that use that habitat for food, cover, and breeding purposes. Furthermore, seagrass zones comprise important foraging resources for many fishes and protected species, including sea turtles and manatees. Although the nearest marine hardgrounds are over 15 km to the south (CSA 1989), an extreme uncontrolled release of silty dredged material could result in a turbidity plume that could be driven by currents even that far.

Indirect effects may also include growth-inducing effects and other effects related to changes in the pattern of land or water use, and related effects on natural systems, including ecosystems. A growth-inducing impact could occur if the proposed project could foster economic development or additional overland or seafaring traffic, either directly or indirectly, in the immediate or surrounding environment. A project may have some (or many) characteristic(s) that may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. In the case of the recommended plan, there is potential for the transit of additional ships, and larger ships, to call at the Port, as well as for additional infrastructure to be constructed at the Port and nearby areas to service additional barges, cargo, tourists, workers, etc. For example, it is likely that the spoil area and associated road just north of the impact area between the Trident Basin and Middle Turning Basin will be moved to the north, which may involve new impacts to previously undeveloped lands. Finally, the use of additional and larger ships at the Port could increase the risk of impacts to water quality and protected species and other fish and wildlife in the Port and offshore areas.

6.1.3 Cumulative Impacts

Under the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.), a "cumulative impact" is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions...Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). The cumulative impact of the proposed construction should be considered in light of deepening and widening other channels in the vicinity and other work producing similar direct and indirect impacts on the environment. Cumulative impacts include the risk of death, injury, or harassment to endangered and threatened species, habitat effects (such as sedimentation), especially to Essential Fish Habitats, and impacts to coastal terrestrial habitats (e.g., those occupied by gopher tortoises or eastern indigo snakes).

6.2 Other Alternatives

The CPA has proposed no *construction* alternatives other than the Preferred Alternative/Recommended Plan. The CPA asserts that all components of the Preferred Alternative are necessary; i.e., the elimination of any component would make all others futile. In lieu of the preferred alternative, there may be some operational and logistical changes, the nature of which have not been disclosed to the Service, that would have to occur to maintain status quo at the Port.

6.3 No Action Alternative

Without implementation of the recommended plan, no deepening or widening of channels or turning basins would occur. There would be no direct impacts to benthic habitats in the Port channels or basins (substrates would remain undisturbed the natural growth and recruitment of benthic infauna would result), no impacts to upland shrub/brushland habitat, and no impacts to rock/rip-rap habitats. Gopher tortoise/indigo snake habitat, and sea turtle foraging habitats would remain intact. Without dredge-related activities, water quality would be maintained at current/normal levels, and benthic and water column productivity would not hindered by turbidity. If the proposed construction were not carried out, there would be no increased risk to direct impacts to sea turtles, manatees and other marine mammals, or other sea life.

7.0 RECOMMENDATIONS OF THE U.S. FISH AND WILDLIFE SERVICE

7.1 Alternative Plans

The Service recommends that the Corps act on the following general recommendations regarding the proposed project:

1. The Service recommends that operational alternatives be developed in the absence of construction alternatives, such that they can be evaluated for feasibility. Alternative plans could be found to be useful toward furthering the goals of the project, but would also avoid and minimize all risk and harm to fish and wildlife resources.

2. Dredge depth, overdredge, and dredge error should be minimized wherever possible, to decrease the risk of turbidity outside the project area and to decrease the time of construction, during which protected species may be at risk in the Port.

3. If construction or operational alternatives are not practicable, and the "No Action Alternative" is not feasible, the Service recommends that only the previously authorized maintenance dredging be carried out, rather than more impactful alternatives.

4. Contractors must monitor tidal cycles and possible discharge/silt plumes to ensure that impacts to habitats outside the immediate vicinity of the project are avoided.

7.2 Fish and Wildlife Resources and Protection/Conservation Measures

7.2.1 Manatees and Sea Turtles

Direct Impacts. Potential for impacts to marine mammals, including manatees and dolphins, and sea turtles exist with the proposed work. To reduce the risk of death, injury, or harassment of these animals, it is recommended that the CPA, Corps, and Contractors observe recommendations outlined in ESA Section 7 consultation with NOAA-Protected Species Division and the Service, as well as the following provisions:

5. The contractor will instruct all personnel associated with construction of the project about the possible presence of sea turtles and/or manatees in the project area and the need to avoid contact with them. Trained observers will be onboard construction vessels at all times during construction. If sea turtles or manatees are sighted within 100 yards of construction activities, all appropriate precautions will be implemented by the contractor to ensure protection of the animals (refer to Section 7 consultation documents). All vessels associated with the project will operate at no-wake speeds at all times in shallow waters or channels where the draft of the boat provides less than 4 feet clearance of the bottom. Boats used to transport personnel will be shallow-draft vessels, preferably of the light-displacement category, where navigational safety permits. Vessels transporting personnel and/or supplies between the landing and work site will follow deep water to the extent possible. All personnel will be advised that there are civil and criminal penalties for harassing, harming, injuring or killing manatees which are protected under the Endangered Species Act and the Marine Mammal Protection Act; and sea turtles, which are protected under the Endangered Species Act. The Contractor will be held responsible for any manatee or sea turtle harassed, injured, or killed as a result of construction activities. As noted above, if manatee(s) or sea turtle(s) are seen within 100 yards of active vessel movement or equipment operation, all appropriate precautions will be implemented to ensure protection of the animal(s). These precautions will include the operation of all moving equipment no closer than 50 feet of the animal(s). At a distance of less than 50 feet, immediate shutdown of equipment will occur. Activities will not resume until the animal(s) have left the work area of its own volition. The Contractor will keep a log detailing all sightings, collisions, injuries, and fatalities involving manatees or sea turtles occurring during the construction period. The data will be recorded on forms provided by the Contracting Officer. All data in original form will be forwarded directly to Dr. Loren Mason, Chief, Environmental Branch, Corps of Engineers, P.O. Box 4970, Jacksonville, FL 32232-0019 within 10 days of collection, with copies to the Contracting Officer's representative. Any collision with, or sighting of an injured, incapacitated or dead manatee, or sea turtle will be reported immediately to the Corps of Engineers (904-232-2202), the Florida Marine Patrol (1-800-342-5367), and the U.S. Fish and Wildlife Service in Jacksonville (1-904-232-2580).

Indirect Effects: Vessel Traffic. The Service believes that the proposed work has the potential to indirectly affect manatees and sea turtles if vessel traffic is increased as a result of deepening and widening the channel and basins. Increases in manatee mortality are directly correlated with increases in boat traffic. To protect manatees and sea turtles, it is important to ensure that there is no net increase in vessels as a result of the project. Therefore,

6. The Service requests and recommends that this issue be fully analyzed in the Environmental Impact Statement (EIS) to determine if vessel traffic would increase as a result of the proposed work.

Indirect Effects: Habitat. Additional indirect effects on manatees and sea turtles exist from the potential of construction to affect seagrass patches nearby the project area in the Banana River. Any decreases in productivity of seagrasses due to turbidity or sedimentation would result in a reduction in forage area or habitat for turtles or manatees.

7. The Service recommends the most stringent precautions against incidental releases of sediment/turbidity plumes into the ICWW, and decreasing the amount of dredge depth wherever possible, so that the risk of incidental releases is minimized.

Also, there appear to be areas of adequate depth in portions of the port/harbor to permit growth of seagrasses (in some of the remote portions of turning basins and shallower areas north of the inner entrance channel); if seagrasses are present in some of these areas, construction would not only indirectly affect them, but they could also be partly directly impacted. Therefore,

8. The Service recommends the CPA perform seagrass surveys of the shallower portions of the port/harbor to determine whether seagrasses are present, and

9. Should SAV be present, that the habitat is mapped and a functional assessment is performed such that adequate mitigation can be determined, following demonstration by the CPA that all impacts have been avoided and minimized to maximum extent practicable.

Finally, foraging resources for sea turtles have been identified on the rock/rip-rap surfaces along the north side of the Inner Channel. Therefore,

10. Impacting sea turtle foraging resources along the Inner Channel should be avoided.

7.2.2 Other Protected Species

Gopher tortoises (protected by the State of Florida) and possibly eastern indigo snakes (listed as threatened under ESA) reside in an area that may be impacted by channel widening. Precautions must be taken not to kill, injure, or harass individual indigo snakes, and pursuant to Florida state law, all gopher tortoises must be relocated. The Service recommends that

11. Sightings of eastern indigo snakes should be regarded as those of manatees and sea turtles, and provisions found above should be carried out for their protection as well.

12. The Corps, CPA, and contractors are informed of the outcome of formal coordination regarding indigo snakes under Section 7 consultation.

13. The Corps, CPA, and contractors are mindful of their obligations under Florida state law regarding gopher tortoises.

7.3 Water Quality

Dredging in marine environments can have substantial effects on species and sensitive habitats, such as seagrass beds and livebottom areas, and can adversely affect water quality far from a construction site. Strong tidal currents may redistribute suspended sediments to other areas both inside and outside the study area that support submerged vegetation. Possibly affected areas would include seagrass habitats in the adjacent Banana River. Resuspended particulate matter may temporarily decrease water clarity and decrease primary production, not only for seagrasses, but also by phytoplankton in the water column.

Deposition of sediments on beds may have other adverse effects, such as the temporary displacement of fish and invertebrates. Therefore,

14. State Water Quality Certification must be obtained prior to construction and state water quality standards must be met during construction.

The State of Florida water quality regulations require that water quality standards not be violated during dredging operations. Therefore,

15. Appropriate protective measures and monitoring programs must be conducted during construction to ensure compliance with state water quality standards, and

16. Should turbidity exceed state water quality standards during construction as determined by monitoring, the contractor would be required to cease operations until water quality standards are met.

8.0 SUMMARY OF POSITION OF THE U.S. FISH AND WILDLIFE SERVICE

The Service has determined that the proposed project may have effects on fish and wildlife and their habitats. Construction activities may directly impact protected species and other species, and some species and assemblages may be affected indirectly by impacts to nearby seagrass beds, water quality, and/or sedimentation. The Service has recommended herein protective measures for threatened and endangered species and other species and assemblages that will be vulnerable during construction and could be possibly affected through indirect impacts to habitat (i.e., seagrasses). Among the notable recommendations of the Service is the need for strict turbidity controls during construction. The Service will carry out additional coordination via the ESA Section 7 consultation process, but advises that impacting important habitat for sea turtles, such as the algal resources on rock/rip-rap in the north side of the Inner Channel should be avoided. The Service recommends that the CPA and Corps carefully examine operational and construction alternatives that will satisfy the project goals and decrease the risks to fish and wildlife, including protected species, and their habitats.

9.0 LITERATURE CITED

Anamar Environmental Consulting, Inc. 2005. Final Report for Canaveral Harbor 103 Evaluation – Deepening Work West Turning Basin Entrance Widening, Corner Cut-off and CT 6 & 7 Dredging.

Continental Shelf Associates, Inc. 1989 (December). Environmental Impact Assessment for Beach Restoration. Brevard County, Florida. Prepared for Olsen Associates, Inc. Jupiter, FL. 64 pp.

Dial Cordy and Associates. 2006a (July). Environmental Baseline Report, Port Canaveral Navigation Improvements, Port Canaveral, FL. Prepared for Canaveral Port Authority. Jacksonville Beach, FL. 28 pp.

Dial Cordy and Associates. 2006b (March). Port Canaveral Protected Species Report, Brevard County, Florida. Prepared for Canaveral Port Authority. Jacksonville Beach, FL. 11 pp.

Dynamac Corporation. 2002. Environmental Site Survey in the Vicinity of the North Jetty at Canaveral Harbor, Brevard County, Florida. Final Report.

Humphrey, S.R. (Ed.). 1992. Rare and endangered biota of Florida: mammals.

Morgan and Ecklund, Inc. 2007 (June). Port Canaveral Section 203 Feasibility Study, Theoretical Volume Calculations and Exhibits. Prepared for CH2M Hill. Deerfield Beach, FL. 11 pp.

South Atlantic Fisheries Management Council. 1998. Final habitat plan for the South Atlantic region. SAFMC Charleston, South Carolina. 457 pp.

U.S. Army Corps of Engineers. 1996. Final Environmental Impact Statement, Brevard County, Florida Shore Protection Project Review Study. U.S. Army Corps of Engineers, Jacksonville District. Jacksonville, FL.

U.S. Fish and Wildlife Service. 1995. Piping Plover (*Charadrius melodus*), Atlantic Coast populations, revised recovery plan. USFWS, Hadley, Massachusetts. 245 pp.

Farmland Protection Policy Act Coordination

DIAL CORDY
AND ASSOCIATES INC
Environmental Consultants

June 9, 2008

Natural Resources Conservation Service
2614 NW 43rd Street
Gainesville, FL 32606-6611

Dear Madam/Sir:

The Canaveral Port Authority is conducting a study for navigation improvements under the authority granted by Section 203 of Water Resources Development Act (WRDA) of 1986 (P.L. 99-662). Section 203 of WRDA 1986 allows non-federal interests, such as the Canaveral Port Authority, to undertake feasibility studies of proposed harbor projects and submit them to the Secretary of the Army. The Canaveral Port Authority has conducted this Section 203 study to determine the feasibility of deepening and widening the channels, wideners, and turning basins at Port Canaveral to accommodate the most modern vessels in the cruise ship fleet and to allow for the passage of deeper draft cargo vessels within the Port. The Canaveral Port Authority has completed form AD-1006, Farmland Conversion Impact Rating for the proposed project and is requesting review and determination of compliance with the Farmland Protection Policy Act with the Natural Resources Conservation Service.

The attachments to this letter include location map, site map, soils map, and copy of form AD-1006 for the Port Canaveral Section 203 Study Project Site. The Canaveral Port Authority appreciates your assistance with this project.

Sincerely,

DIAL CORDY AND ASSOCIATES INC.

Lee Swain
Vice President

Attachments

J05-850
I:\jobs-jax\801-900\05-850\nrcs coordination\nrcs consultation letter.doc
11/24/2008 11:19 AM

490 Osceola Avenue • Jacksonville Beach, Florida 32250
904-241-8821 • fax 904-241-8885 • e-mail info@dialcordy.com
office also in Wilmington, North Carolina

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 6/9/08
Name Of Project Canaveral Port Authority Section 203 Study	Federal Agency Involved Jacksonville District, USACE
Proposed Land Use Ports and Waterways	County And State Brevard County, Florida
PART II *(To be completed by NRCS)*	Date Request Received By NRCS

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).*	Yes ☐	No ☐	Acres Irrigated 0	Average Farm Size 0
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %		Amount Of Farmland As Defined in FPPA Acres: %	
Name Of Land Evaluation System Used	Name Of Local Site Assessment System		Date Land Evaluation Returned By NRCS	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	18.5			
B. Total Acres To Be Converted Indirectly	0.0			
C. Total Acres In Site	18.5	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	0	0	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use		4			
2. Perimeter In Nonurban Use		6			
3. Percent Of Site Being Farmed		0			
4. Protection Provided By State And Local Government		0			
5. Distance From Urban Builtup Area		0			
6. Distance To Urban Support Services		0			
7. Size Of Present Farm Unit Compared To Average		0			
8. Creation Of Nonfarmable Farmland		0			
9. Availability Of Farm Support Services		5			
10. On-Farm Investments		0			
11. Effects Of Conversion On Farm Support Services		0			
12. Compatibility With Existing Agricultural Use		0			
TOTAL SITE ASSESSMENT POINTS	160	15	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	15	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	15	0	0	0

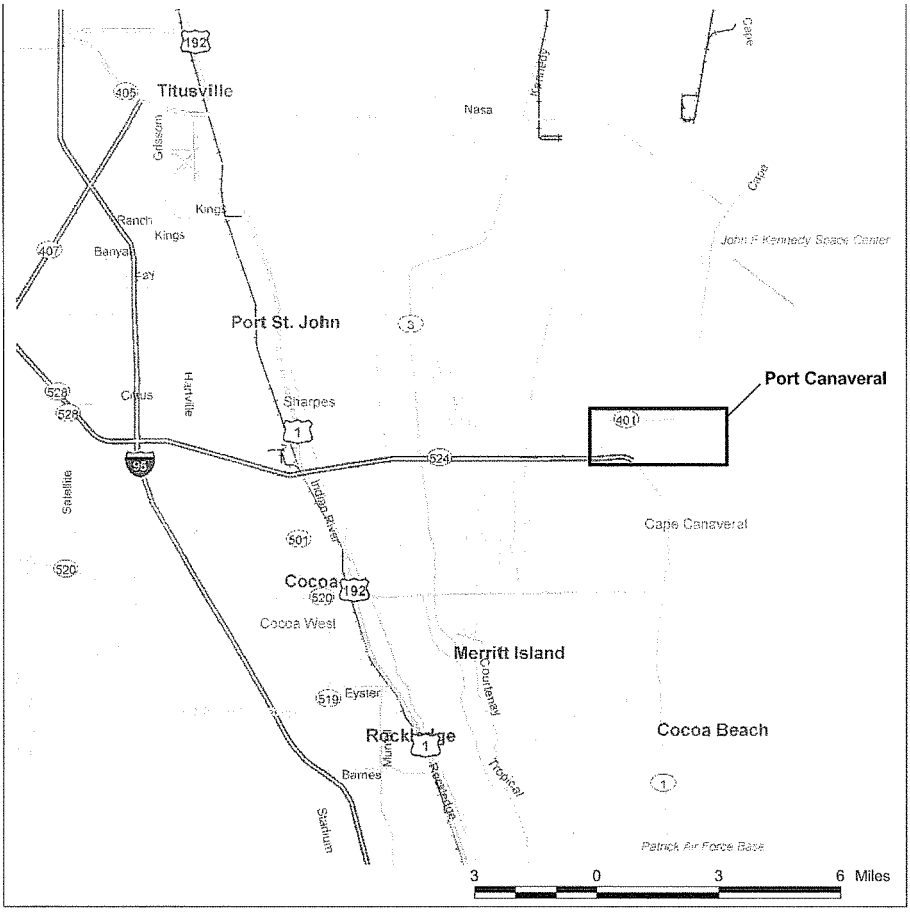
Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☒

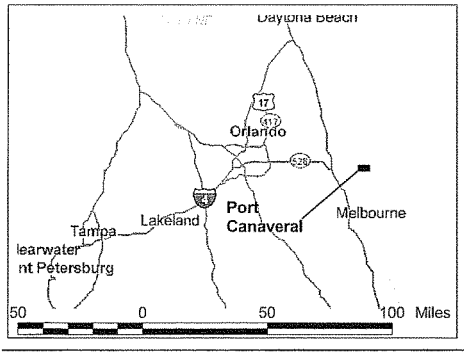
Reason For Selection:

(See Instructions on reverse side)

Form AD-1006 (10-83)

This form was electronically produced by National Production Services Staff

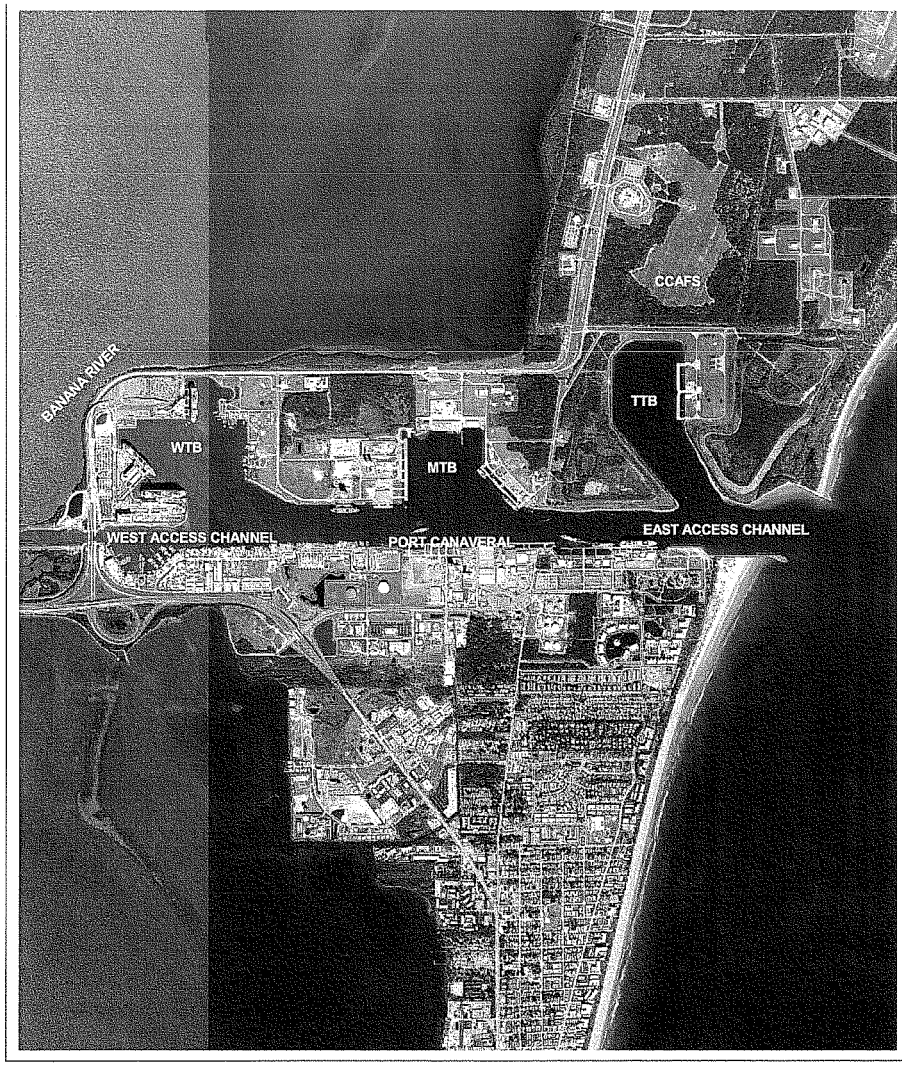


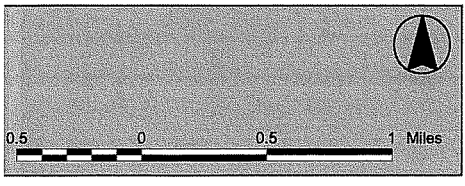


Location Map	
Port Canaveral Environmental Baseline Report	
Scale: 1 inch = 3 miles	Drawn By: MR
Date: April 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC	J05-850
	Figure 1

Port Canaveral Existing and Proposed Navigation Footprints
Proposed Navigation Improvement
NRCS Soils (Brevard County)
0.5 0 0.5 1 Miles

Port Canaveral Soils Map	
Port Canaveral Section 203 Study	
Scale: 1 inch = 0.5 mile	Drawn By: MR
Date: June 2008	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 1





Study Area	
Port Canaveral Environmental Baseline Report	
Scale: 1 inch = 0.5 mile	Drawn By: MR
Date: April 2006	Approved By: LS
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J05-850
	Figure 2

FOR CONTINUATION OF HOUSE DOCUMENT 113-49

THE 2012 FEASIBILITY STUDY FOR CANAVERAL HARBOR, BREVARD COUNTY, FLORIDA

SEE PART 2