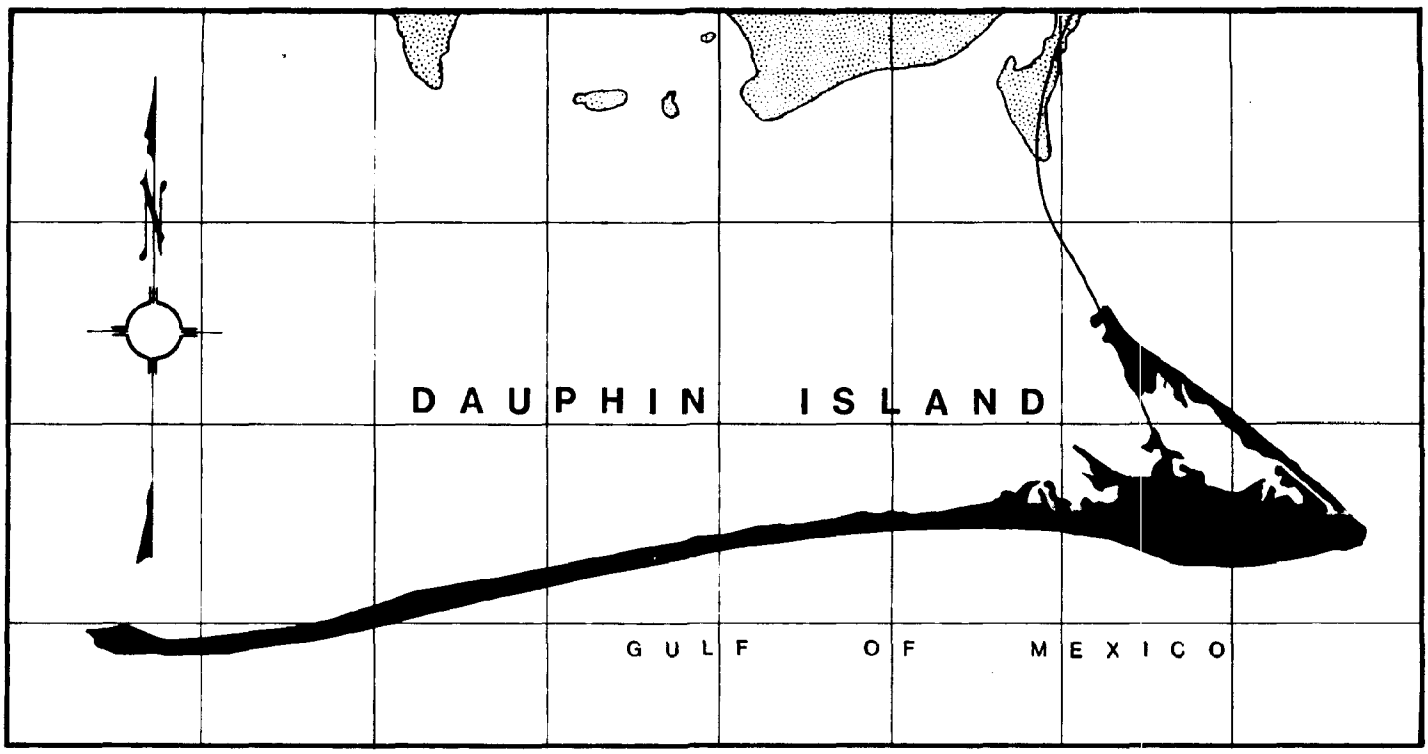


DEVELOPMENT PLAN FOR DAUPHIN ISLAND, ALABAMA

GV
182.3
.D48
1980
c.2

June, 1980

Jordan, Jones & Goulding, Inc.
Engineers — Planners

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

DEVELOPMENT PLAN
FOR
DAUPHIN ISLAND, ALABAMA

Prepared for the
Mobile County Commission
and
Economic Recovery Council

By
Jordan, Jones & Goulding, Inc.
Consulting Engineers Planners
Atlanta, Georgia

GV182.3 .D48 1980 c.2

US Department of Commerce
NOAA Coastal Services Center Library
2234 South Hobson Avenue
Charleston, SC 29405-2413

The preparation of this document was financed in part through a federal grant from the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration as authorized by the Coastal Zone Management Act of 1972; administered by the Alabama Coastal Area Board.

June, 1980

TABLE OF CONTENTS

COVER
TITLE PAGE
TABLE OF CONTENTS
LIST OF FIGURES
LIST OF TABLES

SUMMARY OF REPORT — Page

1.0 INTRODUCTION 1

2.0 ISLAND CHARACTERISTICS 2

2.1 History of Island Development 3
2.2 Environmental Characteristics 3
2.3 Socio-Cultural Characteristics 6
2.4 Land Use 8
2.5 Transportation 10
2.6 Utility Systems 11
2.7 Existing Supply of Recreation Facilities 13
2.8 Existing Management for Public Use Facilities 14

3.0 NEED FOR PUBLIC FACILITIES 15
3.1 Projected Recreation Demand and Facilities Needed 16
3.2 Water System Needs 18
3.3 Wastewater System Needs 19

4.0 ANALYSIS OF ALTERNATIVES 20

4.1 Public Use Areas 21
4.2 Water System 21
4.3 Wastewater System 26

5.0 RECOMMENDED DEVELOPMENT PLAN FOR DAUPHIN ISLAND 30

5.1 Goals and Objectives 31
5.2 Public Use Area Development 33
5.3 Water Supply System 38
5.4 Wastewater System 38

6.0 RECOMMENDED MANAGEMENT FRAMEWORK FOR DAUPHIN ISLAND 39

6.1 Administration, Operations and Maintenance 40
6.2 Methods of Financing 41

REFERENCES
APPENDIX

LIST OF FIGURES

Figure Number	Title	Page
1	Study Area	4
2	Physical Features	5
3	Future Land Development	9
4	Sewer Service Areas	28

LIST OF TABLES

Table Number	Title	Page
1	Current Estimated Island Population (1980)	6
2	Projected Prime Season Weekday Island Population, 1980, 2000	7
3	Prime Season Weekend Island Population, 1980-2000	7
4	Annual and Daily Trips to Dauphin Island, 1970-2000	11
5	Gross Annual and Average Daily Demand	16
6	Weekday and Weekend Prime Season Demand	17
7	Areas or Facilities Required to Meet Prime Season Demand, 1980-2000	18
8	Projected Water Customers, 1974-2000	18
9	Prime Season Water Demand & Needs	19
10	Estimated Cost Summary, Boat Marina	22
11	Estimated Cost Summary Per 200-Site Campground	23
12	Estimated Cost Summary, Outdoor Beach Area	24
13	Estimated Cost Summary, Picnic Areas	25
14	Water Supply System Cost Estimates	27
15	Wastewater System Cost Estimate	29
16	Camping User Fees and Annual Revenue	34
17	Swimming User Fees and Annual Revenue	35
18	Marina, Boating and Fishing Facilities User Fees and Annual Revenue	36
19	Other Facilities User Fees and Annual Revenue	37
A	Participation Rates for Various Recreational Activities	47
B	Length of Season by Activity	48
C	Percent of Distribution by Activity for Prime Season	49
D	Recreation Standards	50

SUMMARY OF REPORT

Dauphin Island, since the mid - 1950's, has served as one of the primary beach resources for the State of Alabama. Visitors and residents include those from Mobile County and the southern part of the state as well as out of state visitors from all parts of the country. While the total amount of dollars that can be attributed to the use of Dauphin Island is unknown, Mobile County can show that tourism related dollars have been expended within the County which are directly related to Dauphin Island and many people are employed as a result of businesses on Dauphin Island.

On September 13, 1979, hurricane Frederic passed directly over Dauphin Island destroying many permanent and seasonal residences, trees, power lines and utility service lines. In addition the bridge connecting the Island to the mainland was severed. Nine months have elapsed but pre-hurricane conditions have not been reestablished. Partially destroyed homes remain standing and are not being torn down or repaired. The water system has just recently been repaired. Septic tanks cannot be reinstalled because of health hazards and high groundwater. Federal emergency disaster money has not been appropriated. A decision on replacement of the bridge has not been made.

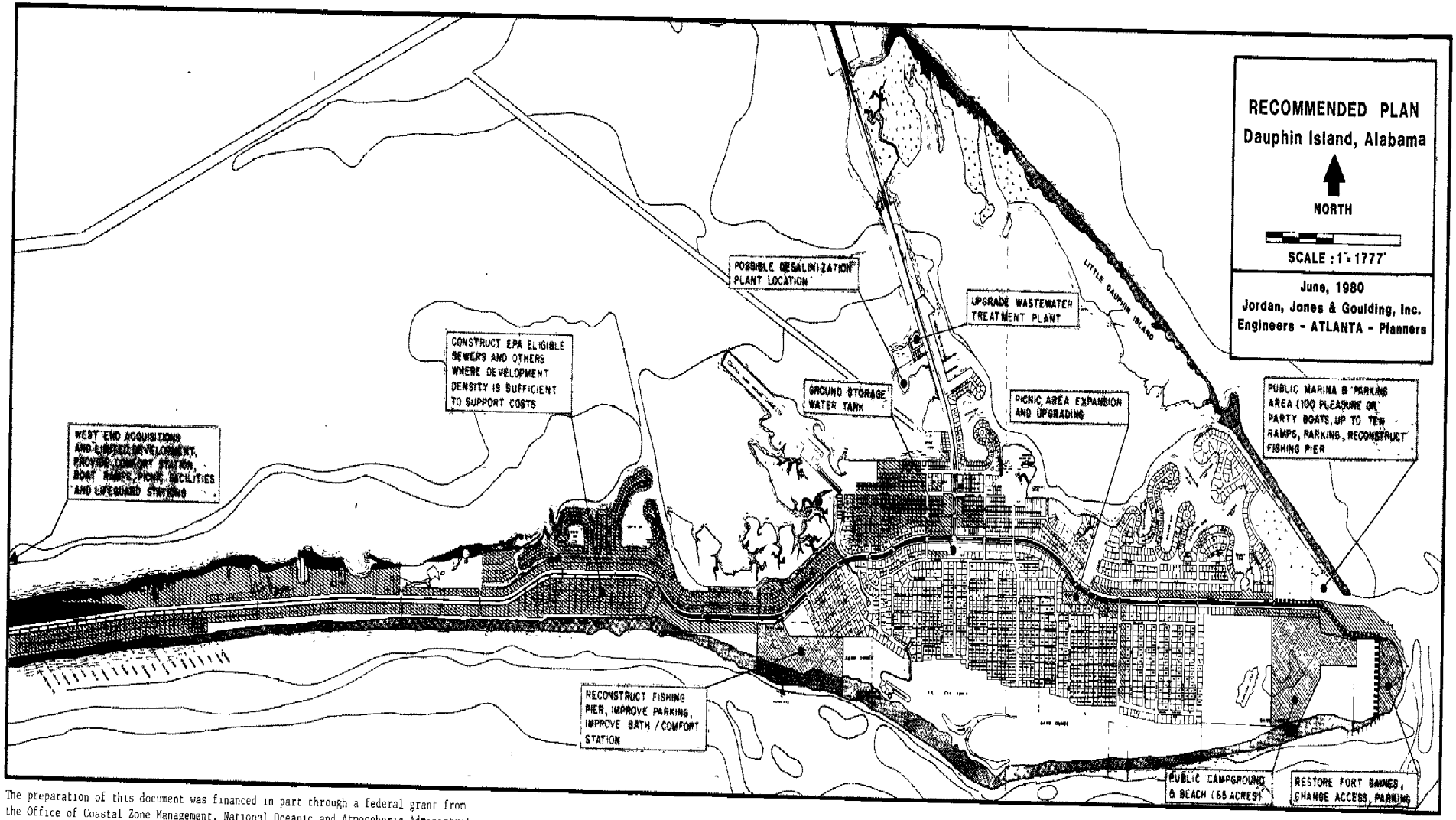
The Development Plan for Dauphin Island, Alabama looks at a logical development of public use areas for the Island and water and wastewater services for the Island. Transportation alternatives were not included.

Based on projections of pre-storm conditions, Dauphin Island could expect a total of approximately 7,600 people on the Island in 1985 during the summer. By the year 2000, this number would climb to almost 11,500 people on any summer weekday. On a holiday (e.g. July 4) or a given weekend, the population would swell to 11,700 in 1985 and over 17,600 people in the year 2000. Clearly, with these large numbers of people, adequate public recreation use areas and water and sewer systems must be provided.

After examining many alternative recreation uses and site locations, a recommended plan was developed for public recreation areas and water and sewer improvements. This plan is shown in the attached figure. The recommended plan and actions to accomplish the plan may be summarized as follows:

Camping--

- establish a 65 acre site to be utilized for camping by expanding the existing campground on the eastern end of the Island into the area now used as a bird sanctuary. Ensure that adequate beach frontage is included. To establish this site requires careful coordination and negotiations with the Audubon Society.
- develop a phased plan for construction of camp sites, including all facilities, walking trails, and utilities required with detailed cost estimates and funding sources.
- secure capital costs for construction.
- develop and adopt a user fee structure.
- construct the first phase of development to meet 1985 demand to include 250 camp sites, of which 100 are for tents and 150 are for recreational vehicles.
- establish a policy that public campgrounds shall be developed to meet one-half of the total estimated demand for a prime season weekend, with the remainder to be provided by the private sector.
- expand the first phase of development to approximately 600 camp sites by the year 2000.



The preparation of this document was financed in part through a federal grant from the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration Zone Management Act of 1972; administered by the Alabama Coastal Area Board.

Swimming/Beach--

- establish the eastern and western ends of the Island and the Bienville beach areas as the public beach areas.
- realign the road between MESC and Ft. Gaines to provide public access and parking on the eastern end of the beach.
- upgrade the facilities at Bienville beach, including establishing adequate parking, beach access walkways, concession areas and recreation facilities.
- expand total beach frontage available to the public by purchase and limited development of the western end of Dauphin Island.
- control access to all beach areas with established parking and user fees.
- actively clean up the beaches and monitor and enforce dune buggy restrictions.
- develop a detailed plan for beach area development with detailed cost estimates, specifications and phasing.

Picnic Facilities--

- expand and upgrade picnic facilities at Cadillac Square.
- establish picnic facilities at Bienville beach, on the western end of the Island and the proposed new beach area on the eastern end of the Island.
- Upgrade and construct comfort stations at Cadillac Square, Bienville beach and west end, where appropriate.

Marinas, Boating and Fishing Facilities--

- construct a public marina to include spaces for 100 pleasure or party boats and 4 boat ramps to accomodate an estimated maximum of 160 boats per day.
- prepare a detailed study of the Billy Goat Hole area to examine the layout, detailed design and cost estimates for a public marina.
- develop the public marina such that parking spaces for cars and trailers, a concession area, gasoline and fishing piers are provided and user access controlled.
- eliminate the median along Bienville Boulevard from Albright Drive eastward to provide parking for approximately 50 cars and trailers.
- remove road access around Pelican Point and Fort Gaines.
- extend Bienville Road southward between Fort Gaines and MESC providing parking and beach access (costs provided as a beach facility).
- reconstruct fishing piers at Pelican Point and Bienville Beach.

Other Facilities--

- an island plan should be developed for bicycle trails and nature paths.
- extensive renovations based on an approved plan should be undertaken around Ft. Gaines and the shell mounds.
- extensive discussions should be undertaken with MESC and the Audubon Society to plan for and promote development of an environmental education center emphasizing the importance of the unique marine environment around Dauphin Island and the "flyway" and species of birds spotted in the bird sanctuary.

- an educational pamphlet should be developed on all historical and scenic sites on the Island.

The total estimated capital costs for the recommended plan is approximately $12 million. Estimated annual operating costs for public recreational areas assuming a 20 year payback and bonds at an interest rate of 9 percent are $1.3 million. These are broken down by type of facility below.

Type of Facilities	Capital and Operating Costs by Facility: Capital Cost (000s)	Annual Operating Costs (000s)
Camping	$ 1,300.0	$ 223.0
Beach Areas	4,000.0	520.0*
Picnic Facilities	1,217.0	214.0
Marina	506.0	125.0
Other Facilities	750.0	200.0
Subtotal	$ 7,773.0	$ 1,282.0
Water System	1,809.0	$ 180.0***
Wastewater System	2,047.0**	--- ***
Subtotal	$ 3,856.0	
Total	$11,629.0	$ 1,462.0***

* Includes acquisition costs of west end.
** Assumes construction of only eligible portion of sewer system.
*** Annual operating costs for water and wastewater systems are 180,000 for the first year with 7.5 percent increase each year thereafter.

User fees and assessments are proposed to be the primary methods of financing. For the public recreation areas, user fees by type of facility are as follows. Annual revenues anticipated are also shown.

Type of Activity	User Fees: Proposed User Fee	Anticipated Annual Revenue
Tents	$ 7.50	$ 57,750
Trailers without sewer	8.50	49,300
Trailers with sewer	10.50	60,900
Swimming	1.50/person	936,000
Parking	.50	100,000
Boat slips (monthly)	25/month	1,250
Boat slips (daily)	5.00	53,550
Boat ramps	4.00	97,920
Ft. Gaines--		
Groups (25+)	.75	59,000
Groups (10-25)	1.00	104,500
Individuals	1.25	98,000
		$1,618,170

The most important aspect of the plan is proper operation and maintenance. The proposed plan requires 12 full time persons and 18 seasonal employees for the public recreation areas. In addition, approximately 3 people will be required to operate the water and sewer systems.

To implement the recommended plan, one of two viable alternatives are recommended. Creation of an Island Development Authority with the power to establish rates, acquire land, construct and operate improvements and manage

all public facilities should be considered. This Authority would replace all existing boards or authorities who now operate public facilities and use areas. A five to seven member board would establish policy and directions for the Authority. An executive secretary would be employed to carry out these policies and direct day-to-day operations.

The second viable alternative is incorporation. Although in the past, incorporation has been defeated, the destruction left by the hurricane and the massive amount of work that needs to be done requires a well coordinated and managed effort. Further, a central Island agency or group serving as spokesman is required. Dauphin Island cannot expect favored treatment from Mobile County. County revenues must be distributed equitably to all portions of the County. However, with incorporation, the Island would have its own source of revenue and a management structure so badly needed to provide those public services required on the Island.

Regardless of the method chosen to implement the recommended plan, Island residents face two challenges -- to work together toward making Dauphin Island an attractive, pleasant, healthy and safe living environment and to ensure that the operation and maintenance of all public facilities are sufficient to meet the needs of seasonal and permanent residents and visitors wishing to come to the Island.

1.0. INTRODUCTION

On September 13, 1979, Dauphin Island was in the direct path of hurricane Frederic. Severe damage resulted. Trees were felled or topped, homes destroyed, power and telephone lines downed, septic tanks uprooted and the elevated water tank and water system damaged. Beaches were severely eroded, marinas and boats demolished and the bridge to the Island severed. As of May 1, 1980, actions to replace the bridge to the Island are halted, beaches remain cluttered with debris, houses severely damaged have not been demolished and island residents must spend a minimum of 6 hours just to ferry to the mainland to purchase groceries.

Clearly, actions are required. But what actions are proper, necessary and in the best interest of both the human and natural environment? Should the bridge be rebuilt, are development controls working, should Dauphin Island remain as a major recreation resource to Mobile County and the southern part of Alabama? Questions such as these have been asked by visitors to the Island, environmentalists and permanent residents. However, answers are not easy and agreement on approaches are even more difficult.

The purpose of this study is not to deal with each of the individual Island issues and suggest fragmented solutions. Rather, this study has been undertaken to accomplish the following objectives:

- to pull together into one report essential information on Dauphin Island
- to systematically and realistically plan for redevelopment of the Island following hurricane Frederic, particularly the public use areas
- to examine each of the existing public use areas for potentially more intensive development, coordination and accommodation of users
- to prepare cost estimates for proposed public use areas with emphasis on the areas generating revenues to pay for capital and operating costs
- to develop a management system for public use areas on the Island
- to provide and determine the cost for water and sewer systems for the Island

Upon completion, review and acceptance of this study, the Island will have a working blueprint for future development and guidance for funding sources from Island residents, visitors and outside sources such as the state and federal governments.

The report contains six sections. The introduction provides background and report objectives. Section 2 discusses Island characteristics including the history of Island development, environmental characteristics and present public use facilities and utility systems. Section 3 examines the need for public facilities including those for recreational use and utility systems. Section 4 focuses on an analysis of alternatives including different types of development, costs, and adequacy to meet anticipated demand. Section 5 presents the recommended plan for development. Section 6 suggests methods of financing, and a management framework for implementing the plan.

2.0. ISLAND CHARACTERISTICS

- History of Island Development
- Environmental Characteristics
- Socio-Cultural Characteristics
- Land Use
- Transportation
- Utility Systems
- Existing Supply of Recreational Facilities
- Existing Management for Public Use Facilities

2.1 History of Island Development

Dauphin Island is rich in history. Its first inhabitants were Indians who fished and hunted all along the Gulf Coast. Following the Indians, Island inhabitants included the Prince of Wales, and French and Spanish explorers. Not until 1813, during the War of 1812, did American forces claim Dauphin Island. The United States Government started construction on Fort Gaines in 1821, completing the fort in 1848.

Fort Gaines played minor roles in the Battle of Mobile Bay and during World Wars I and II. After the end of World War II, the Island again became a largely uninhabited strip of sand with just a tiny fishing village near the deserted fort. (4)

Planned development for the Island began around 1953 when the Mobile Chamber of Commerce assembled a plan to have a toll bridge constructed from the mainland to the Island by the State and to sell lots, using the proceeds to develop the Island and provide public use areas. The land was subdivided at that time and lots sold. The present subdivision remains almost as it was originally planned. Land use controls and building requirements were and still are attached as deed restrictions to any property sold. The ability to change these restrictions rests with the Property Owners Association, which was formed to monitor development, manage and operate property and the Isle Dauphine Club available to the owners, and generally oversee Island development. (5)

In 1953 approximately 2500 lots were sold throughout Alabama. These were sold prior to the bridge being constructed or improvements being made to the Island. Today the Island has over 3,000 single family lots, 114 multi-family lots, 45 commercial lots and over 450 acres available to either property owners or the public for recreation use.

2.2 Environmental Characteristics

2.2.1 Physical Features

Dauphin Island and Little Dauphin Island are located west of the mouth of Mobile Bay, Alabama, and the northern rim of the Gulf of Mexico (See Figure 1). Dauphin Island is 30 miles south of Mobile and about 4 miles off the Alabama Gulf Coast line. The Island is approximately 15 miles long with its greatest width of one mile approximately 5 miles from the eastern end. The western threefourths of the Island tapers to 1100 feet wide and has low relief.

Little Dauphin Island is northwest from the eastern end of Dauphin Island. The two islands are separated by Dauphin Island Bay. Little Dauphin Island extends northwestward for approximately 2.7 miles and its width is generally 750 feet.

Dauphin Island and Little Dauphin Island are an island and spit of the Mississippi Sound barrier island system. Dauphin Island has a broad, well-developed beach backed by dunes on the Gulf side. Beach and intermittent marsh backed by dunes occur on the mainland side of the Island. Dunes average 10 to 20 feet in altitude and reach a maximum of 40 feet on the eastern end (Boone, 1973). Figure 2 shows a generalization of physical features.

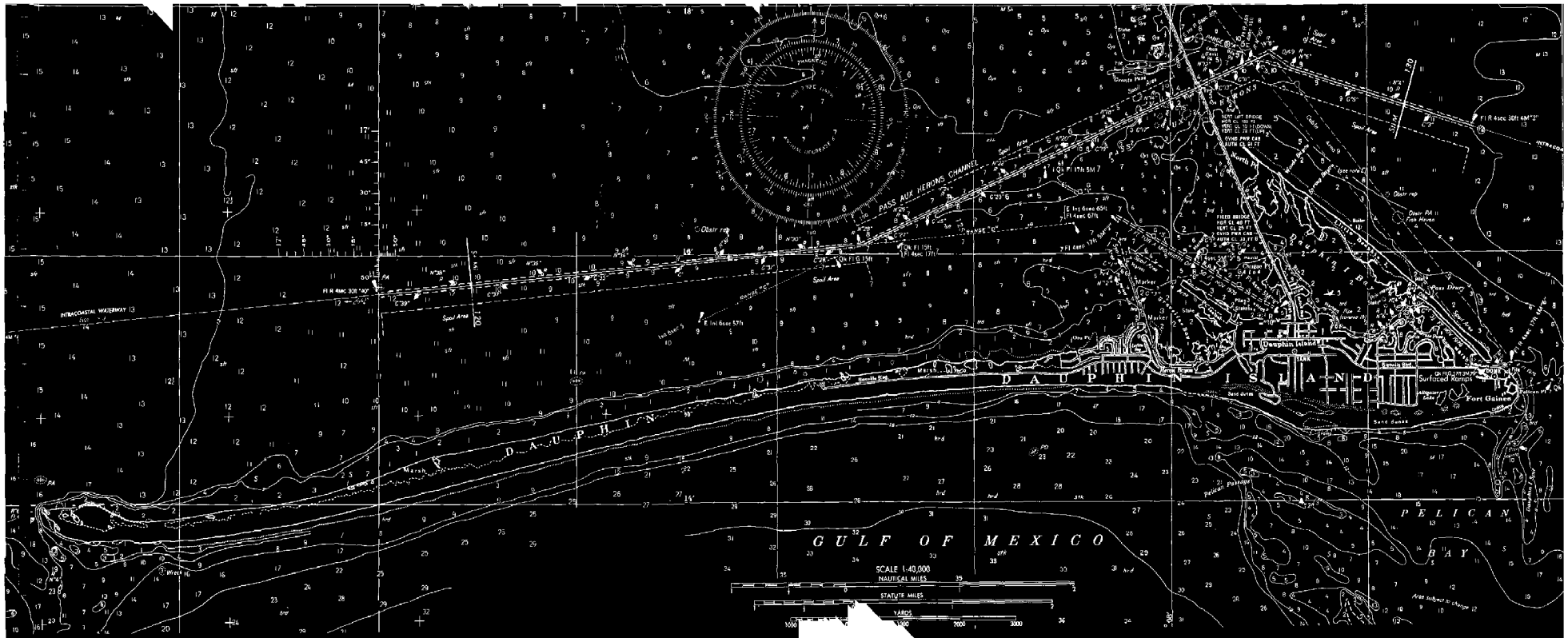


Figure 1

STUDY AREA

Dauphin Island , Alabama

June , 1980

Jordan , Jones & Goulding , Inc.

Engineers - ATLANTA - Planners

The preparation of this document was financed in part through a federal grant from the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration Zone Management Act of 1972; administered by the Alabama Coastal Area Board.

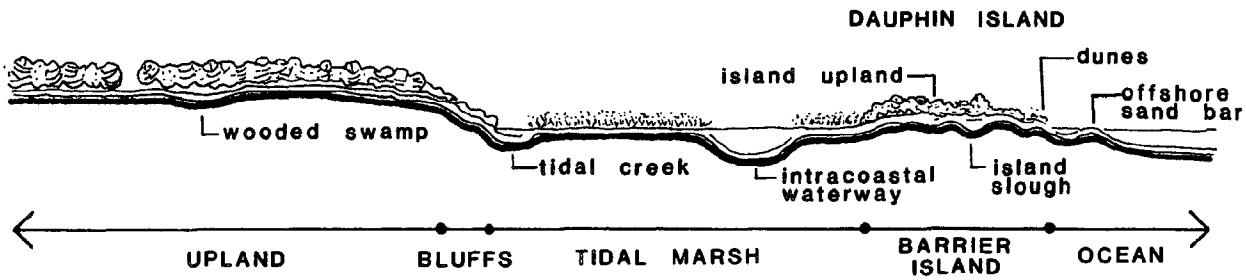


FIGURE 2 PHYSICAL FEATURES

Wooded areas and vegetation are found mostly on the eastern end of the Island where sand dunes have protected the area and the Island is at its widest. Vegetation is mostly shortleaf pine and live oaks. Vegetation elsewhere on the Island is sparse except for marsh grasses, sea oats and other vegetation common to areas innundated by winds blowing across the lower dunes.

Coastal shell mounds and burial sites are found on the bay side of Dauphin Island. These date back to pre-Columbian times when the area was inhabited by Indians of the Muscogee family, a part of the Choctaw tribe. (2)

2.2.2 Climate

The climate of Dauphin Island is characterized by warm, humid summers and mild winters. The mean temperature is 69 F., although it rarely goes above 85 F. because of the moderating effect of the ocean. The annual precipitation is 51 inches, with the most rainfall occuring during September.

Winds are variable, with south to southwest winds from March to August and north to northwest winds from September through February. Some 15 or more winter storms penetrate the Island each year, lasting an average of three days and bringing cool air and strong northerly winds. From October to March, these systems are accompanied by rapid temperature drops and winds in excess of 38 miles per hour. (9)

Since 1900, numerous tropical storms have affected the Alabama coastal area and twenty have reached hurricane proportions. Hurricane Frederic was the most recent storm, and it hit the Island on September 13, 1979.

2.2.3 Water Quality

Surface water quality around the Island is affected by both point and non-point sources of pollution. Point sources of pollution include the Dauphin Island Water and Sewer Authority (DIWSA) wastewater treatment plant, the Mallon Seafood plant and the Patronas Seafood plant. Combined, these sources contribute an average of 142,500 gpd of wastewater discharge to the coastal waters. The DIWSA plant contributes 141,000 gpd of the total.

The greatest sources of non-point pollution on the Island are poorly operating septic tanks, pleasure and commercial boats, dredging, and stormwater runoff and sedimentation. Poorly operating septic tanks are the primary problem. The Health Department presently has a moratorium on all construction which requires a septic tank for wastewater discharge. Health hazards and groundwater contamination have been associated with septic tank systems on the Island. Salmonella organisms were isolated in areas used for swimming and fecal coliform bacteria were excessive. Nutrient levels in well points were also extemely high. (4)

2.2.4 Coastal Ecology

Dauphin Island is one of a series of islands along the Gulf of Mexico which form the Mississippi Sound and Florida barrier island and spit systems. The Island forms the western edge of the mouth of the Mobile Bay and serves as storm protection for inland estuaries and tidal marshes.

Marshlands vary in type and quality and are found along the bay edge of the Island. Much of the western half of Dauphin Island has marsh which is inundated only occasionally by high tides. The remainder of the Island as well as the marsh areas in Dauphin Island Bay are inundated daily.

Two established freshwater lakes are found on the Island. Gaillard Lake is on property now leased by the Audubon Society from the Park and Beach Board and on the east end. French Lake is on property owned by the Dauphin Island Property Owners Association and forms a physical feature on their golf course. From aerial photos taken after Hurricane Frederic, an additional lake was formed adjacent to Gaillard Lake.

By their nature, beaches are a major attraction for tourism and recreation in all coastal areas. In Alabama, natural beaches are limited, and increased private acquisition of access routes to the beaches has further reduced publicly available beach areas. In Mobile County, the major public beaches are on Dauphin Island. The entire Gulf shoreline is beach varying in width from 150 to 450 feet. However, this shoreline is continuously eroding. Portions of the Island are presently eroding at 5 to 10 feet per year. Pelican Point has been extensively protected against erosion but was severely impacted by Hurricane Frederic. The western half of the Island has suffered the greatest erosion. (2)

Major natural oyster reefs lie between Dauphin Island and Cedar Point and include Sand Reef, Cedar Point Reef, Bouy Reef and Kings Bayou Reef. (2) Although there are many acres of firm bottom suitable for oysters in Dauphin Island Bay, no marketable oysters are produced because of the ravages of the oyster drill (9).

Fishing and shellfish harvesting are a major industry in the area. Species of fish caught vary. Sport fishing includes gigging flounder, netting crabs, trawlling for shrimp, castnetting for mullet, fishing from a pier on a private or chartered boat. The estimated dollar value of sport fishing was estimated in 1973 to be as high as $800,000 for Mobile Bay alone (9).

2.3 Socio-Cultural Characteristics

2.3.1 Demographics

The population of Dauphin Island changes throughout the year and consists of permanent residents, seasonal residents, daily visitors and weekend visitors. Prior to hurricane Frederic estimates of population indicated approximately 680 permanent residents, over 2,200 seasonal residents, and 3,450 daily visitors for an Island population during a peak season day of 6,345 people.

TABLE 1
CURRENT ESTIMATED ISLAND POPULATION (1980)

Type of Population	Number
Permanent Residents	680
Seasonal Residents	2,215
Average Daily Visitors	3,450*
Total	6,345

* Based on recreational average daily traffic (one way) times 3 people per auto. Source: J.B. Converse, Inc. & SARPC.

The hurricane has severely hampered and will continue to effect seasonal and visitor use of the Island. In addition, many permanent residents have relocated temporarily to the mainland because of school children, ease of shopping, or destruction of property. However, during the summer and as rebuilding is completed, permanent residents may be expected to return.

The rate of return for seasonal residents and visitors is unknown. Rebuilding of homes has been slow and movement of construction materials to the sites hampered by the bridge being destroyed.

Population growth, however, is expected in the future. Table 2 shows the projected population to the year 2000. These estimates are taken from the Wastewater Management Facility Plan (J.B. Converse, Inc.) completed prior to the hurricane and therefore 1985 figures are likely high. However, the 2000 figures are reasonable and expected.

TABLE 2

PROJECTED PRIME SEASON WEEKDAY ISLAND POPULATION, 1980-2000

	YEAR				
Population	1980	1985	1990	1995	2000
Permanent Res.	680	830	980	1,130	1,280
Seasonal Res.	2,215	2,620	3,020	3,425	3,830
Average Daily Visitors *	3,450	4,125	4,798	5,530	6,261
TOTAL	6,345	7,575	8,798	10,085	11,371

* Based on mean of the projected average recreational daily traffic (one way) times 3 people per auto.

Source: John H. Friend, Inc. (1980); SARPC (1990, 2000); Jordan, Jones & Goulding, Inc. (1985, 1995). Mean calculated between high and low projections.

These figures represent the population that may be expected on the Island during a prime season weekday. Prime season was considered to be from June through August. However, during a prime season weekend, average weekday visitors may be expected to double. This has been the experience in numerous other recreational areas throughout the country. This means that a recreational area, operating at weekend capacity, will realize two percent of prime season visitation during a normal weekend day. Given this assumption, Table 3 shows the anticipated prime season weekend Island population.

TABLE 3

PRIME SEASON WEEKEND ISLAND POPULATION, 1980 - 2000

	YEAR				
Population	1980	1985	1990	1995	2000
Permanent Residents	680	830	980	1,130	1,280
Seasonal Residents	2,215	2,620	3,020	3,425	3,830
Visitors *	6,900	8,250	9,596	11,060	12,522
TOTAL	9,795	11,700	13,596	15,615	17,632

* Based on average daily recreational traffic times 3 people per auto times 2.

2.3.2 Housing

Prior to hurricane Federic, there were approximately 700 structures on the Island including homes, hotels, apartments, commercial establishments and others. Approximately 100 of these structures were nonresidential. Of the

total of 600 residential structures, approximately 250 homes were for permanent residents and 350 were seasonal residences.

Housing varies throughout the Island. Deed restrictions provide minimum building requirements and, in general, homes built are larger than minimum requirements. The requirements, if adherred to, would provide an unpleasant mixture of types and sizes.

Housing is interspersed throughout the east end of the Island. Older residences are clustered near the commercial district. Newer construction is found on the western end of the Island out to the end of the paved portion of Bienville Boulevard. However, many of these homes were severely damaged or destroyed in the hurricane.

2.3.3 Public and Community Services

Numerous nonrecreational public and community services are located on the Island. These include the Dauphin Island airport, the Gulf Coast Water Hygiene Laboratory, the Alabama Marine Resources Laboratory, the U.S. Shellfish Laboratory, the Coast Guard, an annex to Brookley Air Force Base, a post office and the Marine Environmental Science Consortium complex.

The Dauphin Island airport is on the bay side of the Island on approximately 22 acres of land. A landing strip is provided for small planes coming to the Island.

The Federal Department of Agriculture operates the Gulf Coast Shellfish Sanitation Research Center; the U.S. Public Health Service operates the Gulf Coast Water Hygiene Laboratory; and the State of Alabama operates the Alabama Marine Resources Laboratory. All of these are on the northern side of the Island (4).

The Marine Environmental Science Consortium (MESC) is located adjacent to Fort Gaines. This consortium is made up of 18 colleges and universities throughout the country and conducts various research and educational programs in marine sciences.

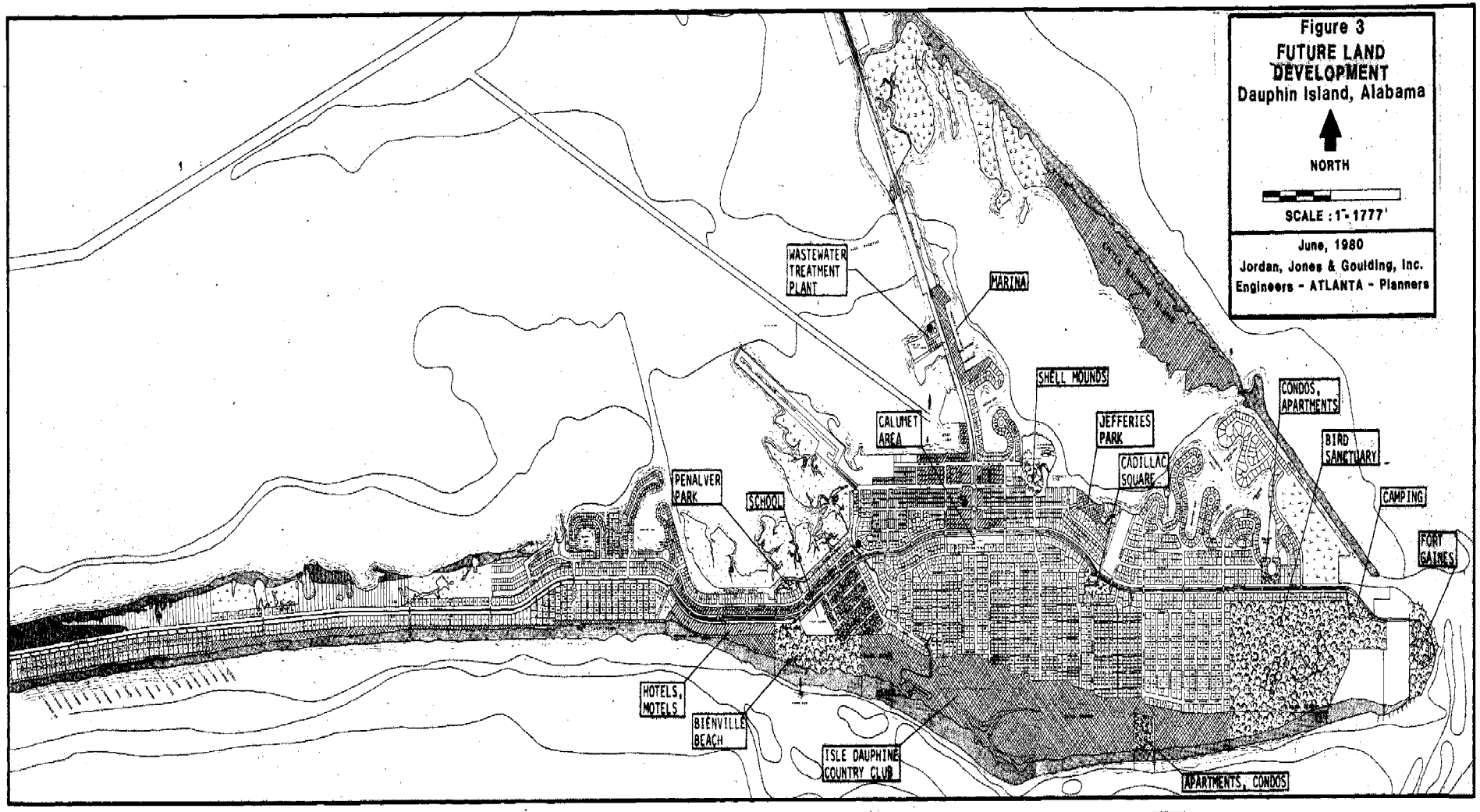
The U.S. Coast Guard has a tract of land at the Fort Gaines harbor and the U.S. Air Force has an annex to Brookley Air Force Base between the MESC property and the Audubon Society bird sanctuary on the east end.

2.4 Land Use

Island development is linear with Bienville Boulevard providing a spine running from the eastern end of the Island westward. Visitors and residents to the Island, before hurricane Frederic, crossed the Gordon Persons Overseas Highway (Dauphin Island Parkway), entering the Island near the Dauphine Isle Marina, wastewater treatment plant, and the central commercial area of the Island. Where the parkway deadends into Bienville Boulevard is the Calumet Area which has the Island's 100,000 gallon elevated watertank. (See Figure 3).

Land uses are primarily devoted to residential and public or semi-public uses (see Figure 3). Commercial use (26 acres) is clustered in an area north of the Calumet Area to the Gordon Persons Overseas Highway. Residential building has been scattered on the eastern end of the Island. However, the western end has been more fully developed. Unfortunately, these homes were the most severely damaged during hurricane Frederic.

Private and public recreational uses occupy a large portion of the Island. The Dauphin Island Park and Beach Board, a division of Mobile County government, operates and maintains public recreational facilities at Bienville



PRIVATE RECREATION
COMMERCIAL
EXISTING WELLS
SINGLE - FAMILY RESIDENTIAL
MULTI - FAMILY RESIDENTIAL
PUBLIC RECREATION

The preparation of this document was financed in part through a federal grant from the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration Zone Management Act of 1972; administered by the Alabama Coastal Area Board.

Beach, Cadillac Square, Penalver and Jefferies Parks, the Dauphin Island campground and the public areas around Fort Gaines. The Board leases 159 acres of land adjacent to the campground to the Audubon Society as a bird sanctuary.

Fort Gaines on the east end of the Island and the shell mounds adjacent to the state and federal shellfish laboratories are also open to the public. Fort Gaines suffered water damage during the hurricane and substantial renovation work is needed to make it attractive to visitors.

Island development was planned for in the original Chamber subdivision. Use patterns have not been substantially altered. With full development of all existing lots, the Island would increase more than 5 times its present development. Projections in Island planning documents indicate that by the year 2000, an additional 1,005 structures will be added. This means that approximately 55 percent of the total single family lots will be developed by the year 2000.

Commercial development may also be expected to increase. Presently, no chain grocery store is located on the Island and shopping is very limited. As development increases, these types of development will become more economically feasible. From 1975 to 2000, permanent commercial establishments are expected to increase from 20 to 38 and seasonal commercial will climb from 65 to 84.

Land use controls on the Island are provided only through deed restrictions, generally established at the time the Island was originally subdivided. The restrictions allow for very small dwellings (as low as 750 square feet). Since no county zoning exists, no authoritative governmental entity has control over development. In recent years, the most control has been exercised by the Mobile County Health Department. Septic tanks and salt water intrusion into the water system have halted further Island development until adequate water supply and sewage disposal systems can be developed.

2.5 Transportation

The Island contains over 40 miles of paved roads which are to be maintained by the county. Many roads, however, remain unpaved.

Traffic volume on Bienville Boulevard, the major road running east-west along the middle of the Island, varies from one season to another. Table 4 shows the annual and daily one-way trips to the Island to the year 2000. Assuming 3 people per auto, in the year 2000 on an average day, almost 10,800 people may be expected to be travelling in one direction on Bienville Boulevard.

These figures assume a bridge connection to the mainland and were prepared prior to hurricane Frederic. Since the bridge was destroyed, travel to the Island has been limited to ferry service, private boat or plane. Ferry service is extremely slow, infrequent and incapable of meeting present demand. A maximum of approximately 20 cars can be accommodated at any one time on the ferry.

The County does operate a landing strip on the north side of the Island. This strip is classified as a Basic Utility II facility. The strip is on a 22 acre site of filled land which projects into Aloe Bay.

TABLE 4

ANNUAL AND DAILY TRIPS TO
DAUPHIN ISLAND, 1970 - 2000

	Average One-Way Traffic							
	1970		1980		1990		2000	
Vehicle By Type	Annual	Daily	Annual	Daily	Annual	Daily	Annual	Daily
Commercial	26,645	73	43,435	119	60,590	166	78,840	216
Nonrecreational	160,235	439	261,705	717	362,080	992	472,675	1,295
Recreational	258,420	708	419,750	1,150	583,270	1,598	761,755	2,087
Total	445,300	1,220	724,890	1,986	1,005,940	2,756	1,313,270	3,598

Notes: Based on annual average daily traffic (one way). Projections for 1980, 1990 and 2000 are the mean of the high and low projections.

Sources: Alabama Highway Department (1970); John H. Friend, Inc. (1980); SARPC (1990-2000).

2.6 Utility Systems

While water and wastewater systems are focused on in this section, solid waste collection and disposal and other utility systems such as electrical and telephone are recognized as important also. All of these systems are privately operated. Alabama Power Company provides electrical service to the entire Island and Bayou Telephone Company provides telephone service. A private company contracts with property owners to collect garbage.

Following the Island subdivision in 1953, both water and wastewater utilities were constructed to serve the permanent residents as well as the public. During the years of development and many years following, construction, operation and management of these facilities were handled by the Dauphin Island Property Owners Association (DIPOA).

In an effort to improve the level of service provided by these utilities, the Mobile County Commission in 1972 created the Dauphin Island Water and Sewerage Authority (DIWSA). By virtue of special State legislation, the Authority was given enabling legislation with powers to own, operate and finance water and sewer improvements on the Island.

The Alabama Office of Public Water Supply issues the permits for operating the water system on Dauphin Island. Annual site inspections are made to insure compliance with health standards. The development of new well supplies must be documented and approved by the Public Water Supply office. Any new construction for system expansion or storage facilities must also be approved by the State office.

The sewerage system is regulated by the Environmental Protection Agency (EPA) on the Federal level, and by the Alabama Water Improvement Commission (AWIC) on the State level. These agencies define the degree of treatment which must be provided by the public wastewater facilities, and they monitor

compliance with these regulations. The use of septic tanks for wastewater disposal is regulated by the Mobile County Health Department. In June, 1976, a moratorium was placed on the construction of new septic tank systems on Dauphin Island. In December, 1979, following hurricane Frederic additional regulations were promulgated to limit the extent to which damaged septic tank systems could be repaired or renovated for continued use.

Hurricane Frederic focused Island residents' attention on utility systems, for suddenly water supply was cut off until checks could be made for contamination, power and telephone lines were snapped and replacement or repair took almost 6 months, on-site sewage systems (septic tanks) floated or became unusable and debris and trash were everywhere with no place in which to dump. Disaster assistance to replace and repair damage suffered during the hurricane would not have been available if the Water and Sewer Authority were privately owned.

2.6.1 Water System

The water system serves all residents of Dauphin Island. The system consists of three wells, equipment for treatment by chemical addition, a 100,000 gallon elevated storage tank, and the distribution system consisting of 6 and 8 inch water mains. Water service is managed and provided by the Dauphin Island Water and Sewer Authority. They have approximately 635 customers.

The supply wells tap fresh water aquifers which are recharged primarily by groundwater recharge occuring in the area of central Mobile County. The three wells can deliver water at a combined rate of 450 gallons per minute (gpm). The treatment of the well water includes the addition of Calgon polymer and chlorination. Over the past decade the quality of water delivered by these wells has deteriorated with increasing concentrations of chlorides.

Based on the water quality reports submitted to the State Office of Public Water Supply and site inspections, the system has met public health criteria and provided satisfactory service to date. Although water service is available throughout the Island, excluding the west beach, growth in water demand to meet increasing seasonal demands of tourist related commerce, vacationing summer residents and day visitors must be anticipated. The existing well supply experienced peak demands during the summer season of 1979 accompanied by high salt concentrations in the raw water. The water supply will ultimately be limited not by the theoretical yield of the wells, but by actual yield which will prevent salt water intrusion. Several additional test wells were drilled in 1979 which encountered high salt concentrations. The available information has not shown these test sites to offer significant potential relief for the well supply system.

The hurricane damaged the elevated storage tank on the Island, causing the tank's support to buckle. Repairs have been completed and water service is now restored. Following completion of repairs, tests were run to check for water contamination.

2.6.2 Wastewater System

The wastewater system on Dauphin Island was constructed in 1956 by the Property Owners Association and the Mobile County Chamber of Commerce. This system consists of a 250,000 gpd secondary waste treatment plant, 5 pumping stations and a collection system composed primarily of 8 inch lines with some 12 and 15 inch lines.

The existing plant was designed to serve a population equivalent of 2,500 people at a design flow of 250,000 gallons per day. The plant is a standard rate, trickling filter plant capable of performing secondary treatment. The plant is located on Chugae Point just south of where the Dauphin Island causeway bridge was. Treated effluent is discharged into Aloe Bay through a 400 foot, 15 inch outfall line (4). The wastewater system was turned over to the Dauphin Island Water and Sewer Authority (DIWSA) by the Property Owners Association in 1972. Prior to hurricane Frederic, the system served approximately 30 permanent residences and 20 commercial establishments. Although some previous customers were displaced by the storm, the capability to provide service has remained primarily unchanged.

The majority of the Island is unsewered. In 1975, there were an estimated 730 on-site disposal systems (septic tanks) on the Island. J.B. Converse, Inc. estimates that almost 500 of these systems serve seasonal residents, while the r -aining serve permanent residents, businesses and marine research establishments. In many Island areas, particularly the west end, septic tanks are built above ground because of the high water table.

In 1976, the Mobile County Board of Health placed a moratorium on the construction of new septic tank systems. A sewerage system with upgraded treatment facilities is required before this moratorium will be lifted.

Planning for long term sewerage service on the Island was undertaken in the mid 70s. The DIWSA received a grant from EPA and prepared the Dauphin Island, Alabama, Wastewater Management Facilities Plan (J.B. Converse, Inc.).

The Facilities Plan evaluated several alternative wastewater system schemes. The alternative finally selected required upgrading and expanding the existing treatment facilities, and major construction of new interceptors and collection sewers. The plan was approved locally, and at the federal level. The EPA determined that costs of design and construction for certain portions of the plan could be supported by a federal grant. The remainder of the costs would be subsidized by assessments and other revenues available to the Water and Sewerage Authority. The design phase was completed and construction phase activities were ready to bid around January, 1979. However, some legal actions were taken which halted bids. Then hurricane Frederic struck. The legal suit, however, has still not been settled. The case pending is expected to be heard in August, 1980.

2.7 Existing Supply of Recreation Facilities

Recreation facilities on the Island include parks, campgrounds, a golf and country club, marinas or boat docking areas, beaches, a nature or bird sanctuary, and open spaces. Four park areas are located on the east end of the Island (east of Pirates Cove Street). These are Penalver, Bienville, Jefferies and Cadillac Square Parks. A total of over 450 acres are in park and beach lands. Only Jefferies Park (5.1 acres) is owned by the Property Owners Association. The remainder are owned and operated by the Park and Beach Board.

One of the major recreational attributes of the Island is its beaches. Beach frontage is divided among a variety of owners. A total of approximately 1.5 miles along the Gulf shoreline is owned by the Dauphin Island Park and Beach Board. However, only about half a mile is available for the general public. The uninhabitated portion of western Dauphin Island was leased by the County from a private concern for about 10 years. However, when the lease

expired in 1978, the owners put the land up for sale for a r ported $3.5 million dollars. This area has approximately eight miles of shoreline. The U.S. Air Force Defense Control Station has about 0.6 miles of shoreline, 0.2 on Mobile Bay and 0.4 on the Gulf of Mexico. The U.S. Shellfish Laboratory on Dauphin Island Bay has a few hundred feet of shoreline. The Marine Environmental Science Consortium has approximately 500 feet of shoreline.

2.8 Existing Management of Public Use Facilities

Three groups are responsible for the management of the public use facilities on the Island. These are the Park and Beach Board, the Property Owners Association and the Dauphin Island Water and Sewer Authority.

The Park and Beach Board is a division of Mobile County government and is funded from property tax revenues, federal grants and user fees. The Board was formed in 1953 under Chapter 18 of Title 12 of the Alabama Code of 1940 by the Board of Revenue and Road Commissioners of Mobile County. The Board consists of three members, nominated by the Mobile County Board of Commissioners to the Governor of Alabama. Upon his approval, these members serve a term of six years, staggered as necessary. The Board is charged with various duties of handling all public properties on the Island, including (along with the Property Owners Association) the dredging of channels and installation of concrete seawalls so that low lying properties can be recovered from marsh and flooded areas and sold. Upon construction of these, the two agencies were to get back not only the money it had used to fund a project, but also would share in the sale of the new lots. In the original trust indenture, the Dauphin Island Park and Beach Board was to receive thirty percent (30%) and the Property Owners Association seventy percent (70%) from the sale of each lot. However, since the Property Owners Association no longer has the control of the water system, it is unknown if this perc ntage was reduced.

The Property Owners Association was also established in the original trust indenture for Dauphin Island (1953). The Dauphin Island Property Owners Association is a non-profit Alabama Corporation originally established to provide and maintain a water system for Island property, to construct and maintain a public golf course and to develop and maintain parks, beaches and other community and recreational facilities and services for the use of owners of residential lots, members of their families and their guests. Current dues for members are ten dollars ($10) annually. (6)

The Dauphin Island Water and Sewer Authority was created in late 1972 by the Mobile County Commission at the request of the Dauphin Island Property Owners Association. Its purpose was to upgrade water and sewer service to Island residents. However, since Dauphin Island is unincorporated and has no legal standing, special State legislation had to be passed to enable the creation of the authority and to give it the powers to own, operate and finance water and sewer improvements on the Island. Since that time a rate structure and improvements plan have been implemented. Bonds for major system improvements were to be sold shortly before the hurricane.

3.0. NEED FOR PUBLIC FACILITIES

- Projected Recreation Demand and Facilities Needed
- Water System Needs
- Wastewater System Needs

The need for public facilites is generated by the expected total population, its social characteristics and the economy. This chapter first looks at the projected recreation demand to be created by the projected population and the need for facilities or areas to meet this demand. Finally, the chapter presents the proposed water and wastewater systems required to meet the projected population.

3.1 Projected Recreation Demand and Facilities Needed

The projection of recreation demand and the further calculation of facilities or areas needed as a result of demand is an imprecise science. Little data are routinely and accurately collected. However, through the use of experience statewide and nationwide, a general level of demand and need may be projected. Demand is based on population projections and participation rates for various recreational activities. In this section three levels of demand are presented; gross annual demand, prime season weekday demand, and prime season peaking or weekend demand. The gross annual demand and average daily demand assumes that nearly all participation in a given activity takes place during a specific recreation year rather than throughout the calendar year. The annual participation rates by activity is multiplied by projected population growth to develop gross annual recreation demand by selected activity. Rates of participation were assumed to remain constant throughout the planning period. Rates of participation by activity are shown in the Appendix. (1,5)

Table 5 shows the gross annual demand by activities common to Dauphin Island. The greatest number of participants in any activity are swimmers, coming to Dauphin Island's beaches. This activity is followed by sightseers and then picnickers. Camping will generate the least number of participants, although in the year 2000, 1100 campers can be expected on an average day with an annual total of 390,800 people.

When people go on a vacation, an outing or an overnight trip, usually during a given day they participate in more than one recreational activity. Therefore, Table 5 does not add to the total number of expected visitors but reflects the wide variety of activities in any given year or day in which the visitors may participate.

TABLE 5
GROSS ANNUAL AND AVERAGE DAILY DEMAND

In Thousands (000's)

	1980		1985		1990		1995		2000	
Activity	Gross Annual	Average Daily	Gross Annual	Average Daily	Gross Annual	Average Daily	Gross Annual	Average Daily	Gross Annual	Average Daily
Bicycling	40.3	.1	48.2	.1	56.0	.2	64.6	.2	73.1	.2
Boating	84.4	.2	100.9	.3	117.2	.3	135.2	.4	153.1	.4
Camping--tent/ trailer*	214.1	.6	257.5	.7	299.5	.8	345.2	.9	390.8	1.1
Fishing- saltwater	366.0	1.8	437.6	2.2	509.0	2.6	586.7	2.9	664.2	3.3
Nature Walking	289.0	1.5	345.6	1.7	402.0	2.0	463.3	2.3	524.5	2.6
Picnicking	456.9	2.3	546.3	2.7	635.4	3.2	732.3	3.7	829.1	4.1
Sailing	16.4	.04	19.6	.05	22.7	.06	26.2	.07	29.7	.08
Sightseeing designated	155.2	.8	185.6	.9	215.9	1.1	248.8	1.2	281.8	1.4
Sightseeing-- scenic drive	531.4	2.7	635.3	3.2	739.0	3.7	851.7	4.2	964.2	4.8
Special Attractions	323.1	1.6	386.3	1.9	449.3	2.3	517.9	2.6	586.3	2.9
Swimming-- Saltwater	652.5	3.3	780.2	3.9	907.5	4.5	1045.9	5.2	1184.1	5.9
Visiting historical site	218.4	1.1	261.1	1.3	303.7	1.5	350.0	1.7	396.2	2.0

* Based only on the number of expected visitors to the Island. Seasonal and permanent residents were excluded because camping is defined to occur at least during an overnight stay.

Experience has shown that if recreational facilities or areas were designed to meet the gross annual or average daily demand, they would not be adequate, particularly during the times or seasons in which the facilities are most used. This time for Dauphin Island is the summer (June 1 - August 31) and is called the prime season. Prime season participation assumes that a given percentage of the annual demand for an activity occurs during the prime season. Length of season by activity and the percent of distribution by activity for the prime season are shown in the Appendix. Therefore, to calculate the prime season, total annual demand is multiplied by the percentage of demand occurring in the prime season and dividing this number by the number of days in the prime season (92 days). (5)

Table 6 shows the weekday prime season demand from 1980 -2000 by selected activity. In general, activities are expected to increase approximately 80 percent from existing usage. On an weekday during the summer 2,500 people are expected to be camping, 900 people saltwater fishing and over 12,000 people swimming on the beaches.

While these numbers show a tremendous increase in participation, they are not reflective of the number of people anticipated on a given weekend during the summers. To determine the prime season peak demand or prime season weekend demand, the prime season weekday demand must be multipled by 2. These figures are also shown in Table 6. The factor of 2 is based on experience nationwide and in Alabama means approximately twice as many people visit a facility on a weekend. Therefore, a recreation area, operating at weekend capacity, will realize two percent of prime season visitation during a normal weekend day. (1,5)

TABLE 6
WEEKDAY AND WEEKEND PRIME SEASON DEMAND

	Peaking Demand (000's)									
	1980		1985		1990		1995		2000	
Activity	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
Bicycling	.2	.4	.3	.6	.3	.6	.4	.8	.5	1.0
Boating	.6	1.2	.7	1.4	.8	1.6	.9	1.8	1.0	2.0
Camping--tent/ trailer	1.4	2.8	1.7	3.4	1.9	3.8	2.3	4.6	2.5	5.0
Fishing- saltwater	.5	1.0	.6	1.2	.7	1.4	.8	1.6	.9	1.8
Nature Walking	1.6	3.2	1.9	3.8	2.2	4.4	2.5	5.0	2.8	5.6
Picnicking	3.5	7.0	4.2	8.4	4.8	9.6	5.6	11.2	6.3	12.6
Sailing	.1	.2	.1	.2	.1	.2	.2	.4	.2	.4
Sightseeing designated	1.0	2.0	1.2	2.4	1.4	2.8	1.6	3.2	1.8	3.6
Sightseeing-- scenic drive	3.5	7.0	4.1	8.2	4.8	9.6	5.6	11.2	6.3	12.6
Special Attractions	1.8	3.6	2.1	4.2	2.4	4.8	2.8	5.6	3.2	6.4
Swimming-- Saltwater	6.7	13.4	8.1	16.2	9.4	18.8	10.8	21.6	12.2	24.4
Visiting historical site	1.2	2.4	1.4	2.8	1.7	3.4	1.9	3.8	2.2	4.4

* Based only on the number of expected visitors to the Island. Seasonal and permanent residents were excluded because camping is defined to occur at least during an overnight stay.

Using Table 6, the demand was expressed in areas or facilities required (Table 7). These were based on recreation standards found in the Appendix. (10)

TABLE 7
AREAS OR FACILITIES REQUIRED TO MEET
PRIME SEASON DEMAND, 1980 - 2000

Activity		1980	1985	1990	1995	2000
Bicycling		8 miles	12 miles	12 miles	16 miles	20 miles
Boating:	ramps	12	14	16	18	20
	parking	60	70	80	90	100
Camping tent*:	sites	120	140	160	190	210
	acres	9	10	11	14	15
trailer*:	sites	230	280	320	380	410
	acres	29	35	40	48	50
Nature Walking		25 miles	30 miles	35 miles	40 miles	45 miles
Picnicking*:	tables	310	370	450	500	570
	acres	30	40	45	50	60
Saltwater Swimming		1.2 miles	1.5 miles	1.8 miles	2.0 miles	2.3 miles

* Based on peak weekday demand
** Based on annual visitation

3.2 Water System Needs

Three wells supply public water for Dauphin Island. Based on a 16-hour per day pumping rate, these are capable of producing approximately 400,000 gallons of water per day. (4)

The projected number of water customers are shown in Table 8 below.

TABLE 8

PROJECTED WATER CUSTOMERS

1974-2000

	1974	1975	1980	1985	1990	1995	2000
Permanent Residences	200	212	272	332	392	452	512
Seasonal Residences	495	518	633	748	863	978	1093
Permanent Commercial	20	20	20	23	26	31	38
Seasonal Commercial	65	65	70	75	78	81	84
Total	780	815	995	1178	1359	1542	1727

Source: Dauphin Island, Alabama, Wastewater Management Facilities Plan

Using these figures and assuming an average daily water consumption rate, the average daily and maximum daily demands have been calculated. These are presented in Table 9.

TABLE 9

PRIME SEASON WATER DEMAND & NEEDS

(in 1,000 gallons per day)

	1975	1980	1985	1990	1995	2000
Average Daily Demand	302	357	413	469	524	580
Maximum Daily Demand (1.5 x average)	453	535	620	704	784	870
Water Needs:						
Average Daily	0	0	13	69	124	180
Maximum Daily	53	135	220	304	384	470

Source: Wastewater Management Facilities Plan

While these figures represent prime season (summer) demand for those living on the Island, they do not add any factor of demand for the thousands of daily visitors. However, even using only the prime season residents, the present well system is inadequate and appropriate measures are required to meet water demands and to solve the high chloride content found in some of these wells.

3.3 Wastewater System Needs

The Dauphin Island Wastewater Management Facilities Plan prepared in 1975 is still viewed as the best plan for facilities' development. In the aftermath of hurricane Frederic, the ability to finance local costs for these projects is of greater concern, perhaps, given the urgency to finance other redevelopment projects.

The 1975 plan selected "consists of approximately 14 miles of various size gravity sewer lines, 10 pumping stations, 3 miles of force mains, and approximately 500 manholes. Both the gravity sewers and force mains will be constructed in existing or proposed streets and rights-of-ways and are designed to provide service to the expected Island population." The expected 2000 population, including permanent and seasonal residents and commercial establishments, is 1727 customers or 5,110 people. Projected wastewater flows for the year 2000 are estimated to be 242,000 gpd in the winter, 371,000 gpd during the transitional season and 467,000 gpd in the summer. The expected average daily wastewater flow is 375,000 gpd and the estimated peak flow is 1,218,000 gpd during the summer.

The existing treatment facility will be extensively upgraded. Information was not available for this study on the impact the hurricane had on the treatment facility.

In summary, the existing wastewater treatment plant is outdated (24 years) and needs substantial improvements. The existing collection system also needs to be renovated. Excessive infiltration/inflow is evident throughout the system. In addition, expansion of the system into areas where development is occurring is important because of the high water table and extensive problems experienced with septic tanks. (4)

4.0. ANALYSIS OF ALTERNATIVES

- Public Use Areas
- Water System
- Wastewater System

4.1 Public Use Areas

Public use area alternatives were examined from two perspectives. These were location and cost. In looking at existing and potential locations of public use area sites, a number of factors including available acreage, proximity to users, transportation access and proximity to existing and planned utility systems were evaluated. Alternative or unit cost estimates were also prepared for a marina, campground, public beach, and picnic area. These were used in developing a recommended plan.

Existing public use sites were considered for more than one use. In general, public use areas have been allowed to deteriorate and become an eyesore, the Park and Beach Board is understaffed, areas are scattered making operations and maintenance more difficult, garbage collection is inadequate, and dune buggies are uncontrolled and severely damaging the beach and dune system throughout the Island. In addition parking, particularly during prime season weekends and holidays, is inadequate.

Tables 10, 11, 12 and 13 show estimated capital and operating costs for various types of recreation facilities located on the Island. These are based on incremental development and can be utilized as preliminary estimates for needed facilities times the number of units needed.

4.2 Water System

The long term plans for an adequate Island water system must include 1) an adequate raw water supply, 2) storage capacity to meet average as well as seasonal demands, and 3) distribution with adequate pressure and flow.

Several alternatives have been proposed for supplying the raw water to the system. Additional wells on the Island are readily considered, expanding the well supply system currently used. Potable water can be piped to the Island from the mainland. This requires connection to an existing mainland system or the development of new well supplies there. At present this is unfeasible since existing systems on the mainland are also experiencing problems. The other alternative is to construct desalinization facilities to treat brackish water.

Developing additional fresh water wells on Dauphin Island would be the most desirable solution as a matter of economics considered on a dollar per gallon basis. The limitation on the alternative appears at this time to be the ability to locate wells with sufficient yield to meet the demand, and the historical deterioration of the water quality resulting from salt water intrusion. Additional wells on the Island are considered as viable alternatives only for the short ter .

Desalinization facilities are a feasible alternative for water supply. Dauphin Island is presently being considered by the Department of Interior for a solar operated desalinization plant. The Department would construct and operate the plant for 5 years as a demonstration project and then turn over the plant to the Water and Sewer Authority. However, final site selection has not been made and the Island is one of a number of the sites being considered.

If unsuccessful in securing the demonstration plant, the Water and Sewer Authority may still wish to consider constructing and operating a desalinization plant of its own. If a mechanical system were constructed rather than a solar project, the total construction costs are estimated to be $850,000. One of the disadvantages of the solar system is that extensive acreage would be required. In either system, the disposal of residue would have to be considered.

TABLE 10

ESTIMATED COST SUMMARY
BOAT MARINA
(4 Launch Ramps, 100 Pleasure or Party Boats)

Item	Quantity	Total Cost Dollars
A. CAPITAL COSTS		
Concrete Launch Ramp (12' X 30')	4	$20,000
Castwalk		
Main Walk (8' Wide)	2,400 L.F.	63,000
Slip Walks (4' Wide)	5,000 L.F.	65,600
Anchor Piles (Every 6')	750	30,000
Launch Ramp Walks (4' Wide)	400 L.F.	5,300
Channel Markers		1,000
Trash Receptacles		1,800
Parking Spaces, including trailers	150	34,000
Gas Tank and Pump		3,500
Office/Concession/Restroom	1	40,000
Sitework		10,000
Sewer Line	1/8 mi.	13,200
Water Line	1/8 mi.	6,500
Electrical Service and Lighting		24,000
Road Access	1/8 mi.	20,000
Shop Equipment		1,000
Signs, Markers		2,000
Subtotal		$340,900
Contingency (25%)		85,225
Subtotal		$426,125
Acquisition of Land (10 acres X $8,000/acre)		80,000
TOTAL CAPITAL COSTS		$506,125
B. ESTIMATED ANNUAL OPERATING COST		
Direct Cost		
Personnel		
Manager (3/4 of total time)	1	16,000
Maintenance	1	10,000
Security Guard	1	10,000
Office Attendent	1	11,500
Subtotal		47,500
Operating Supplies and Service		
Concession, Restroom Supplies		2,000
Office Supplies		1,000
Equipment Replacement		1,000
Motor Fuel and Supplies		2,000
Electricity		1,000
Water		800
Sewer		800
Subtotal		8,600
Payroll Overhead (30% of Payroll)		14,300
Fixed Cost		
20 Year Capital Recovery Payment (9%)		
With Acquisition		55,400
Without Acquisition		46,700
TOTAL ESTIMATED ANNUAL OPERATING COSTS		
With Acquisition		125,800
Without Acquisition		117,100

TABLE 11
ESTIMATED COST SUMMARY
PER 200-SITE CAMPGROUND
(Eastend, Little Dauphin, etc.)

Item	Quantity	Total Costs, Dollars: Tent (50 sites)	Total Costs, Dollars: Trailer (150 sites)
A. CAPITAL COSTS			
Roads			
Main Access	1/4 mi.	$ 20,000	$ 60,000
Circulation	1 mi.	20,000	60,000
Camping Unit			
Pad	256 sq.ft.	21,000	63,000
Picnic Tables	200	12,500	37,500
Fire Rings	200	5,000	15,000
Parking	200	11,300	33,700
Trash Cans	100	3,700	11,300
Electrical Hookup	100	12,500	37,500
Water Faucets, Support Line to Street	100	5,000	15,000
Dumpsters	2	400	1,200
Sewage Collection	75	NONE	10,000
Water Supply and Distribution		15,700	37,000
Comfort Station	4	50,000	150,000
Sewage Trt. Dump Sta	1	NONE	5,000
Registration Building	1	11,300	11,500
Site Work		10,000	10,000
Trails, Walkways, Bikepaths		5,000	5,000
Signs, Markers		3,500	6,500
Lights and Distribution		12,500	37,900
Subtotal		$219,500	$607,100
Contingency (25%)		54,900	151,800
Subtotal		$274,400	$758,900
Acquisition of Land (35 acres X $8,000 per acre)		70,000	210,000
TOTAL CAPITAL COSTS		$344,400	$968,900
B. ESTIMATED ANNUAL OPERATING COSTS			
Direct Costs			
Personnel (Year Round)	1		
Superintendent*		$ 1,600	$ 4,900
Laborers, Clean-up Crew*	2	2,100	6,400
Subtotal		$ 3,700	$ 11,300
Personnel (Seasonal)			
Registration Attendant	1	1,000	3,000
Laborers	4	3,000	9,100
Subtotal		4,000	12,100
Operating Supplies and Equipment			
Comfort Station	4	2,500	7,500
Maintenance Supplies		3,000	3,000
Pickup Truck*	2	2,000	8,000
Handtools Equipment and Parts*		500	1,500
Motor Fuel and Supplies*		1,500	4,000
Miscellaneous		500	500
Electricity		5,000	15,000
Water		2,500	5,000
Sewer		NONE	5,000
Payroll Overhead (30% of Payroll)		2,300	5,700
Land and Equipment Maintenance		2,000	2,000
Subtotal		21,300	57,200
FIXED COSTS:			
20 Year Capital Recovery Payment			
With Acquisition of Land		37,700	106,100
Without Acquisition of Land		30,100	83,200
TOTAL ESTIMATED ANNUAL OPERATING COSTS			
With Acquisition		66,700	175,700
Without Acquisition		59,100	163,800

* 1/2 of Total Allocated to Campground

TABLE 12
ESTIMATED COST SUMMARY
OUTDOOR BEACH AREA
(Bienville, West End, Other Areas)

Item	Quantity	Total Cost, Dollars
A. CAPITAL COSTS		
Road (west end)--hard surface, including 4 hard surface parking bays for 24 cars on each side, one every 1/4 mile.	1 mi.	$150,000
Road (east end)--hard surface from Bienville Blvd. between MESC and Ft. Gaines to beach, including parking for 50 cars.	1500 ft.	45,000
Extend water & sewer to east and west end	6,780 L.F.	200,000
Extend electricity to east and west end	6,780	136,000
Construct comfort stations with dressing rooms, restrooms and concession facilities with package sewage treatment plants--2 west end, 1 east end	3	150,000
Site Work		20,000
Beach equipment:		
Lifeguard station	6	7,500
Picnic Tables	90	45,000
Boat launch ramps with car park area and boat dock facilities (west end)	2	50,000
Construct pedestrian walkways bikepaths	4,100 l.f.	28,700
Subtotal		$832,200
Contingency (25%)		208,000
Subtotal		$1,040,200
Acquisition of beach	8 mi.	$2,957,000
TOTAL ESTIMATED CAPITAL COSTS		$3,997,200
B. ESTIMATED ANNUAL OPERATING COSTS		
Direct Cost		
Personnel		
Manager (1/4 of total hours)	1	$ 6,300
Lifeguards (summer only)	6	19,900
Maintenance (year round)	2	20,000
Comfort Station Attendants (summer only)	3	8,300
Subtotal		54,500
Operating Supplies		
Comfort Station		3,000
Maintenance Supplies		1,000
Equipment		1,000
Utilities		5,000
Payroll Overhead (30% of payroll)		16,350
Subtotal (Operating, Equipment, Utilities, Overhead)		26,350
Fixed Cost:		
20-year Capital Recovery Payment (9%)		437,700
TOTAL ESTIMATED ANNUAL OPERATING COSTS		$ 518,550

TABLE 13

ESTIMATED COST SUMMARY
PICNIC AREAS

Item	Quantity 50-Unit	Quantity 400-Unit	Total Cost, Dollars 50-Unit	Total Cost, Dollars 400-Unit
A. CAPITAL COSTS				
Road				
Main Access	1/8 mi.	1/8 mi.	$ 19,800	$ 19,800
Circulation	1/4 mi.	1 mi.	39,600	158,400
Parking	25	200	5,600	45,000
Picnic Unit				
Table	50	400	25,000	200,000
Fireplace	50	400	5,000	40,000
Trash Receptacle	50	400	7,500	60,000
Dumpster	1	2	1,600	3,200
Water Supply & distribution			21,400	76,400
Comfort Station	1	2	50,000	100,000
Sewage Treatment			2,500	10,000
Picnic Shelter	2	6	40,000	120,000
Pickup Truct	1/2	1	5,000	10,000
Bikepaths, Walkways	3/4 mi.	2 mi.	30,000	80,000
Sitework			3,000	10,000
Signs, Markers			1,000	3,000
Lights and Distribution			13,000	37,700
Subtotal			$270,000	$973,500
Contingency (25%)			67,500	243,500
Subtotal			$337,500	$1,217,000
Acquisition of Land	7 ac.	50 ac.	56,000	400,000
TOTAL CAPITAL COST			$393,500	$1,617,000
B. ESTIMATED ANNUAL OPERATING COSTS				
Direct Cost				
Personnel (Year Round)				
Superintendent*			$ 10,000	$ 10,000
Laborers, Clean-up Crew	1	2	10,000	20,000
Subtotal			20,000	30,000
Personnel (Seasonal)				
Laborers, Clean-up Crew	1	4	3,500	14,100
Subtotal			3,500	14,100
Operating Supplies and Services				
Motor Fuel and Supplies			1,000	3,000
Comfort Station Supplies			2,000	5,000
Equipment and Parts			1,000	3,000
Electricity			500	1,200
Water			2,000	5,000
Sewer			2,000	5,000
Land and Equipment Maintenance			500	1,500
Subtotal			9,000	23,700
Payroll Overhead (30% of Payroll)			700	13,200
Fixed Cost				
20-year Capital Recovery Payment (9%)				
With Acquisition			43,100	177,200
Without Acquisition			37,000	133,300
TOTAL ESTIMATED ANNUAL OPERATING COST				
With Acquisition			76,300	258,200
Without Acquisition			70,200	214,300

* 1/2 of Total Time Allocated

Seasonal activities substantially multiply the water demand otherwise expected from permanent residential and commercial customers. Additional storage will be required to handle the peak summer demands. Storage required may be maintained as ground storage with pumps for system distribution, or elevated for gravity distribution. The costs of ground storage and system repumping must be compared to the cost of an elevated tank structurally designed for severe weather conditions; i.e. hurricane force wind loads.

The existing distribution system utilizes 8 inch water mains as the largest system pipe. Because water main size governs the pressure loss under a given flow condition, it is possible to state that the existing system cannot meet the demanding conditions of fire flow. The configuration of Dauphin Island requires a long water main from the well supplied to the western end of the Island. Therefore, the future system will require the construction of relief mains along the east-west service corridor in order to insure adequate service to property owners.

The capital cost summary for water supply alternatives is presented in Table 14. Development of new fresh water wells on Dauphin Island is clearly the most economical, assuming such wells can be found. The desalinization plant represents the most cost effective long term solution for providing potable water. There are various processes which can be used for desalinization, including various distillation techniques, freezing processes, electrodialysis and reverse osmosis. Because these processes are equipment intensive and frequently modular, staged construction can be accomodated to coincide with increasing demand.

The construction of a ground storage reservoir is the most cost effective alternative for providing storage, as shown in Table 14. The reservoir can be located adjacent to the existing elevated storage and will be designed for a 100,000 gallon capacity to satisfy the requirements for service over the next 20 years.

4.3 Wastewater System

The 1975 plan prepared by J.B. Converse is still viewed as the best plan for facilities' development. This was discussed in detail in Section 3.3. The collection system proposed, however, was designed to serve the entire Island. As a consequence of federal regulations, only a portion of these were eligible for construction grants. The areas served by the existing system, grant eligible sewers, and non grant eligible sewers proposed are shown in Figure 4. The western end of Dauphin Island, which has public use potential, and Little Dauphin Island would remain unsewered.

Because of the hurricane, the pending legal suit and severe financial constraints, sewerage service to the entire Island may not be wise. Rather, an alternative phased approach may be more logical. Under this approach, emphasis would be placed on those lines EPA grant eligible and areas in which there are residences. Other areas would be provided service as development occurs, density increases and assessments justify the extension of lines. However, as a long term goal, the entire Island should be served with sewer.

Table 15 shows the total estimated construction costs for the proposed wastewater treatment system.

TABLE 14
WATER SUPPLY SYSTEM COST ESTIMATES

ALTERNATIVE AND ITEMS	ESTIMATED COST
A. Supply Facilities	
Alternative 1 - Fresh water wells:	
Well drilling, casing, etc.	$ 15,000.
Mechanical equipment - pumps, chemical feed	24,000.
Electrical systems	14,000.
Pump house	19,000.
Misc. piping	4,000.
Subtotal	76,000.
Contingency	11,000.
Engin., Admin	5,000.
Land	5,000.
TOTAL	$ 97,000.
Alternative 2 - Mechanical desalinization plant:	
Mechanical equipment	$575,000.
Appurtenances	100,000.
Subtotal	$575,000.
Contingency	101,000.
Eng., Admin	68,000.
Land	5,000.
TOTAL	$849,000.
B. Distribution System	
Relief mains:	
23,700 L.F. of 12 inch main	$441,000.
11,800 L.F. of 10 inch main	172,000.
Misc. valves, etc	70,000.
Subtotal	$683,000.
Contingency	102,000.
Engin., Admin	68,000.
TOTAL	$853,000.
C. Storage Facilities	
Alternative 1 - 100,000 gallon elevated tank:	
Tank, erected	$150,000.
Foundation, piles, etc	14,000.
Sitework	19,000.
Subtotal	183,000.
Contingency	27,000.
Engin., Admin	18,000.
TOTAL	$228,000.
Alternative 2 - 100,000 gallon ground storage reservoir and repump station:	
Steel Fabricated tank, erected	$ 30,000.
Foundation	10,000.
Sitework	18,000.
Pump house	24,000.
Mechanical equipment	3,000.
Subtotal	85,000.
Contingency	13,000.
Engin., Admin	9,000.
TOTAL	$107,000.

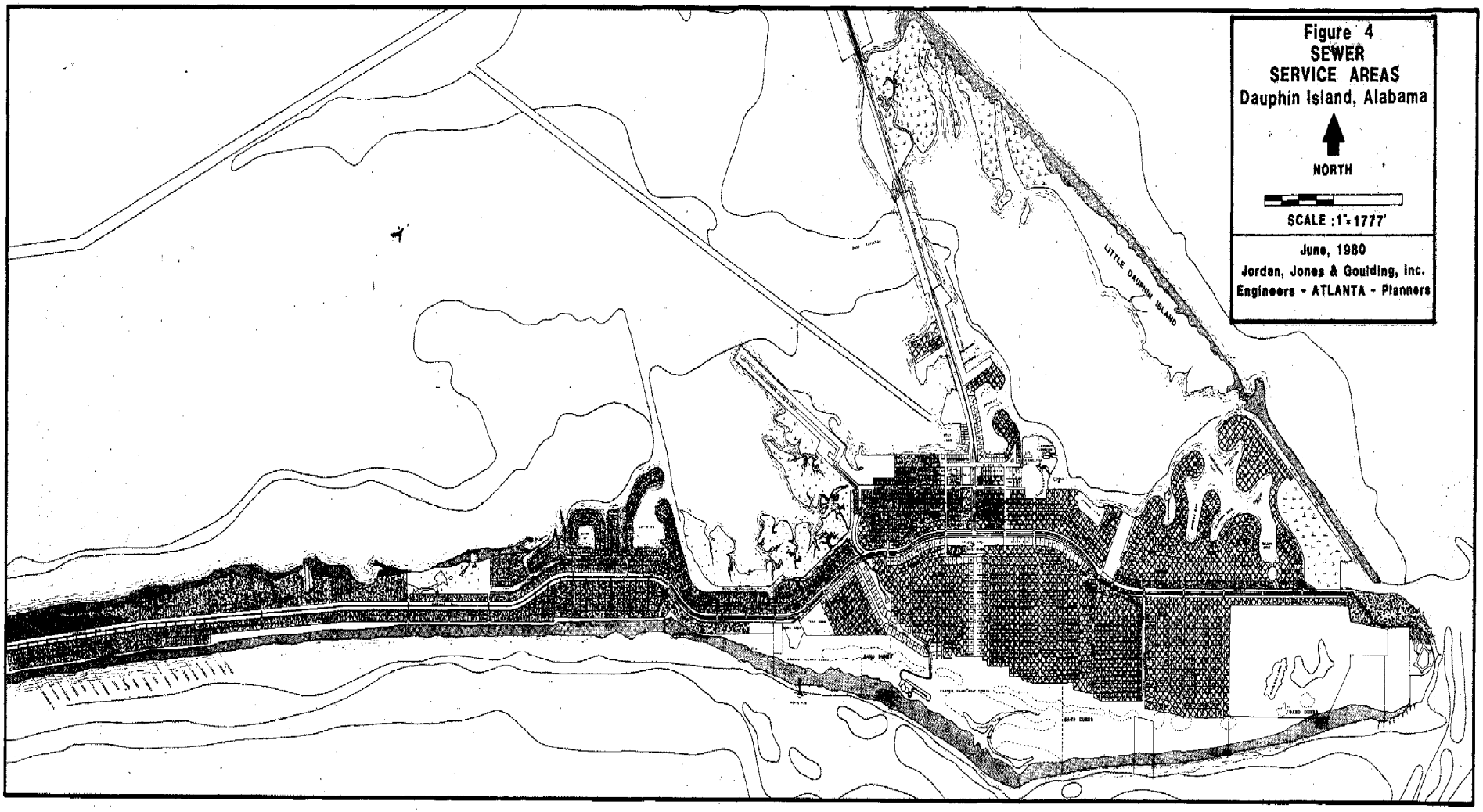


Figure 4
SEWER SERVICE AREAS
Dauphin Island, Alabama

June, 1980
Jordan, Jones & Goulding, Inc.
Engineers - ATLANTA - Planners

EPA ELIGIBLE SEWER AREA
EPA INELIGIBLE SEWER AREA
EXISTING SERVICE AREA

The preparation of this document was financed in part through a federal grant from the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration Zone Management Act of 1972; administered by the Alabama Coastal Area Board.

TABLE 15
WASTEWATER SYSTEM COST ESTIMATE*

	Bid	Eligible	Grant	Local Share
WPCP J&P Const. Co.	$ 854,632	$ 854,632	$ 640,974	$ 213,658
Interceptor Paul M. Howard Outfalls Lateral P.S.	6,891,455	3,367,325	2,525,494	4,365,961
Tech Services	398,390	232,298	174,224	224,166
Legal	268,391	0	0	268,391
Administrative	10,000	10,000	7,500	2,500
Interest during Const.	610,050	0	0	610,050
Contingencies	210,000	210,000	157,500	52,500
TOTAL	$9,242,918	$4,674,255	$3,505,692	$5,737,226

* Based on bids received in 1979.

Source: Environmental Protection Agency.

5.0. RECOMMENDED DEVELOPMENT PLAN FOR DAUPHIN ISLAND

- Goals and Objectives
- Public Use Area Development
- Water Supply System
- Wastewater System

5.1 Goals and Objectives

To plan and take positive actions in a logical and systematic way requires that goals and objectives be established and adopted by those in charge of implementation. Therefore, the goals and objectives provided in this section are comprehensive and focus on the orderly development of Dauphin Island. They are divided into five major areas: land development, public use areas, utility systems, revenues and administration.

5.1.1 Land Development

All lands on the Island are owned by private individuals or corporations, the State of Alabama, the federal government, Mobile County (Park and Beach Board), or the Dauphin Island Property Owners Association. While the Island has been subdivided into over 2,500 parcels of land, only a small portion of the Island has been developed. With development of all subdivided parcels, an estimated 10,000 people would live or have seasonal residences on the Island. Goals and objectives for land development are:

Goal: To control land development on the Island with proper land use and building codes which protect environmentally sensitive areas, provide for the health and safety of those on the Island, and establish a pleasing living environment.

Objective: To review and determine the adequacy of existing deed restrictions and available means of enforcing these.

Objective: To examine the adequacy of water and sewerage systems and their impact on land development.

Objective: To review and develop an administrative structure for controlling and enforcing development restrictions on the Island.

5.1.2 Public Use Areas

Public, in the case of Dauphin Island, means two different things: 1) the general public and 2) property owners. Each have separate public use areas. Therefore goals and objectives are divided to respond to each.

Goal: Public use areas reserved for Island property owners shall be developed, operated and maintained by the property owners at no cost to the general public.

Objective: To provide those recreational services and facilities which meet the needs of the property owners.

Objective: To recover the cost of capital, operating and maintenance costs of recreational facilities provided through the use of membership or user fees, assessments on property or other methods of financing available to the Property Owners' Association.

Goal: To develop, operate and maintain public use areas to serve visitors to Dauphin Island.

Objective: To provide camping, boating, fishing and other recreational facilities for visitors to the Island.

Objective: To operate and maintain these facilities with funds from user fees, tax revenues and other methods of financing.

Objective: To expand the beach areas available to visitors within areas that are not environmentally sensitive.

Objective: To provide adequate rules, regulations and enforcement to protect beaches and recreational facilities from abuse and destruction.

5.1.3 Utility Systems

The existing sewage system serves only a small portion of the Island. Before the hurricane, septic tanks were used to provide sewage treatment. A moratorium is now in effect on all construction requiring a septic tank.

The water system is facing salt water intrusion into existing wells. Storage and system capacity cannot now meet fire flow requirements during the peak season.

Other utility systems are adequate and are provided by privately owned systems. The Water and Sewer Authority is presently fighting a legal battle to upgrade and expand the sewage system.

Goal: To provide adequate and reliable water and sewer service to permanent and seasonal residents and visitors to the Island.

Objective: To expand the sewage system to all property on the Island.

Objective: To establish a rate structure which will cover the Island's portion of the costs for capital, operating and maintenance costs for the sewage system.

Objective: To determine needed improvements to the water system to meet fire flow requirements and peak flow demands.

Objective: To establish a rate structure to cover capital, operating and maintenance costs for the water system.

Objective: To ensure that administration of the water and sewer system is adequate, efficient, and effective.

5.1.4 Revenues

Adequate revenues are mandatory to provide, operate and maintain essential public services on the Island. At present revenues generated do not meet the requirements for needed services.

Goals: To use all available resources and legal methods of financing to provide essential public services on the Island.

Objective: To fully explore outside sources of revenue to provide essential public services.

Objective: To develop a comprehensive funding program to provide revenues for essential public services.

Objective: To explore the establishment of user fees and other methods of paying for public use area development and operation

5.1.5 Administration

Dauphin Island is separate and distinct from the remainder of Mobile County. Its needs and requirements are different. At present there is no central authority which controls development or administers public services on the Island.

Goal: To provide for the efficient and effective management of the public services on Dauphin Island at a reasonable cost.

Objective: To explore incorporation as a means of consolidating authority and control over public services.

Objective: To explore the possibility of the County having a stronger leadership responsibility in Island functions.

Objective: To explore forming an authority with control over all public construction, operation and maintenance activities on the Island.

5.2 Public Use Area Development

The recommended plan for public use area development consists of a discussion of each of the facilities to be expanded or developed, the recommended actions or steps to be taken, estimated costs (capital and operating), recommended user fees and estimated annual revenues. The administrative structure and methods of financing available are outlined in the next chapter.

5.2.1 Camping

In the year 2000 on a prime season weekday, over 600 camp sites on 65 or more acres of land will be needed to accomodate the projected participants. These numbers double on a prime season weekend or holiday. The recommended plan suggests that public camping continue to be confined to the eastern end of the Island. Private camping will be limited to Little Dauphin Island and other scattered small sites.

Recommended Actions -- The following are recommended actions to meet existing and projected camping demands:

- establish a policy that public campgrounds shall be developed to meet one-half of the total estimated demand for a prime season weekend, with the remainder to be provided by the private sector.

- establish a 65 acre site to be utilized for camping. Ensure that adequate beach frontage is included. To establish this site requires careful coordination and negotiations with the Audubon Society.
- develop a phased plan for construction of camp sites, including all facilities, walking trails, and utilities required with detailed cost estimates and funding sources.
- secure capital costs for construction.
- develop and adopt a user fee structure.
- construct the first phase of development to include 250 camp sites, of which 100 are for tents and 150 are for recreational vehicles.

Estimated Costs -- The total estimated capital costs for the 250 camp sites, assuming no acquisition of land is $1.3 million and annual operating costs are estimated to be $143,000, assuming a 20 year capital recovery payment with interest at 9 percent.

Recommended user fees and Annual Revenues -- User fees are proposed to pay for the facilities. They are shown in Table 16 with the estimated annual revenue in 1985 assuming 32,200 camp site visits with 4 people per camp site at the public campground and an occupancy rate of 50 percent.

TABLE 16
CAMPER USER FEES AND ANNUAL REVENUE

Type of Facility	User Fee	Estimated Annual Revenue
Tents (100 sites)	$ 7.50	$ 57,750
Trailers with sewer (75 sites)	10.50	60,900
Trailers without sewer (75 sites)	8.50	49,300
		$167,950

Monies remaining at the end of any given year would be used to either make additional improvements to the campground or make payments on borrowed money.

5.2.2 Swimming

In the year 2000 on a prime season weekday, over 12,000 swimmers may be anticipated on the Island as visitors. This number will double during holidays and weekends. In 1985, given the assumptions discussed in previous chapters, over 780,000 annual swimmers are expected or a total of almost 4,000 per day.

Recommended Actions -- The following recommended actions are proposed to accomodate the anticipated swimming demand and provide the associated swimming facilities.

- establish the eastern and western ends of the Island and the Bienville beach areas as the public beach areas.
- realign the road between MESC and Ft. Gaines to provide public access and parking on the eastern end of the beach.

- upgrade the facilities at Bienville beach, including establishing adequate parking, beach access walkways, concession areas and recreation facilities.
- expand total beach frontage available to the public by purchase and limited development of the western end of Dauphin Island.
- control access to all beach areas with established parking and user fees.
- actively clean up the beaches and monitor and enforce dune buggy restrictions.
- develop a detailed plan for beach area development with detailed cost estimates, specifications and phasing.

Estimated Costs -- The total estimated capital costs for public beach area acquisition and development of associated beach facilities is approximately $4 million. Estimated annual operating costs are $520,000. User fees for the public beach area are divided into a fee for swimming and a fee for parking. In addition, the proposed fee was developed so as to be adequate to cover all Island picnic areas since no access controls are proposed for the picnic areas. Therefore, the total annual operating costs required to be covered by user fees is $820,000 per year.

Recommended User Fees and Annual Revenues -- User fees were established assuming that 80 percent of the anticipated 1985 demand would use the public beach areas. Table 17 shows the proposed user fees and annual revenues.

Table 17
SWIMMING USER FEES AND ANNUAL REVENUE

Type of Activity	User Fee	Estimated Annual Revenue
Swimming	$ 1.50/person	$ 936,000
Parking *	.50	100,000
Total		$1,036,000

* Assumes 450 parking spaces times turnover rate of 5 times 95 days.

5.2.3. Picnic Facilities

In 1985 on a prime season weekend or holiday, approximately 8,400 picnickers may be anticipated on the Island. These picnickers will require approximately 370 tables. Almost 600 tables will be required in the year 2000.

Recommended Actions -- The following are recommended actions to meet the demands of picnickers. For planning purposes, an assumption was made that 80 percent of the picnickers would use picnic facilities if available.

- expand and upgrade picnic facilities at Cadillac Square.
- establish picnic facilities at Bienville beach, on the western end of the Island and the proposed new beach area on the eastern end of the Island.
- Upgrade and construct comfort stations at Cadillac Square, Bienville Beach and west end where appropriate.

Estimated Costs -- The total estimated capital costs to provide 400 picnic tables at areas described above are $1.6 million. The total estimated annual operation cost is approximately $260,000.

Recommended User Fees and Annual Revenues -- No user fees are recommended for picnic areas. Rather, the costs of these areas will be covered in the fees established for swimming and parking. These were discussed in the previous section.

5.2.4 Marinas, Boating and Fishing

In 1985 an estimated 1,400 boaters, 1,200 fishermen and 200 sailors will be using Dauphin Island facilities on a prime season weekend. Several assumptions:

- construct a public marina to include spaces for 100 pleasure or party boats and 4 boat ramps to accomodate an estimated maximum of 160 boats per day.
- prepare a detailed study of the Billy Goat Hole area to examine the layout, detailed design, and cost estimates for a public marina.
- develop the public marina such that parking spaces for cars and trailers, a concession area, gasoline and fishing piers are provided and user access controlled.
- eliminate the median along Bienville Boulevard from Albright Drive eastward to provide parking.
- remove road access around Pelican Point and Ft. Gaines.
- Extend Bienville road southward between Ft. Gaines and MESC providing parking and beach access (costs provided as a beach facility).
- reconstruct fishing piers at Pelican Point and Bienville Beach.

Estimated Costs -- Preliminary estimates of capital costs for the marina are $510,000 exclusive of the fishing piers. These are to be reconstructed with Federal Emergency Management Agency (FEMA) monies. Total estimated annual operating costs are $125,000.

Recommended User Fees and Annual Revenues -- Table 18 shows the recommended user fees and annual revenues projected.

Table 18
MARINA, BOATING AND FISHING USER FEES & ANNUAL REVENUE

Type of Activity	User Fee	Estimated Annual Revenue
SLIPS (100)		
Monthly use (50 slips)	$25/mo.	$ 1,250
Daily use (50 slips)	5.00	53,550
RAMPS (4)	4.00	97,920
Total		152,700

In calculating annual revenue, monthly assigned slips were assumed to be 100 percent occupied; daily slips were assumed to be occupied 70 percent of the time with a turnover rate of 2 times per day; and ramps were assumed to be used for 153 days per year with a daily maximum turnover of 40.

5.2.5 Other Facilities

Other facilities include bicycle trails, nature walkways and improvements to the shell mound facilities and Ft. Gaines. These are discussed together in this section. In 1985, special attractions such as Ft. Gaines, the shell mounds and others may attract almost 3,000 visitors. By the year 2000, visitors may total over 4,000.

Recommended Actions -- The following are recommended actions for other facilities:

- an island plan should be developed for bicycle trails and nature paths.
- extensive renovations based on an approved plan should be undertaken around Ft. Gaines and the shell mounds.
- extensive discussions should be undertaken with MESC and the Audubon Society to plan for and promote development of an environmental education center emphasizing the importance of the unique marine environment around Dauphin Island and the "flyway" and species of birds spotted in the bird sanctuary.
- an educational pamphlet should be developed on all historical and scenic sites on the Island.

Estimated Costs -- The total estimated capital costs for provement to other facilities is unknown. One estimate for renovation of Ft. Gaines was over $500,000, but this has probably escalated to $750,000 after hurricane Frederic. (3) Other improvements are estimated to bring the total capital costs for other facilities to $2 million. Annual operating costs are estimated to be $200,000.

Recommended User Fees and Annual Revenues: Table 19 shows recommended user fees and annual revenues. Only Ft. Gaines was proposed to impose a user fee. All other shall be open free of charge. Total 1985 visitors to historical sites were assumed to visit Ft. Gaines.

Table 19
OTHER FACILITIES USER FEES AND ANNUAL REVENUE

Facility	Fee	Annual Revenue
Ft. Gaines*		
- individuals	$1.25	$ 98,000
- groups (25 or more)	.75	59,000
- groups (10-25)	1.00	104,500
Total		$261,500

* Groups (25 or more) were assumed to represent 30 perc nt of the total. Groups (10-25) represent 40 percent; and individuals 30 percent.

5.3 Water Supply System

The recommended plan for the Island's water system consists of improvements to the supply, distribution and storage systems. Recommendations for the supply system are to consider the engineering feasibility of constructing a desalinization plant. The Department of Interior's interest in constructing a solar desalinization plant on the Island should be carefully examined and pursued. This facility may require a large area for drying beds and land constraints may be a major factor in the final decision. However, a mechanical plant would not require as much land area. Further investigations into this type of facility should be explored.

The water distribution system requires upgrading. The recommended plan calls for the construction of 23,700 linear feet of 12 inch mains and 11,800 linear feet of 10 inch mains. These lines would run along Bienville Boulevard.

Ground storage to meet summer demands is recommended as the preferred alternative. This would be located in the Calumet area and only be utilized as needed. In future years, its need would become critical.

The total estimated capital costs for supply, distribution and storage is $1.8 million dollars. This includes a total of $849,000 for the desalinization plant, $853,000 for the relief mains, and $107,000 for the 100,000 gallon ground storage reservoir and repump station.

5.4 Wastewater System

The recommended plan is similar to the plan proposed by J. B. Converse in the Island's 201 Facilities Plan. However, because of the limited financial resources, the recommended plan suggests that only those sewers eligible for EPA funding be constructed at this time. If additional areas desire sewers and are agreeable to assessments being placed on their property, these may be constructed also. However, in undeveloped areas of the Island, extensions of sewer lines are not recommended.

To construct only those EPA eligible sewers will require a minimum of approximately $4.7 million. This is based on the bids received in January, 1979 on construction of the system. These costs will increase because of the year and a half delay and because no bridge is available to transport material and construction crews. If construction can be delayed until the bridge is rebuilt, increased costs may only reflect inflation.

Preliminary estimates indicate that the initial year of operation will cost $180,000 and this will increase 7.5 percent per year because of inflation. This recommended plan assumes that a minimum of 3 people will be required to operate both the water and sewer systems.

6.0. RECOMMENDED MANAGEMENT FRAMEWORK FOR DAUPHIN ISLAND

- **Administration, Operations and Maintenance**
- **Methods of Financing**

6.1 Administration, Operations and Maintenance

To operate the proposed recreation areas requires 12 full time persons and 18 seasonal employees. In addition, approximately 3 people will be needed to operate the water and sewer system.

At present these employees would be County employees assigned to Dauphin Island. Two preferred alternatives are proposed for administration, operations and maintenance of public services on Dauphin Island. These are either incorporation or creation of an Island Development Authority. Each is discussed below.

6.1.1. Incorporation

The idea of incorporation is not a new idea to Dauphin Island. The concept has long been discussed and voted on, only to be turned down at the polls. Incorporation, however, is not a negative concept, and particularly at this time has several positive aspects.

Hurricane Frederic severely affected Dauphin Island and actions that need to be taken for clean-up are massive. Federal emergency money has not been forthcoming. Many houses demolished in the storm are not scheduled for demolition and will likely remain for months to come. In addition, essential services required on the Island have been replaced or repaired extremely slow.

Incorporation can provide an organizational framework in which to accomplish needed actions and a source of funds to construct public improvements. In addition, incorporation can provide the necessary funds for adequate operations and maintenance.

This report emphasizes the utilization of user fees to pay for operation and maintenance of public recreational use areas. However, so much is needed to make the Island a safe and attractive place in which to live. Adequate garbage collection, street paving, maintenance of road rights-of-ways and enforcement of existing laws (e.g. dune buggy ordinance) are just a few services needed. Dauphin Island residents cannot be expected to be given preferential treatment over the remainder of Mobile County. However, if residents truly prefer and desire additional services, perhaps the best solution is incorporation. Numerous stories are related as to why incorporation has failed each time it has been considered. These arguments must be put aside and considerations given as to what is for the good of the Island, its residents and its visitors.

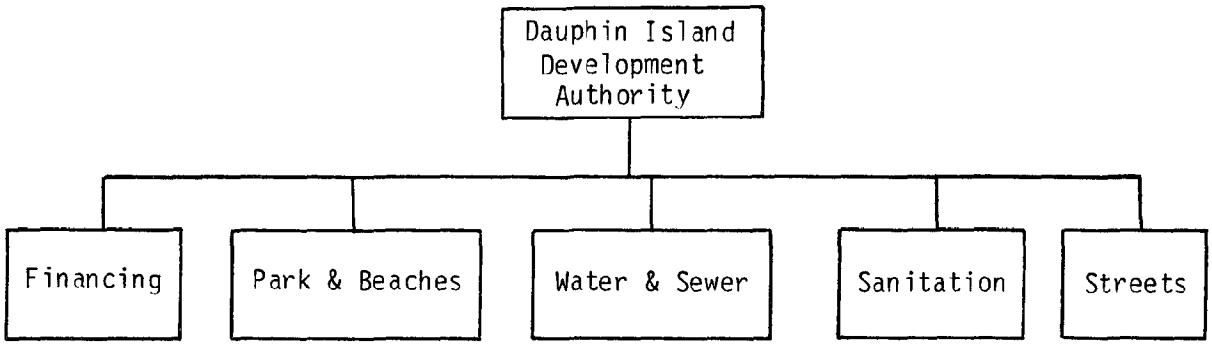
6.1.2. Dauphin Island Development Authority

The present approach to management of any new Island facilities is to develop an authority or board given certain powers and duties for each major Island facility. The result is confusing, an administrative nightmare, and ends with no one taking responsibility when "gray" areas arise.

The formation of the Dauphin Island Development Authority could solve these problems, although an authority would lack the taxing advantage offered by the incorporation alternative. Formation of an authority would consist of assembling five to seven people on a board with the power to establish policy and rates for all public services to be provided on the Island. An executive secretary would be hired to carry out day-to-day operations and the executive secretary would hire adequate staff to operate and maintain all public facilities and services.

The Authority should be established under the laws of the State of Alabama. Rates, user fees and other financing arrangements would be established by the Authority board and administered by the executive secretary. While this option does not have many of the advantages of incorporation, it is probably the most feasible and easiest to implement.

The executive secretary, at the direction of the board, would establish an organizational structure for his staff. This may be structured as below with at least one board member assigned to each area.



This report emphasizes that the formation of a separate authority to administer just the public use areas is unwise. Rather, all public services should be consolidated under one administrative organization.

6.2 Methods of Financing

The total estimated capital costs for the improvements outlined herein is approximately $12 million. Of this total and assuming only eligible sewers are constructed, $4.1 million is for water and s w r improvements. Estimated annual operating costs for public recreational areas with a payback in 20 years and assuming bonds at an interest rate of 9 perc nt are $1.3 million. The user fees established for public recreation areas are projected to generate $1.6 million annually. The largest expenditure of funds is to purchase and develop the west end of the Island at an estimated acquisition cost of almost $3 million.

A combination of methods of financing are recommended to develop the recreation areas. These include bonds, grants from the state, grants from federal agencies, and user fees.

The recommended strategy for financing involves the following actions:

- work with the state legislature and federal agencies (e.g. the National Parks Service, Fish and Wildlife and Bureau of Outdoor Recreation) to encourage the purchase of the western end and provide some development funds.
- develop a bond package for water, sewer and recreation improvements.
- establish and implement user fees for Island recreation areas.
- if incorporation is adopted, adopt a tax rate to cover additional expenses that may incur (staffing, maintenance, etc.)
- establish the feasibility of creating a toll on the new bridge to be

constructed. If possible, use this toll to cover a portion of the total costs of public services.

Obtaining the capital costs to develop the recreational areas and needed water and sewer systems is the most difficult. A bond issue is probably the best alternative. The bond market has been rapidly changing within the last six months. While bonds were considered six months ago to be an unwise investment, the market is changing rapidly and their attractiveness is increasing. One of the most serious problems the Island will face in the selling of bonds is that the Water and Sewer Authority has no historical record for the sale of bonds and therefore its rating by bonding companies is expected to be low. This would also be true of a new authority or if incorporation were adopted.

No one method of financing should be relied on to secure the capital funds required. Rather all avenues should be explored and pursued. The Department of Interior's consideration of the Island as the location of an experimental solar desalinization plant should be actively pursued. Congressman should be contacted and interest shown. The Environmental Protection Agency (EPA), HUD, Farmers Home, Economic Development Administration, Bureau of Outdoor Recreation, Fish and Wildlife and a number of other sources are available to the Island as potential funding agents. All should be actively pursued. Those communities who are well off financially today are those who have used a well planned, coordinated and balanced program of local, state and federal funds. The emphasis, however, is not to lean solely on any one source.

REFERENCES

Within the text of the report, references are noted by the number of the reference below.

(1) Adams, Robert L., Robert C. Lewis and Bruce H. Drake. Outdoor Recreation, A Legacy for America, Appendix "A", An Economic Analysis. U.S. Department of the Interior, Bureau of Outdoor Recreation, December, 1973.

(2) Alabama Coastal Area Board. The Alabama Coastal Area Management Program, A Balanced Approach to Economic Development and Natural Resources (Hearing Draft), January, 1979.

(3) Hunter, Albert B. A Proposal for the Restoration of Fort Gaines.

(4) J. B. Converse, Inc. Dauphin Island, Alabama, Wastewater Management Facilities Plan.

(5) Kentucky Department of Parks. Comprehensive Outdoor Recreation Plan for the Commonwealth of Kentucky - 1972, 1973.

(6) McNeely, S. Blake (narrator). The Development of Dauphin Island, Alabama. The Mobile Chamber of Commerce, 1974.

(7) South Alabama Regional Planning Commission. Acquisition and Development Strategy for the West End of Dauphin Island, 1980.

(8) South Alabama Regional Planning Commission, Recreation Development Plan for Dauphin Island, Alabama, October, 1971.

(9) U.S. Army Corps of Engineers, Mobile District, Mobile, Alabama, Final Environmental Statement, Permit Application by Mobil Oil Corporation, Installation of An Inland Drilling Barge for Oil Exploration, Mobile Bay, Alabama, November, 1975.

(10) U.S. Department of the Interior, Bureau of Outdoor Recreation. Outdoor Recreation Space Standards, April, 1967.

Other references reviewed as a part of preparing this report, include the following:

Agricultural Experiment Station, Auburn University, Alabama Outdoor Recreation Plan Executive Summary, 1971.

Bryant, Ted. "Dauphin Island - 'Gem' or just coastal rip-off". The Birmingham Post-Herald, Volume 133, No. 328, March 26, 1980.

Bryant, Ted. "Dauphin Island Undeveloped Area for Sale". The Birmingham Post-Herald, Vol. 133, No. 327, March 27, 1980.

Chermock, R.L. The Environment of Offshore and Estuarine Alabama, Geological Survey of Alabama, Information Series 51, 1974.

Clark, John R. with Stephen Gilbert, Bruce Maclain, Robb Turner and Langdon Warner. Review of Major Barrier Islands of the United States. The Barrier Islands Workshop, July, 1977.

Department of Agricultural Economics and Rural Sociology, Auburn University. Alabama's Statewide Comprehensive Outdoor Recreation Plan, Vol. 13, Alabama's Coastal Land and Water Resources, September, 1971.

Department of the Interior, Heritage Conservation and Recreation Service (in conjunction with National Parks Service, Fish and Wildlife Service, Office of Coastal Zone Management, and Council on Environmental Quality. Alternative Policies for Protecting Barrier Islands Along the Atlantic and Gulf Coasts of the United States, December, 1971.

Spaulding, Irving A. Factors Influencing Willingness to Pay for Use of Marine Recreational Facilities: Sand Beach. University of Rhode Island, Marine Technical Report 51, 1974.

Spaulding, Irving A. Factors Related to Beach Use. University of Rhode Island, Marine Technical Paper Series, Number 13, Kingston, 1973.

APPENDIX

TABLE A

PARTICIPATION RATES FOR
VARIOUS RECREATIONAL ACTIVITIES

ACTIVITY	PERCENT PARTICIPATION RATE
Bicycling	3.2*
Boating	6.7*
Camping -- Tent/Trailer	17.1
Fishing -- Saltwater	29.0
Nature Walking	22.9
Picnicking	36.2
Sailing	1.3*
Sightseeing -- designated	12.3
Sightseeing -- scenic drive	42.1
Special Attractions	25.6
Swimming -- Saltwater	51.7
Visiting Historical Sites	17.3

NOTE: These figures are for Mobile, Baldwin and Escambia Counties. Dauphin Island was assumed to have the same rates of participation.
* Based on national participation rates - no state data available.

Source: Alabama Statewide Comprehensive Outdoor Recreation Plan, Vol. 21.

TABLE B

LENGTH OF SEASON BY ACTIVITY

Activity	Season			Season Length (days)
Swimming	Memorial Day	-	Labor Day	95
Outdoor Games*	April 1	-	October 31	214
Fishing	February 1	-	November 28	300
Picnicking	May 1	-	September 30	153
Boating	May 1	-	September 30	153
Bicycling	April 1	-	October 31	214
Nature Walks	Mid-April	-	Mid-October	184
Camping	May 1	-	September 30 and 8 weekend days in April and October	169
Sailing	May 1	-	September 30	153
Sightseeing	January 1	-	December 31	365

* Includes baseball, playground activities, and playfield activities.

Source: Based on experience in various areas throughout the Country and related to Dauphin Island. (1, 5)

TABLE C

PERCENT OF DISTRIBUTION BY ACTIVITY FOR PRIME SEASON *

Activity	Prime *	Other **
Swimming	95	5
Outdoor Games[1]	60	40
Fishing	40	60
Picnicking	70	30
Boating	60	40
Bicycling	57	43
Nature Walks	50	50
Camping	60	40
Sailing	60	40
Sightseeing	60	40

* Prime season is summer (June - August).

** Total for other than prime season.

[1]Includes baseball, playground activities, and playfield activities.

TABLE D

RECREATION STANDARDS

Activity		Standard
Bicycling		3 bikes per party, turnover rate of 50 per mile of trail.
Boating:	Ramps	1 ramp per 40,000 annual recreational visitors. Each ramp to serve 40 boats on a season's peak day. Parking spaces for 60 autos with trailers to be provided for every 4 ramps with turnover rate of 3. Each boat has average of 2.5 people.
	Marinas	Minimum acreage is 25 acres. Average party of 3 persons. Forty slips can accommodate 120 persons. Provide 1 parking space for every 2 boat slips.
Camping:	Tent	3,000 sq. ft. per unit. A unit includes tent space, vehicle parking space and use area for cooking, eating, wood, storage, trash disposal, etc. Fourteen (14) units per acre. Camp sites average 4 persons each. Dimension of tent space is 16 X 16 ft.
	Trailer	Average party of 4 persons, 8 parties per acre. Approximately 5,500 sq. ft. per unit. Each unit includes a prepared fire pits. Associated restroom facilities and store available.
Nature Trails		4 people per party, turnover rate of 30 per mile of trail.
Historic Sites		45 people at any one time, daily turnover rate of 16.
Picnicking		10 to 15 tables per acre. Four (4) persons per table. Expected turnover rate of twice daily. One picnic table for each 4,000 annual visitors, or each 10 to 15 daily picnickers. For every 4 tables provide trash receptacle. Water faucets to be provided for every 10 tables.
Beach		2 linear feet of shoreline per user. Thirty percent of swimmers in water at one time. Since most of the time there are more people on the beach sunning than in the water, beach area per user should average 50 to 100 sq.ft. Associated facilities should include bath-change facilities for each swimming area that attracts 50 or more; peak-day turnover of 5 per day and 4 people per car.

NOAA COASTAL SERVICES CTR LIBRARY
3 6668 14110923 3