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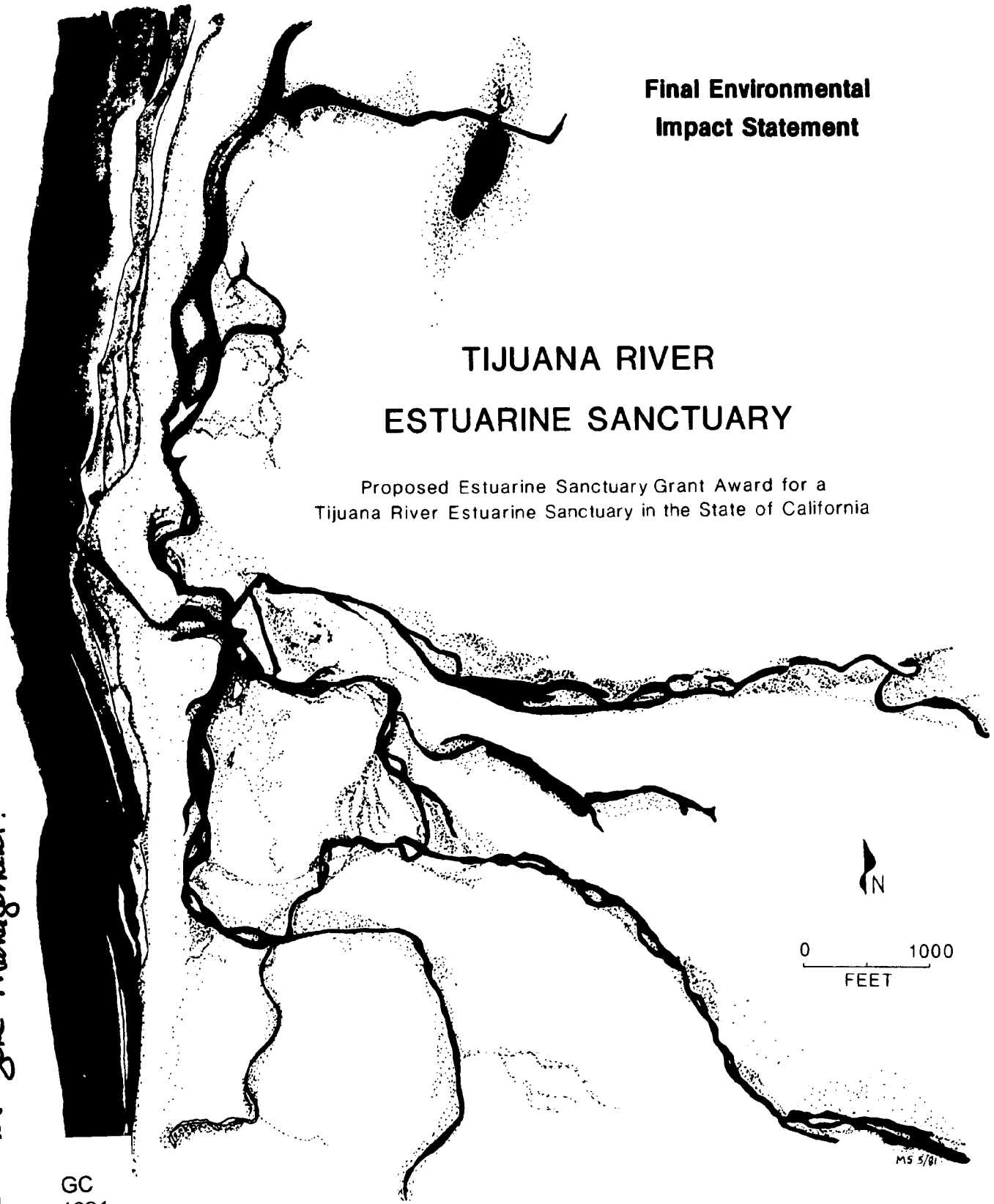
Final Environmental Impact Statement

TIJUANA RIVER ESTUARINE SANCTUARY

Proposed Estuarine Sanctuary Grant Award for a
Tijuana River Estuarine Sanctuary in the State of California



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DEPARTMENT OF COMMERCE

FINAL ENVIRONMENTAL IMPACT STATEMENT

PROPOSED ESTUARINE SANCTUARY GRANT AWARD TO THE STATE OF CALIFORNIA FOR A TIJUANA RIVER NATIONAL ESTUARINE SANCTUARY

AUGUST 1981

Prepared by:

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Clapper Rail

Great Egret

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DESIGNATION: Final Environmental Impact Statement

TITLE: Proposed Estuarine Sanctuary Grant Award to the State of California for a Tijuana River National Estuarine Sanctuary

ABSTRACT: The State of California has submitted an application for a grant from the U.S. Department of Commerce, National Oceanic and Atmospheric Administration/Office of Coastal Zone Management (NOAA/OCZM) to establish an estuarine sanctuary in the Tijuana River, adjacent to the California-Mexican border. The proposed sanctuary when complete, will represent a major subcategory within the southern part of the Californian biogeographic region. The site is a tidally-flushed area with a network of channels, mudflats, mudbanks and salt marshes that reflect the physical system and biota for system-wide research and educational purposes. The total estuarine sanctuary area is approximately 2,531 acres, including existing public lands (State Park & U. S. Fish & Wildlife Service, U. S. Navy, and the City of San Diego) and private lands that will be acquired.

Approval of this grant application would permit the establishment of an estuarine sanctuary representing the Californian biogeographic region. The proposed sanctuary would be used primarily for research and educational purposes, especially to provide information useful for coastal zone management decisionmaking. Multiple use would be encouraged to the extent that they are compatible with the proposed sanctuary's research and educational programs.

Research and monitoring in and near the proposed sanctuary would provide baseline information against which the impacts of human activities elsewhere on the California coast and can be assessed.

APPLICANT: California Coastal Commission

LEAD AGENCY: U.S. Department of Commerce
National Oceanic and Atmospheric Administration
Office of Coastal Zone Management

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SUMMARY

BACKGROUND

In response to the intense pressures upon and conflicts within the coastal zone of the United States, Congress enacted the Coastal Zone Managaement Act (CZMA) of 1972 (PL 92-583), with amendments enacted by the U.S. Congress in 1976 and 1980. The Act authorized a new Federal program--administered by the National Oceanic and Atmospheric Administration (NOAA) within the Department of Commerce--to assist and encourage States to develop and implement comprehensive management programs for the resources of the coastal zone. The CZMA affirms a national interest in the coastal zone's effective management, beneficial use, and development, and it permits the awarding of grants for the purpose of meeting these ends.

Section 315 of the CZMA established the Estuarine Sanctuary Program, which, on a matching basis, provides grants to States to acquire, develop, and operate estuarine areas to be set aside as natural field laboratories. These areas will be used primarily for long term scientific and educational purposes, which, in addition to other multiple-use benefits, will provide information essential to coastal management decisionmaking. Examples of estuarine sanctuary purposes are:

- To gain a more thorough understanding of ecological relationships within the estuarine environment;
- To make baseline ecological measurements;
- To serve as a natural control in order to monitor changes and to assess the impacts of human stresses on the ecosystem;
- To provide a vehicle for increasing public knowledge and awareness of the complex nature of estuarine ecosystems, their values and benefits to humans and nature, and the problems confronting them; and
- To encourage multiple use of the estuarine sanctuaries to the extent that such usage is compatible with the primary sanctuary purposes of research and education.

In order to ensure that the Estuarine Sanctuary Program adequately represents regional and ecological differences, the programmatic guidelines establish a biogeographical classification scheme that reflects geographic, hydrographic, and biological characteristics. Sub-categories of this basic system are developed and utilized as appropriate to distinguish different subclasses of each category.

The Estuarine Sanctuary Program guidelines, first published in 1974, and amended in 1977, authorize three kinds of 50 percent matching grants: (1) an optional, initial planning grant for the purpose of developing a land acquisition grant application which includes cost for surveying, appraising, and assessing the lands to be acquired, developing a management

plan and research, and education programs etc.; (2) grants for acquisition of the real property within the sanctuary boundaries and construction of facilities; and (3) operational grants for managing and operating the established sanctuary and to implement research and educational programs.

The California Coastal Commission (CCC), on behalf of the State of California, submitted a grant application to the National Oceanic and Atmospheric Administration's Office of Coastal Zone Management (NOAA/OCZM) for funding assistance to gather information directed toward preparing a formal land acquisition grant application and establishing an estuarine sanctuary in the Tijuana River Estuary.

NOAA awarded a pre-acquisition grant of $50,000 to CCC, matched by an equivalent amount from the State, on April 15, 1981. This grant enabled CCC to proceed with development of information for a formal grant application which, if approved, would provide 50 percent matching funds for the acquisition of lands and for constructing interpretive/education facilities for the sanctuary. Should the proposed sanctuary be established, California will also be eligible for annual grants of up to $50,000 for sanctuary management and operations for a period of 5 years.

PROPOSED ACTION

The proposed sanctuary is located on the coast of California approximately 12 miles south of San Diego adjacent to the California-Mexican international border.

The State of California, through the California Coastal Commission, proposes to request a $1.03 million grant from NOAA/OCZM to be matched by $1.03 million in State funds provided by the California Coastal Conservancy for the fee simple and less than fee acquisition of approximately 885 acres of private real property in the Tijuana River Estuary in Southern California. The proposed 2,531-acre National Estuarine Sanctuary will also contain 1,646 acres of public real property presently held by Federal, State, and local government agencies.

The composition of real property within the proposed sanctuary will be as follows:

Property	Size in Acres
Existing public	1,426
Portion of Imperial Beach Naval Air Station	220
Private	885
Total acres	2,531

In establishing this sanctuary site, the California Coastal Conservancy has determined that as a matter of policy it will not exercise its power of eminent domain (condemnation) to acquire any of the land, but will rely only on negotiated sales with willing sellers. The State would consider acquiring either fee simple title or less than fee interests such as conservation easements, or life estates in privately owned lands, etc. Less than fee simple acquisitions are preferred if they are cost effective and provide appropriate protection of the sanctuary resource. The California Coastal Conservancy will be the State agency responsible for land acquisition.

Multiple use of the sanctuary (i.e., the simultaneous utilization of an area or resource for a variety of compatible purposes or to provide more than one benefit) will be encouraged as long as such use is compatible with National Estuarine Sanctuary Program objectives. These uses may include low intensity recreation, fishing, and wildlife observation.

MANAGEMENT

The proposed sanctuary will be managed by the California Department of Parks and Recreation as the lead agency with a three tier management structure, which will include a Sanctuary Management Authority, a Sanctuary Advisory Committee, and 3 sanctuary subcommittees; Agriculture, Water Quality, and Research and Education. Membership composition of the management committee will include representation from the private sector, governmental agencies of the U.S. and Mexico, real property owners and interested and qualified citizens. The management program will be consistent with subsection (e)(2) of the Coastal Zone Management Act, 16 USC 1456.

Since existing State and Federal statutes and regulations appear fully adequate to address any potential problems resulting from uses within the sanctuary and in adjacent waters and lands, establishment of the sanctuary will not result in the need for new or additional environmental regulations, creation of a new State agency, or a new division within existing state agencies.

ENVIRONMENTAL CONSEQUENCES

The most direct environmental consequence of the proposed action will be the long-term preservation of the area and its resources in their natural state for scientific and educational uses. The sanctuary will enable increased research and education to take place which will enhance the knowledge and understanding of estuarine systems in California and, therefore, will provide information for improved coastal zone resource decisionmaking.

Positive environmental impacts will include:

- preservation of essential wetland habitats that have national significance and are in limited supply;

- fish and wildlife habitat preservation, including the maintenance and enhancement of fish breeding species that are important economically to commercial fishing;

- improved air quality from the limiting of urbanization within the sanctuary boundaries;

- water quality improvement from the limiting of urbanization;

- increased public usage through the conversion of private land, including additional controlled access points; and,

- additional scientific, research, and educational opportunities for students, educators, and scientists, which will also bring economic benefits to the region.

PART I: PURPOSE OF AND NEED FOR ACTION

In response to intense pressures on the coastal resources of the United States, Congress enacted the Coastal Zone Management Act (CZMA), which was signed into law on October 27, 1972, and amended in 1976 and 1980. The CZMA authorized a Federal grant-in-aid and assistance program to be administered by the Secretary of Commerce, who in turn delegated this responsibility to the Office of Coastal Zone Management (OCZM) in the National Oceanic and Atmospheric Administration (NOAA).

The CZMA affirms a national interest in the effective protection and development of the Nation's coastal States (including those bordering on the Atlantic and Pacific Oceans, the Gulf of Mexico, and the Great Lakes) and U.S. territories to develop and implement State coastal zone management programs. The Act established a variety of grant-in-aid programs to such States for purposes of:

- developing coastal zone management programs (§305);
- implementing and administering coastal management programs that receive Federal approval (§306);
- avoiding or minimizing adverse environmental, social, and eocnomic impacts resulting from coastal energy activities (§308);
- coordinating, studying, planning, and implementing interstate coastal management activities and programs (§309);
- conducting research, study, and training programs to provide scientific and technical support to State coastal zone management programs (§310); and
- acquiring land for estuarine sanctuaries and island preservation (§315).

Section 315 of the Act established the Estuarine Sanctuary Program to provide matching grants to States to acquire, develop, and operate natural estuarine areas as sanctuaries, so that scientists and students may be provided the opportunity to examine the ecological relationships within the areas over time. Section 315 provides a maximum of $3 million in Federal funds, to be matched by an equivalent amount from the State, to acquire and manage lands for each sanctuary. Regulations for implementation of the Estuarine Sanctuary Program were published on June 4, 1974 [15 CFR Part 921. Federal Register 39 (108): 19922-19927], and amended on September 9, 1977 [15CFR Part 921, Federal Register 42 (175): 45522-45523] (see Appendix A). Regulations are presently being prepared for the Island Preservation Program that is also included within Section 315 of the CZMA.

Estuarine sanctuaries have the dual purpose of (1) preserving relatively undisturbed areas so that a representative series of natural estuarine systems will always remain available for ecological research and education, and (2) ensuring the availability of natural areas for use as a control against which impacts of human activities in other areas can be assessed. These sanctuaries are to be used primarily for long-term scientific and educational purposes, especially to provide information useful to coastal zone management decisionmaking.

Research purposes may include:

- gaining a more complete understanding of the natural ecological relationships within the various estuarine environments of the United States;
- making baseline ecological measurements;
- serving as a natural control against which changes in other estuaries can be measured, and aiding in evaluation of the impacts of human activities on estuarine ecosystems;
- providing a vehicle for increasing public knowledge and awareness of the complex nature of estuarine systems, their benefits to people and nature, and the problems confronting these ecosystems.

While the primary purpose of estuarine sanctuaries is scientific and educational, multiple use of estuarine sanctuaries will be encouraged to the extent it is compatible with the primary sanctuary purpose. These uses may generally include such activities as low intensity recreation, fishing, and wildlife observation.

The CZMA and the estuarine sanctuary guidelines express the intent that ultimately the Estuarine Sanctuary Program will fully represent the variety of regional and ecological differences among the estuaries of the United States. The regulations state that "the purpose of the estuarine sanctuary program...shall be accomplished by the establishment of a series of estuarine sanctuaries which will be designated so that at least one representative of each estuarine ecosystem will endure into the future for scientific and educational purposes" [15CFR 921.3 (a)]. As administered by OCZM, the Estuarine Sanctuary Program defined 11 different biogeographic regions based on geographic, hydrographic, and biological characteristics. Subcategories of this basic system are established as appropriate to distinguish different subclasses of each biogeographic region.

Since 1974, NOAA has awarded grants to establish nine estuarine sanctuaries (described in Appendix A). These include:

Sanctuary	Biogeographic Classification
South Slough Coos Bay, Oregon	Columbian
Sapelo Island McIntosh County, Georgia	Carolinian
Waimanu Valley Island of Hawaii, Hawaii	Insular
Rookery Bay Collier County, Florida	West Indian
Old Woman Creek Erie County, Ohio	Great Lakes
Apalachicola River/Bay Franklin County, Florida	Louisianian
Elkhorn Slough Monterey County, California	Californian
Padilla Bay Skagit County, Washington	Columbian
Narragansett Bay Newport County, Rhode Island	Virginian

The proposed action under consideration by NOAA is a land acquisition grant application from the State of California to establish a National Estuarine Sanctuary in the Tijuana River.

The Tijuana River Estuarine Sanctuary, if established, will be representative of a major estuarine sanctuary subcategory within the southern half of the Californian biogeographic region, and the second estuarine sanctuary within this region. This addition further completes the National Estuarine Sanctuary System as provided for in Section 315 of the CZMA.

PART II: ALTERNATIVES (INCLUDING PROPOSED ACTION)

A. Preferred Alternatives

1. Proposed Boundaries

Introduction

The proposed boundaries for Tijuana River Estuarine Sanctuary include the existing public lands (Federal, State and local) and important private lands which are in, or buffer, the core wetland and critical floodplain of the Tijuana River Estuary.

The boundaries proposed below are the product of an analysis of natural resources in the area, numerous site inspections, and a statement of consensus by virtually all of the affected government and private groups with an interest in the wetland and lowland areas of the Tijuana Estuary.

The following principles guided development of the proposed boundaries:

1. Encompass the critical habitats and resource features of Tijuana River Estuary.

2. Provide an "umbrella" for existing public ownership.

3. Delineate Sanctuary boundaries in an area large enough to preclude direct threats of encroachment into critical habitat areas.

4. Encompass enough of the drainage area to make possible reasonable and consistent management of the immediate floodplain and side drainage area.

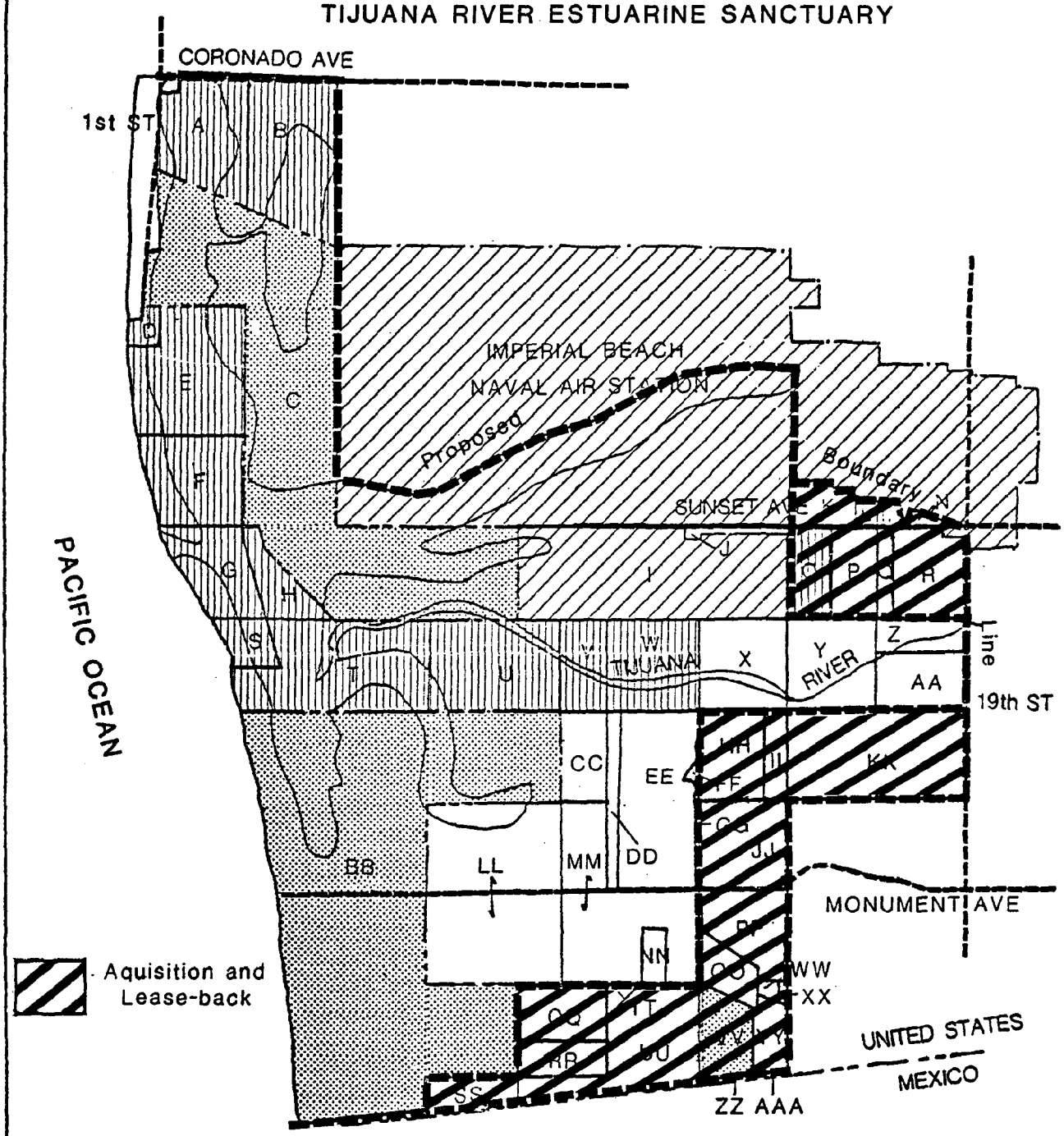
5. Design sanctuary boundaries to allow land uses compatible with the resource protection goals of the sanctuary to continue.

6. Facilitate reasonable public access and use of the site for research, education, and other compatible activities.

The proposed boundaries for the Tijuana River Estuarine Sanctuary are identified in Figure 1. The upper portion of the Sanctuary would be bounded on the west by First Street in Imperial Beach, proceed east along Coronado Avenue, south along the western border of the Imperial Beach Naval Air Station, southeast along the boundary between several private parcels and the Naval Air Station to the intersection of Sunset Avenue and 19th Street. The sanctuary boundary then proceeds about 2,700 feet west, and south past Monument Avenue to the United States-Mexico border. The border forms the southern boundary of the sanctuary. Between the international border and a point north of the mouth of the estuary, the mean high tide line forms the western boundary of the sanctuary.

Proposed Boundaries

TIJUANA RIVER ESTUARINE SANCTUARY



The letters on the map correspond to the ownership list in Appendix D.

Note : Proposed boundaries do not encompass developed land seaward of 1st St.

Estuarine Sanctuary Preaquisition Study
California Coastal Commission

SOURCE: San Diego County Assessor's Records, U.S. Navy

FIGURE 1

The boundaries encompass all of the 505 acre U. S. Fish and Wildlife Refuge, the 263 acres above the mouth of the estuary leased by the Department of Parks and Recreation from the U.S. Navy, and all of the 418.4 acre Border Field State Park. Thus the total land area held by Federal and State resource management agencies amounts to 1,186 acres. In addition, a 120-acre parcel below Sunset Avenue managed by the Navy, and a portion of Imperial Beach Naval Air Station estimated at 220 acres are proposed for inclusion, along with about 120 acres held by the City of San Diego. This brings the total public land proposed for inclusion within the sanctuary boundaries to 1,646:4 acres, more or less.

Private Land to Be Acquired

A total of 31 parcels of private land, comprising about 885 acres of private land are proposed for acquisition west of 19th Street and below the Imperial Beach Naval Air Station. Major landowners include San Diego Gas and Electric Company and its land management subsidiary, Japatul Corporation, Coronado Realty, Leonard and Ursula Horwin, the Conde Investment Corporation, General Telephone, Ross Spooner, H. G. Chaffe Company, and the H.G. Fenton Material Company.

Of the 31 parcels proposed for acquisition, seven parcels above the river and thirteen parcels below the river would be "leased back" to sellers for agricultural use and other activities compatible with the maintenance of the sanctuary. See Appendix D for description of land ownership.

2. Management Program

Introduction

As shown in Figure 2, a three-tier management structure is proposed, consisting of a Sanctuary Management Authority, a Sanctuary Advisory Committee, and 3 management sub-committees; Agriculture, Water Quality, and Research and Education.

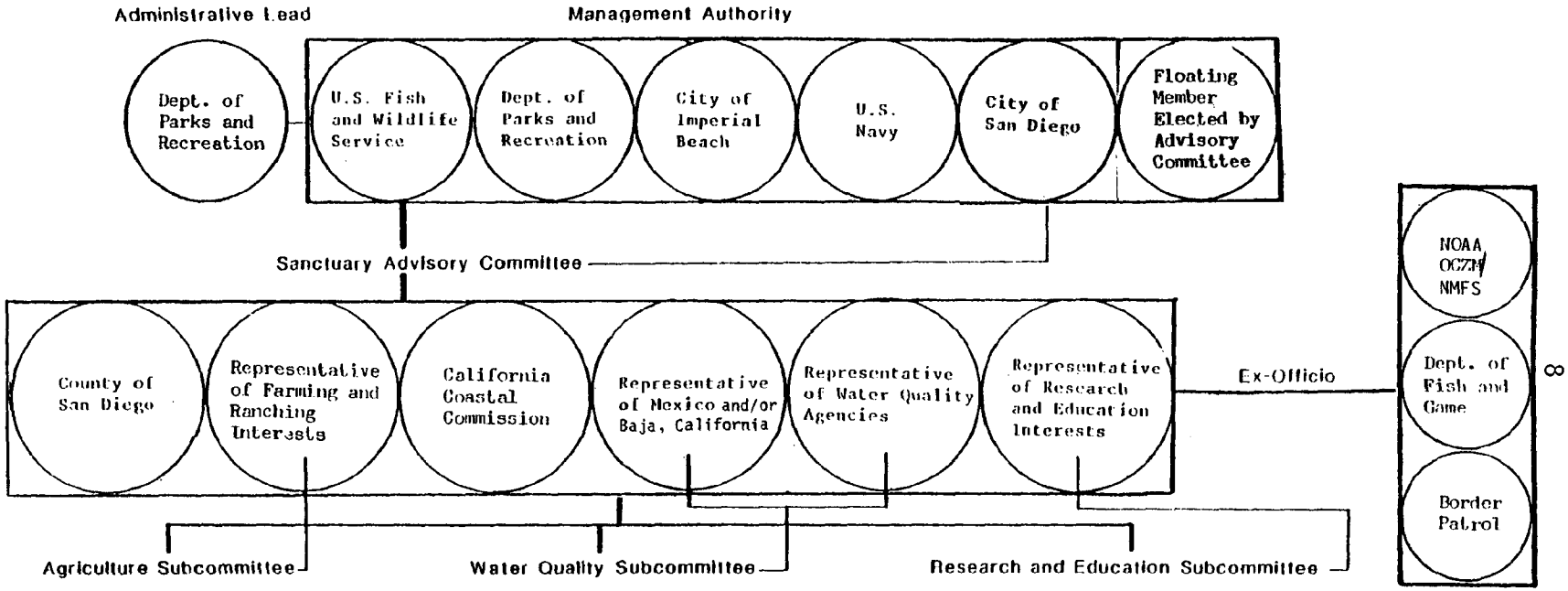
The management structure proposed below is the product of an analysis of important institutions in Tijuana Valley, a review of management programs for other Estuarine Sanctuaries, and a statement of consensus by the same government and private groups/individuals participating in developing the proposed boundary.

Several principles guided the development of the management structure:

1. Create a management authority large enough to reflect important interests and small enough to operate efficiently.

2. Organize a management structure that is capable of addressing the concerns of the local communities/constituency.

PROPOSED MANAGEMENT STRUCTURE: Tijuana River Estuarine Sanctuary



One representative each from:
- Cultivated Agriculture
- Livestock Interests
- Equestrian Interests

Soil Conservation Service
Additional members as needed

Representative of Mexico and/or Baja, California
Representative of State of California Executive Branch
Environmental Protection Agency
International Boundary and Water Commission
Regional Water Quality Control Board
Additional members as needed

One representative each from:
- San Diego State University
- Sea Grant
- Other Universities
- Endangered Species Recovery Team
- Community Colleges
- Interpretive Associations
- Secondary School Districts
- Elementary School Districts

FIGURE 2

3. Organize the management structure to include representatives of groups with vested interests in the proposed Sanctuary, especially affected landowners.

4. Create a mechanism which will involve educational and research interests in sanctuary management.

5. Organize a management authority capable of integrating its sanctuary administrative activities with other environmental planning initiatives in the region, which will include, but not be limited to, waste water treatment and protection of agricultural land.

6. Create a forum for reaching consensus on management issues.

a. Management Authority

As one of the major landowners in the Tijuana Valley, the Department of Parks and Recreation is the logical administrative lead in the development and management of the proposed Estuarine Sanctuary. Principal responsibilities as the administrative lead will include receiving funds from the Office of Coastal Zone Management, hiring and providing general guidance for the Sanctuary manager, and organizing meetings and correspondence for the Management Authority.

A six-member Management Authority, representing important vested interests in Tijuana Estuary, is proposed for the Estuarine Sanctuary. Membership will include representatives of the Department of Parks and Recreation, the U.S. Fish and Wildlife Service, the U.S. Navy, the City of Imperial Beach, the City of San Diego, and a floating position elected for one year from the Sanctuary Advisory Committee.

Method of Selection

All members of the Management Authority shall have formal training or practical experience in resource management, and preferably both. Representatives of the U.S. Fish and Wildlife Service, the U. S. Navy, and the Department of Parks and Recreation shall be appointed by the appropriate manager responsible for resource planning in the Tijuana River Area. The representatives from Imperial Beach and San Diego shall be appointed by their respective City Council at a formal public meeting. The floating member shall be elected for a one-year term by the six members of the Sanctuary Advisory Committee.

Responsibilities of the Management Authority

Sanctuary status will confer no new regulations on the Tijuana River nor affect the jurisdiction, powers, or prerogatives of the International Boundary and Water Commission, United States, and Mexico as provided under subsection (e)(2) of the Coastal Zone Management Act, 16 USC 1456. Rather, the sanctuary will be a focus for policy making, coordinating existing planning efforts, and formulating recommendations which may be implemented through existing regulatory mechanisms, such as local coastal programs and State park plans, etc. Principal responsibilities include, but are not limited to the following:

1. Receive and consider the findings and recommendations of the Sanctuary Advisory Committee and the sub-committees.

2. Formulate an overall management program for the sanctuary.

   a. Articulate management policies.

   b. Determine permitted uses for land acquired for the sanctuary.

   c. Recommend, with the participation of landowning agencies, permitted uses on public lands within the sanctuary.

   d. Recommend specific actions to implement the management policies.

   e. Carry out an ongoing evaluation of sanctuary management policies and recommend changes where appropriate.

3. Review and comment on plans and proposals for the lower Tijuana Valley and Tijuana River watershed that would impinge on the sanctuary. Make specific recommendations that will help to integrate the sanctuary and other land use and resource management planning underway in the region, including revisions in land use plans. Monitor potential impacts from sand and gravel extraction in the Border Highlands, specifically sedimentation, water table, haul roads, and protection of endangered plant species and communities.

4. Communicate the objectives of the sanctuary to other agencies, the local community, news media, and other interested parties. Maintain ongoing communication with management authorities for other estuarine sanctuaries. Make a concerted effort to establish a positive relationship between the Sanctuary Management Authority, and local community and private landowners in the surrounding area.

5. Receive and consider findings and recommendations of scientific researchers conducting work at Tijuana Estuary.

6. Identify research needs and priorities for the estuary and where possible, lend written or funding support.

7. Recommend changes or additions in the number and general responsibilities of subcommittees.

8. Propose and evaluate changes in the sanctuary boundary, with the advice of the Sanctuary Advisory Committee.

9. Provide policy guidance for the Sanctuary manager in the conduct of his or her duties including review and approval of the manager's position description.

10. Prepare a statement of progress on an annual basis.

11. Appoint members of subcommittees as described in a following section.

12. Support meetings and dissemination of information by all Estuarine and Marine Sanctuary Managers.

13. Pursue additional funds for land acquisition and management, including research and education.

14. Consider the establishment of a land trust to complement the goals of the estuarine sanctuary.

b. Sanctuary Advisory Committee

In order to provide adequate technical advice to the Management Authority, and to ensure that agency and private sector interests are represented in carrying out the purpose of the estuarine sanctuary, a Sanctuary Advisory Committee will be established.

A six-member Advisory Committee is proposed. Membership would be invited from the County of San Diego, the California Coastal Commission, a representative of agricultural interests, a representative of the governments of Mexico and/or Baja, California, a representative of the water quality agencies, and a representative of research and education interests. The California Department of Fish and Game, the Border Patrol, and NOAA will be ex-officio members on the Advisory Committee. NOAA will be represented by the National Marine Fisheries Service's Southwest Regional Office.

The Sanctuary Advisory Committee will have direct links to both the Sanctuary Management Authority and its subcommittees. One member of the Advisory Committee, elected for a year term by a majority of its members, will serve on the Management Authority. The person with expertise in ranching and agriculture will serve on, and represent, an Agriculture Subcommittee. Both the representative of Mexico and/or Baja, California, and the representative of the water quality agencies will be invited to serve on the Water Quality Subcommittee. Similarly, the spokesperson for research and education interests on the Advisory Committee will also be a member of the Research and Education Subcommittee.

Method of Selection

All members of the Sanctuary Advisory Committee should have familiarity with the resources and planning issues of the Tijuana Valley, and be qualified to speak on technical and political aspects of management proposals. The representative of the County of San Diego should be appointed by its governing body, upon the recommendation of their planning department. The Executive Director of the California Coastal Commission should designate an appropriate representative. The representative of Mexico should be chosen with the advice of the U.S. Consulate in Tijuana and existing international bodies, including the Commission of the Californias, and the International Boundary and Water Commission. The State Water Resources Control Board is the logical appointing authority for the water quality representative. A self-selection process is most appropriate for the representatives of ranching and farming interests, and research and education interests. This may take the form of an election, or more likely, a statement of consensus by the groups invited to participate in each subcommittee.

Responsibilities of the Sanctuary Advisory Committee

1. Provide technical advice in the development of the overall management program for the sanctuary.

2. Represent the viewpoints of agencies and interests of the Advisory Committee membership.

3. Summarize with assistance from the appropriate subcommittee the important issues in agriculture, water quality management and research and education for consideration by the Management Authority.

4. Meet on a regular basis to identify important management issues and provide recommendations that shall be considered for action by the Management Authority.

5. Carry out an ongoing evaluation of Sanctuary management policies and recommend changes to the management authority where appropriate.

Management Authority Subcommittees

Three subcommittees are recommended to serve important interests that will be affected by or benefit from sanctuary designation: agriculture in Tijuana Valley, water quality management, and research and education interests. Creation of these subcommittees will strengthen the sanctuary as a focus for resource management in Tijuana Valley. In addition, delegation of technical issues to the subcommittees for consideration and recommendations will enable the Management Authority and the Sanctuary Advisory Committee to function more efficiently.

Agriculture Subcommittee

The proposed subcommittee will draw from the three important uses in Tijuana Valley: cultivated agriculture, livestock interests, and equestrian interests. Nominees will be solicited from the community and the Management Authority will make the final selection. A representative of the Soil Conservation Service will also be invited to serve on the committee. Initial responsibilities include: 1) representing the interests of agriculture and ranching to the Sanctuary Advisory Committee, 2) communicating sanctuary objectives to landowners both within and outside of the sanctuary boundaries, and 3) erosion control and protection of wildlife habitats adjacent to cultivated areas.

Water Quality Subcommittee

The water quality subcommittee responsibilities include: 1) to help improve the coordination of planning already underway for the Tijuana Valley, 2) to ensure that sanctuary goals are considered in planning for flood control, groundwater management, and planning for sanitary measures, and 3) coordinate planning for wastewater treatment facilities with responsible local, State, and Federal agencies. Membership will be invited from the governments of Mexico and Baja, California, and the executive branch of the State of California. With this membership, the subcommittee would have the unique opportunity to foster international progress towards the dual goals of resource protection and water quality management. The participation of the U. S. Consulate in Tijuana, the Commission of the Californias, and the International Boundary and Water Commission will be useful in inviting the appropriate representatives of Mexico and Baja, California. The same individual will be invited to serve on the Sanctuary Advisory Committee. Agency representatives will be invited from the Environmental Protection Agency, the State Water Resources Control Board, the International Boundary and Water Commission and Metro II.

Research and Education Subcommittee

Membership of this working group will draw from researchers at San Diego State University, other universities, Sea Grant and the Endangered Species Recovery Team. Representation will also be invited from universities in Baja, California. Those members with a stronger emphasis on education will include community colleges, interpretive groups such as the Southwest Wetlands Interpretative Association, and local and secondary school districts. Nominations will be solicited from each of these groups and the Management Authority will make the final selection.

An objective of the Estuarine Sanctuary Program is to secure estuarine areas suitable as outdoor laboratories for teaching and research. Creation of a special subcommittee for research and education is the most effective way to ensure that these primary users of the estuary are included in management decisions. Such a subcommittee will also provide a forum for discussing research needs, developing proposals, and collaborating in

the development of education curricula. One of the most important tasks of this subcommittee will be to work towards implementation of the programs for research and education. The subcommittee will also be asked to direct important management issues to the attention of the Sanctuary Advisory Committee.

c. Research Policy and Program

Introduction

The ability to protect, utilize and manage complex coastal systems, and the ability to convey the importance of these systems to the general public as well as professionals, depends largely on the quality of scientific research and research results which are the basis for these efforts.

A coherent program of research related to understanding the structure and functions of undisturbed estuary systems and techniques for habitat protection, enhancement and possible restoration of degraded areas should be a high priority. Tijuana Estuary should play a central role in building this level of understanding. According to Joy Zedler of San Diego State University, an ecologist with a special interest in the Tijuana River estuary:

> "Our studies have demonstrated that the Tijuana River Estuary is significantly different from eastern systems because of its usual hypersaline conditions (being subject to low rainfall, low runoff, continuous tidal input, and high evaporation), and that it differs greaty from more disturbed wetlands in southern California. Hence it would be a good sanctuary, both from the national perspective (because it represents an arid region wetland) and from a local perspective (because it is closer to its natural condition than other southern California systems)."

History of Research Use

The research record for Tijuana Estuary spans many of the issues of contemporary interest in understanding estuarine structure and function. Since 1974, ecologists have been working to describe nutrient exchange, primary productivity, and the structure of algal and salt marsh communities in the estuary. The National Oceanic and Atmospheric Administration, through its Sea Grant Program, has been an essential funding source for this research. Students at San Diego State University have completed theses on several topics in invertebrate ecology, including the ghost shrimp, the littleneck clam, and other groups of mollusks.

Special attention has been devoted to the use of the Tijuana Estuary by the Federally-endangered Light Footed Clapper Rail. Both the U.S. Navy and the U.S. Fish and Wildlife Service have underwritten ecological research on techniques to maintain and restore the Spartina marsh crucial to the existence of this species.

Additional Sea Grant-sponsored investigations have examined the response of wetlands to disturbance, in order to provide a sound technical basis for habitat restoration. More recently, student studies have documented the role of Tijuana Estuary as a nursery for commercially and recreationally important fish, and as a wintering area for migratory shorebirds. Studies to evaluate the recovery of commercially harvestable clams and shrimp after flooding in the estuary are continuing through the sponsorship of the Department of Fish and Game. The record of publications for these research projects began in 1977 and continues to the present. See Appendix B, Table 10.

During the course of these studies, a variety of habitat types within the marsh have served as a natural field laboratory. Many of the studies have been concentrated near the mouth of the river and around the northern arm of the estuary (Figure 3) on land owned by the U.S. Fish and Wildlife Service and the U.S. Navy.

Proposed Framework for a Research Program at Tijuana Estuarine Sanctuary

1. Create a mechanism to enable research findings to be used by the Sanctuary Management Authority agencies responsible for managing resources in the lower Tijuana Valley and watershed, government agencies, and the private sector.

2. Convene workshops with scientists, members of the management authority, agency staff, and representatives of public and private foundations to present research findings and draw up agendas for future research.

3. Prepare guidelines for ensuring that research efforts will be compatible with long-term resource protection in the Tijuana Estuary. New research proposals should be subject to review consistent with the guidelines.

4. Develop interpretive facilities for the Tijuana Estuary, that include a space for storing experimental equipment, carrying out small experiments, and briefing visitors.

5. Assess the feasibility of creating a single information clearinghouse for Tijuana Estuary, to serve as a depository of all published and unpublished reports about the system.

6. Foster the development of a newsletter to communicate research findings and important management questions to other groups charged with managing estuaries and similar resource areas throughout the United States, California and Mexico.

7. Assess the feasibility of forming a non-profit foundation, with authority to apply for, accept, and disburse funds for research in Tijuana Sanctuary.

Habitat Types and Selected Research Sites

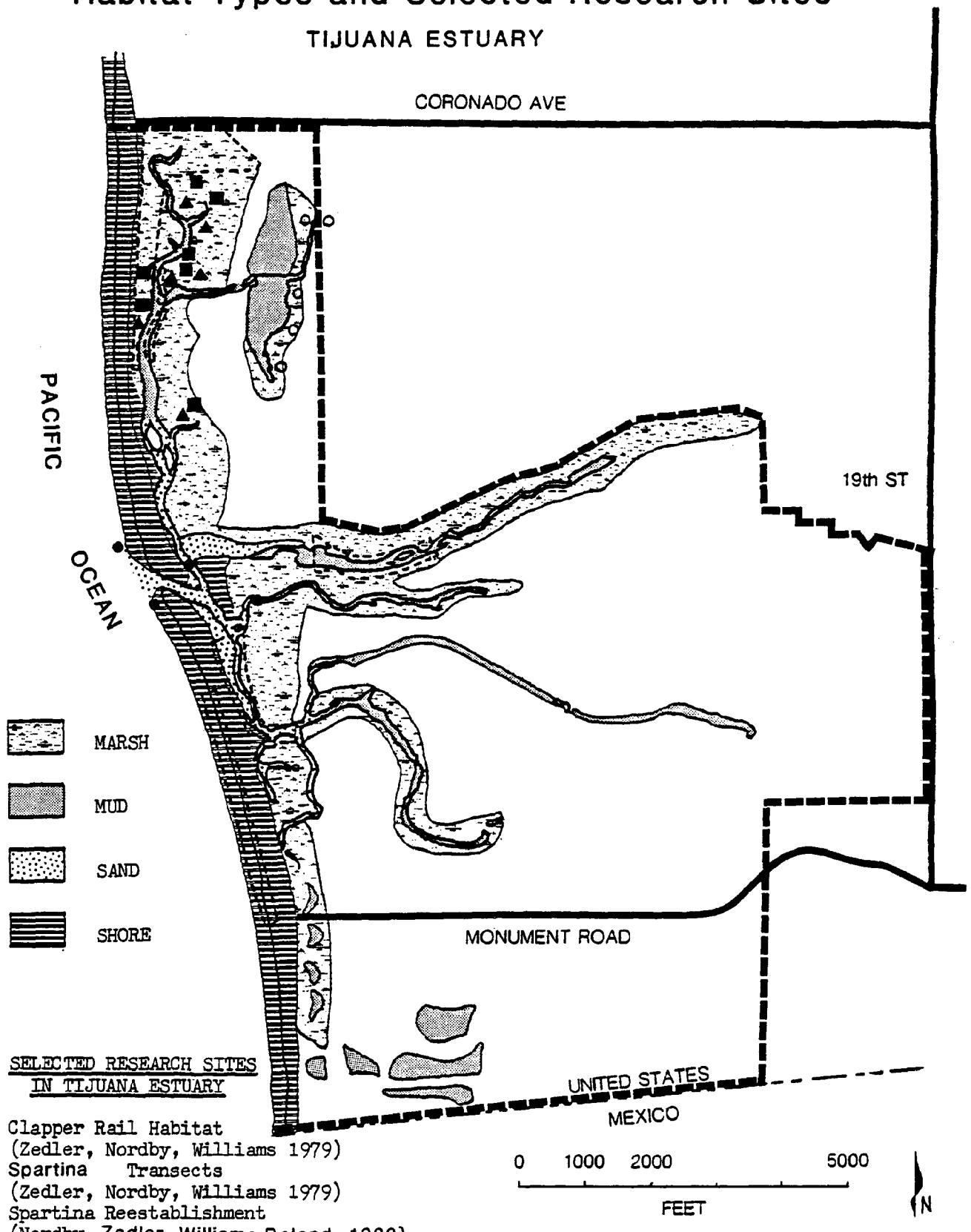


FIGURE 3

Research Objectives

Tijuana Estuary is both a representative of other California estuarine systems and a unique subject of research in its own right. For this reason, a research agenda drawn from both State and National needs and from interests of scientists familiar with Tijuana Estuary is appropriate.

State and National Research Objectives

1. Develop sound management schemes for modified estuaries to achieve the best possible ecological balance over the long term. (Source: Felix Smith, U.S. Fish and Wildlife Service. Personal communication, July 28, 1977.)

2. Characterize desirable physical conditions for wetlands, including the extent of tidal prism, nutrient flux, and water quality.

3. Develop and test methodologies for wetland restoration. (Source: E. C. Fullerton, Department of Fish and Game, personal communication, July 17, 1981.)

4. Determine expected sedimentation rates under various strategies for managing the watershed and correlate these rates with disturbance in the watershed.

5. Evaluate the compatibility of aquaculture with long-term estuarine protection and utilization.

6. Assess the tolerance of wetland wildlife to humans and domestic animals.

7. Evaluate the habitat requirements of wetland wildlife species. (Source: Bruce Browning, Department of Fish and Game, personal communication, July 28, 1977.)

Research Needs Identified Specifically for Tijuana Estuarine Sanctuary

A fundamental premise in developing a research agenda is that both long-term study of the salt marsh and examination of the entire wetland system are essential in understanding estuarine structure and function. A second concern is that special emphasis should be placed on research that will explain the relationships between land use management in the watershed and the components of the estuary. In support of the goals of the sanctuary program, studies that test the effectiveness of sanctuary status as a tool for resource management and open space preservation should also have high priority. The outline below presents specific research issues that should be addressed at Tijuana Estuary:

1. Community Structure and Primary Productivity

2. Habitat Management and Enhancement

3. Management to Maintain and Enhance Populations of Endangered Species

4. Estuary - Watershed Relationships

5. Role of Tijuana Estuary in a Larger Ecological Setting

6. Nutrient Cycling

7. Agricultural Practices that Ensure Estuarine Productivity.

8. Evaluate Alternative Strategies to Protect the Riparian Habitat East of 19th Street.

9. Evaluate Combining a Pure Ecological Research Program with an Applied Research Program.

d. Education Program

Introduction

Apart from their extraordinary value in providing habitat, contributing to fish and shellfish productivity, and creating open space buffers beyond the fringes of urban development, the educational importance of wetlands and estuaries have been widely recognized in the past decade. Beginning with its Coastal Plan, the Commission has long supported education as a principal use: "Natural habitat areas that are fragile shall be used only for those activities that are directly dependent on those natural resources...such as nature study or education." (Policy 27) The Coastal Act calls for uses of the marine environment to be carried out in a way that sustains biological productivity and held by populations of all species adequate for long term scientific and educational purposes (§30230).

Beyond the involvement of State and Federal agencies, the study of wetland ecosystems has become a popular activity. Sunset Magazine invited a California readership of almost 3.5 million to tour two South coast sites in a 1980 article: "Wetlands In Southern California: Here Is What To Explore, What To Look For." The President of the California Coastal Wetlands Coalition has estimated that during the past eight years, over 50,000 students have learned about the value and ecology of wetlands at Upper Newport Bay.

John Clark, executive secretary of the National Wetlands Technical Council characterized the wetlands protection movement: "It has been propelled by the hunches and instincts of some scientists and overwhelming public support. There are intangible values perceived by the public--a wetlands ethic." (Conservation Foundation Letter, October 1978)

Tijuana Estuarine Sanctuary as an Educational Resource

The broad expression of support for creation of an estuarine sanctuary at Tijuana River is both solid evidence of an emerging "wetlands ethic" for the South Coast, and a reflection of the high level of educational use already underway. Resources available for study include salt marsh, mudflat, mudbank, and sandy shore communities. Elementary schools,

secondary schools, universities and private groups all find Tijuana Estuary an ideal place to carry out their educational objectives. Moreover, local educators have used the estuary since the late 1950. A survey of classroom and field trip use puts current levels well over 3,000 visits per year, with the potential for much greater participation (See Appendix B, Table 11.

College level education programs have been in operation since 1966 when biology students of Southwestern College were brought to the estuary, followed by the initiation of Grossmont College's program in 1969. Scripps Institute, the University of San Diego and especially San Diego State University have exposed large numbers of students to aspects of invertebrate biology, estuarine ecology and watershed processes since the early 1970's. Adult education and docent training programs have been offered by some educators through the Scripps Aquarium. Public school use of Tijuana Estuary has also grown over the past twenty-five years.

A special interpretive program has been operated at Border Field by the State Department of Parks and Recreation for several years. During the past few years, several thousand people have taken advantage of the tours. A series of bilingual signs on the mesa overlooking the marsh helps to orient visitors to the habitats and wildlife.

One of the newest groups of users is the Southwest Wetlands Interpretive Association (SWIA), organized especially to take advantage of the rich teaching resources at Tijuana Estuary. The SWIA has already carried out cooperative programs with the Department of Parks and Recreation. Other private environmental groups whose programs depend in part on Tijuana Estuary are the California Native Plant Society, the Audubon Society, San Diego Orthological Club, and the San Diego Chapter of the Sierra Club.

Local educators, school administrators, and leaders of environmental organizations have been invited to submit their suggestions for developing an education program for Tijuana River Estuarine Sanctuary. The following education framework is a synthesis of the ideas contributed.

Framework for an Education Program at Tijuana Estuarine Sanctuary

1. Create an Education subcommittee drawn from local school districts, community colleges, universities, and environmental groups. Develop a mechanism such as a newsletter to communicate with non-local education.

2. Encourage educational organizations with similar interests to participate in combined field or interpretive activities. This may take the form of joint field trips for biology classes in different school districts, sharing of educational materials, or cooperative development of curriculum.

3. Design and develop a site plan for an interpretive center. Prepare a site plan for an upland area adjacent to the wetlands considered able to tolerate limited development.

4. Encourage the participation of the communities of Imperial Beach and San Diego, including the local news media, in all aspects of the education program.

5. Limit the nature and extent of field exercises that require collection of samples of vegetation or wildlife to selected advanced classes.

6. Design a trail system to protect sensitive habitats and species while allowing observation of representative portions of the estuarine environment. Borrowing on the experience of other public access programs for wetlands, consider a network of wood boardwalks to confine access and minimize trampling of vegetation.

7. Prepare illustrated field guides and other written materials, and print the text and captions in both English and Spanish.

8. Restrict activities incompatible with education, especially within portions of the estuarine system best suited to class learning and field trips.

Educational Objectives

Specific educational objectives have been articulated for various levels of students which will include, but not be limited to, the following:

Elementary Level

1. Study how certain groups of plants and animals live together in a common environment.

2. Study effects of the ocean and its tidal action on the salt marsh.

3. Study the history and culture of Native Americans who used the Tijuana River.

4. Familiarize students with common plants and animals of the salt marsh.

Secondary Level

1. Study the importance of Tijuana Estuary as a breeding area for birds, fish, and shellfish.

2. Study the distribution of plants and wildlife in relation to physical conditions in the estuary.

General Public

1. Explain floodplain management.

2. Provide an understanding of the subtle gradation of plant communities and their importance in maintaining ecological stability in marshlands.

3. Explain the effect of urbanization on watersheds adjacent to marshlands and the marshlands themselves.

4. Explain how natural evolutionary processes effect marshlands.

5. Emphasize the relationship between marshland resources and oceanographic resources.

Although extensive use of specific areas of the proposed sanctuary by elementary and secondary school systems has existed in the past, this is not assurance that this valuable research area will be available in future years. Therefore, the only fail-safe mechanism to assure permanent utilization and protection for public research and educational efforts is through direct public ownership and management.

B. Alternatives Considered

1. Funding

Given its unique design as a Federal-State partnership for protecting estuarine systems, while promoting resource management research and education, genuine alternatives to the Estuarine Sanctuary Program are probably nonexistent.

Among the State programs with objectives related to the Estuarine Sanctuary Program, the Coastal Conservancy administers a revolving fund for wetlands restoration. However, the Estuarine Sanctuary Program is not designed to restore degraded habitat areas. Monies intended for restoration also include funds from the Pittman-Robertson Fund and the Dingell Johnson Act. Similarly the Migratory Bird Conservation Fund and the Land and Water Conservation Fund are intended for different purposes.

Expansion of Border Field State Park, through allocation of the State Park Bond monies, would accomplish some of the goals of land acquisition, but would not provide the emphasis on research or education or the important coordinating mechanism offered by the sanctuary. Park Bond monies are, however, the logical source of State matching funds for the sanctuary.

Expansion of the Fish and Wildlife Service Refuge would be difficult to justify based on the Endangered Species Act alone, and would not provide the strong emphasis on research, education, and cooperative management of resources.

2. Site Selection

The proposal for designation of a second estuarine sanctuary in California was developed by over 100 interested individuals and organizations including marine scientists, educators, representatives of environmental groups, the six Regional Commissions of the CCC, and other State agencies.

Six sites were nominated and a seventh was added by one of the State Coastal Commissioners. The seven candidates included: (1) Ten Mile River, Mendocino County; (2) Esteros Americano and de San Antonio, Marin/Sonoma Counties; (3) Tomales Bay, Marin County; (4) Petaluma River Marsh, Marin/Sonoma Counties; (5) Los Penasquitos Lagoon, San Diego County; (6) Batiquitos Lagoon, San Diego County; and (7) Tijuana River Estuary. The Petaluma River site falls within the jurisdiction of the San Francisco Bay Conservation and Development Commission, while the remaining six sites are within the jurisdiction of the CCC.

Staff of the Estuarine Sanctuary Program at OCZM/NOAA and the CCC conducted a cooperative evaluation of the candidates. Some 14 factors were considered for each site, reflecting the criteria set forth in the Federal procedural guidelines for estuarine sanctuaries. Important considerations included diversity of habitats and species, the present and potential research and educational use, the degree to which the estuaries are representative of other systems in the regions, the natural character of the areas, and the presence of compatible land uses in the estuarine ecosystem and adjacent watershed.

Before making a recommendation, the CCC convened a six-member Sanctuary Selection Committee, with membership drawn from the U. S. Fish and Wildlife Service, the San Francisco Bay Conservation and Development Commission, State Department of Parks and Recreation, the State Department of Fish and Game, and the Assembly Office of Research.

As a result of the site evaluation process, three candidates were eliminated: (1) Ten Mile River which has limited utility as a site for research and education, and is seasonally blocked; (2) the Esteros which are generally blocked from tidal flushing and are prone to hypersaline conditions; and (3) Batiquitos Lagoon because it is significantly degraded.

Of the remaining four sites, Tijuana River was ranked first by the Commission staff, Tomales Bay second, Petaluma River Marsh third, and Los Penasquitos Lagoon fourth. Major considerations in ranking Tijuana River first were its value as a representative of arid region wetland and estuarine systems, its natural character, and its exemplary record of research and educational use. Tomales Bay was identified as an exceptionally strong candidate with outstanding habitat and species diversity and a major background of oceanographic and wetlands research. However, given the size of the immediate drainage area and the complexity of management programs which already exist, the Commission concluded that a certain degree of protection is afforded Tomales Bay at this time. In addition,

the need for land acquisition is questionable, and needs to be resolved before a positive action to establish Tomales Bay as a National Estuarine Sanctuary can be considered. Similarly, a sanctuary at Petaluma River Marsh would have generated stronger support if a non-acquisition approach was pursued.

Before making a formal nomination, the CCC invited written comments, and held two public hearings, one in Long Beach and one in Monterey. Over 25 individuals and organizations supported creation of a sanctuary at Tijuana River, including San Diego State University, local community colleges, the Southwest Wetlands Interpretive Association, the California Wetlands Coalition, three local school districts, the Mayor of Imperial Beach, and some of the major landowners with holdings adjacent to the estuary. In contrast, limited support was expressed for a sanctuary at Tomales Bay that would involve land acquisition. Public reaction to the Petaluma River Marsh proposal was mixed with the major objection to the proposed project being from area land owners.

3. Boundaries

Four significant boundary alternatives were considered. The first alternative, a non-acquisition approach, would have been limited to lands held by the State Department of Parks and Recreation, the U.S. Fish and Wildlife Service, and the U.S. Navy. This option was rejected because it would exclude important wetland, riparian, and floodplain areas.

A second alternative, also rejected because it would not provide adequate protection of vital resources, would encompass public land, portions of the wetland, and portions of the immediate river area. However, important portions of the lower Tijuana Valley and adjacent uplands, identified by the Advisory Committee as essential and which would make up a complete estuarine sanctuary area, and to control damaging erosion and sedimentation would be excluded.

The third alternative would embrace virtually the entire Tijuana Valley west of 19th Street, to gain a strong measure of protection for the wetlands, river course, floodplains, and highlands, but would not lease back important agricultural lands, or sand and gravel mining areas for uses dependent on these resources. This option would preclude economically important uses compatible with the sanctuary and the cost could probably exceed the level of funding available.

The fourth alternative considered would add the purchase of non-contiguous parcels that contain pool and riparian habitats along the Tijuana River. This is perhaps the ideal sanctuary boundary which would ensure that all related components of the ecosystem are represented. However, without the participation of an agency such as the California Wildlife Conservation Board, or a private entity such as The Nature Conservancy, such a proposal is not likely to come to fruition within the current funding limitations of the Estuarine Sanctuary Program.

4. Management Structure

Three significant alternatives to the proposed management program were considered. One alternative would involve designating a single agency as the management authority, with other interests serving on a subordinate advisory committee. This alternative was rejected for two reasons: (1) no single agency has the resources to manage effectively the entire sanctuary, and (2) a cooperative management authority was deemed preferable by CCC staff and its Sanctuary Advisory Committee.

A second alternative, involving only the major landowning agencies in the management authority, was rejected because it would preclude the direct involvement of municipal, research and education, and agricultural interests in sanctuary management.

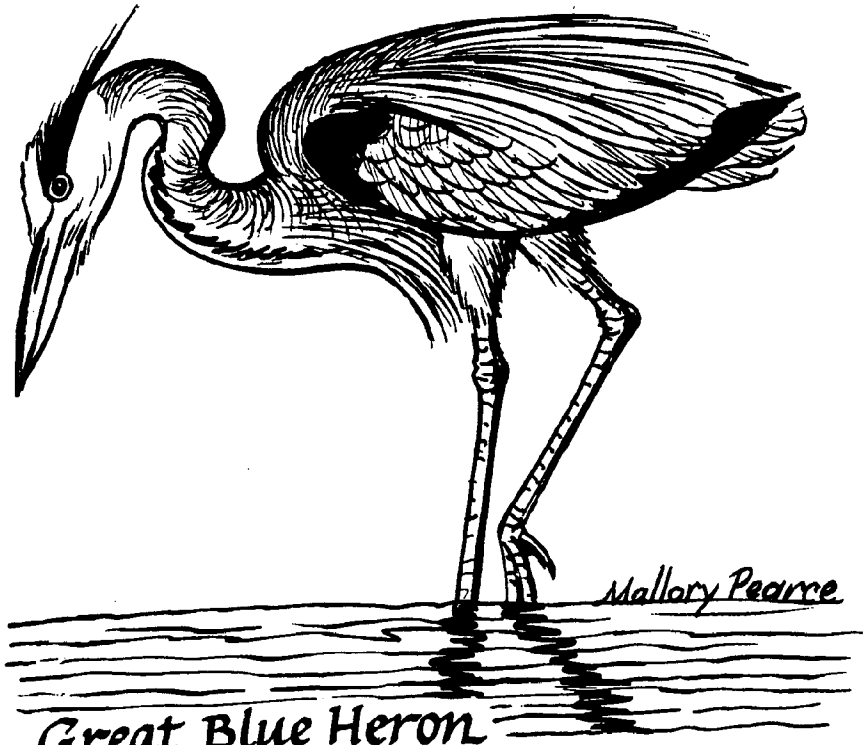
The third alternative considered, a much expanded management authority, was rejected as too unwieldy to operate efficiently.

The membership and duties of the Advisory Committee and the subcommittees reflect both the need to provide access to sanctuary decisionmaking by several important agencies and interests, and the need to delegate consideration of detailed issues to small working groups. Establishment of specific subcommittees for agriculture, water quality, and research and education would add to the potential of the sanctuary as a focus for progressive systems resource management. In addition, the multi-agency management structure would offer a more useful and reasonable alternative to the existing, fragmented, and impractical individual management structure (vis a vis, U.S. Fish and Wildlife Service management responsibility located in the Imperial Valley, Department of Parks and Recreation, Navy, City of San Diego, etc.)

5. No Action

A course of "no action" on this sanctuary proposal would sacrifice an opportunity to secure the entire wetland ecosystem and adjacent lowlands of the lower Tijuana River Valley in a unified program of management and compatible use. Part of the core wetland area river corridor and vital uplands would remain outside public sewardship, and the maintenance of compatible agricultural uses in perpetuity will not be a certainty. A forum for working towards further cooperation with Mexico for water quality and resources would also be lost.

In addition, the Cities of Imperial Beach and San Diego will lose both national recognition and an opportunity to capitalize economically on the sanctuary through the development of visitor serving facilities.



Great Blue Heron

Least Tern

PART III: AFFECTED ENVIRONMENT

A. Location

Tijuana River Estuary, California is the southernmost estuarine system on the West Coast of the United States. A number of seasonal lagoons occur along the coast of North San Diego County, and the tidally-flushed Tijuana River is situated below San Diego Bay, just 1.5 miles above the United States-Mexico international border (see Figure 4). The mouth of the river and the network of channels, mudflats, mudbanks, and salt marsh together occupy about 1,100 acres. They are bounded on the north by Coronada Avenue in the City of Imperial Beach, the Imperial Beach Naval Air Station, and further inland by the community of Nestor. To the east are the agricultural lowlands of the Tijuana Valley, bisected by 19th Street, Hollister Road, and the Dairy Mart Road. Interstate 5 traverses the basin about 3.5 miles from the river mouth. Below the estuarine system are Border Field State Park (formerly a Naval Reservation), and a series of mesas and swales known as the Border Highlands (see Figure 5).

B. Sanctuary Description

The proposed estuarine sanctuary is in the Pacific Flyway, between the City of Imperial Beach, San Diego County, California, and the border of Mexico. Approximately one-half of the estuary is now in public ownership. Tijuana Estuary is the southern most coastal wetlands in California with an ocean opening only 1.5 miles north of the Mexican border. The marsh system is at the end of the Tijuana River, an ephermeral stream draining about 1,731 square miles of watershed area within Mexico and the United States. The estuary is flanked on the north by the City of Imperial Beach and on the south by Border Field State Park and the Mexican Border. The estuary, portions of which extend about 1.5 miles inland and 3 miles along the ocean shore, is almost completely separated from the ocean by a broad sandy beach and a narrow zone of low sand dunes. Unlike other lagoons in San Diego County, the mouth of the Tijuana Estuary remains open almost continually.

Tijuana Estuary can be divided into north and south sections based on the contrasting physical makeup of each area. The northern section, referred to as Oneonta Slough, is a relatively productive marsh containing 95 percent of the estuary's growth of cord grass. The main channel leading into this section branches into many small channels which are surrounded by areas of low marsh heavily vegetated with cord grass. Also in the northern section, a channel extends easterly to the remains of a sewage oxidation pond complex. During low tides, sizable areas of mud flats are exposed throughout these ponds and adjacent channels.

Approximately 885 acres of the estuary, marsh and mud flats, and adjacent uplands are in private ownership, and are proposed for fee or less-than-fee simple acquisition.

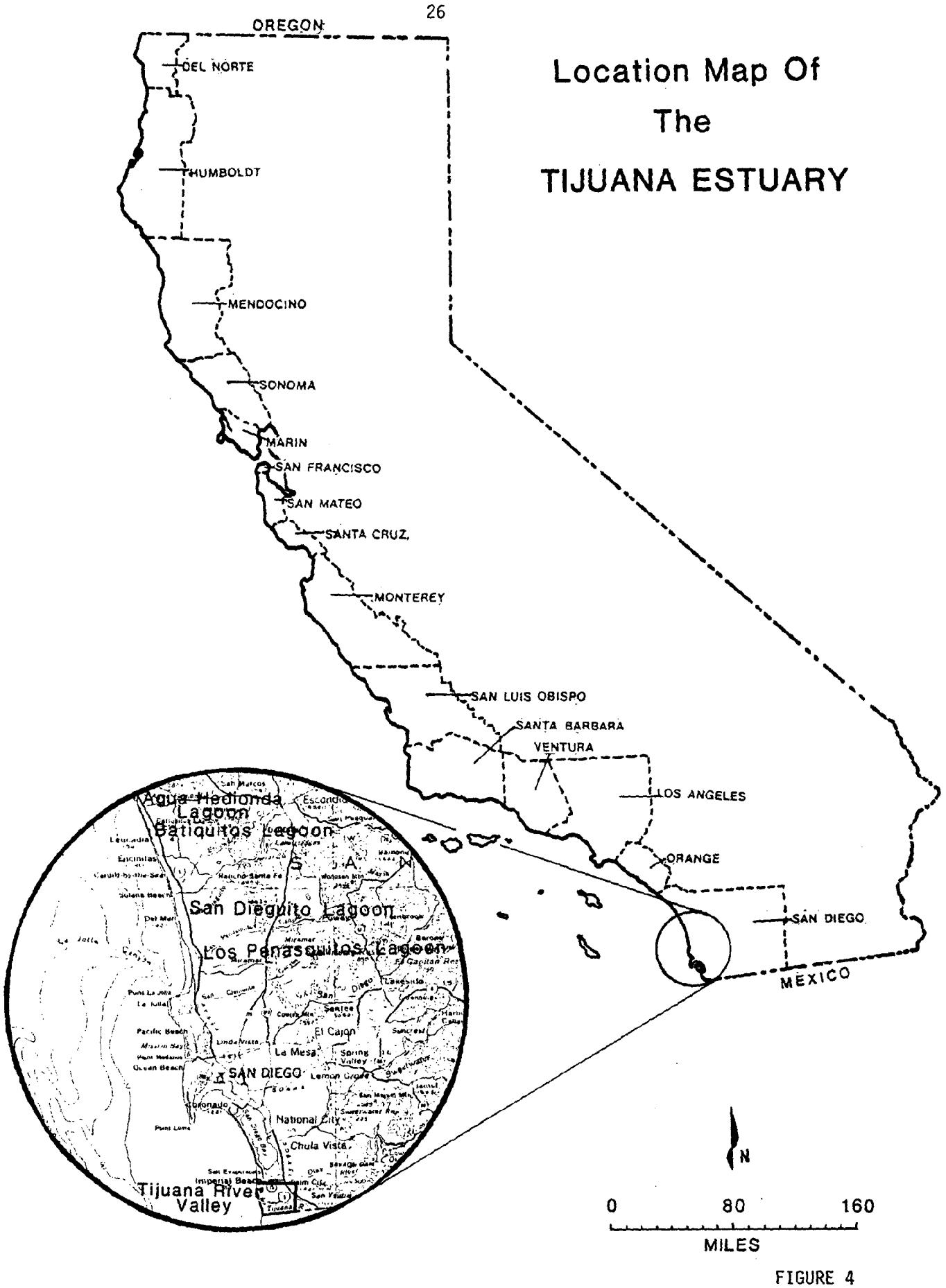
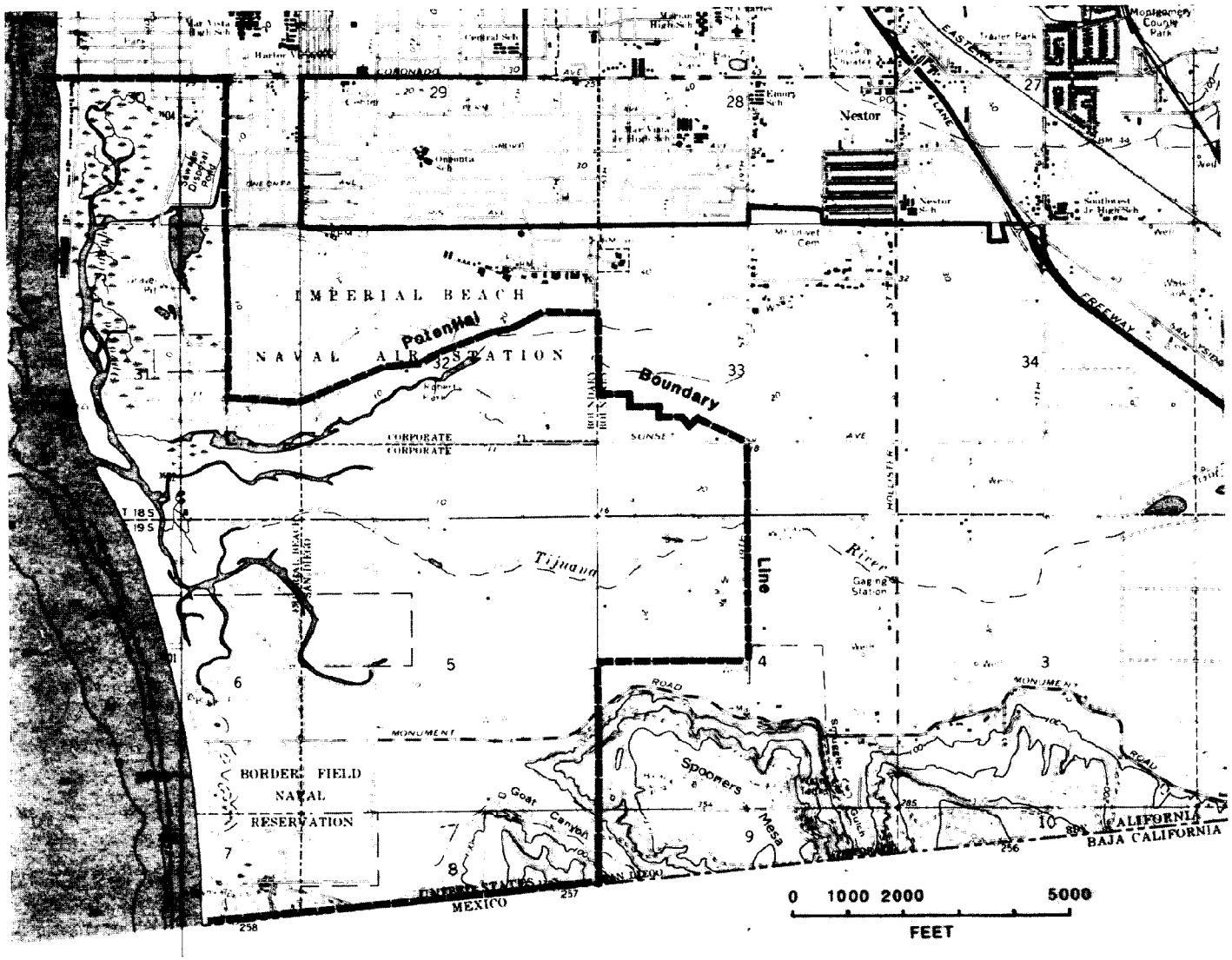

Location Map Of
The
TIJUANA ESTUARY
OREGON
DEL NORTE
HUMBOLDT
MENDOCINO
SONOMA
MARIN
SAN FRANCISCO
SAN MATEO
SANTA CRUZ
MONTEREY
SAN LUIS OBISPO
SANTA BARBARA
VENTURA
LOS ANGELES
ORANGE
SAN DIEGO
MEXICO
Agua Hedionda Lagoon
Batiquitos Lagoon
San Dieguito Lagoon
Los Penasquitos Lagoon
SAN DIEGO
Tijuana River Valley
N
0
80
160
MILES

FIGURE 4

TIJUANA RIVER VALLEY



Source: USGS 7.5′ topographic quadrangle map

The California Department of Parks and Recreation owns a 377-acre parcel at the southern end of the estuary. This was formerly U.S. Navy property called Border Field. The State Parks and Recreation Department also leases 283 acres from the Navy at Ream Field. A large portion of the leased area (approximately 100 acres) is estuarine habitat. An additional acreage of the estuary is contained within the Ream Field, but is not included in the lease. A Naval facility, used primarily to train helicopter pilots, is located just south of the City of Imperial Beach. The facility comprises approximately 634 acres. The Navy is now in the process of or has acquired a buffer area consisting of an additional 570 acres along the southern and western boundaries of Ream Field. San Diego Gas and Electric Company owns 200 acres on the east side of the Tijuana Estuary.

In total, the estuary and closely associated upland contains approximately 1,180 acres. The tide influenced area consists of 546 acres, 147 acres of which are tidal channels and 368 acres of mudflats and marshlands. Salt-tolerant and freshwater vegetation, sand dunes and beach area comprise the remaining 634 acres.

C. Climate

A subtropical climate with hot summers and mild winters characterizes the lower Tijuana River. Mean monthly temperatures range from 52°F in January to 68°F in July (International Boundary and Water Commission, 1974). Occassional daytime temperatures near 120°F have been reported in summer (U.S. Fish and Wildlife Service, 1980). Prevailing winds are from the northwest in winter and from the southwest in summer. Afternoon velocities range from 5 to 15 miles per hour.

Winter rainfall, particularly in January and February, account for most of the precipitation. Some 88 percent of the rain is received from November through April; rainfall from June through September averages only 0.28 inches. Near the coast, rainfall in a "normal" year would be 9-10 inches, and mountainous parts of the watershed would receive 25-28 inches. Over the past thirty five years of record, precipitation has exceeded the average in less than one fourth of the rainy seasons (International Boundary and Water Commission, 1974). However, weather patterns do vary dramatically from year to year. In 1977 close to 2 inches of rainfall drenched the valley in August, while in 1978 there were heavy rains in January-March, accompanied by severe flooding (Zedler, 1979).

D. Cultural and Historic Resources

While no cultural sites have been reported immediately adjacent to the slough system, the neighboring border highlands have a significant number and variety of cultural sites. Record searches performed by the City of San Diego (Polan, 1981) have revealed a total of 16 documented sites, including 14 reported by the San Diego Museum of Man and 5 reported by the Cultural Resource Management Center at San Diego State University.

Ten additional prehistoric sites and isolated artifacts were identified in a recent field reconnaissance of Spooners Mesa (Polan, 1981). Scrapers, cores, hammers, manos, metates (grinding surfaces) and flakes--the remains of early quarries and workshops--were revealed in these studies. The majority of sites are associated with the San Dieguitos, believed to be the first inhabitants of the border highlands as this desert group adapted to a coastal existence. Most of the sites have sustained some disturbance through road construction, mining activities, and random looting, but some are relatively pristine. See Appendix B, Table 12 for a complete listing of the attributes of natural sites in the Border Highlands.

At least two or three additional sites exist near the boundary marker in Border State Park, representing the Digueno, San Dieguito and La Jolla cultures (International Boundary and Water Commission, 1974).

Father Junipero Serra is believed to have camped in Smugglers Gulch in the 1700's. The marble boundary marker delineates the western end of the United States-Mexico land border (International Boundary and Water Commission, 1974).

E. Geology

Geology of the Tijuana River Valley

Tijuana River Valley is structurally controlled by faults of Quaternary age. (Kennedy and Tan, 1975) The east side of the area is bounded by the San Ysidro fault, juxtaposing tertiary and quaternary-aged rock along the southwest side toward the valley floor, while the south side of the valley is bounded by a complex, discontinuous group of faults. About twenty five well-exposed or inferred faults traverse the Border Highlands. Three prominent faults on Spooners Mesa together constitute the northern part of the Los Buenos Fault, which extends south into Mexico. Significant separation on the order of 35m, juxtaposes rocks of the San Diego (early Pleistocene) and Lindavista (late Pleistocene) formations.

In the offshore bight, a branch of the Silver Strand fault--part of the Rose Canyon fault zone, extends from an area opposite southern San Diego Bay to the northern arm of Tijuana Estuary at about 1.7 km from the coastline. Beyond the mouth of the estuary and south to the border, the Silver Strand is less persistent, comprised of several splays offset in a parallel configuration (Kennedy and Welday, 1980).

The faulting within the Tijuana Floodplain and offshore bight includes early Pleistocene formations, but it is not clear if late Pleistocene and Holocene formations are faulted. Holocene alluvium and slopewash overlap faults between San Ysidro fault and the border highlands,

so the projection of faults beneath the valley is speculative. About ten concealed lineaments are thought to be present. These include a trace parallel to Monument Road between Hollister Road and Dairy Mart Road, a trace intersecting 19th Street, and a third extensive trace intersecting both 19th Street and 27th Street. (Kennedy and Tan, 1977). Other traces are thought to be present beneath unfaulted sediments of Smugglers Gulch and Goat Canyon (Kennedy and Tan, 1975). Kennedy and Tan (1977) have completed the best available geologic map of the area as shown in Figures 6 and 7, undifferentiated alluvium and slopewash is the geologic unit underlying the Wildlife Refuge, the southern part of Imperial Beach Naval Air Station, Border Field State Park, and most of the proposed acquisitions. Poorly consolidated stream deposits of silt, sand, and cobble-sized particles, derived from adjacent bedrock, comprise the alluvium. Slopewash is deposited on lower valley flanks through the interaction of seasonal rainfall and gravity. Recent beach deposits are present along the shoreward length of the estuarine system, and bound the estuary near its mouth.

Two similar sedimentary units, the Bay Point Formation and the Unnamed, nearshore marine sandstone underlie the areas above the northern arm of the estuary, and east of 19th Street. The fossil-bearing Bay Point Formation is composed of poorly consolidated sandstone derived from marine, lagoonal, and non-marine sources, was laid down on a marine-cut terrace in the late Pleistocene. The marine sandstone is a fine grained mixture of well-sorted and poorly-sorted deposits.

The westernmost part of the Border Highlands is mostly composed of the Bay Point Formation. Two outcrops of the San Diego Formation are prominent on Spooners Mesa and the eastern part of the Highlands. The conglomerate part of the formation occur at higher elevations where steep natural exposures occur, and the sandstone part occur in areas east and below the conglomerate faces. The pebble and cobble conglomerate is bound in a sandstone matrix which is extremely resistant to weathering, while the locally-cemented sandstone is weak and susceptible to rapid erosion.

The Lindavista Formation, created by the deposition of nearshore marine and non-marine sandstone sediments on a wave-cut platform, occupies the upper slopes of the border highlands. Iron-based cement (hematite) makes this material resistant to erosion.

Landslides, the product of oversteepened slopes, groundwater saturation, and surface water erosion, have occurred in several locations along the valley walls in the Border Highlands where the San Diego formation crops out. Another large landslide deposit is located just east of Interstate 5 near Larsen Field, and eleven distinct slides have occurred along the slopes of Spring Canyon and Moody Canyon, both tributary watersheds to the Tijuana River.

Along the upper reaches of these canyons, the Lindavista Formation grades into the sandstone portion of the San Diego formation and the tertiary Otay Formation. This geologically older formation is composed of well sorted, poorly compressed sandstone and claystone. Further east, the San Ysidro Mountains are underlain by the jurassic-age Jasper Volcanic Formation.

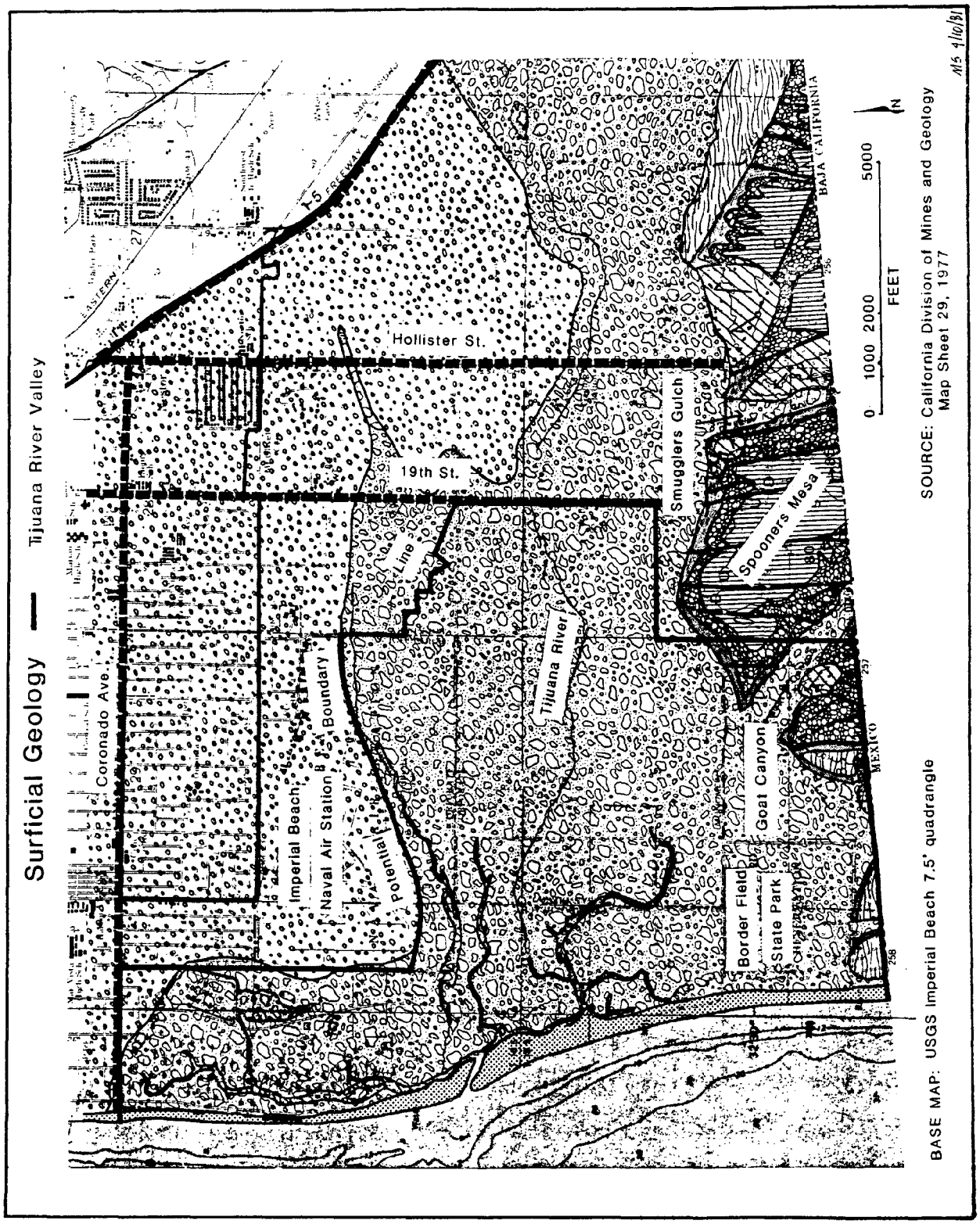
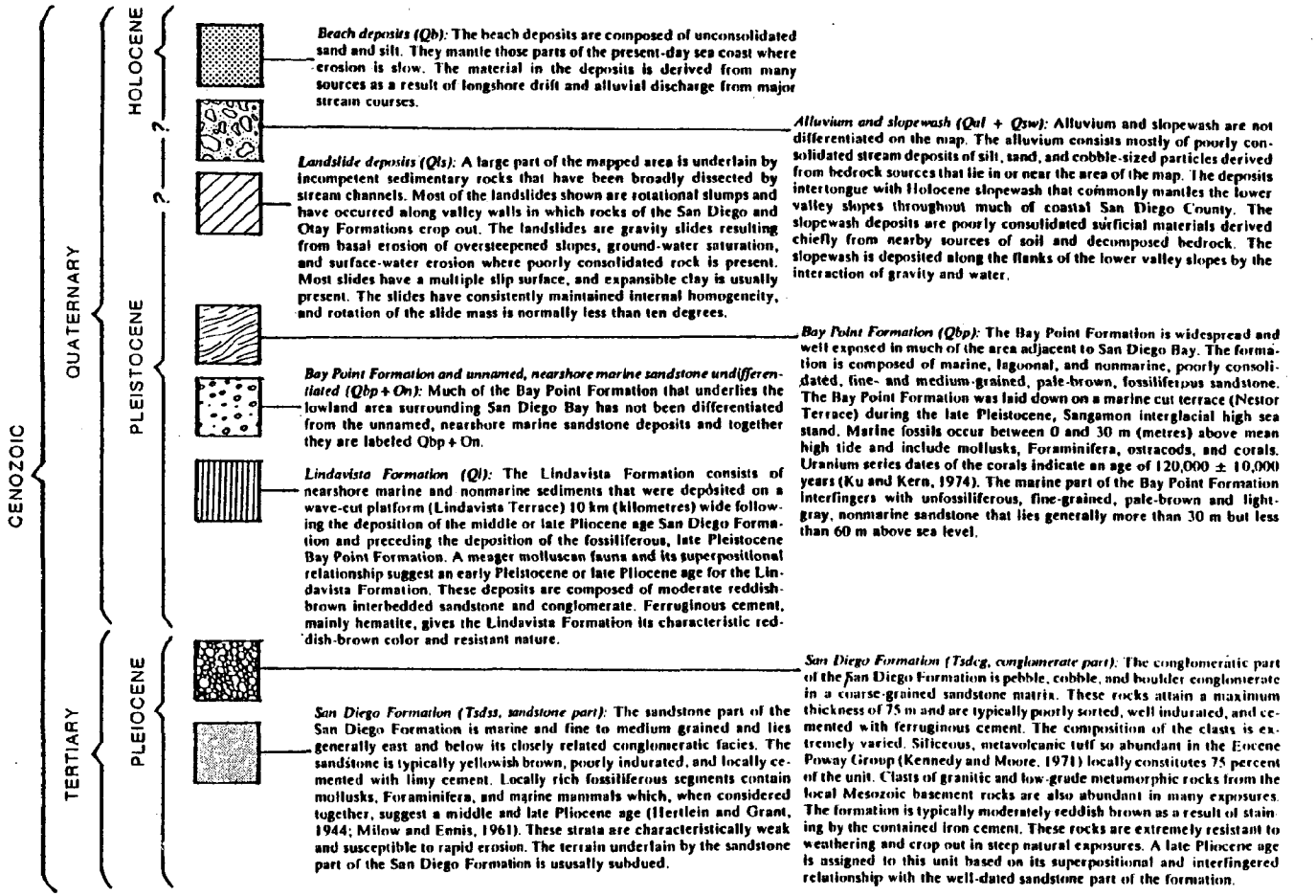

Surficial Geology
Tijuana River Valley
Coronado Ave.
Imperial Beach
Naval Air Station Boundary
Potential
Hollister St.
19th St.
Tijuana River
Smugglers Gulch
Spooners Mesa
Border Field State Park
Goat Canyon
MEXICO
BAJA CALIFORNIA
I-5 FREEWAY
EASTERN
0 1000 2000 5000
FEET
N
SOURCE: California Division of Mines and Geology
Map Sheet 29, 1977
BASE MAP: USGS Imperial Beach 7.5' quadrangle

FIGURE 6

Surficial Geology– Tijuana River Valley



Beach deposits (Qb): The beach deposits are composed of unconsolidated sand and silt. They mantle those parts of the present-day sea coast where erosion is slow. The material in the deposits is derived from many sources as a result of longshore drift and alluvial discharge from major stream courses.

Alluvium and slopewash (Qal + Qsw): Alluvium and slopewash are not differentiated on the map. The alluvium consists mostly of poorly consolidated stream deposits of silt, sand, and cobble-sized particles derived from bedrock sources that lie in or near the area of the map. The deposits intertongue with Holocene slopewash that commonly mantles the lower valley slopes throughout much of coastal San Diego County. The slopewash deposits are poorly consolidated surficial materials derived chiefly from nearby sources of soil and decomposed bedrock. The slopewash is deposited along the flanks of the lower valley slopes by the interaction of gravity and water.

Landslide deposits (Qls): A large part of the mapped area is underlain by incompetent sedimentary rocks that have been broadly dissected by stream channels. Most of the landslides shown are rotational slumps and have occurred along valley walls in which rocks of the San Diego and Otay Formations crop out. The landslides are gravity slides resulting from basal erosion of oversteepened slopes, ground-water saturation, and surface-water erosion where poorly consolidated rock is present. Most slides have a multiple slip surface, and expansible clay is usually present. The slides have consistently maintained internal homogeneity, and rotation of the slide mass is normally less than ten degrees.

Bay Point Formation (Qbp): The Bay Point Formation is widespread and well exposed in much of the area adjacent to San Diego Bay. The formation is composed of marine, lagoonal, and nonmarine, poorly consolidated, fine- and medium-grained, pale-brown, fossiliferous sandstone. The Bay Point Formation was laid down on a marine cut terrace (Nestor Terrace) during the late Pleistocene, Sangamon interglacial high sea stand. Marine fossils occur between 0 and 30 m (metres) above mean high tide and include mollusks, Foraminifera, ostracods, and corals. Uranium series dates of the corals indicate an age of 120,000 ± 10,000 years (Ku and Kern, 1974). The marine part of the Bay Point Formation interfingers with unfossiliferous, fine-grained, pale-brown and light-gray, nonmarine sandstone that lies generally more than 30 m but less than 60 m above sea level.

Bay Point Formation and unnamed, nearshore marine sandstone undifferentiated (Qbp + On): Much of the Bay Point Formation that underlies the lowland area surrounding San Diego Bay has not been differentiated from the unnamed, nearshore marine sandstone deposits and together they are labeled Qbp + On.

Lindavista Formation (Ql): The Lindavista Formation consists of nearshore marine and nonmarine sediments that were deposited on a wave-cut platform (Lindavista Terrace) 10 km (kilometres) wide following the deposition of the middle or late Pliocene age San Diego Formation and preceding the deposition of the fossiliferous, late Pleistocene Bay Point Formation. A meager molluscan fauna and its superpositional relationship suggest an early Pleistocene or late Pliocene age for the Lindavista Formation. These deposits are composed of moderate reddish-brown interbedded sandstone and conglomerate. Ferruginous cement, mainly hematite, gives the Lindavista Formation its characteristic reddish-brown color and resistant nature.

San Diego Formation (Tsdcg, conglomerate part): The conglomeratic part of the San Diego Formation is pebble, cobble, and boulder conglomerate in a coarse-grained sandstone matrix. These rocks attain a maximum thickness of 75 m and are typically poorly sorted, well indurated, and cemented with ferruginous cement. The composition of the clasts is extremely varied. Siliceous, metavolcanic tuff so abundant in the Eocene Poway Group (Kennedy and Moore, 1971) locally constitutes 75 percent of the unit. Clasts of granitic and low-grade metamorphic rocks from the local Mesozoic basement rocks are also abundant in many exposures. The formation is typically moderately reddish brown as a result of staining by the contained iron cement. These rocks are extremely resistant to weathering and crop out in steep natural exposures. A late Pliocene age is assigned to this unit based on its superpositional and interfingered relationship with the well-dated sandstone part of the formation.

San Diego Formation (Tsdss, sandstone part): The sandstone part of the San Diego Formation is marine and fine to medium grained and lies generally east and below its closely related conglomeratic facies. The sandstone is typically yellowish brown, poorly indurated, and locally cemented with limy cement. Locally rich fossiliferous segments contain mollusks, Foraminifera, and marine mammals which, when considered together, suggest a middle and late Pliocene age (Hertlein and Grant, 1944; Milow and Ennis, 1961). These strata are characteristically weak and susceptible to rapid erosion. The terrain underlain by the sandstone part of the San Diego Formation is ususally subdued.

SYMBOLS: ——— CONTACT U ↑80 / D ——— FAULT

(Long dash where location is approximate, short dash where inferred, dotted where concealed, D, downdropped side; U, upthrown side; arrow and associated number indicate dip of fault)

Figure 7

F. Soils

Tidal flats, alluvial sandy loams, and sands account for the majority of soils in the lower Tijuana Valley. Nearest the influence of tidal action, the fertility of the basin is lowest. Non-arable tidal flats extend beyond the upper limit of the slough system and provide the substrate for mudflat and marshland habitat. The saline series of Chino sandy loam occurs east of the tidal flats and upslope from river-deposited sand. Surveys by the Soil Conservation Service (1975) have determined that much of the lowlands are suitable for agriculture. However, most of this area has a tendency to erode rapidly and therefore requires effective management to sustain land uses consistent with long term protection of the estuary.

Two erodable soils in the lowlands have been placed in the highest capability unit for cultivation: Chino sandy loam and Visalia sandy loam. Both are considered good terrain for citrus, truck crops, and flowers. As illustrated in Figures 8 and 9, other soils with some utility for agriculture are also highly erodable as a result of their low clay content and the nature of their surface texture.

To the south, steep terrace escarpments and fine sandy loam--the object of mining activity dominate Spooner's Mesa. Cobbly loam is most prevalent in the eastern highlands and non-arable riverwash separates the two bluffs. Each of these surficial types is also subject to erosion, contributing to downstream sedimentation. See Appendix B, Table 12 for a complete listing of attributes for the Tijuana River Valley.

G. Hydrology of the Tijuana River

Measured from its most distant source, the Tijuana River system is about 85 miles long, and drains a basin of approximately 1,731 square miles. The named Tijuana River is defined as starting 11 miles from the ocean at the confluence of two main tributaries: the Rio de las Palmas in Mexico and Cottonwood Creek (Arroyo del Alamar) in the United States. Only the last 5.8 miles of the Tijuana River flow through the United States; 27 percent of the basin (467 square miles) lies north of the border.

Pryde (1976) has divided the basin into four portions, bounded by topographic and urban features. The estuarine area, including the network of channels and salt marshes, comprises the first subunit; the second unit is the undeveloped floodplain extending five miles from the estuary to the international border. An urbanized area in Mexico extending from the border through the City of Tijuana to the Rodriquez Dam comprises the third subunit. Average rainfall of these three areas falls in the range of 9-10 inches annually. Everything above Rodriquez Dam, together with the entire Cottonwood Creek drainage, makes up the balance of the basin. Extrapolation of limited records indicates an average rainfall of 25-28 inches in the fourth subunit.

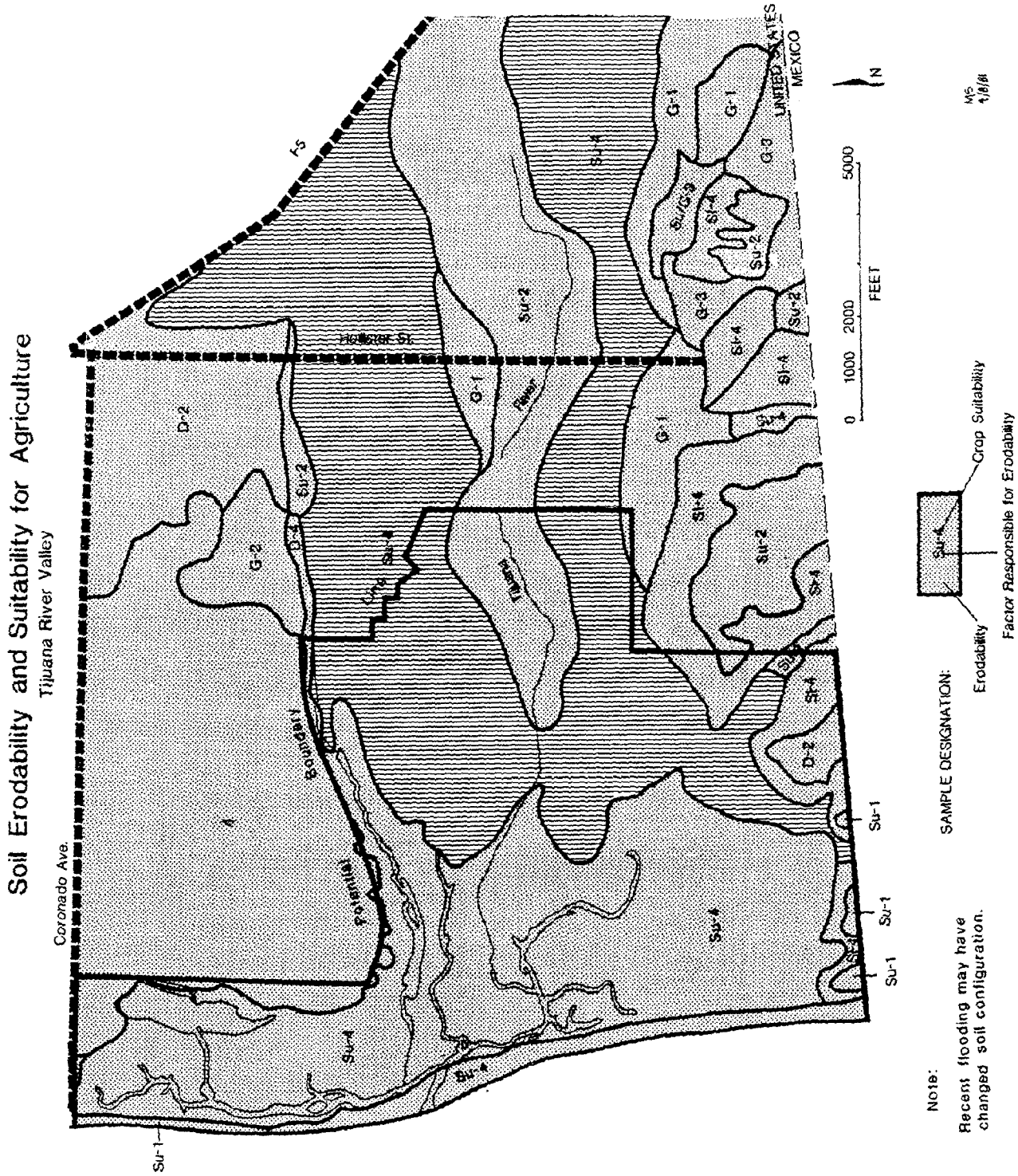

Soil Erodability and Suitability for Agriculture
Tijuana River Valley
Coronado Ave.
Hollister St.
Potential Boundary
Tijuana River
UNITED STATES
MEXICO
N
0 1000 2000 5000
FEET
SAMPLE DESIGNATION:
Erodability
Factor Responsible for Erodability
Crop Suitability
Note:
Recent flooding may have changed soil configuration.

FIGURE 8

SOIL ERODABILITY AND SUITABILITY FOR AGRICULTURE
Tijuana River Valley

LEGEND

ERODABILITY:

Moderate

Severe

FACTOR RESPONSIBLE FOR ERODABILITY:

Su- Surface layer texture
D- Depth to hard rock
G- Grade of structure in surface layer
Sl- Slope

CROP SUITABILITY (for specified crops: avocados, citrus, truck crops, tomatoes, flowers):

1- Good for 3-5 specific crops and Fair for 0-2 " "
2- Good for 1-2 specific crops and Fair for 0-3 " "
3- Good for 0 specific crops and Fair for 1-5 " "
4- Not suitable for specified crops or not arable

MAP SYMBOL	SOIL TYPE
Su-4	Chino silt loam, saline (0-2% slope)
Su-1	Marina loamy coarse sand (2-9%)
Su-4	Coastal Beaches
	Tidal Flats
	River Wash
Su-2	Huerhuero loam (5-9%)
	Tijunga sand (0-5%)
	Carlsbad gravelly loamy sand (2-5%)
D-2	Huerhuero loam (2-9%)
	Chesterton fine sandy loam (2-5%)
D-4	Huerhuero loam (9-15%)
G-1	Visalia gravelly loam (2-5%)
	Visalia sandy loam (0-2%)
	Chino fine sandy loam (0-2%)
G-2	Ramona sandy loam (2-5%)
G-3	Oliventrain cobbly loam (9-30%)
Su/G-3	Oliventrain cobbly loam (2-9%)
Sl-4	Oliventrain cobbly loam (30-50%)
	Terrace Escarpments
4	Huerhuero -Urban land complex

SOURCE: U.S.D.A.,Soil Conservation Service and Forest Service- Soil Survey, San Diego Area, California , 1973

FIGURE 9

Three dams in the Tijuana River watershed are the product of an early resource management program that emphasized the capture of runoff for municipal and irrigation water supplies. Morena and Barrett reservoir were built in 1912 and 1922 respectively on Cottonwood Creek; Rodriquez Dam on Rio de las Palmas was built in 1935. Together they control about 71 percent of the watershed and have a combined storage capacity of 206,850 acre feet (Pryde, 1976). A series of wet years filled the dams to near capacity and produced an anomalous year-round flow during the early 1940s. Since that time, none of the dams approached capacity until the intense winter storms of 1978, 1979, and 1980.

Prior to the collection of quantitative records, severe floods were reported in 1825 and 1862. Medium to large floods occurred in the drainage area in ten subsequent years, with the largest estimated at 75,000 cfs in 1916. The largest measured historical discharge rate was 17,700 cfs in 1937. Estimates have placed the probabilistic 100 year flood slightly higher at 80,000 cfs--enough to inundate about 4,400 acres in the floodplain and lowlands.

Freshwater Inflow

Readings from the USGS gauging station at Nestor indicates that freshwater inflow to Tijuana Estuary fluctuates significantly from year to year as a function of seasonal rainfall and release of water from upstream dams. Mean annual discharge for 44 years of record is 29.1 cfs, or 21,080 acre feet per year. However, even during wet years this contribution to the estuary tends to be concentrated in the months of January to April, while summer and late fall runoff is often negligible. The total amount of freshwater entering the slough system has been below average for 37 of the 44 years of record. Prior to the rainy years of 1978-1980, general drought conditions prevailed and peak runoff has typically been less than 500 cfs. The relatively wet year of 1978-79 produced freshwater input over 100 cfs on 36 consecutive days, and rates above 1 cfs were measured through most of the year. The largest discharge on record, 53,282 cfs, was gauged during the winter of 1979-80. See Figures 10 and 11 for a detailed summary of freshwater inflow to the lower Tijuana River. (Pryde after U.S. Boundary and Water Commission, 1976; U.S. Geological Survey, 1976-1980; U.S. Geological Survey, personal communication, 1981).

Groundwater

The groundwater capacity of the lower Tijuana Valley is thought to be about 20,000 acre feet (International Boundary and Water Commission, 1976). Studies completed by the International Boundary and Water Commission (1974), based on earlier reports of the State Department of Water Resources, indicates that a groundwater deficit existed for many years in the lower Tijuana Valley. In the upper part of the basin, water could be found just 8 feet below the surface prior to the 1940s. After 1945, pumping and export of groundwater, combined with dam storage and low rainfall, resulted in insufficient recharge. Water levels rose in many wells after 1965 as pumping was cut back and wetter weather patterns returned.

Figure 10 - Recent Freshwater Inflow to Lower Tijuana River (Data from Nestor Gauge)

Water Year	Maximum Discharge	Mean Discharge	Days Flow Exceeds 1 cfs	Days Flow Exceeds 100 cfs	Total Discharge	Period with the-flow
October 1979 to Sept. 1980	34,200 cfs					
October 1978 to Sept. 1979	1,610 cfs	56.42 cfs	289	49 (36 consecutive days March-April)	40,712 a.f.	47 days
October 1977 to Sept. 1978	6,370 cfs	97.70 cfs	92	32 (28 consec. days)	71,243 a.f.	8.5 months
October 1976 to September 1977	26 cfs	.13 cfs	6	None	48.24 a.f.	
October 1975 to September 1976	168 cfs	.96 cfs	9	None	663.82 a.f.	11.5 months

Sources: U.S. Geological Survey Water Resources Data in California 1975 - 1980;

USGS Laguna Niguel Data Retrieval Office, personal communication.

cfs = cubic feet per second

af = acre feet

Figure 11 - Historical Freshwater Inflow to the Lower Tijuana River

Calendar Years	Average Peak Discharge	Average Total Annual Discharge	Comments
1916	53,282 cfs		Estimate
1937 - 1940	9,053 cfs	36,655 a.f.	3 years Nestor gauge
1946 - 1950	2,599 cfs	99,222 a.f.	3 years peak data
1951 - 1955	1,574 cfs	4,312 a.f.	2 years peak data; different gauges
1956 - 1960	194.2 cfs	4,907 a.f.	2 years peak data; different gauges
1961 - 1965	706.2 cfs	688 a.f.	Boundary gauge
1966 - 1970	22.95 cfs	2,170 a.f.	Boundary gauge
1971 - 1975	18.36 cfs	704 a.f.	(1973-75 Nestor gauge 4 years record for peak data

Sources: Adapted from Pryde (1976) after International Boundary and Water Commission (1976)

H. Biological Characteristics

1. Community Structure in Tijuana Estuary

a. Vascular Plants

Zeller (1977) has described the community structure in significant detail. Species composition and community structure in Tijuana Estuary varies as a function of elevation over a relatively small (one meter) gradient. Elevation is in turn a good indicator of soil salinity, inundation, soil organic matter, and soil clay content. Like most southern California salt marshes, vegetation in Tijuana Estuary cannot be separated into meaningful zones or associations.

A more notable feature is the presence of Spartina foliosa (cordgrass), a species absent in more disturbed sites in southern California and at Elkhorn Slough, California's first National Estuarine Sanctuary. Spartina dominates at the lowest elevations, declining abruptly in frequency and abundance as elevation increases. A fairly discrete boundary occurs at 6-7 decimeters (dm) mean sea level (MSL), above which almost no Spartina occurs. Shallow channels (MSL or higher) usually have some Spartina; elevations up to 3-4 dm MSL contain at least some dense stands of Spartina, sometimes sharing dominance with Salicornia virginica (pickleweed).

A changing vegetation profile is visually evident as tall coarse saltgrass (60 centimeters (cm)) drops out, to be replaced by low growing succulents, characteristically less than 40 cm in height. Dominance in the 5-8 dm range shifts to Batis maritima (Salt wort), a perennial trailing succulent, and Salicornia bigelovii, an upright annual succulent. Similar patterns of distribution suggest that the two species are not ecological competitors. Their distinct morphology and reproductive habits are thought responsible for co-occurrence; however, sampling does not indicate a consistent Batis-Salicornia association.

These dominant forms grade into Jaumea dominated areas, followed by Suaeda, Frankenia (alkalai heath), Monanthochloe, and Salicornia subterminalis (glasswort). In Tijuana Esutary there is clearly an overlap in distribution between morphologically similar species--the succulents Batis, Jaumea, Salicornia, and Suaeda--and genetically similar species: Salicornia and Suaeda are Chenopodiacea; Monanthocloe and Distichlis are Graminae.

Salicornia virginica occurs in two different growth forms, with a bimodal peak in distribution. At low elevations a tall, branching form accounts for 24-50% of the cover, while at higher elevations a lower form occurs. Little pickleweed occurs at the higher elevations. S. virginica generally tolerates a wide range of environmental conditions, as evidenced by pure stands at two disturbed sites: Los Penasquitos Lagoon and the San Diego River Flood Control Channel. Competition may limit the abundance of S. virginica where S. bigelovii is present, causing the bimodal distribution. Batis may also be an ecological competitor.

b. Algal Communities

A thick mat made up of diatoms, filamentous bluegreen algae, and green algae are responsible for much of the primary productivity in Tijuana Estuary. Zedler (1979) identified 83 species, including 38 common forms: 32 species of diatoms, 4 bluegreen algae, and 2 green algae. Compared to the overstory of larger vascular plants, the composition of the algal communities is more similar in space but more dynamic through time. Factors that influence vascular plants, such as dessication and inundation also influence algal species abundance. Succulents, grasses, and other vascular plants also affect their associated algal communities by providing the patterns of light and shading that are so important to both composition and productivity.

Using a statistical measure of similarity, Zedler found the highest degree of similarity among algae communities growing between the larger Monanthochloe (Salt cedar) and Batis (Salt wort). However, all algae communities had a similarity index exceeding 50%--far higher than the vascular plant communities.

Larger algae, especially the bluegreen forms with filamentous growth, are able to "average out" differences in environmental conditions, but tiny diatoms are more sensitive to minute changes in moisture or nutrient levels. The bluegreen algae are more frequent in warm seasons, giving way to a greater abundance of diatoms and green algae during cooler periods. An abundance of species is found year-round, indicating that even with fluctuations in freshwater inflow and tidal inundation, there is no "best" season for growing the plants that serve at the base for the food chain. Dramatic changes in community structure are seldom evident, due to the presence of a large number of species and a broad spectrum of sensitivity to environmental change. Subtle changes detected between March and April and between May and June coincide with low algal productivity and the stress of desication as freshwater input declines. See Appendix B, Table 3 for a list of common algal species.

B. Estuarine Productivity

Primary productivity, the production of plant material from sunlight, gasses, and nutrients, is the result of contributions of larger vascular green plants, and microscopic algae. Productivity, like the composition of plant communities, varies with elevation. Creeks and channel banks in the estuary support dozens of tiny diatoms which color the sediment gold or brown. While individually abundant, these diatoms together with the phytoplankton drifting in the open water produce only one sixth the plant matter generated by the low marsh (Zedler, 1978). Spartina-dominated marsh, growing at the lowest elevation, generates the most plant matter per unit area. Compared to east coast marshes, Tijuana River's most prolific vascular plants are less productive. However, when the contribution of algae is added, the total Spartina community generates as much living plant matter in a given year (over 1,500 grams dry weight per square meter, compared to 1,000-3,000 grams in the east). At the middle and higher elevations, the dominant succulents and salt cedar contribute somewhat less plant matter in a similar area, but the contribution of algae is higher--up to 50% of the total community. Because the area of high marsh is much greater than low marsh, it produces the most plant material when the whole estuarine system is considered.

Measuring primary productivity helps provide an understanding of the foundation of the food chain in the estuary. Marsh grasses growing at low and high elevations have little food value while still growing, but do nourish a variety of bacteria and fungi as they decompose, in turn providing food for larger detritus-feeding animals. The most food may be available at middle elevations, where succulents and algae are grazed while growing and after they begin to decay. Fish and shellfish feed on succulents as they undergo rapid decomposition. Algal mats dominated by bluegreen algae may be directly used by smaller invertebrates such as nematodes, protozoa, amphipods, and snails--the food for valuable fish and shellfish.

3. Marine Invertebrates

The 54 invertebrate species in Tijuana Estuary reflect adaptations to a variety of substrate, salinity, and tidal conditions. Quantitative studies by Peterson (1969), McIlwee (1970) and Ocean Science and Engineering (1971) demonstrate that clams and other bivalve mollusks are numerically dominant among the invertebrate animals living in the sediment of tidal channels and lower intertidal mud-sand flats. Some of these filter feeding animals are found throughout the estuary, while others are limited by their requirement for a particular sand or mud content in the substrate. As shown in Figure 12, three varieties of clams were among the most abundant animals in both the 1969 and 1971 surveys: the purple clam, Sanguinolaria nuttali, the common littleneck, Prototheca staminea, and tne California jackknife, Tagelus californica. The jackknife clam appears to favor habitats with a high mud content, while the purple clam and the bentnose clam--another common bottom-dweller--prefer environments with lower amounts of mud.

Figure 12

COMMON BENTHIC INVERTEBRATES OF TIJUANA RIVER ESTUARY

Species	Taxonomic Group	Peterson Ranked Abundance	OSE* Ranked Abundance
Sanguinolaria nutallii (Purple clam)	Bivalve	1	5
Protothaca staminea (Common littleneck clam)	Bivalve	2	1
Dendraster excentricus (Sand dollar)	Echinoderm	3	10
Tagelus californicus (California jackknife clam)	Bivalve	4	3
Macoma nasuta (Bent-nose clam)	Bivalve	5	11
Macoma seca (White sand clam)	Bivalve	6	4
Laevicordium substriatum (Egg cockle)	Bivalve	7	14
Callianassa californiensis (Ghost shrimp)	Crustacean	8	7
Tellina carpenterii	Bivalve	9	-
Apolymetic biangulata	Bivalve	11	-
Tresus nutalli (Gaper clam)	Bivalve	11	-
Crytomya californica (False mya)	Bivalve	13	12
Olivella biplicata (Purple olivella)	Gastropod	13	-
Nassarius tegula (Mud nassa)	Gastropod	14	6
Chione undatella	Bivalve	15	9
Cooperella subdiaphana	Bivalve	18	-
Donax californicus (Wedge clam)	Bivalve	18	-
Olivella bactica (Beatic olivella)	Gastropod	18	15
Soleroplax granulate	Crustacean	19	-
Hemigrapsis oregonensis (Mudflat crab)	Crustacean	20	13
Bulla gouldiana	Gastropod		
Cerithidea california (California horn shell)	Gastropod		1 8
Owenia fusiformis (Sand tubeworm)	Polychaete worm		

Sources: Peterson, 1969. Ranking of abundance by individuals/sample, based on 10 sampling efforts with 19-74 samples at several sites. *Ocean Science Engineering, 1971. Ranking of mean density/sample over 5 sites with 2-8 point/site.

Polychaete worms, ecologically important as consumers of detritus and a food source for carnivores, are also numerically important. Larger and more common species are the sand tubeworm, Owenia fusiformis and Ophelia limonica.

Among the single-shelled gastropod mollusks, the predatory mud Nassarius tegula and the purple and beatic olivella are important in tidal channel and sand flat associations. The ghost shrimp, Callianassa californiensis, valued for bait, is the most abundant crustacean in Tijuana Estuary, particularly in tide-flushed mud and sand flats. In beds on the deeper, sandy bottoms of tidal channels, where high current velocities prevail, the common sanddollar, Dendraster excentricus, is fairly common.

Before the 1978-79 floods, one numerically significant snail, the California horn shell, Certithidea californica, is found only in marsh associations where it feeds on plant detritus. Two other inhabitants of the marsh environment are the gastropod, Melamphris olivacius, and the burrowing fiddler crab, Uca crenulata.

4. Benthic and Pelagic Fish

The waters and bottom communities of Tijuana Estuary provide habitat for 29 fish species in 19 families, including an abundance of small gobie sand sculpins as well as important recreational species of base and flatfish. Studies conducted by the U.S. Fish and Wildlife Service (1980) and Ocean Science and Engineering (1971) have identified the topsmelt, Atherinops affinis, and the California killifish, Fundulus parvipinnis, as particularly abundant species. Topsmelt and the benthic staghorn sculpin, Leptocottus armatus, occur mainly over sandy bottoms and mud-sand transition zones, while killifish use habitats with muddy substrates. Small burrowing gobies, especially the arrowbody, Clevelandia ios, and cheekspot, Ilypnus gilberti, are abundant in fine sand and mud bottoms.

Among recreationally important fish, the striped mullet, Mugil cephalus, was abundant in both surveys. The U.S. Fish and Wildlife Service found significant numbers of California halibut, Paralichthys californicus, and diamond turbot, Hypsopsetta guttulata, estimating their populations at 30,000 and 17,000 respectively. Three bass species utilize the estuary: the kelp bass, Paralabrax clathratus, the spotted sand bass, P. masculatofasciatus, and the sand bass, P. nebulifer. Spotted turbot, Pleuronichthys ritteri, California corbina, Menticirrhus undulatus, white croaker Genyonemus lineatus and the opaleye, Girella nigricans make up the balance of valuable sportfish. Juveniles of each species were documented by the Fish and Wildlife Service.

About half of the species using Tijuana Estuary are year-round residents. The barred sand bass, kelp bass, and shovelnose guitar fish are seasonal or sporadic residents.

a. Larval Fish Use of the Tijuana Estuary

Unpublished studies (Nordby, 1981) revealed densities of larval fish in the estuary as high as 250 times greater than offshore habitats during the peak breeding months of December-January, demonstrating the importance of the area as a nursery. In the main channels, halibut and turbot account for less than 5 percent of the larval fish, anchovy species make up 10-20 percent, and topsmelt account for a similar proportion. The bulk of individuals, 60-70 percent, are goby species. Nearby offshore habitats, while having fewer larval, fish, also have high densities of eggs, with flatfish, together with croakers, accounting for less than 5 percent. Other larval fish have a different composition: 30-40 percent goby species, 25-35 percent queenfish (Seriphus politus), 15-25 percent anchovy species, and 10-15 percent topsmelt.

5. Birds

Reports of the U.S. Fisn and Wildlife Service (1980), San Diego Field Ornithology Club (n.d.) and Boland (1981) indicate that at least 246 species of birds occur at the estuary and river valley. The Fish and Wildlife Service reports that about 69 species rely principally on the estuarine habitat, and another 85 species are found in both estuarine and riparian/upland habitats. Boland's unpublished data has documented that shorebird species are abundant at the estuary, 11 are common, and 35 are rarely encountered. Water-associated birds include grebes, herons, egrets, cormorants, dabbling and diving ducks, shorebirds, gulls and terns, rails and coots, perching birds, and raptors. (See Appendix B, Table 6 for a list of species.)

The proposed sanctuary is the United States southernmost stop in the Pacific Flyway, the channels, mudflats, and sandy beaches of Tijuana Estuary are used by a variety of migrating species. Shorebirds account for the largest portion of the migration. Migratory waterfowl are common in winter months, notably the Pintail, Cinnamon Teal, American Widgeon, Surf Sooter, and Ruddy Duck. Sandbars attract flocks of terns, including Forester's, Elegant, Caspian, and California Least, where these birds rest before diving for fish at higher tide levels (San Diego Field Ornithology Club). The importance of the estuary as a stop on the flyway is underscored by a year long census (San Diego Field Ornitholgy Club, 1974), which found that only 16 of the 89 species identified use the area more than nine months of the year.

Protected Species

The presence of seven bird species, classified as endangered or protected by State or Federal law, is a compelling indication of the relatively undisturbed character of Tijuana Estuary in a region characterized by degraded wetland and estuarine systems. The cordgrass and pickleweed marsh is critical to the survival of the endangered Light Footed Clapper Rail, a subspecies whose population is estimated at just 250 individuals

statewide. An early Fish and Wildlife Study (1974) identified 25 rails in a single day; later estimates placed the Tijuana Estuary population at 75-85 individuals, or one third of the California total. To ensure that the fragile rail population could continue to use the tall cordgrass and low Salicornia marsh for feeding, resting, and escape cover, the U.S. Fish and Wildlife Service purchased 503 acres of wetland and adjacent upland in late 1980, thereby establishing the Tijuana Estuary Wildlife Refuge.

Sand dune and river mouth areas provide nesting sites for the California Least Tern. As many as 100 pairs of nesting Terns were observed prior to 1973, but colonies have numbered only a few pair since then. Brown Pelicans rest at the estuary between foraging trips to offshore feeding grounds. An endangered raptor, the American Peregrine Falcon, forages for prey throughout the estuary and river valley. The most common perching bird using the marsh environment is the Beldings Savannah Sparrow, a species classified as rare by the State. The Black Rail, another marsh inhabitant, has been placed in the State's rare category.

The other birds of prey ranging over the estuary and river valley, the White-Tailed Kite and Golden Eagle, are protected by the State Fish and Game Code. Locally endangered species (San Diego Field Ornithology Club) include the Nesting Snowy Plover, the seasonally-present Elegant Tern, and Bell's Vireo. (See Appendix B, Table 1, for the classification of each State and Federally-protected species.)

a. Shorebird Use of Tijuana Estuary

About 20 species of shorebirds use the tidally-influenced portions of Tijuana Estuary on a fairly regular basis (Boland, 1981). As shown in Figure 13, four species--the Willet, Dowitcher, Western Sandpiper, and Marbled Godwit--account for over three fourths of the individuals counted. These four species were also among the most abundant in the year long census (San Diego Ornithology Club, 1974). Seven other species, including the American Avocet, Dunlin, Least Sandpiper, and Sanderling each accounted for over one percent of the total individuals, in the recent survey, and nine other species make up the balance. Among the less common birds reported are the Snowy Plover, Greater Yellowlegs, and the Northern and Western Phalaropes.

Boland's data reflect a fluctuation of numerical abundance with the season, as well as clear habitat preferences. The four most common species are abundant in each of three sampling seasons, December-January, July-August and October. Others, notably the American Avocet and Dunlin, are numerically significant in winter, but virtually absent in summer. Peak numbers of individual shorebirds occur in winter, but more species are represented during the summer period. Seven of the species show a peak abundance in winter, five are most abundant in summer, five are most abundant in fall, and three species are equally abundant in the summer and fall sampling periods.

SHOREBIRDS OF TIJUANA ESTUARY: ABUNDANCE, SEASONAL USE, AND HABITAT PREFERENCE

Species	Proportion of Total Individuals	[1] Cumulative Total	Season of Greatest Abundance	Preferred Habitat 1st	2nd
Willet	23.4%		Dec-Jan	Sand	Mud
Dowitcher	22.1%	45.5%	Dec-Jan	Sand	Mud
Western Sandpiper	21.0%	66.5%	Dec-Jan	Sand	Mud
Marbled Godwit	9.3%	75.8%	Oct	Sand	Mud
American Avocet	5.5%	81.8%	Dec-Jan	Sand	Mud
Dunlin	4.0%	65.8%	Dec-Jan	Sand	Mud
Least Sandpiper	3.9%	89.2%	Oct	Sand	Mud
Black BP	3.6%	92.8%	Dec-Jan	Sand	Mud
Red Knot	2.0%	94.4%	Dec-Jan	Sand	Mud
Sanderling	1.5%	96.4%	July-Aug	Shore	Shore
L. Bill Curlew	1.0%	97.4%	July-Aug/Oct	Mudbottom	Sand
Snowy Plover	.8%	98.2%	July-Aug	Sand	Shore
Whimbrel	.5%	98.7%	July-Aug	Sand	Mud
Greater Yellow Legs	.5%	99.2%	Oct	Sand	Mud
Ruddy Turnstone	.4%	99.6%	July-Aug	Shore	Sand
Killdeer	.3%	99.9%	Oct	Mud	Sand
Semipalamated plover	*		Jul-Aug	Sand	Mud.
Black NS	*		July-Aug/Oct	Mud/Sand	N.S.
Western Phalarope	*		July-Aug	Sand	N.S.
Northern Phalarope	*	100.0% [2]	July-Aug/Oct	Mud/Mudbottom	N.S.

Source: Boland. Seasonal abundances, habitat utilization, feeding strategies and interspecific competition within a wintering shorebird community and their possible relationships with the latitudinal distribution of shorebird species. San Diego State University M.S. Thesis, 1981.

[1] Birds are ranked approximately .1% of total in order of abundance aggregated over three sampling seasons.

[2] Adjusted to correct rounding error.

Tijuana Estuary is comprised of five distinct types of shorebird habitats: shore, sand, mud, mudbanks, and marsh. Sandflats are the preferred habitat for fourteen of the twenty species, and most individuals were observed there. Mudflats are second most significant in terms of numerical abundance of individuals. Only the Killdeer is most abundant in mudflats. Mudflats are the second preferred habitat for twelve species. The Long Billed Curlew is most abundant in mudbanks, a habitat used by 8 other species. Two species, the Sanderling and Ruddy Turnstone, are most common in the shore habitat; seven other shorebirds were also observed. The marsh, principal habitat for the endangered Light Footed Clapper Rail, is used by only four species of shorebirds: the Dowitcher, Willet, Marbled Godwit, and Long Billed Curlew.

6. Mammals

The lower Tijuana Valley provides habitat for twenty species of mammals, including mice, and rabbits. Small herbivores include brush and desert cottontail rabbits, the California ground squirrel, and several species of mice, notably the San Diego pocket mouse. Large carnivores found in the lowlands include the grey fox, coyote, and an occasional bobcat. Several predators depend upon ecotones or edges between habitat types where larger concentrations of prey are found. Riparian areas in the river valley are particularly important in providing water and shelter.

7. Amphibian and Reptiles

One amphibian, the Pacific treefrog, has been reported in the riparian and pool areas of the Tijuana River Valley. Eight reptiles are present in the scrub-dominated areas including the Southern alligator lizard, four species of lizards, the gopher snake, and two species of rattlesnakes.

I. Existing and Proposed Land Use

Principal land uses existing and proposed for the area within the proposed sanctuary are resource conservation and agriculture. A majority of the area proposed for inclusion is already devoted to preservation and public use on Border Field State Park, the U.S. Fish and Wildlife Service Refuge, and Imperial Beach Naval Air Station. Both the State Park and the Refuge are slated for open space use in perpetuity, with light recreational use encouraged at the State Park. Moderate expansion is possible on Navy land north of Sunset Avenue, subject to constraints imposed by floodplain hazards and endangered species management.

Flooding during the winters of 1979 and 1980 has removed much of the lowlands once used for agriculture from productive use. Alfalfa, vegetables, and other truck crops have previously been grown in the area. Some of the owners of these properties are attempting to restore the productivity of these lands while others have not been improved significantly. The Local Coastal Program for the Tijuana Valley contemplates continued resource management/agriculture for the area.

Portions of the uplands near the southeastern boundary of the proposed boundary have been targeted to sand and gravel excavaton, subject to environmental controls imposed by the County of San Diego and regulatory agencies. These areas are not presently subject to any certified Local Coastal Program.

Around the periphery of the proposed sanctuary, residential and visitor serving facilities are proposed for the coastal areas west of First Street and above Coronado Avenue in Imperial Beach. The Imperial Beach Naval Air Station houses a helicopter training facility including runways, storage and maintenance buildings, and administration buildings. Land uses east of 19th Street are devoted to agriculture, ranching, equestrian activities, and low density residential use.

J. International Consideration

The Governments of the United States and Mexico, pursuant to provisions in the Treaty of February 3, 1944, for the Utilization of the Waters of the Colorado and Tijuana Rivers and of the Rio Grande (59 Stat. 1237) have jointly undertaken measures and works in the Tijuana River area at the boundary for control of river floods for emergency deliveries of water and for resolving border sanitation problems.

Under the 1944 Treaty, the two Governments through their joint International Boundary and Water Commission undertook works in their respective territories for a coordinated plan for control of floods from the Tijuana River. Under the plan, Mexico, between 1972 and 1979, constructed a concrete-lined channel for 2.5 miles to meet a similarly designed channel at the boundary, constructed by the United States as a dissipator structure between 1978 and 1979 so as to reduce the velocity of floods from Mexico and spreading these for their natural flow into the Tijuana Estuary.

Also, the Governments through the International Boundary and Water Commission in 1972 (TIAS 8412) entered into an agreement for use of the Southern California aqueducts to deliver a portion of the waters of the Colorado River allotted to Mexico for use on an emergency basis in the City of Tijuana. That agreement remains in force on a standby basis.

With respect to sanitation problems, the two Governments through the International Boundary and Water Commission in 1965 entered into an agreement for emergency use by a rapidly growing City of Tijuana, Mexico of the sewage disposal system of the City of San Diego and jointly constructed an emergency connection line to effect the agreement. The

connection is designed to prevent overflows on the surface of sewage from Tijuana into the United States during periods of breakdowns to the Tijuana disposal system that relies heavily on pumping.

In more recent years, the two Governments through the International Boundary and Water Commission in September 1979 reached agreement for the solution of border sanitation problems which specifically confers to this Joint Commission the responsibility and jurisdiction to effect the provision in the 1944 Water Treaty that the two Governments shall give preferential attention to the solution of border sanitation problems. Following instructions of the Presidents of the United States and Mexico, in September 1979 the International Boundary and Water Commission is at work seeking supplementary agreements for specific solutions to existing border sanitation problems, including one at San Diego - Tijuana, where breakdowns to the sewage disposal system at Tijuana and the resulting excessive use of an emergency sewage connection to the City of San Diego present a threat to the health and well-being of inhabitants on both sides of the border and to the beneficial use of the waters of the Tijuana River and of the surf waters near the boundary.

At this time, this Commission is engaged in negotiating an agreement for solution of the sanitation problem in the Tijuana area, with a view to completing an agreement this year. One of the possibilities for permanent solution of the problem is a joint waste treatment plant located in the lower Tijuana River Valley, to handle wastes from both San Diego and Tijuana.

PART IV: ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

A. Environmental Impacts of the Proposed Action

1. Local Impacts

a. General Impacts

Awarding a land acquisition grant by NOAA/OCZM would enable the State of California to purchase additional wetlands, lowlands, and uplands, which, combined with other protected lands already owned by the State, Federal, and local agencies, would establish a National Estuarine Sanctuary representative of arid region estuaries of the Californian Biogeographic Classification.

Designation of this estuarine sanctuary is expected to have several positive impacts. As a base for research and education, the sanctuary should enrich the understanding of estuarine ecosystems and resources. These research efforts will provide the foundation for a more effective program to preserve, protect, utilize and manage the Tijuana River Estuary and other wetland and estuarine ecosystems.

Educational programs to be carried out through the sanctuary will expose residents of Imperial Beach, the City of San Diego, and the greater San Diego metropolitan area to aspects of estuarine ecology and physiography, and the natural history of familiar plants and animals. Guided walks, studies, and interpretive programs will be developed and programmed to all educational levels from elementary school through secondary levels of education. Growing public knowledge and awareness of the complex nature of estuarine ecosystems will generate support effective land use planning and resource management. Through its open processes of site selection, establishment, and management, Tijuana River Estuarine Sanctuary can be the cornerstone of a popular initiative to protect Southern California wetlands and estuaries.

Conceived as a program for cooperative resource management, the estuarine sanctuary will link together existing State, Federal, and international efforts already underway. The sanctuary will provide a single "umbrella" for public lands in the Tijuana Estuary now held and managed by the U.S. Fish and Wildlife Service, the Department of Parks and Recreation, the U.S. Navy, and the City of San Diego. Tijuana River will be the first estuarine sanctuary in the Nation to couple estuarine conservation and preservation of viable agricultural land through a lease back arrangement.

The Advisory Committee and Subcommittees on Agriculture, Water Quality, and Research and Education, will provide a forum to provide technical advice to the appropriate agencies in the solution of environmental problems in the larger region. Special emphasis will be directed toward joint initiatives for research and estuary management between the United States and Mexico as may be appropriate with the understanding in subsection (e)(2) of the Coastal Zone Management Act of 1972, 16 USC 1456.

b. Impacts on Geology, Soils, and Hydrology

While specific regulations are not envisioned now, the estuarine sanctuary should have a positive impact on preserving adequate flows of freshwater into the estuary and maintaining soils suitable for agriculture. A particular goal of the program of acquisition and lease back will be to control erosion of land in the floodplain and uplands, and the accelerated rates of sediment deposition that result. Acquisition of land will also preclude the development of commercial and industrial uses in areas subject to flooding and seismic liquefaction. The Water Quality Subcommittee will invite membership of those agencies charged with monitoring and regulation of water quality and supply. The involvement of these government bodies should improve the coordination of resource protection and planning.

c. Impacts on Community Structure, Vegetation, and Wildlife

The Tijuana River Estuarine Sanctuary will embrace over 1,100 acres of tidal channels, salt marsh, mudflats, and mudbanks as well as adjacent riparian, cultivated, agriculture, and coastal upland communities totalling over 2,400 acres.

A permanent refuge will be provided for over 250 species of birds, 54 species of invertebrates, 29 species of fish, 20 species of mammals, and 9 reptile and amphibian species.

The habitat of at least eight endangered or rare species will be preserved, including the Light Footed Clapper Rail, Least Tern, and Beldings Savannah Sparrow.

The Management Program carried out under the auspices of the estuarine sanctuary will be directed to habitat maintenance, limited restoration, preservation of natural diversity, and compatible uses.

Harmful changes in the natural physiography of the Tijuana River and Estuary will be prevented, and natural fluctuations in the biotic community structure will follow their own course. Limited short-term manipulative research, that will be closely monitored by NOAA/OCZM and the State, is envisioned, but the net effect of these studies is expected to be positive. Research will be encouraged that provides an understanding of community structure and function and provides insights for habitat enhancement and restoration. Additionally, the research and resource management undertaken at Tijuana River should foster companion projects that will protect community resource values at other Southern California estuaries.

d. Impacts on Land Use

An immediate consequence of the sanctuary will be to stabilize the entire mosaic of wetland and salt marsh in open space/resource conservation, and to preserve the open character of the lower Tijuana Valley east of 19th Street.

A small portion of the land once used for agriculture, recently damaged by flooding, will be acquired as an open space buffer. Agricultural uses will be permitted and encouraged throughout most of the Tijuana Valley provided that the best available techniques are rigorously employed to control erosion.

Sand and gravel mining already underway in the Border Highlands will continue. Portions of the Border Highlands are proposed for acquisition and lease back. This strategy is intended to permit reasonable use of the resource and to ensure after extraction is complete, that the best available land restoration and replanting techniques are employed to preserve valuable upland habitat and to control erosion and accelerated sedimentation of the wetland habitats of Tijuana Estuary.

2. State and Federal Impacts

Introduction

Sanctuary designation is a logical mechanism to unify the many resource planning initiatives already underway in the lower Tijuana Valley and Estuary. It is singularly well suited to bridging the gap between stewardship of public land, regulation of private land, and protection and management of natural resources that are not confined to particular property boundaries. While the orientation of the program is definitely one of preservation, protection & utilization, the intent of sanctuary designation is to foster uses of the estuary and Tijuana Valley that are compatible with the longterm maintenance of a diverse and productive estuarine ecosystem. Since the designation itself does not confer any new regulations, it is vital that the Tijuana River Estuarine Sanctuary be brought to fruition with the cooperation and support of the many government agencies with jurisdiction or interest in the area. A generally positive relationship between the estuarine sanctuary and public and private interests is anticipated.

B. Relationships Between Estuarine Sanctuary Designation and Other Resource Management Programs

1. Adopted Local Coastal Programs and General Plans

a. City of Imperial Beach LCP

The City planning staff is now revising early drafts of the land use portion of the City's local coastal program (LCP), and is expected to pass the document to the City Council for consideration in late 1981. Following City action, the first phase of the LCP will be submitted to the State Coastal Commission sometime in September 1981. A review by the State Coastal Commission to certify that plan policies conform to the Coastal Act is the final step in approval of the City's land use plan. The second phase of the LCP, consisting of zoning ordinances to implement the land use plan, must follow the same procedures for review and certification.

The Coastal Commission expects to give close attention to several issues before the LCP can be certified. Establishment of the Tijuana River Estuarine Sanctuary will directly support certification of a land use plan and implementing ordinances consistent with the Coastal Act. The Federal and State action will also support polices for protection of the northern portion of the estuary, thereby carrying out the following Coastal Act policy:

> The biological productivity and the quality of coastal waters, streams, wetlands, (and) estuaries...appropriate to maintain optimum populations of marine organisms shall be maintained, and, where feasible, restored through controlling runoff, preventing depletion of groundwater supplies and substantial interference with surface water flow...maintaining natural vegetation buffer areas to protect riparian habitats and minimizing alteration of natural streams. (§30233)

Similarly, the designation and management of the sanctuary supports preparation of an LCP that conforms to Coastal Act policies for protection of sensitive habitat areas:

> Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas.
>
> Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas. (§30240)

Since the Tijuana River Estuary is a proven attraction for educational users and other visitors, conferring sanctuary status on the area will provide additional research, education and general use by the public, thereby reinforcing the need for visitor-serving facilities adjacent to the estuary, as outlined in the Coastal Act:

> The use of private lands suitable for visitor-serving commercial recreation facilities designed to enhance public opportunities for coastal recreation shall have priority over private residential, general industrial, or general commercial development, but not over agriculture or coastal-dependent industry.

The sanctuary will also support the use of coastal areas in Border Field State Park for recreation consistent with §30220 and §30222 of the Coastal Act.

b. Tia Juana Valley Segment, City of San Diego LCP

The estuarine sanctuary proposed for Tijuana River and vicinity is consistent with the land use plan adopted as part of the LCP for the Tia Juana Valley Segment of the City of San Diego. The LCP represents a revision of the 1976 Land Use Plan, modified to reflect conditions added by the Coastal Commission to strengthen protection of natural resources, maintenance of agricultural land uses and provision of facilities to serve visitors. Land acquisition proposed for the sanctuary is entirely consistent with the LCP designation of the portion of the river valley west of 19th street as Resource Management: Limited Agriculture/Recreation.

Sanctuary boundaries complement the LCP stipulation that only uses dependent on the resources are allowed in the following environmentally sensitive areas: channels and ponds, mudflats and saltflats, freshwater and saltwater marshes, riparian habitat areas, nursery and breeding areas for fish and wildlife, and salt pans. Furthermore, land acquisition and management for research, education, and other compatible uses will specifically implement the requirements that buffer strips at least 100 feet wide be maintained around the periphery of important habitats, and that access to the buffer areas be limited.

Sanctuary designation is also consistent with the following resource protection provisions of the LCP:

- Agricultural activities are to employ soil conservation practices to minimize soil erosion and sediment loading in the estuary.
- The application of fertilizers and pesticides is to be strictly regulated.
- Diversion of stream flow and disturbance of riparian vegetation can only be accomplished after a finding that the estuary will not be harmed.

Through its recommendation for acquisition and lease back of agricultural land, the sanctuary will help implement LCP policies restricting the subdivision of agricultural land. Sanctuary boundaries are drawn so as not to interfere with development of areas along Interstate 5 identified as appropriate for residential use. The sanctuary proposal directly supports LCP policies calling for view protection from major roads, and for restoration of visual quality. Acquisition and leaseback of agricultural lands in the floodplain fringe will ensure that the visual quality of these areas remain high.

c. Border Highlands Segment, City of San Diego LCP

An initial review of the LCP by the San Diego Regional Coastal Commission at a public hearing on June 12, 1981, resulted in denial of the LCP as originally submitted. At its July 1981 public hearing, the State Coastal Commission approved the LCP with the following conditions:

1) A runoff control plan with performance standards shall be established to minimize erosion, control runoff on site, and ensure that runoff is discharged at non-erosive velocities.

2. A licensed engineer qualified in hydrology and hydrolics shall prepare a runoff and sediment control plan. Runoff control shall be accomplished through on-site catchment basins, detention basins, and siltation traps. These measures will ensure that discharge will not exceed natural levels given the most intensive rainfall by a hypothetical ten-year storm.

3. The City of San Diego will work with the International Boundary and Water Commission and the State of Baja, California to resolve problems related to erosion control and sewage effluents.

The LCP also calls for:

1. Maintaining the hillsides that face Monument Road in their natural state.

2. Replanting debilitated areas with natural vegetation.

3. Limiting excavation areas at one time to 3-7 acre units.

4. Maintaining large contiguous areas with natural vegetative cover.

The estuarine sanctuary proposal is consistent with the LCP. Purchase-leaseback arrangements will be designed to ensure full implementation of the LCP.

2. Imperial Beach Naval Air Station Program

Two significant areas in U.S. Navy ownership are proposed for inclusion within the Tijuana River Estuarine Sanctuary. A 263 acre area already leased to Border Field State Park, and an additional area, estimated at 340 acres, in the southern portion of the Imperial Beach Naval Air Station. If the estuarine sanctuary is established, the U.S. Navy will consider leasing all their lands within the proposed sanctuary boundaries to the U. S. Fish and Wildlife Service, except those that historically have been encumbered by leases.

Several activities generally incompatible with sanctuary goals are carried out on the northern portion of the Naval Air Station--an area not proposed for inclusion in the sanctuary. A Master Plan is underway for the entire southern portion of the Naval Air Station. This process must

respond to expansion needs dictated by nationwide security considerations, and must comply with Federal flood guidelines, the National Environmental Policy Act, and the Endangered Species Act.

In response to these Federal requirements, the Natural Resources Management Branch of the NAS North Island's Staff, Civil Engineering Department now operates a program of resource conservation at OLF Imperial Beach.

Since the proposed sanctuary management program is not intended to exert any "veto power" over the Navy's internal master planning process, and will not impose any new regulations, the sanctuary should be entirely compatible with U.S. military objectives. As one of the members of the Sanctuary Management Authority, the Navy will be in a position to ensure that its own goals are integrated with planning for adjacent areas.

Given the sensitive habitats within the Navy property, the need to maintain a buffer between Navy uses and other activities, and the existence of a 100-year floodplain within the area, no expansion into the undeveloped portion of their lands within the proposed sanctuary boundaries is planned.

3. Tijuana Estuary National Wildlife Refuge--U.S. Fish and Wildlife Service

The U.S. Department of the Interior, through the U.S. Fish and Wildlife Service, has obtained title to 505 acres of land in the lower Tijuana Valley from Helix Properties. (See Appendix D, "Ownership - Lower Tijuana Valley".) This land acquisition created a National Wildlife Refuge for the purpose of conserving the habitat of the endangered California Light Footed Clapper Rail (Rallus longirostris levipes), consistent with the Endangered Species Act of 1973. Land purchase was accomplished in December 1980 and an on site manager for the area has been designated. The area will be administered by the U.S. Fish and Wildlife Service and will be subject to the regulations and policies governing access and use of lands within the National Wildlife Refuge.

In the Environmental Assessment for the Proposed Land Acquisition, the Fish and Wildlife Service noted:

> The feasibility of the service leasing and managing the U.S. Navy property within the estuary will be explored. It is essential that the service seek a cooperative agreement with the California State Parks Department to allow service input on that portion of Border Field State Park considered essential Clapper Rail Habitat.

The proposed boundaries of the estuarine sanctuary will embrace the Fish and Wildlife Service Refuge, Border Field State Park, and portions of the U.S. Navy ownership. All three land owning agencies will be principals in the Sanctuary Management Authority. The management authority

will work towards unified goals for the public lands within the sanctuary, as well as additional private lands acquired for the sanctuary. Sanctuary policies, however, will not override specific management techniques prescribed for the refuge.

In advocating the incorporation of the Tijuana Estuary Wildlife Refuge within the estuarine sanctuary, this proposal draws on the precedent set for Florida's Apalachicola River/Bay Estuarine Sanctuary. There, the sanctuary boundaries were drawn to include all of the 12,490 acre St. Vincent's Island National Wildlife Refuge.

Establishment of the Tijuana Estuarine Sanctuary is, therefore, consistent with past actions as well as the administrative goals of the U. S. Fish and Wildlife Service. In addition, the proposed programs for land acquisition, management, research, and education will implement the following objectives of the refuge:

- Develop a land use management plan, adapted to the capabilities and limitations of the natural resources and surrounding environment.
- Acquire privately owned marshlands for natural resource preservation and enhancement.
- Maintain the Tijuana River Valley as a green belt zone downstream of the proposed flood dissipation system.
- Encourage compatible educational and scientific uses of the estuary and surrounding river valley.

As one of the members of the Sanctuary Management Authority, the U. S. Fish and Wildlife Service will be in a position to accomplish these goals, as well as more site specific goals for habitat restoration. Furthermore, the management structure proposed for the sanctuary will better integrate the refuge with other resource planning in Tijuana River Valley through the advisory committees and special subcommittees.

4. Border Field State Park

The proposed estuarine sanctuary will embrace all of the Border Field State Park, as well as U.S. Navy land leased to the Department of Parks and Recreation. The management plan prepared for the sanctuary will provide general guidelines for development and preservation within its confines, and should address the specific needs of the State Park.

A 1974 document, Resources Management and General Development Plan for Border Field State Park, sets forth general guidelines for the area. The overriding theme is recognition of the natural value of the estuarine system and the proposal that the estuarine system be preserved in as natural a condition as possible. Development of a small day use facility on Monument Mesa, as proposed by the Plan, has been accomplished. Flooding has complicated other planned developments, which included 40 camp units, 280 parking spaces, and 2 miles of trails.

Establishment of Tijuana River as an estuarine sanctuary is compatible with development already accomplished on Monument Mesa. In addition, sanctuary designation is complimentary to the Declarations of Unit Purpose and the Management Policy for Border Field State Park. The sanctuary will help to implement several specific objectives.

- Protect, restore, and perpetuate the scenic features and ecological integrity of the large and extensive lagoon system at the mouth of Tijuana River, together with its relation to ocean and marshlands.
- Protect and perpetuate the integrity of the coastal strand.
- Identify, protect, and perpetuate all areas of botanical significance including any and all rare and endangered species, together with the ecological integrity of such areas.
- Identify rare and endangered animal species, which find their habitat within the park, and provide for their perpetuation in a natural state.
- Enhance public knowledge and understanding of estuarine ecosystems.
- Enhance public knowledge and understanding of endangered species and their habitats.

As a member of the Sanctuary Management Authority, the Department of Parks and Recreation will have an opportunity to ensure that State Park planning is integrated with planning for adjacent areas. The current education program in Border Field State Park will be complemented by the sanctuary education program and the work of the Research and Education Subcommittee.

5. Planning for Wastewater Treatment Facilities

As the first of three steps in the development of wastewater treatment development (planning, design, and construction), The Metropolitan Facilities Plan was prepared for the City of San Diego in 1977. The plan established the need for additional sewage treatment capacity in the City, and described 38 alternative sites, of which 6 were identified as most valuable. Each of the preferred sites included a new 190 million gallons per day (mgd) ocean outfall and substantial treatment facilities in the Tijuana Valley. A proposal not included in the plan was submitted by the City which identified a site near the intersection of Monument Road and Hollister Road for facilities development. In reviewing this plan, the CCC determined that locating a treatment facility at the Monument Road site would not be consistent with the Coastal Act. This finding reaffirmed Commission actions on 2 permits, 284-77 and 285-77, which bought appeals to the State Commission seeking construction of single-family homes. In both appeals, the Commission found that the need to protect agricultural land, and the need to reserve a suitable site for a sewage treatment facility in the Tijuana Valley took precedence over new residential construction.

The Tia Juana Valley LCP (City of San Diego, 1979) reserves a 200-acre site near Sunset and 27th Street for a regional sewage treatment facility pursuant to the Coastal Act which states:

> The Commission shall provide for required reservations of sites for the construction of sewage treatment works and points of discharge within the coastal zone adequate for the protection of coastal resources... (§30524)

This site reservation lapsed on March 13, 1981 and was renewed for a period of three months and expired on June 13, 1981. An amendment to the LCP will be required before any alternative sites can be reserved for a sewage treatment facility. As of August 1981, the Sunset and 27th Street site remains undeveloped and available as a site.

The planning by the City of San Diego for additional wastewater treatment facilities in the Tijuana Valley assists the International Boundary and Water Commission in developing alternatives for a long-term solution to the border sanitation problem at San Diego - Tijuana: One of the possibilities for permanent solution of the problem is a joint waste treatment plant located in the lower Tijuana River Valley, to handle wastes for both San Diego and Tijuana.

Recent correspondence from EPA to the Coastal Commission (April 10, 1981), and from the City of San Diego to the Coastal Commission (April 9, 1981) expresses interest in construction of a facility to serve both the United States and Mexico, perhaps at a site other than the reserved site at Sunset and 27th. Concern has been raised about possible contamination of the Tijuana River and South San Diego County beaches as more sewage is pumped through Mexican connector lines, which are operating to capacity, to a surf discharge several miles below the border. Also, recent correspondence from the United States Section, International Boundary and Water Commission (May 8, 1981) advises that at this time that Commission is engaged in negotiating an agreement for solution of the sanitation problem in the Tijuana area, with a view to completing an agreement this year; further, it advises that in view of the hazard posed by the Tijuana sanitation problem to the health of citizens on both sides of the boundary including those using the ocean beaches, and the estuary itself, and of the status of negotiations with Mexico toward a solution of the problem, this agency must oppose the designation of the Tijuana River estuary as a National Estuarine Sanctuary, if such designation would preclude the construction of a joint waste treatment plant in the lower Tijuana River Valley.

Any change in the Sunset and 27th Street reservation will require an amendment to the Local Coastal Program, and must be found consistent with Coastal Act policies on preservation of agricultural land, view protection, and maintenance of wetlands, water quality, and sensitive habitats.

The management structure of the Estuarine Sanctuary can respond to water quality issues in the Tijuana Valley through recognizing the prerogatives reserved to the International Boundary and Water Commission by subsection (e)(2) of the Coastal Zone Management Act of 1972. A representative of the water quality agencies, and a representative of the government of Mexico and/or Baja, California will be invited to serve on the Sanctuary Advisory Committee. A water quality subcommittee will be established with membership invited from the EPA, the United States Section of the International Boundary and Water Commission, the Regional Water Quality Control Board, a representative of the government of Mexico, a member from Baja, California, and a representative of those agencies in the Executive Branch of the State of California.

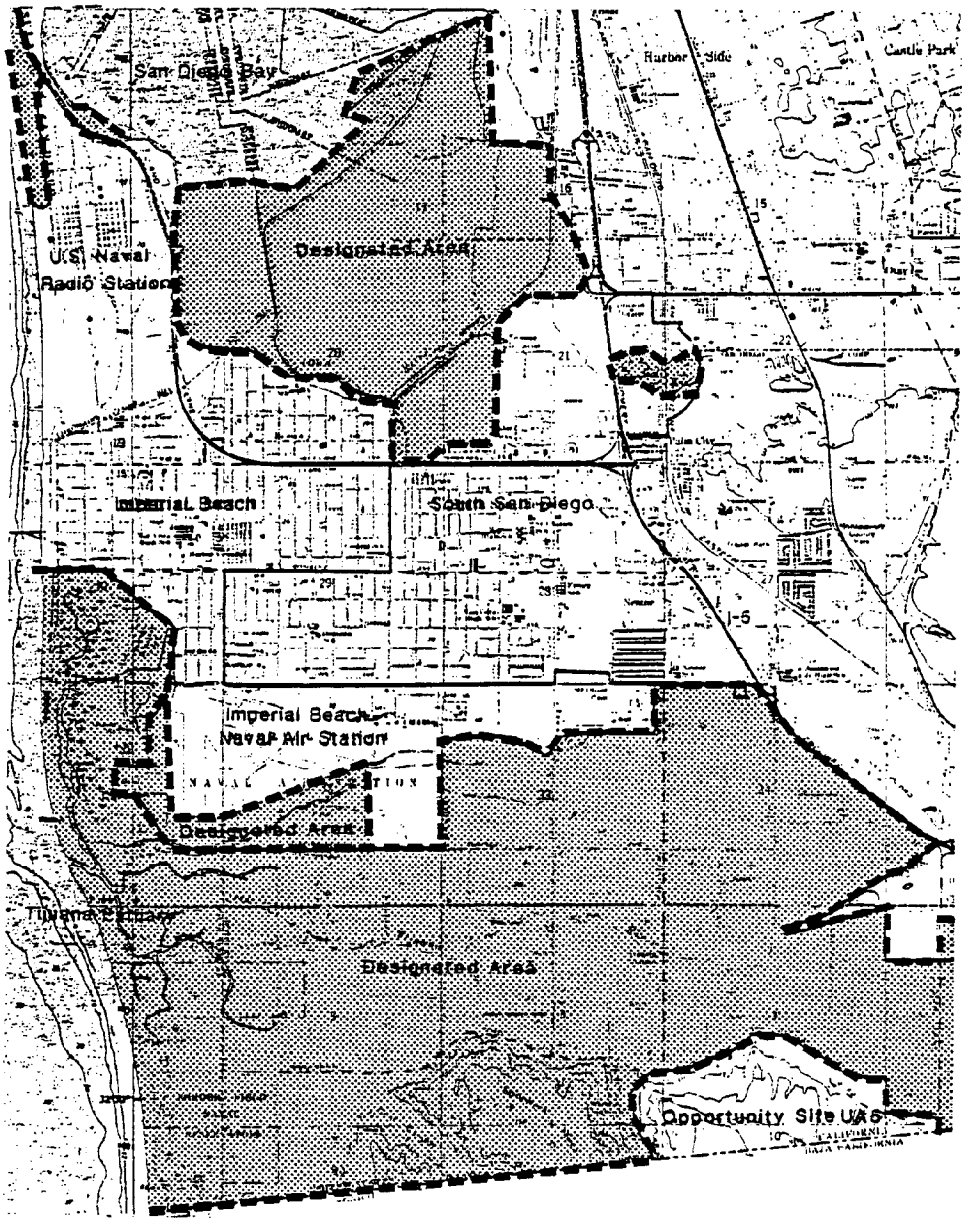
6. Planning for Future Electrical Generating Capacity

The California Coastal Commission is authorized to prepare and periodically update a statewide study designating areas where the location of a thermal power plant (50 MW or greater) would prevent achievement of coastal resource protection goals. In other words, the designations identify areas where power plants should not be sited. The core wetland area of Tijuana Estuary was designated, but several adjacent areas are presently undesignated (Figure 14). As part of its long range planning efforts, the Energy Commission, California's power plant siting authority, has prepared a study that continues the Coastal Commission's work. The draft study (March 1981) examines opportunities for locating coastal power plants. Some 200 individual undesignated sites were initially examined for power plant opportunities, using 27 environmental and technical screening factors. Most areas were deleted because of air quality problems or insufficient land area, but Tijuana Valley emerged as one of nine areas where opportunities may exist for future power plant siting.

As shown in Figure 14, the study identifies an undesignated area (UA) near the Tijuana River as an "opportunity". Opportunity site UA 5 is located on the mesa, east of Smugglers Gulch and south of the wetland. The initial analysis identified two other sites near Tijuana River: one at the Navy Radio Station and the second at the southern portion of the Imperial Beach Naval Air Station, just north of one arm of the slough system. Both were dropped in response to concerns about unacceptable impacts to natural resources and interference with Navy operations. The Energy Commission has identified a number of moderate to severe constraints building a power plant near Tijuana River, notably liquification hazards, risks to rare and endangered species, and conflicts with the wetland, estuarine, and natural area values. A particular concern is the set of impacts associated with building the cooling water pipeline to serve the potential sites.

The number of factors to be considered in California's power plant siting process will make development of the remaining Tijuana River site unlikely in the foreseeable future. The current Supply and Demand Forecast through the year 2000, adopted in the Energy Commission's 1981 Biennial Report, has not shown the need to develop any of the nine "opportunities"

Possible "Opportunity" Sites for Future Thermal Power Plants



Source: Opportunities for New Coastal Power Plants in California' (Final Draft Staff Report): California Energy Commission March 1981
'Coastal Power Plant Designation Areas', California Coastal Commission 1979

FIGURE 14

(areas) during the period 1980-1992. Recent analyses completed by the Energy Commission reflect a much slower rate of increase in new electricity demand--the result of growing public awareness, more accurate forecasting, and more effective use of conservation measures and alternative sources.

Both Energy Commission recommendations and Coastal Act policies call for expansion of existing coastal facilities as a first response to new electricity needs. Energy Commission staff have shown that there are 7,600 to 10,000 MW of capacity at the 20 coastal power plants. More modest opportunities (3,700 to 4,800 MW) exist at the nine coastal opportunity sites. Second priority would go to new sites next to existing facilities, and other new coastal sites would be developed last. The study suggests that the analysis of sites should be used by the responsible agencies in a collaborative effort to set priorities for the use of coastal sites. Finally, the Energy Commission intends to evaluate inland areas as well as coastal sites in planning to meet new electricity demands. Actual development of any of the sites will require Energy Commission certification after detailed study and compliance with the California Environmental Quality Act.

The Energy Commission has recommended that the Coastal Commission adopt a partial designation of Tijuana River to allow development of underground ancillary facilities, such as pipelines, while prohibiting power plants themselves. The Coastal Commission staff believes this would be premature since there is little demand for new sites before 1992 or 2000, and some 7,600 to 10,000 MW of expansion opportunities exist at other sites. Under Section 25526 of the Public Resources Code, the Coastal Commission can allow ancillary facilities through a designated area if analysis of a specific proposal determines that such facilities would be consistent with primary use of the land and would not cause substantial adverse environmental impacts. The Commission can require specific mitigation measures during this process to assure that the development is consistent with Coastal Act policies.

C. Relationship Between Local Short Term Uses of the Environment and the Maintenance of Long-Term Productivity

Establishment of an estuarine sanctuary at Tijuana River is the logical next step in a series of actions undertaken in the Tijuana Valley to preserve the long-term productivity of the environment. These actions have included the designation of Border Field State Park in 1974, the certification of a Local Coastal Program in 1979, and the purchase of the majority of the wetland by the U.S. Fish and Wildlife Service in December 1980.

Without designation of the sanctuary, it is possible that intense short-term uses, such as residential or commercial development, might eventually be carried out in a more relaxed regulatory climate. While the proposed purchase and lease back of portions of the floodplain and uplands east of 19th Street will have an effect on agricultural use and sand and gravel excavation, it will not prevent these economic activities. Rather, all significant uses in the Tijuana Valley will be managed to ensure long-term productivity.

D. Irreversible or Irretrievable Commitment of Resources

Within the proposed sanctuary, there are no resources that will be irreversibly or irretrievably lost, and there appears to be no major, unavoidable, adverse environmental effects from its establishment. Agriculture will be precluded on a portion of the land to be acquired. After a reasonable period of productive sand and gravel mining, managed to be compatible with the sanctuary, the portions of Border Highlands west of 19th Street will no longer be subject to mining, thus stabilizing erosion and contribution of sediment from this area.

Should the 200-acre parcel be purchased from the San Diego Gas and Electric Company, a future energy production site would be irretrievably lost.

PART V: LIST OF PREPARERS

Mr. Scott McCreary - California Coastal Commission

Mr. McCreary has B.A. degrees in Biology and Environmental Planning and a Master's degree in Environmental Planning. He has completed numerous planning projects in coastal resource protection, land use regulation, and development of alternative energy sources. As an Associate in the Coastal Resources Program of the Conservation Foundation, he was lead planner in developing a shoreline strategy for the Apalachicola River/Bay, Estuarine Sanctuary in Florida. He has participated in coastal management efforts for Honolua Bay, Hawaii; Big Sur and Elkhorn Slough, California; and Winyah Bay, South Carolina, and has authored several articles.

Currently an Analyst with the Technical Services Division of the California Coastal Commission (CCC), Mr. McCreary is Project Manager for this DEIS. Primary responsibilities included organizing the Coastal Commission's work on the sanctuary, coordinating the Sanctuary Advisory Committee, and preparing the discussions of Alternatives, Affected Environment, and Environmental Consequences, as well as the Appendices. Previously, he was employed by the Estuarine Sanctuary Program of the U.S. Department of Commerce where he worked with the California Coastal Commission to complete the site selection for the Tijuana River Estuarine Sanctuary. He is the primary author of this FEIS.

Mr. James W. MacFarland - Office of Coastal Zone Management

Mr. MacFarland received his B.A. and M.A. in Economics and has previously prepared land acquisition strategies, purchased land, acted as a consultant, and analyzed the socioeconomic impacts of land preservation for major land conservation organizations. He is an author and recognized expert on natural resource protection.

Currently, he is the Estuarine Sanctuary Program Manager for the Office of Coastal Zone Management within the National Oceanic and Atmospheric Administration. His present position includes direct project responsibility for nine existing estuarine sanctuaries and the establishment of future estuarine sanctuaries.

Primary responsibility in the preparation of this FEIS included organization of the report for publication, including assisting the State in preparing responses to public comments.

Mr. Milton H. Martin - Washington State Department of Ecology

Mr. Martin is an environmental planner for the Washington State Department of Ecology. From July 1980 through June 1981, he was on a one-year leave of absence from the State to work with the NOAA/OCZM Estuarine Sanctuary Program Office. He was the Project Manager for the Tijuana River Estuarine Sanctuary proposal during the DEIS stage. He was responsible for the overall direction, and organization of the DEIS for publication.

Mr. Martin's background is in the field of Administration and Management in public recreation and parks, where he has held the following positions since 1959: Director, Parks and Recreation Department, Vancouver, Washington; Superintendent, Parks and Recreation Department, Benton County, Washington; Assistant Director, Washington State Parks and Recreation Commission; and Assistant Administrator, Washington State Outdoor Recreation Agency.

Mr. Martin is the 1980 recipient of the Washington State Environmentalist of the Year Award for Washington State appointed officials.

Ms. Gloria D. Thompson - Office of Coastal Zone Management

Ms. Thompson is a Program Support Specialist for the Estuarine Sanctuary Program Office. Her major responsibilities in the preparation of this document for publication included overall coordination, incorporation of revisions, editing the FEIS, and assisting in responding to comments.

Ms. Mary Sager - California Coastal Commission

Ms. Sager is a Coastal Analyst in the Technical Services Division of the CCC. She has a B.S. in Environmental Sciences. Ms. Sager assisted in the preparation of graphics for this FEIS.

Mr. Loren Loo - California Coastal Commission

Mr. Loo is a staff assistant in the Mapping Section of the Technical Services Division of the CCC. He has an Associate degree in Science, and is currently completing undergraduate requirements for a B.S. in Urban Sciences. Mr. Loo prepared several maps and figures for this FEIS.

Mr. Jon Van Coops - California Coastal Commission

Mr. Van Coops is a Coastal Analyst in the Technical Services Division of the CCC. He has a B.A. in Geography. Mr. Van Coops assisted in the preparation of graphics for this FEIS.

Acknowledgments

The Estuarine Sanctuary Program Office wishes to acknowledge the clerical assistance from Ms. Lois Mills in assisting in the preparation of this FEIS.

Several individuals provided vital assistance in the preparation of this FEIS. William Travis, Deputy Director, and L. Thomas Tobin, Chief of the Technical Services Division provided overall supervision and policy guidance for the CCC.

Mr. Brian Baird, Power Plants Coordinator for the CCC, provided information and reviewed drafts during the preparation of the discussion on Planning for Future Thermal Generating Capacity. Mr. Richard McCarthy, Staff Geologist for the CCC, contributed to the development of the discussion of Geology, Soils, and Hydrology. Mr. Jim McGrath and Mr. Steve Horne, Land Use Division, CCC, provided information and reviewed drafts during preparation of the discussion of the relationship between Sanctuary Designation and Local Coastal Programs. Mr. Eric Metz, Wetlands Coordinator, Mr. John Zentner, Resource Ecologist, and Ms. Debbie Benrubi, Information Specialist, assisted in the development of resource discussions.

Ms. Jennie Engel and Ms. Noreen Clouse of CCC's Energy Ocean Resources and Technical Services Division provided graphics, administrative, and clerical assistance. Dr. Joy Zedler and her colleagues at San Diego State University devoted many hours to review resource discussion, to recommend additional sources, and to develop the recommended research framework. Dr. Mike McCoy and Patricia McCoy of Imperial Beach assisted in the preparation of the education framework.

Mr. James Neal, Area Manager for the Department of Parks and Recreation, Larry Dean, Refuge Manager for the U.S. Fish and Wildlife Service, and Mr. Jan Larsen and Mr. Paul Jorgensen, Wildlife and Resource Management Program, Staff Civil Engineer, U.S. Navy provided information on resource management programs already underway.

PART VI: LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS RECEIVING COPIES

Federal Agencies

Advisory Council on Historic Preservation
Department of Agriculture
Department of Defense
Department of Health and Human Services
Department of Housing & Urban Development
Department of the Interior
Department of Transportation
  U.S. Coast Guard
Environmental Protection Agency

Congressional

Honorable Alan Cranston
Honorable S. I. Hayakawa
Honorable Duncan Hunter
Honorable Peter C. Chacon
Honorable Wadie P. Deddch
Honorable James Ellis
Honorable Lawrence Kapeloff
Honorable Barry Keene
Honorable James Miller

State Assembly Committee on Natural Resources
State Senate Committee on Wildlife

State/City/County Agencies

California Department of Fish and Game
City of Imperial Beach - Mayor
City of Tijuana - Mayor
International Boundary and Water Commission
San Diego Gas and Electric Company
San Francisco Bay Conservation and Development Commission

Interest Groups

Envirosphere Company
League of Women Voters of San Diego
Otay Mesa Homeowner's Association
Southwest Wetlands Interpretive Association

Universities

San Diego State University

Individuals

Landowners - Lower Tijuana River Valley
Members of the Estuarine Sanctuary Advisory Committee
Gray, Cary, Ames and Frye
Dr. Willard Edwards
H. G. Fenton Material Company
Laurel Granquist
Leonard Horwin Law Corporation
Sylvia Kaliss
E. A. Keen
Tim Lichty
Cassie Morton
Jean Strongylos

PART VII: RESPONSES TO COMMENTS RECEIVED ON THE TIJUANA RIVER ESTUARINE SANCTUARY DRAFT ENVIRONMENTAL IMPACT STATEMENT

This section summarizes the written and verbal comments received on the Draft Environmental Impact Statement (DEIS) and provides OCZM's response to these comments. Generally, responses are made in one or more of the following ways:

1. Expansion, clarification, or revision of the DEIS,

2. General responses to comments raised by several reviewers, and

3. Specific responses to the individual comments made by each reviewer.

All written comments received on this DEIS are published as a compendium at the end of this section, and are mailed to all persons who commented, or anyone else upon request.

The following are some of the most common issues raised by reviewers:

GENERAL RESPONSE TO ISSUES

A. The Name of the Estuarine Sanctuary

At the present time, the name will remain "Tijuana River National Estuarine Sanctuary." The Sanctuary Management Authority will be responsible for considering any proposals to change the name, and making the change if so desired.

B. The Issue of Availability of Funds

Because of current funding limitations by the Office of Coastal Zone Management (change from an initial request of $3.0 million) the State of California has made an application for funding in the amount of $1.03 million to be matched equally by State funds. Matching funds (or greater) are available from the Local Coastal Program implementation program administered by the Coastal Conservancy. The State may provide in excess of 50% matching funds required by OCZM, if their funds are available and resource values are threatened. In addition, local and private sources of funds are available and will be pursued.

C. Wastewater Treatment Facilities

Both the State of California and the Office of Coastal Zone Management recognize that water quality problems exist in the Tijuana River and support efforts to construct a wastewater treatment plant in the most suitable location. The California Coastal Act, and the Local Coastal Program process it established, would remain the arbiter of wastewater treatment facility siting in the Tijuana Valley. All negotiations would

specifically involve and consider this mandate of the California Legislature. At present, the site at 27th and Sunset is considered the most suitable site by the Coastal Commission. If, through the LCP process, a site within the upper portion of the Sanctuary boundaries is chosen as the most suitable location for a treatment facility or outfall line, the Office of Coastal Zone Management will support this decision, provided that the best possible mitigation measures are used.

D. Water Quality Information

As stated in the response to the comment above, both the State of California and the Office of Coastal Zone Management recognize that water quality problems exist in the Tijuana River. This is precisely the reasoning behind the establishment of a Water Quality Subcommittee, with membership invited from EPA, other water quality agencies, and the Governments of Mexico and Baja, California. The Water Quality Subcommittee will specifically consider issues raised by EPA, and will receive and consider any data made available by that agency. The Subcommittee will be empowered to make specific recommendations to the Management Authority based on its findings.

E. The Problems of Parking and Access Along First Street

(Sunset Drive)

The Management Authority will work with the City of Imperial Beach and the Coastal Commission to examine this problem and recommend possible solutions. Alternative methods to fund improvements will be investigated, including the access and urban waterfronts programs administered by the Coastal Conservancy.

F. The Issue of Marina Development

The adoption of strong wetland protection laws by the California Legislature as part of the 1976 Coastal Act set stringent requirements for wetlands preservation, and provide that marina development can only occur under very narrow circumstances. The purchase of the Helix Property by the U. S. Fish and Wildlife Service in 1980 transferred the potential marina site to the Federal government for permanent management as a refuge for endangered species. Taken together, these events effectively rule out a marina development in the Tijuana Estuary. The designation of a National Estuarine Sanctuary for research and education are consistent with the earlier actions of the California Legislature and the U.S. Fish and Wildlife Service.

G. The Issue of Land Values

As required by Federal law, independent land appraisals will be conducted for all parcels of land proposed for inclusion within the boundaries of the Estuarine Sanctuary, and offers for purchase will be made at fair market value. Other protective arrangements are available, including acquisition of easements and acquisition and subsequent lease-back of agricultural land.

The State of California has specifically clarified this process in a letter from Michael Fischer, Executive Director of the Coastal Commission dated July 31, 1981 and sent to all landowners whose land is proposed for inclusion in the sanctuary. The land values of $3,400 or $3,900 per acre in no way represent an appraisal, estimate of value, or a preliminary negotiating price.

FEDERAL AGENCIES

1. U.S. Environmental Protection Agency
   Sheila M. Prindiville, Acting Regional Administrator,
   San Francisco, CA, 7/29/81

   Comment - Classified DEIS as LO-2, Lack of Objections, Insufficient Information. Requests information and further discussion of water quality in the Tijuana River and Estuary.

   Response - See General Response D. The State has requested information from EPA which has not been received to date. Upon receipt, this information will be used by the Water Quality Subcommittee to address water quality issues in detail.

2. U.S. Department of Health and Human Services
   Frank S. Lisella, Ph.D., Chief, Environmental Affairs Group,
   Atlanta, Georgia, 7/29/81

   Comment - Establishment of estuarine sanctuary should not preclude use of any control measures for public health purposes. If vector-borne disease problems occur or are anticipated, prevention and control measures, including pesticides, may be necessary.

   Response - The primary purpose of the sanctuary is to preserve the estuary in a natural condition suitable for research and education. Under normal circumstances no vector control work should be done. However, if because of health concerns, the Sanctuary Management Authority may recommend that control measures be taken. Any action taken should be designed to minimize damage to the estuary while controlling any vector-borne disease problems.

   Comment - Continued local development may increase vector control impacts. It may be necessary to implement appropriate planning measures to control incompatible management and development activities.

   Response - General concern expressed by comment accepted. However, the estuarine sanctuary does not have responsibility for developments outside its boundaries. This function is primarily the responsibility of the City of San Diego under their Local Coastal Program.

3. U. S. Department of the Navy, Naval Air Station, North Island
F.J. Hartman, CDR, CEC, USN, San Diego, CA, 7/31/81

Comment - Document is well written, but further discussion of the 5 year operation grant is requested, especially in view of the current funding climate.

Response - OCZM policy is to award $50,000 operations grants, which are 50% matched by the State, for 5 years. As long as OCZM receives Congressional funding this policy will continue. To date the Administration and Congress has supported the Estuarine Sanctuary Program, but, we cannot predict the future. The same situation applies to the State of California, except at the end of 5 years, management responsibility will be entirely theirs. Our experience has indicated that the estuarine sanctuary program is an important link in resource protection and funds for their management have been forthcoming. It is interesting to note, that from the initial grant in 1974, all states have provided the maximum $50,000 match for operations.

Comment - Not clear how the research and education programs are to be implemented.

Response - The education programs can be partially funded from operations grants. The educational component of the Research and Education Subcommittee includes "educational users," and we are optimistic that if provided an outdoor environmental educational facility, educational institutions will develop plans for their usage.

Research is more difficult since operational funds cannot be used for this purpose. Again, we are dependent upon estuarine sanctuaries being managed to provide a logical location for estuarine research. Although this program is relatively new, researchers and research funds are gravitating towards estuarine sanctuaries. The use of Elkhorn Slough, California by the Moss Landing Marine Institute is a good example.

Comment - Included numerous individual comments and corrections for the text.

Response - All accepted and changes made.

4. Advisory Council on Historic Preservation
Louis S. Wall, Chief, Western Division of Project Review, 7/31/81

Comment - Pursuant to Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. Sec. 470f, as amended, 90 Stat. 1320) Federal agencies must, prior to the approval of the expenditure of any Federal funds or prior to the granting of any license, permit, or other approval for an undertaking, afford the Council an opportunity to comment on the effect of the undertaking upon properties included in or eligible for inclusion in the National Register.

Until the requirements of Section 106 are met, the Council considers the DEIS incomplete in its treatment of historic, archaeological, architectural, and cultural properties. To remedy this deficiency, the Council will provide, in accordance with its regulations, "Protection of Historic and Cultural Properties" (36 CFR Part 800), substantive comments on the effect of the undertaking on these properties.

Response - A call was made to the Advisory Council on Historic Preservation on August 6, 1981. After explaining the nature of the action (i.e., no construction activities would occur which would jeopardize historic, or archaeological properties in the estuary), Council personnel stated that there would be no need for further involvement of compliance at this time. If any construction were to take place in the future for the interpretive center, for instance, Section 106 consultation and requirements would be complied with.

5. International Boundary and Water Commission, United States Section
J. F. Friedkin, Commissioner, 7/28/81

Comment - Page iii, Paragraph 2, add portion underlined to last sentence so as to read: "These uses may include low intensity recreation, fishing, and wildlife observation, and facilities consistent with the obligation by the Government of the United States in the Treaty with Mexico of February 3, 1944 for the Utilization of the Waters of the Colorado and Tijuana Rivers and of the Rio Grande (59 Stat. 1219)."

Response - The local coastal plan (LCP) for San Diego, required under California law provides for a potential sewage treatment plant located near 27th Street and Sunset, which is not within the sanctuary boundaries. At this time under the LCP, a wastewater treatment plant could not be built within the proposed estuarine sanctuary. Should the LCP be amended to include a wastewater treatment plant within the estuarine sanctuary, the sanctuary itself would not preclude such facilities since they are operated and managed under State law and policy. In the event a wastewater treatment plant is located within the estuarine sanctuary all mitigating measures should be taken to protect the estuarine resource. Therefore, the suggested language is not being added to the FEIS. Also see General Response C.

Comment - Page iii, first paragraph under MANAGEMENT, add portion underlined to last sentence so as to read: Membership composition of the management committee will include representation for the private sector, governmental agencies of the United States and Mexico, real property owners and interested and qualified citizens, it being understood that the management program will be consistent with subsection (e)(2) of the Coastal Zone Management Act, 16 USC 1456.

Response - Change accepted.

Comment - Page 7, second paragraph under Private Land to be Acquired, add portion underlined to read: Of the 31 parcels proposed for acquisition, seven parcels above the river and thirteen parcels below the river would be "leased back" to sellers for agricultural use and other activities, including sanitary facilities, compatible with the maintenance of the sanctuary. See Appendix D for description of land ownership.

Response - Comment not accepted, basically for reasons outlined above.

Comment - Page 10, first paragraph under Responsibilities of the Management Authority, add underlined portion so as to read: "Sanctuary status will confer no new regulations on the Tijuana River, nor affect the jurisdiction, powers, or prerogatives of the International Boundary and Water Commission, United States and Mexico as provided under subsection (e)(2) of the Coastal Zone Management Act, 16 USC 1456. Rather,..."

Response - Change accepted.

Comment - Page 11, under b. Sanctuary Advisory Committee delete "a representative of the government of Mexico" replace with "A member from Baja California, Mexico, would be invited". Some change requested for serving on the water quality subcommittee.

Response - We are unsure of the rationale for this requested change so the original language was changed to include the possibility of two representatives. However, language was added under "Method of Selection" that the representative of Mexico and Baja, California would be chosen with the advice of the International Boundary and Water Commission.

Comment - Page 12 paragraph under Water Quality Subcommittee, revised, with bracketed portion deleted and underlined portions added so as to read: "The water quality subcommittee responsibilities include 1) to help improve the coordination of planning already underway for the Tijuana Valley in the United States, and 2) to ensure that sanctuary goals are considered in planning for flood control, groundwater management, and [planning for wastewater treatment] sanitary measures. [with] Membership will be invited from Baja, California, [the governments of] Mexico and the executive branch of the State of California. With membership from Baja California, Mexico, the subcommittee would [will] have the [unique] opportunity to [foster international progress towards] obtain views from Baja, California on the [dual] goals [of resource protection and water quality management] of this subcommittee.

Response - Several of the above language changes were made. However, some of the suggested changes seem to indicate a desire that the Water Quality Subcommittee concern itself only with the U.S. side of the border. The National Estuarine Sanctuary Program has developed into a National model for estuarine ecosystem management, and as such must consider and understand the dynamic process occurring in the estuary watershed. The Tijuana River is unique since the majority of the watershed is in Mexico. The scientific expertise of members of all advisory committees and subcommittees should prove invaluable to the International Boundary and Water Commission in its role to negotiate a solution to the wastewater treatment problem that presently exists.

Comment - Suggested change on p. 24, under 5. No Action of "cooperative management" to "further cooperation".

Response - Change accepted.

Comment - Add a new section, J. International Considerations on page 48.

Response - Total text added.

Comment - Page 49, under a. General Impacts revise last paragraph, deletions in brackets and additions underlined, so as to read: The Advisory Committee and Subcommittees on Agriculture, Water Quality, and Research and Education, will provide a forum to [work toward] provide the technical advice to the appropriate agencies in the solution of environmental problems in the larger region. Special emphasis will be directed for research and estuary [water] management between the United States and Mexico as may be appropriate with the understandings in Sub Section (e)(2) of the Coastal Zone Management Act of 1972, 16 USC 1456.

Response - Change accepted.

Comment - Page 57 under 5. Planning for Wastewater Treatment Facilities, add a new paragraph 4 after "... to expire on June 13, 1981," and revise last paragraph.

Response - Text changed. As earlier stated, the Local Coastal Plan must be amended prior to a wastewater treatment plant being located anywhere in the Tijuana River Valley, other than at 27th and Sunset Streets.

Comment - Page 58, revise second paragraph, deletions in brackets and additions underlined so as to read: "The management structure of the Estuarine Sanctuary can [explicitly] respond [s] to [the] water quality issues in the Tijuana Valley, though recognizing the prerogatives reserved to the Interantional Boundary and Water Commission by Subsection (e)(2) of the Coastal Zone Management Act of 1972. A representative of the water quality agencies, and a representative [of the government of Mexico] from Baja, California, will be invited to serve on the Sanctuary Advisory [Management authority] Committee. A water quality subcommittee will be established with membership invited from the EPA, the United States Section of the International Boundary and Water Commission, the Regional Water Quality Control Board, a member from Baja, California, [a representative of the government of Mexico,] and a representative of [those agencies in] the Executive Branch of the State of California. [Government that have discussions underway with the government of Mexico.]

Response - Changes accepted, except there will be an option on the Advisory Committee and the Water Quality Subcommittee of having a representative from Mexico and/or Baja, California.

Comment - Page 5, revise item 4, deletions in brackets and additions underlined so as to read: "Encompass enough of the drainage area to make possible reasonable and consistent management of the immediate floodplain and [drainage basis] side drainage area".

Note: The proposed sanctuary area of 2,531 acres (4 square miles) is only 0.2 percent of the 1,731 square mile drainage basin.

Response - Change accepted.

Comment - Page 17, revise item 3, deletions in brackets and additions underlined so as to read: "3. Determine expected sedimentation rates [under various strategies for managing the watershed and correlate these rates with disturbance in the watershed] in relationship to flood flows to determine sediment inflows to the estuary, beaches replenishment, and impacts on the estuary.

Response - Change accepted, with minor modification.

Comment - Page 36 contains a description of the freshwater inflows into the estuary. It would be desirable to include the silt and sediment inflows and their impacts on aquatic organisms.

Response - We agree. This shall be a research priority for the Research and Education Subcommittee.

STATE AGENCIES

6. California Department of Fish and Game
Mr. Charles Fullerton, Director, Sacramento, CA, 7/17/81

Comment - Figure 1, page 6, confusing.

Response - Comment accepted. If the sanctuary proposal is funded, new maps will be prepared showing the boundaries and the interests in land to be acquired.

Comment - Suggested language describing the problems with single agency management at the Tijuana River.

Response - Comment accepted, text changed.

Comment - Serious concern over the fact that research in wetland restoration techniques and methodology were not included in the research agenda.

Response - Comment accepted, restoration added to the research agenda.

Comment - Supports the Department as an ex-offico member of the Sanctuary Advisory Committee and will assist in any way possible with sanctuary establishment.

Response - Comment accepted. In addition, OCZM would like to congratulate the Department of Fish and Game for its outstanding job of managing the Elkhorn Slough Estuarine Sanctuary.

LOCAL INTEREST GROUPS

7. California Wetlands Coalition
   Rimmon C. Fay, Ph.D., 7/21/81

   Comment - The objectives of the California Wetlands Coalition include protection, maintenance, enhancement and restoration of wetlands habitat. The area is extensive and in a nearly natural state and is important to wildlife habitat. We support this acquisition and designation of the area of Tijuana Slough as an estuarine sanctuary for the people of California and the Nation.

   Response - Comments accepted.

8. Envirosphere Company
   R. John Little, Ph.D., Newport Beach, CA, 7/30/81

   Comment - Provided corrected spellings for plants in Table 2.

   Response - Changes made.

   Comment - Provided list of species to be included in final report.

   Response - List has been added at the end of this section. This list shall be used by the Sanctuary Manager when developing exhaustive flora and fauna lists for the proposed sanctuary. We appreciate Dr. Little's information concerning the plants in the Tijuana River area.

9. League of Women Voters of San Diego
   Betty Challberg/Pat Richardson, undated

   Comment - Supports the sanctuary status in keeping with the League support of preserving wetlands in their natural state.

   Response - Comment accepted.

UNIVERSITIES

10. San Diego State University, Department of Geography
    Phillip R. Pryde, 7/16/81

    Comment - Has found that the lower Tijuana River valley is one of the best areas for field study of the interaction of natural and human environments, as well as an outstanding example of an endangered and very productive southern Californian landform and ecosystem. Believes this proposal will help prevent this important natural area from becoming any more impacted by adverse human intrusion. Endorses the sanctuary concept.

    Response - Comment accepted.

INDIVIDUALS

11. H.G. Fenton Material Company
Tim Flanagen, San Diego, CA, 7/30/81

Comment - Fenton Material Company's 52 acres is not necessary for success of the sanctuary and should be removed from the sanctuary boundaries. The property is not for sale and the DEIS makes a weak case for its inclusion within the sanctuary boundaries.

Response - The State of California and NOAA/OCZM feel that this particular parcel should remain within the sanctuary boundaries to provide access opportunities for research and education related to the estuarine system. This property also contains important chaparral habitat that is very scarce in California that should also be protected as part of the estuarine system.

As mentioned elsewhere, any land sale is voluntary. Hopefully an arrangement, that is satisfactory to the H.G. Fenton Material Company, can be reached. Two years from the award of this grant, the State with the advice of the Management Authority, shall examine all remaining ownerships not acquired and determine if any should be eliminated from the sanctuary boundaries for any reason (i.e., lack of funds, unwilling seller, marginally cost-effective resource protection).

Comment - Error on page 4 of Appendix D.

Response - Error corrected.

12. Gray, Cary, Ames and Frye
Theodore J. Cranston, San Diego, CA, 7/10/81

Comment - Represents Mrs. Harley Knox and Francis Harris, co-trustees under the will of Harley Knox. The trust and Mrs. Knox are property owners. Opposed because the project represents a potential waste of government money.

Response - The Tijuana River estuarine system's natural resource value to the State of California is well documented in the DEIS and elsewhere. Coupled with the fact that substantial use of less-than-fee land acquisition techniques will be utilized, leads us to conclude that it is an excellent investment for the State and NOAA.

Comment - Concerned about price of land based upon a per acre figure derived from monies available and total acreage.

Response - See General Response B.

13. Cassie H. Morton, Imperial Beach, California, 8/4/81

Comment - Enthusiastically supports the proposed Tijuana River Estuarine Sanctuary.

Response - Comment accepted.

Comment - The problem of access will have to be dealt with.

Response - See General Response E.

14. Galen and Louise Watts, Nestor, California, undated

Comment - Did not receive any information on the proposed estuarine sanctuary or notice of the public hearing.

Response - We attempted to find current addresses of all property owners and send copies of the DEIS and notice of public hearing. We apologize for the error if you did not receive the DEIS or Notice. By now you should have received a letter from Mr. Michael Fisher concerning land acquisition and suggesting a personal meeting with you.

Comment - Questions the statement in the DEIS that deer live within the proposed sanctuary boundaries. Since 1937, he has never seen any deer there.

Response - Extremely competent scientists provided us with the lists of animals, plants, and birds of the Tijuana River Valley. We assume they are reasonably accurate. In the case of deer, we will ask the Research and Education Subcommittee to document its existence or exclude it from any lists.

Comment - Not in favor of giving up their property.

Response - See General Response G. You will not have to give up your retirement property unless you wish to.

15. Otay Mesa Homeowners Association
Ruth J. Schneider, President, Nestor, California, 8/3/81

These comments (included in compendium at end of this section) were received after the deadline (August 4, 1981) and just as the FEIS was going to the printers. Most of the comments have already been made in the FEIS. OCZM requests that the Management Authority consider and address the comments, if the sanctuary is established.

16. Michael A. McCoy, D.V.M.
Imperial Beach, California, 8/1/81

These comments (included in compendium at end of this section) were also received after the deadline. The great majority of Dr. McCoy's suggestions have been incorporated into the FEIS. OCZM requests the Management Authority to address Dr. McCoy's comments and take appropriate action, if the sanctuary is established.

RESPONSES TO STATEMENTS MADE AT THE PUBLIC HEARING
IMPERIAL BEACH CITY COUNCIL CHAMBERS
JULY 23, 1981 - 7:00 P.M.

Overview: The capacity of the building was not large enough to seat the more than 90 persons attending the public hearing. Forty-six individuals testified with the majority in favor of establishing the estuarine sanctuary. A representative of the City of Imperial Beach stated the city could not support the sanctuary as long as they were pursuing the approval and construction of a marina in the area. Some land owners expressed their reluctance to be willing sellers unless there was an assurance of receiving a fair market value for their land.

1. Jean A. Strongylos
Resident - Imperial Beach

Comment: I would like this letter read at the public hearing because I am unable to attend in person.

Response: Letter was read by the Public Hearing Officer.

Comment: I am in complete agreement with Jackie Dewey's article in Sunday's (June 19, 1981) Star News (Article reproduced in compendium). Let us do all we can to preserve our last open space in our area. I have lived facing that area for almost 20 years and still find it to be something worth looking at regardless of the time of day or the season of the year.

Response: Comments accepted.

2. Laurel Granquist
Resident - Imperial Beach

Comment: The educational value of the sanctuary has already been demonstrated by the many elementary, high school, and University students and instructors who have studied the flora and fauna of the ecosystem in this area as well as several organizations. I am a teacher and strongly urge approval of the sanctuary. (Letter read by Public Hearing Officer.)

Response: Comments accepted.

3. Dr. Willard Edwards
Resident - Imperial Beach (Statement read by Cris Liotta)

Comment: Fully understanding and interacting with the unique area which contributes to the health, longevity, pleasure of living and the income of the residents of Imperial Beach. I have spent my entire life in education and have seen the value of a continuing education program emphasizing natures beauty and marvels and have seen how local residents (young and old) have profited from it. One of the reasons I moved to Imperial Beach was because of the clean air and mild climate and opportunity to study plant and marine life in the area. Based upon first-hand knowledge, I have seen the beneficial impacts (social/economic) associated with the establishment of a nature study center and would like to see the same occur in this area.

Response: Comments accepted.

4. Mike McCoy
Resident - Imperial Beach - Member Estuarine Sanctuary Committee

Comments: Points that he would like to see added in FEIS.

1. Success of the program will come through the establishment of a good working relationship between the management authority and other agencies and local interest groups. People are concerned over the effect sanctuary status will have on their lives. Good planning and communications will work to everyone's benefit.

Response: Comment accepted. This is the purpose of establishing an Advisory Committee and a Management Committee which includes all the various representatives to facilitate good planning and communication.

2. The sanctuary presents an opportunity to develop a model for good management. Concern over the potential impacts of sand and gravel extraction sedimentation, endangered species, and the water table. The Sanctuary Management Committee would be the authority to ensure proper management of these activities and the restoration of the wetlands.

Response: Comment accepted. Wetland restoration added as a research priority. The Advisory Committee and Subcommittee shall have as one of their responsibilities the examination of mineral extraction, sedimentation, endangered species, and the water table.

3. On page 53, under agricultural uses, would like to introduce concept of compatible multiple-use research program. Must encourage new agricultural practices which will not destroy wetlands and critical habitat and ensure productivity through good estuarine sanctuary management. At the same time, a research management program can act as a model approach for dealing with urban impacts on wetlands.

Response: Comment accepted. Included as a research priority.

Comments: Assess feasibility of combining pure ecological research programs dealing with compatible use, urban impact, and food production and formulate this to an applied research program. The two programs should be combined.

Response: Comment accepted. Included as a research priority.

Comment: Favors the existing sewage treatment site reservation at Sunset and 27th Streets.

Response: Comment accepted. Also, we thank Dr. McCoy for his involvement with the Estuarine Sanctuary Advisory Committee.

Comment: Supports the concept of the sanctuary. He is on the Board of Operation Wildlife (California affiliate of National Wildlife Federation) and they support the sanctuary as well.

Response: Comment accepted.

5. Kristeen Roberts
Resident - San Diego

Comment: Supports sanctuary designation.

Response: Comments accepted.

6. Jim Bell
San Diego Center for Appropriate Technology

Comment: Spoke in support of the interpretive center. The center will not only show how the estuary works, but also how our daily actions affect the estuary and to offer alternative actions of daily activities which would have less impacts on the estuary. This would apply also to agricultural systems that are not dependent on pesticides, etc., and can enhance estuarine productivity.

Response: Comment accepted. Interpretive Center to be established as soon as possible.

7. Matt Marshall
Farmer-landowner in Tijuana valley
President, Citizens of the U.S. Tijuana River Valley
Member, Estuarine Sanctuary Advisory Committee

Comment: Tijuana River Valley right now is a mess. In favor of the sanctuary.

Response: Comment accepted.

Comment: The management authority that would be established for the sanctuary program can provide a mechanism to foster understanding between educators, agricultural interests, etc. There are many problems which have arisen since the flood of January 1980, including boundaries between agricultural uses and riparian habitat, horse use and other uses, water quality (biggest problem), flood control, vector control, etc. Concerned about boundary between riparian habitat and agricultural land.

Response: We are very optimistic that the management authority will provide an excellent communication process. The Management Authority will be addressing the problems as stated, including boundaries between riparian habitat and agricultural land.

Comment: Stressed the importance of cooperation between the various agencies and Mexico regarding sewage, a major problem from Mexico, and water releases from Rodrigues Reservoir. Hopefully, the sanctuary will provide a mechanism to address these issues.

Response: Again, we feel that the Management Authority, Advisory Committee, and Subcommittees will provide an excellent forum to address the sewage and water resource issues.

Comment: The sanctuary may serve to solidify the involvement of the City of San Diego in the problems of the Valley.

Response: City of San Diego has been added to the Management Authority to assist in this effort.

Comment: Pointed out that the Local Coastal Program for the area has been approved. The sanctuary won't change the status of the LCP, but will establish a mechanism to deal with resource use problems.

Response: Comment accepted. Also, we appreciate Mr. Marshall's work with the Advisory Committee.

8. John K. Kracha
Resident Chula Vista
Represents San Diego Sierra Club

Comment: Stated that the DEIS was a good comprehensive document. Sanctuary status would be in the long term interest of the people in the State and the Nation. The exposure it would provide to all ages is invaluable. The boundary explored in the DEIS appears feasible. Sierra Club fully supports designation. They oppose any acquisition attempt to remove lands from the sanctuary for purposes of commercial or recreational purposes that would have an adverse impact on the endangered species.

Response: Comment accepted.

9. Ann Steward Gertler
Resident, Ocean Beach, Graduate Student at San Diego State doing research on the National Estuarine Sanctuary Program.

Comment: Thinks Tijuana will contribute to all levels of government and benefit wetlands research. From 1947-67, 60 percent of California's estuarine habitat has been lost (90 percent in southern California). The Tijuana is the least disturbed site in southern California. Research on the importance of estuaries should be encouraged. Supports approval of the sanctuary, but hoped that this would not preclude additional designations in northern California.

Response: Comments accepted.

10. James E. Neal
California State Department of Parks and Recreation

Comment: Expressed willingness of the Department of Parks and Recreation to serve as lead administrative agency of the sanctuary. It has the support of the entire Resources Agency.

Response: Comment accepted and highly appreciated by OCZM.

Comment: Sanctuary is composed of mainly public land with some private acquisition (through willing sellers) proposed. Existing uses would be continued. Resources of estuary are extremely important to people of the

state, especially because few acres of healthy or semi-healthy acres of estuarine habitat remains (90 percent destroyed in Southern California since 1900). In time, the area will increase in importance and will draw more visitors and revenue to the area. A coordinated approach to management will help eliminate duplication of effort and solve problems associated with habitat protection, pest control, water quality, etc. Public input is a very important part of the management program and his department looks forward to working with the many people of the area as well as Federal, State and local government entities.

Response: Comment accepted.

11. Jeffrey M. Knor
Resident, Imperial Beach

Comment: Concerned over the loss of wetlands in the area through in-fill and use of recreational vehicles and hopes that these problems will be addressed as quickly as possible.

Response: There are management problems which would be addressed by the Sanctuary Management Authority and Sanctuary Manager.

12. Alfred Hughes
Resident, Imperial Beach

Comment: Formerly a supporter of the proposed marina but has changed his mind because of a number of events which transpired including the problems with a lack of funding to conduct the dredging and the lack of Federal support for developments in the floodplain, and the local government would have to be financially responsible.

Response: Comments accepted.

Comment: Supports the Federal government (and state) in retaining jurisdiction of the estuary because of the significant sewage disposal problems and the need for the Federal Government to be involved along with Imperial Beach in determining the importance and location of the sewage treatment plant which is needed.

Response: Once the sanctuary is established, California State owns and has the responsibility for managing the sanctuary. However, since it is a National Estuarine Sanctuary, OCZM will participate as much as it can to assist the State and Imperial Beach.

13. Jan Larson
Wildlife Biologist - Naval Air Station

Comment: Administer lands within the sanctuary boundary. Since 1977, the Navy has made a commitment to the wildlife resources within this area. Conducted many studies on endangered species (Clapper rail), coordinated with county on mosquito control, and made compatible land use designations for wildlife. Because almost 1/4 of their lands are within the sanctuary boundary and their considerable interest in the wildlife resources, they

were members of the Sanctuary Advisory Committee and support the designation of the sanctuary. They believe that compatible land use (e.g., helicopter activities) can be achieved through interagency agreements.

Response: OCZM is grateful for the Navy's concern and willingness to participate in the proposed action. We know that the wildlife studies conducted by Mr. Larson and others will provide a valuable base of knowledge to the overall purposes of the sanctuary.

14. Rueben Bingham
Chairman, Southwest Wetlands Interpretive Association,
Resident, Imperial Beach

Comment: The Association supports the approval of the sanctuary designation.

Response: Comment accepted.

Comment: The Association is working to further the preservation and appreciation of the wetlands through educational activities, guided walks, and the distribution of informational literature and seeks the construction of a bio-museum within the sanctuary. The sanctuary would enhance the possibility of reaching these goals.

Response: The goals are compatible.

Commment: Proper management would encourage multiple use, provide for long-term preservation of the area, increase public education and controlled access, and bring economic benefits to Imperial Beach and the surrounding region. While the Association's main goal is educational, they realize the value of low intensity multiple uses and views the sanctuary status as the most important vehicle for increasing public knowledge and awareness of the estuarine system.

Response: Comments accepted.

15. Alicia Hand Hass
Resident, San Diego

Comment: Related the importance of sanctuary to her way of life. Owns property close by the estuary and appreciates its beauty and values. She was appalled to see trucks dumping trash in the wetlands and even risked her life to stand in front of them to stop such actions. Asks that the area be protected and that we work with Tijuana to solve management problems. Protection of the estuary will also mean money for Imperial Beach.

Response: Comments accepted and appreciated. We are glad the dump truck did not injure such a good speaker!

16. William Haas
Resident, San Diego - formerly Imperial Beach

Comment: Continues to keep interest in area because of friends and love for the area. There are some people dissatisfied because they want a

marina instead of a sanctuary. He offered several suggestions which might make people happier.

1. Consider changing name to Imperial Beach Estuarine Sanctuary (to put town more in the public life).

2. Too much emphasis has been placed on saving the Least tern. Should stress the importance of area as a "International motel for migrants" (i.e., migrating birds use in large numbers).

3. Emphasize that the sanctuary would control dumping, unhampered use of guns, offroad vehicles and control access generally.

Response: These are all good suggestions. Several names were proposed. A name change is something the Sanctuary Management Authority can consider in the future. On page 44 of the DEIS, the importance of the estuary as a stop-over for migrating birds is discussed. We do believe that management of the sanctuary will provide additional protection from abuses which have occured in the past.

17. Timothy C. Flanagan
Property Engineer for H.G. Fenton Material Company

Comment: Company owns 52 acres of land in extreme southeast corner of sanctuary boundary known as Border Highlands. They are in the sand and gravel business. He made the following points:

1. They are not opposed to the creation of a sanctuary but they are opposed to the inclusion of their property because it is in the fringe of wildlife habitat and is an active gravel pit. The approved Local Coastal Program recognizes the natural resource value of aggregate materials. Additional controls of any kind would be burdonsome and unacceptable. They take on good faith the policy statement to deal only with willing sellers and since they are on the fringe, the sanctuary will not be hurt much by its exclusion.

Response: Inclusion of the H. G. Fenton property discussed under written comments received #11. We appreciate their support for the sanctuary, which will not add additional controls on their operation. It will be the policy goal of the State and NOAA to work out a mutually satisfying, willing seller agreement with the H. G. Fenton Material Company.

Comment: The grant request is very low given the value of land (approximately $3,500/acre and less if San Diego land involved). Land is not free and the scope of the project needs to be reduced or the budget needs to be increased.

Response: See General Responses B and G.

18. Michele Barber
Resident, Imperial Beach

Comment: Grew up in slough - it is beautiful. Husband fishes (for halibut). Supports sanctuary and hopes children will also get to appreciate it.

Response: Comments accepted.

19. Cindy Barrett
Resident, Imperial Beach

Comment: Stated her appreciation for teachers who showed her the values of the estuary. The sanctuary would be important to the residents and she hopes that the problems with water quality can be worked out with Mexico. Supports the sanctuary.

Response: Comments accepted.

20. Dick Lynas
Resident, Imperial Beach

Comment: Stated that the DEIS was good, as was the management plan for the area. The only shortcoming he saw was how the sanctuary would be funded after the 5 year Federal funding runs out. Would like to see other institutions and agencies make commitment.

Response: See General Response B.

21. Tommie Schuette
Resident, Imperial Beach

Comment: Stated her opposition to the sanctuary because the marina question has not been settled. The people voted for the marina in 1980.

Response: See General Response F.

22. Earl Lauppe
State Department of Fish and Game

Comment: His agency supports the sanctuary. Complimented the quality of the DEIS and wanted to see some expansion on two points.

1. The roles of his Department on the Advisory Committee.

2. The possibility of the restoration of the wetlands. Coordinated efforts (and good communications) will get the job done.

Response: The role of the Department of Fish and Game on the Advisory Committee will primarily be a function of the level of time and effort it wishes to devote. Obviously, we would support any expertise and advice that is made available. Wetland restoration has been added as a research priority.

23. E. A. Keen
Resident, San Diego

Comment: Related his pleasure at what was going on with the estuary and his experiences with the Naval Air Station to preserve the area as a natural research area. He also commented on the quality of the DEIS and had two suggested changes to make and questioned one point of fact. The first point is that he feels the City of San Diego should be included as a member of the Management Committee. Secondly, the U.S. - Mexican Boundary and Water Commission be included in the management structure in an advisory capacity since it is the most important water management agency.

Response: Comments accepted and have been included.

Comment: The last paragraph on page 25 states 385 acres are still in private ownership "including the prime habitat adjacent to the estuary mouth." This appears to contradict the ownership map in Appendix D.

Response: This statement was somewhat misleading and the text in the FEIS has been revised. Most of the prime habitat is in public ownership.

24. Jim LaJoie
Resident, Imperial Beach

Comment: Fully supports the EIS as presented and the estuarine sanctuary.

Response: Comment accepted.

25. Guy Sanderson
Resident, Imperial Beach

Comment: With the acquiring of the sanctuary we might save something for somebody else to enjoy.

Response: Comment accepted.

26. Francis Harris
Trustee, Harley E. Knox and Mrs. Bessie J. Knox

Comment: Still has 84 acres of ranch left near the border. It was bought in 1950. He is a farmer and believes that not many people realize what it costs to farm. Since 1970, their ground has been completely controlled by governmental agencies. He is against the proposal unless the government is willing to pay the fair maket value for the land.

Response: See General Response G.

27. Galen Watts
Resident, Imperial Beach

Comment: Mr. Watts is a horse rancher and owns 10 acres of land (Property identified by symbol K). He clearly stated his opposition to the sanctuary proposal and emphasized that if the government wanted his property they would have to pay the proper price.

Response: We understand Mr. Watt's feelings. There will be no attempt to condemn his property or negotiate a sale for less than fair market value. The State's commitment is to deal with willing sellers only. There is hope however, that through the various methods of purchase, lease backs, or easements, Mr. Watt's concerns can be met and everyone comes out achieving their particular goals.

28. John Kinsello
Resident, Imperial Beach

Comment: Expressed concern over the limited funding and the small amount that would be available to purchase private land.

Response: See General Responses B and G.

29. John Ruger
Represents San Diego Chapter of the Southern California Wildlife Society

Comment: His organization supports the preferred alternative and had several comments on the DEIS.

Response: Comments accepted.

Comment: Figure 1 (page 6) does not clearly show the eastern boundary. It is easy to see why there is confusion.

Response: Upon close examination the boundary line should be read as the darker boundary that follows 19th street to Sunset Avenue and then heads west. The smaller broken line depicts 19th Street only and is not a boundary line.

Comment: These are several pieces of information on the map which aren't appropriately labeled and would help in clarification.

Response: New labels have been added.

Comment: Believed that there were too many representatives on the Management Authority which would make it less effective. Felt that some could be placed in an advisory capacity.

Response: Our experience elsewhere has indicated that this number can be effective. The advisory group that "put together" the Management Authority felt the proposed structure would work.

30. Mary Ann Saponara
Resident, Chula Vista
School Program Specialist of San Ysidro School District

Comment: In favor of having sanctuary established. Sanctuary offers the opportunity to the children in a natural environment and help teach them to be better citizens of tomorrow (rather than destroy, they will help preserve their environment).

Response: Comment accepted.

31. John Bradshow
Teacher, University of San Diego

Comment: Has used the Tijuana Lagoon for many years for teaching purposes because it has a well flushed entrance. Supports designation of the sanctuary.

Response: Comments accepted.

32. Mr. Holt
Resident, Imperial Beach

Comment: Lives across from slough which has been a part of her life for 35 years and has appreciated its natural beauty. She stated the problems of dumping in the slough even though against the rules. Gets mad when people run the slough down. "God save the slough."

Response: Comments accepted. Dumping would be prohibited activity in the sanctuary boundary and enforced by the State Department Parks and Recreation.

33. Sandy Woodhouse
Land Planner, San Diego Gas & Electric Company

Comment: Supports the efforts to preserve valuable ecosystems through the Estuarine Sanctuary Program. The Gas & Electric Company owns 200 acres within the proposed sanctuary. While they want to retain the land for future possible energy related development, they would be willing to negotiate a sale of the site at fair market value.

Response: Comment accepted and we appreciate the willingness to negotiate a sale.

Comment: It is my understanding that the grant request is for $3 million from OCZM to be matched by $3 million from State funds.

Response: See General Response B.

Comment: Recommended the need to include the City of San Diego on the Sanctuary Management Authority.

Response: Comment accepted. They have been included.

Comment: On page 51, a correction should be made to reflect the fact that the Regional Commission expires on July 1, 1981 and will not review the City of Imperial Beach LCP.

Response: Correction made.

Comment: On page 61, the DEIS should reflect the fact that a 200 acre future energy production site would be irretrievably lost.

Response: Addition made in the FEIS.

Comment: The sanctuary is the best possible way to implement the resource management designations in the approved LCP and will ease the burden in trying to figure out what types of zoning controls will be needed if the land is acquired.

Response: Comment accepted.

34. Harold Wier
Resident, San Diego
Field Trip Chairman, San Diego Audubon Society

Comment: The estuary is accessible for bird watching and is used as part of their annual Christmas Count Circle. The chief value of the sanctuary is for its educational value because the building of a political support base. Research is also important.

Response: Comment accepted.

Comment: Believes that riparian habitat protection should be extended from the eastern boundary to Dairymont Rd. because of the abundant bird life in the water ponds and the importance to assure stable banks.

Response: The possibility of marsh (riparian) restoration has been added as a research priority.

35. Linda Deaton
Resident, Imperial Beach

Comment: Supports the estuarine sanctuary.

Response: Comment accepted.

36. Ed Deaton
Resident, Imperial Beach

Comment: Supports the estuarine sanctuary. He has helped clean up slough before and expressed a willingness to help after the sanctuary is designated.

Response: Comments accepted and willingness to help appreciated.

Comment: Would like to see the FEIS discuss the economic benefits to the city because of the sanctuary. He has seen similar cases when nature centers have been built and it has had a positive impact on tourism.

Response: While we know that there will be positive impacts to bringing visitors to visit the area, this is extremely hard to quantify and is speculative at best. We do know that there will probably be more visitations from educators, students, and researchers, but the general public as well loves to see wild and scenic places.

37. Michael Bixler
Resident, Imperial Beach

Comment: Lives adjacent to wetlands. Discussed the problems associated with 1st Street traffic for residents. If additional use will result from sanctuary designation there will be problems for the residents. Suggested that some action (such as a deed back) be made to allow for some expansion of the street with a sidewalk and turn around area. He is for the sanctuary and feels that proper access would be in everyone's interest.

Response: Comment accepted. See General Response E.

38. Jackie Dewey
Resident and Columnist

Comment: For many years she has done research and printed articles in favor of the marina, but feels that it is no longer a viable alternative and therefore supports the sanctuary.

Response: Comments accepted.

Comment: Feels that the sanctuary may be one way to establish a reasonable working relationship with Mexico regarding the water quality problem.

Response: See General Responses C and D.

Comment: Emphasized the point that landowners should get the fair market value for their property.

Response: Comment accepted. See General Response G.

Comment: The Interpretation Center may have beneficial impacts for Imperial Beach and she suggested the sanctuary be named the Oneonta Estuarine Sanctuary. She submitted a copy of the recent column which was published in The Star News (Sunday, July 19, 1981) which has been reproduced within the compendium at the end of this section.

Response: OCZM and the State feel that a new name would not be inappropriate at this time, but would prefer that such a decision be made by the Advisory Committee and Management Authority. See General Response A.

39. Ruth Schneider
Chariman, Otay Mesa Nestor Plan Group

Comment: Stated that the "highlands" area are important to the estuary. Boundaries should extend from international border north to the southern limits of the property on Leon Avenue through to the Imperial Beach city limits. The eastern boundary should be all the way to the Freeway.

Response: We concur about the value of the "highlands." It is suggested that a local land trust be established to accomplish these goals. The Trust for Public Land a non-profit organization, provides such information (415/495-4014).

Comment: Believes that the sanctuary should be controlled by a large governmental entity than the City of Imperial Beach or San Diego with local citizens sitting on the Board to make the decisions.

Response: Comment accepted. The sanctuary would be run by the State government with impact from local citizens.

Comment: She feels that the land uses in the sanctuary should stay as natural uses with farming allowed on the fringe areas.

Response: Comment accepted.

40. Lorraine Taverty
Resident, Imperial Beach

Comment: If we are going to have an estuary then we must have the Federal money because of the scope of the project. There is not enough money to buy the land or manage it.

Response: See General Response B.

Comment: She related the history of the area as pertaining to the desire by the majority of the citizens of Imperial Beach to have a small boat harbor, but that development was frustrated over and over again by State and Federal agencies. In her opinion, various Federal and State agencies have not managed the natural resources well and not been cognizant of the flooding and water quality problems.

Response: See General Responses C, D, and F.

Comment: Feels that the 1st Street traffic problems should be addressed.

Response: See General Response E.

41. Patty Emond
Sanctuary Advisory Council Member and Mayor's Representative

Comment: Speaking for the Mayor of Imperial Beach, the Mayor will not support the estuarine sanctuary until all avenues of approach to building the marina have been exhausted. If all efforts prove futile, then she believes the sanctuary would be a good use of the area.

Response: See General Response F.

Comment: Speaking as an individual, she did not want to see the issue of the 1st Street traffic congestion and inadequate road be addressed, and supported Mr. Wixler's statement.

Response: See General Response E.

42. Randy West
Property Owner, Tijuana River Valley

Comment: Owns 40 acres of property. He feels that 1646 acres of public property (which includes all of slough area) is sufficient for sanctuary designation. The private land is outside of slough. He is not interested in selling his land to the Federal government. The proposed price per acre wouldn't allow him to buy comparative farm land.

Response: See General Response G.

Comment: As a farmer he was concerned with statement on page 53 which states that "the application of fertilizers and pesticides is to be strictly regulated." Farming is like fishing and you have to know the land and what it needs. These decisions should be left up to the farmers.

Response: The statement on page 53 (now 55) is part of the Local Coastal Plan developed by the City of San Diego.

Comment: On page 55, a correction should be made "to delete the proposed dissipation system."

Response: Correction made.

Comment: Would like to see more information distributed to residents of the valley regarding the wastewater treatment plant.

Response: See General Responses C and D.

43. W. P. Vetter
Non-resident, Taxpaying property owner

Comment: He endorses Mr. Randy West's comments but feels that private lands should be included (all or none).

Response: See General Responses D and G, and responses above to Mr. West's comments.

Comment: Hope that final report gives a greater clarification of source and availability of funds, particularly if it amounts to inverse condemnation.

Response: See General Response B.

44. Sylvia Kaliss & Son (Tad Hinman)
Members, Wetlands Association

Comment: Supports the sanctuary as an opportunity to preserve open space and add an economic advantage to Imperial Beach. As a graduate student in history and archaeology, she became aware that some of the earliest settlements were in the slough, including Indians of the Oneonta Community. She hopes that the sanctuary and management plan will have a plan for the rememberance of this early local history and of the farmers and settlers.

Response: Comments accepted. Sanctuary establishment would not preclude the interpretation of the historical/archaeoloical setting. Much of this will depend on the advise of the Advisory Committee and local interest groups.

45. Jana Farfan
Parents live in Imperial Beach

Comment: She is a student doing research on the Tijuana Slough for her Master's Thesis. This area is very productive for research and teachers and students from several universities use this area. Feels that the sanctuary is important and for conducting baseline comparative studies between this ecosystem and other more degraded ones.

Response: Comments accepted. Comparative research is certainly one of the major purposes of establishing national estuarine sanctuaries.

WRITTEN COMMENTS RECEIVED ON THE TIJUANA RIVER DEIS

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P. O. BOX 2711
LOS ANGELES, CALIFORNIA 90053

Action: Miner/MacFarland

cc: CZ/SP
NEPA
GCZ

SPLED-E

6 July 1981

Mr. Robert W. Knecht
Acting Assistant Administrator
Office of Coastal Zone Management
3300 Whitehaven Street, N.W.
Washington, D.C. 20235

Dear Mr. Knecht:

This is in response to a letter from your office which requested review and comments on the Draft Environmental Impact Statement for the proposed Tijuana River Estuarine Sanctuary, Office of CZM, San Diego County, California.

The proposed plan does not conflict with existing or authorized plans of the Corps of Engineers. We have no comments on the DEIS.

Excavation, filling, or construction of any structures within the Tijuana River (subject to tidal action) will require a permit from the Corps of Engineers. Also, any filling in the Tijuana (not subject to tidal action) and/or its adjacent wetlands will require a permit. We suggest that you contact our Navigation Branch at FTS telephone 8-798-5606 regarding requirements for filing permit applications at your earliest convenience in order to expedite the permitting process.

Thank you for the opportunity to review and comment on this document.

Sincerely,

Robert L Hall
NORMAN ARNO
Chief, Engineering Division

NAVAL AIR STATION
NORTH ISLAND
SAN DIEGO, CALIFORNIA 92135

IN REPLY REFER TO:
1843/JKL:lp
Ser 18-326

JUL 31 1981

Director,
Estuarine Sanctuary Program Office
Office of Coastal Zone Management
3300 Whitehaven St., NW
Washington, D.C. 20235

Dear Sir:

After review of the Draft Environmental Impact Statement for the Tijuana River Estuarine Sanctuary, NAS North Island has both general comments and a number of specific comments/corrections, the latter of which is attached separately.

In general, the document is well written and serves to communicate the proposed santuary in an excellent manner. Though the original Office of Coastal Zone Management matching funds grant is discussed, further emphasis is required to sufficiently explain that process during the initial 5-year grant period and how funding will be handled once the California Department of Parks and Recreation becomes the fiscal manager of the santuary. This discussion will be particularly pertinent since the current funding climate is austere, and probably will become worse in the future.

One of the major objectives for the establishment of an estuarine sanctuary is for research and educational purposes. This is emphasized in a major section of the document beginning on page 13. However, it is not clear how these programs and policies are to be implemented, i.e., the responsibilities of the Management Authority and the Advisory Committee alluded to research and education, but do not specifically provide for the implementation of such, which according to background statements on page i, are of high priority.

Finally, it should be pointed out that the Outlying Field, Imperial Beach is a facility of and is administered by NAS North Island. Reference to the facility as the Imperial Beach Naval Air Station is incorrect.

Thank you for the opportunity to comment on the draft environmental document. NAS North Island looks forward to further participating in the effort to establish the sanctuary as a viable means for the conservation of a unique area.

Sincerely,

F. J. HARTMAN
CDR, CEC, USN
By direction of the
Commanding Officer

Encl:
(1) Comments to Draft Environmental Impact

11ND-NASNI-(11)-5216/12 (REV. 8-79)

100

COMMENTS/CORRECTIONS TO THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE TIJUANA RIVER ESTUARINE SANCTUARY

pg ii - breakdown of acreage at bottom of page: OLF Imperial Beach land within the boundaries of the proposed santuary total approximately 603 acres.

pg iii - first sentence: to alleviate the fears of many private land owners in the Tijuana River Valley, this statement should be either expanded or reemphasized elsewhere, or both.

pg iii - third line under MANAGEMENT: the Sanctuary Management Authority Committee is cumbersome and redundant. "Committee" should be left off.

pg 2 - (second to last para, last line): hunting, if it implies the use of firearms, should be eliminated.

pg 7 - (second para, second line): "would be acquired" should be changed to "are proposed for acquisition".

pg 9 - sentence #4: this is a weak statement for the role of research and education, given its emphasis in other sections of the document.

pg 10 - sentence #3: based on this sentence, the City of San Diego should be included in the Management Authority.

pg 15 - the proposed boundaries of the sanctuary should be included for perspective.

pg 16 - sentence #1 top: sentence unclear.

pg 25 - last paragraph: paragraph out of date.

pg 27 - a newer map, if available, would reflect recent changes in the area.

pg 39 - last paragraph: Monanthochle is a grass, Suaeda is misspelled in line 5, numerous taxa are not underlined, and cordylanthus maritimus ssp. maritimus, which is an endangered plant, is not mentioned anywhere in this section.

pg 44 - third paragraph, seventh line: replace "Common" with "Caspian"

pg 45 - second paragraph, eighth line: replace "endangered" with "rare". There have been no recent records for the occurrence of the black rail.

pg 45 - third paragraph: add the osprey.

pg 47 - first paragraph, fourth sentence: this sentence is confusing.

pg 53 - title "b" change "TiaJuana" to Tijuana"

pg 54 - first paragraph: change 220 to 340 in fourth line, and eliminate everything after the word "leasing" in the last sentence and add "all their lands within the proposed sanctuary boundaries to the U. S. Fish and Wildlife Service, except those that historically have been encumbered by leases.

pg 54 - third paragraph: change "Wildlife and Resource Management" section to "Natural Resources Management Branch", change "U. S. Navy's" to "NAS North Island's, Staff Civil Engineering Department", and eliminate everything after the word "conservation" and add "at OLF Imperial Beach".

pg 54 - paragraph four: eliminate "Committee" in line 5

pg 54 - paragraph five: starting with the word "the" in the second line, reword to read "existence of a 100 year flood plain within the area, no expansion into the undeveloped portion of their lands within the proposed sanctuary boundaries is planned.

pg 54 - sixth paragraph: eliminate

pg 55 - first paragraph, second line: Rallus longirostris levipes is misspelled.

Appendix B, Table 2, pg 2: change "Mesembryanthenum" to "Gasoul"

Appendix B, Table 6: change Red-tailed "kite" to "hawk", add Osprey as "R" to Falconiformes, change "clapper rail" to "Light-footed clapper rail", change "white-tailed" to "white-winged dove" (Columbiformes).

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta, Georgia 30333

(404) 262-6649

July 29, 1981

Mr. Milt Martin
Estuarine Sanctuary Project Officer
Office of Coastal Zone Management
3300 Whitehaven Street, N.W.
Washington, D.C. 20235

Dear Mr. Martin:

We have reviewed the Draft Environmental Impact Statement (EIS) for a Proposed Estuarine Sanctuary Grant Award for the Tijuana River Estuarine Sanctuary in California. We are responding on behalf of the U.S. Public Health Service and are offering the following comments for your consideration in preparing the Final EIS.

We understand that the $1.5 million grant from NOAA/OCZM and matching State funds will be used to acquire 885 acres of private real property for the proposed 2,531 acre National Estuarine Sanctuary. In general, we support the proposed designation. However, the designation and management of this Sanctuary should not preclude the use of any control measures in the Sanctuary for public health purposes.

The EIS should indicate whether the proposed Sanctuary area has the potential to harbor any large population of vectors capable of causing vector-borne disease problems for local communities and residents. If vector-borne disease problems occur or are anticipated, the use of special vector prevention and control measures, including pesticides, may be necessary.

Continued local development may have a negative effect upon the Sanctuary due to possible increase in vector control impacts, construction impacts, drainage alterations and diversions, pollution, etc. Therefore, it is important that the Tijuana River Estuarine Sanctuary Management Plan consider these development effects. It may be necessary to implement appropriate planning measures (i.e., buffers, building codes, zoning, etc.) to help control and prevent incompatible management and development activities, such as resorts, subdivisions, and campgrounds in the vicinity of the Sanctuary.

We appreciate the opportunity to review the Draft EIS. Please send us one copy of the final document when it becomes available.

Sincerely yours,

for Frank S. Lisella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Center for Environmental Health

ACTION: Miner/ MacFarland
cc: BMAT

cc: NEPA
CZ/SP
GCZ

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, D.C. 20410

OFFICE OF THE ASSISTANT SECRETARY
FOR COMMUNITY PLANNING AND DEVELOPMENT

IN REPLY REFER TO:

CZM
REC'D.
1981 JUN 29 PM 2:32
MAIL ROOM

Mr. Robert Knecht
Acting Assistant Administrator
Office of Coastal Zone Management
3300 Whitehaven Street NW
Washington, D. C. 20235

Dear Mr. Knecht:

We have carefully considered the draft statements relating to the proposed California Grant Award for the Tijuana River Estuarine Sanctuary. We enthusiastically support adoption of the proposal, and believe that the sanctuary well serves both national and State interests. The Tijuana River proposal is the first site in a truly urbanized area. Bordered by Federal land, San Diego city and County, and Imperial Beach, it is the the only sanctuary almost completely surrounded by built areas.

We therefore urge that surrounding jurisdictions insure adequate zoning restrictions to protect the sanctuary area from high rise or other structural invasions which might intrude on the visual space, and that attention to urban recreation needs and promotion of "educational" interests relevant to the sanctuary area be carefully controlled to prevent wanton mis- or overuse of sanctuary facilities. Urban park sites in may cities have unfortunately suffered from neglect of adequate precautionary zoning and land-use controls.

California's proposed management plan is outstanding in completeness of design involving most aspects of oversight, education and research, and in the variety of community and other groups and interests represented. HUD has had extensive experience with citizen participation in housing, Community Development Block Grant and other programs involving broad community representation. We have found that, in time, a very broadly representative process may either deteriorate from lack of interest on the part of many of the participants, or coalesce about a few of the most active. Care must be exercised to maintain a broad yet workable range of interests on the advisory committees should either condition predominate.

Further information may be secured from our Los Angeles Area Office CZM Coordinator, Mr. Ceferino Ahuero, or me.

Melvin W. Wachs
HUD Coastal Zone Management Coordinator

cc:
Ms. Joyce M.T.Wood,Director
Office of Ecology & Conservation
Room 5813 - U.S. Department of Commerce
Washington, D. C. 20230

Miner/MacFarland

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

cc: NEPA
LCZ/SP
GCZ

MAILING ADDRESS:
COMMANDER (oan)
ELEVENTH COAST GUARD DISTRICT
UNION BANK BLDG.
400 OCEANGATE
LONG BEACH, CA. 90822
(213) 590-2222

16475
Ser: oan 181-81
10 July 81

Mr. Robert W. Knecht
Acting Assistant Administrator
Office of Coastal Zone Management
3300 Whitehaven Sreet N.W.
Washington, D.C. 20235

Dear Mr. Knecht:

Thank you for the opportunity to review the Draft Environmental Impact Statement (DEIS) for the proposed Tijuana River Estuarine Sanctuary.

For purposes of Coast Guard Bridge Administration, permits will be required for the construction of bridges or causeways over/in navigable waters of the United States. The Coast Guard has not studied the navigability of the Tijuana River, however, preliminary review indicates that it may be a navigable waterway, for Bridge Administration purposes.

The Eleventh Coast Guard District Aids to Navigation office is currently studying the navigability of the Tijuana River. The final results of this study will be forwarded as soon as it becomes avisilable.

Since the DEIS for the proposed sanctuary does not include plans to construct a bridge or causeway, I have no further comments at this time.

Please send me a copy of the Final Environmental Impact Statement when it is available.

M. J. DANKO
Lieutenant Commander U.S. Coast Guard
Chief, Aids to Navigation Branch
By direction of the District Commander

ACTION: MINER/MACFARLAND

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

Project #D-NOA-K90011-CA

Robert W. Knecht, Acting Assistant Administrator
National Oceanic and Atmospheric Administration
Office of Coastal Zone Management
3300 Whitehaven Street, N.W.
Washington, D.C. 20235

29 JUL 1981

Dear Mr. Knecht:

The Environmental Protection Agency (EPA) has received and reviewed the Draft Environmental Impact Statement (DEIS) titled PROPOSED TIJUANA ESTUARINE SANCTUARY.

The EPA's comments on the DEIS have been classified as Category LO-2. Definitions of the categories are provided by the enclosure. The classification and the date of the EPA's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal Actions under Section 309 of the Clean Air Act. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and the adequacy of the environmental statement.

The EPA appreciates the opportunity to comment on this DEIS and requests five copies of the Final Environmental Impact Statement when available.

If you have any questions regarding our comments, please contact Susan Sakaki, EIS Review Coordinator, at (415) 556-7858.

Sincerely yours,

for Sheila M. Prindiville
Acting Regional Administrator

Enclosure

cc: Joyce M.T. Wood, Director, Office of Ecology and Conservation, National Oceanic and Atmospheric Administration

Water Quality Comment

The Draft Environmental Impact Statement (DEIS) does not adequately discuss the water quality in the Tijuana River and the Tijuana River Estuary. The Final Environmental Impact Statement (FEIS) should thoroughly discuss the water quality and flows of the Tijuana River and indicate how these will impact the beneficial uses of the estuary.

EIS CATEGORY CODES

Environmental Impact of the Action

LO—Lack of Objections

EPA has no objection to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER—Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU—Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1—Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2—Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3—Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft impact statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

STATE OF CALIFORNIA—RESOURCES AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF FISH AND GAME
1416 NINTH STREET
SACRAMENTO, CALIFORNIA 95814
(916) 445-3531

cc: SPO

July 17, 1981

Robert W. Knecht
Acting Assistant Administrator
Office of Coastal Zone Management
3300 Whitehaven Street, N.W.
Washington, D.C. 20235

Dear ~~Mr. Knecht~~ Bob:

Thank you for the opportunity to review the DEIS for the proposed Estuarine Sanctuary Grant Award for a Tijuana River Estuarine Sanctuary in San Diego County, California. As sponsor and manager of California's first estuarine sanctuary and having a vested interest in all coastal wetlands, the Department has a keen interest in the prospects and proposals for the Tijuana River Estuary. We find the DEIS very well prepared and commend Scott McCrary for the excellent job. We have several review comments on a few specific points, for your consideration.

Regarding the proposed boundaries map (Figure 1, page 6), we find the coding confusing as to the parcels of land to be acquired in fee, as opposed to those that are to be acquired and leased back. Generally, however, we find the boundary lines well chosen.

It might be reinforced in the "No Action" - management structure alternative (page 24) that the sanctuary would offer a more useful and reasonable alternative to the existing, fragmented and impractical management structure (viz. USFWS management responsibility - located in Imperial Valley, Department of Parks and Recreation, Navy, City of San Diego, etc.).

Our most serious concern over the specifics of the subject DEIS pertains to an oversight in the sections on research objectives and needs on pages 16 and 17. The Department feels strongly that one of the major research needs regarding most coastal wetlands, including the Tijuana River Estuary, is for research in wetland restoration techniques and methodology. Since much of the southern portion of the wetlands could and should be restored, the sanctuary would be an appropriate place for such research.

We find the assignment of the Department as an ex-officio member of the Sanctuary Advisory Committee appropriate, and will do whatever we can to

assist in the establishment of the Sanctuary. Please call Bruce Browning, our Coastal Wetland Program Coordinator, (916) 445-9992, should you need any further input regarding our comments.

Sincerely,

Director

cc: Region 5
Scott McCrary, California Coastal Commission

105

Ms. Joyce Wood
Director,
Office of Ecology and Conservation
U.S. Department of Commerce
Washington, D.C. 20235

Dear Ms. Wood:

The United States Section, International Boundary and Water Commission, has completed its review of the draft Environmental Impact Statement which you submitted with your letter of June 12, 1981, on the "Proposed Estuarine Sanctuary Grant Award to the State of California for a Tijuana River Estuarine Sanctuary."

We, of course, understand that the Sanctuary program under the Coastal Zone Management Act of 1972 (16 USC 1456) is designed to provide matching funds to states for land acquisition and management of outstanding estuaries for teaching and research purposes. We also understand that a sanctuary designation does not impose new regulations or alter those already in place. At the same time, however, this agency is concerned that the draft statement does not properly address the jurisdiction, powers and prerogatives adequately for this International Commission to be able to fulfill the obligations and assert the rights under the boundary and water treaties between the United States and Mexico that those governments have entrusted upon the International Boundary and Water Commission.

The Governments of the United States and Mexico, pursuant to provisions in the Treaty of February 3, 1944, for the Utilization of the Waters of the Colorado and Tijuana Rivers and of the Rio Grande (59 Stat. 1237) have jointly undertaken measures and works in the Tijuana River area of the boundary for control of river floods, for emergency deliveries of water and for resolving border sanitation problems. The draft statement makes no mention of these international obligations. The invitation of membership from Mexico and this Section to the three tier Committee Management, while perhaps helpful to the estuarine sanctuary goals, cannot, nor should be, considered a sufficient safeguard to fulfill the obligations and asserting the rights under the boundary and water treaties entrusted to the International Boundary and Water Commission.

Recognizing the international obligations under the boundary and water treaties with Mexico, the Congress of the United States in passing the Coastal Zone Management Act provided in Subsection (c) (2):

> "Nothing in this Chapter shall be construed..."
>
> "(2) as superseding, modifying, or repealing existing laws applicable to the various Federal agencies, nor to affect jurisdiction, powers, or prerogatives of the International Boundary and Water Commission, United States and Mexico."

With specific reference to water quality, the Presidents of the United States and Mexico in the Fall of 1979, approved an agreement through this Commission for a permanent solution to the border sanitation problems and directed this Commission to conclude supplementary agreements for solution of existing sanitation problems, including the one originating in Tijuana. In December 1980, the United States and Mexico approved the Commission-negotiated agreement for solution of the sanitation problem at Calexico-Mexicali. At this time this Commission is negotiating an agreement for solution of the sanitation problem in the Tijuana area, with a view to completing an agreement this year. It now appears that the most certain approach for a permanent solution of the problem is a joint waste treatment plant located in the lower Tijuana River Valley, to handle waters from both San Diego and Tijuana. In view of the hazard posed by the Tijuana sanitation problem to the health of citizens on both sides of the boundary including those using the ocean beaches and the estuary itself, and of the status of negotiations with Mexico toward a solution of the problem, this agency must oppose the designation of the Tijuana estuary as a National Estuarine Sanctuary, if such designation would preclude the construction of a joint waste treatment plant in the lower Tijuana River Valley at a site near the westerly end of the valley and near the international boundary.

To address these concerns, the United States Section, International Boundary and Water Commission suggests a number of revisions to the subject draft EIS, as noted in the attached memorandum, on the following places in the draft statement:

SUMMARY

Page iii, revise second paragraph, under "Proposed Action," and first paragraph under "Management."

TEXT

Page 7, revise second paragraph under:

"Private land to be acquired"

Page 10, revise first paragraph under:

"Responsibilities of the Management Authority"

Page 11, revise second and third paragraphs under:

"b. Sanctuary Advisory Committee"

Page 12, revise paragraph under:

"Water Quality Subcommittee"

Page 24, revise first paragraph under:

"No action"

Page 48, add a Section J:

"International Considerations" to "part III":

Affected Environment"

Page 49, last paragraph under:

"General Impacts"

Page 57, add a new fourth paragraph and revise first paragraph under:

"Planning for Wastewater Treatment Facilities"

Page 58, revise second paragraph.

Sincerely,

J. F. Friedkin
Commissioner

cc: Robert W. Knecht
Acting Assistant Administrator
Office of Coastal Zone Management
3300 White Haven Street N.W.
Washington, D.C. 20235

Richard Coddington
EPA, San Francisco

bcc: ARA/REX
OES/EAR through ARA/RLX

MRY:JJV:CRB:JFF:mr 7/27/81

MRY:tks
7/9/81

MEMORANDUM OF THE UNITED STATES SECTION,

INTERNATIONAL BOUNDARY AND WATER COMMISSION'S

COMMENTS ON DRAFT EIS

"PROPOSED ESTUARINE SANCTUARY GRANT AWARD TO THE STATE

OF CALIFORNIA FOR A TIJUANA RIVER ESTUARINE SANCTUARY."

SUMMARY

Page iii, Paragraph 2, add portion underlined to last sentence so as to read: "These uses may include low intensity recreation, fishing, and wildlife observation, and facilities consistent with the obligation by the Government of the United States in the Treaty with Mexico of February 3, 1944 for the Utilization of the Waters of the Colorado and Tijuana Rivers and of the Rio Grande (59 Stat. 1219).

Page iii, first paragraph under MANAGEMENT, add portion underlined to last sentence so as to read: Membership composition of the management committee will include representation from the private sector, governmental agencies of the United States and Mexico, real property owners and interested and qualified citizens, it being understood that the management program will be consistent with subsection (c) (2) of the Coastal Zone Management Act, 16 USC 1456.

Text

Page 7, second paragraph under Private Land to be Acquired, add portion underlined to read:

Of the 31 parcels proposed for acquisition, seven parcels above the river and thirteen parcels below the river would be "leased back" to sellers for

agricultural use and other activities, including sanitary facilities, compatible with the maintenance of the sanctuary. See Appendix D for description of land ownership.

Page 10, first paragraph under Responsibilities of the Management Authority, add underlined portion so as to read: "Sanctuary status will confer no new regulations on the Tijuana River, nor affect the jurisdiction, powers, or prerogatives of the International Boundary and Water Commission, United States and Mexico as provided under subsection (e) (2) of the Coastal Zone Mangement Act, 16 USC 1456. Rather, . . ."

Page 11, under b. Sanctuary Advisory Committee, Revise second and third paragraphs, deletions in brackets and additions underlined, so as to read:

A seven-member Advisory Committee is proposed. Membership would include the City of San Diego, the County of San Diego, the California Coastal Commission, a representative of agricultural interests, [a representative of the government of Mexico,] a representative of the water quality agencies, and a representative of research and education interests. A member from Baja California, Mexico, would be invited.

The Sanctuary Advisory Committee will have direct links to both the Sanctuary Management Authority and its subcommittees. One member of the Advisory Committee, elected for a year term by a majority of its members, will serve on the Management Authority. The person with expertise in ranching and agriculture will serve on, and represent, an Agriculture Subcommittee. Both the [representative of Mexico] member from Baja California, and the representative of the water quality agencies will be invited to serve on the Water Quality Subcommittee. Similarly, the spokesperson for research and education interests on the Advisory Committee will also be a member of the Research and Education Subcommittee.

Page 12 paragraph under Water Quality Subcommittee, revised, with bracketed portion deleted and underlined portions added so as to read: "The water quality subcommittee responsibilities include 1) to help improve the coordination of planning already underway for the Tijuana Valley in the United States, and 2) to ensure that sanctuary goals are considered in planning for flood control, groundwater management, and [planning for wastewater treatment] sanitary measures. [with] Membership will be invited from Baja California, [the governments of] Mexico and the executive branch of the State of California. With membership from Baja California, Mexico, the subcommittee would [will] have the [unique] opportunity to [foster international progress towards] obtain views from Baja California on the [dual] goals [of resource protection and water quality management] of this subcommittee. The participation of the United States Consulate in Tijuana and the Commission of the Californias will be useful in inviting the appropriate representative of Mexico. The same individual will be invited to serve on the Sanctuary Advisory Committee. Agency representatives will be invited from the Environmental Protection Agency, the State Water Resources Control Board, the United States Section of the International Boundary and Water Commission and Metro II.

Page 24, under 5. No Action, revise first paragraph, deletions in brackets and additions underlined, so as to read:

A course of "no action" on this sanctuary proposal would sacrifice an opportunity to secure the entire wetland ecosystem and adjacent lowlands of the lower Tijuana River Valley in a unified program of management, and compatible use. Part of the core wetland area river corridor and vital uplands will remain outside public stewardship, and the maintenance of compatible agricultural uses in perpetuity will not be a certainty. A forum of working towards [cooperative management] further cooperation with Mexico for water quality and resources would also be lost.

Page 48, add Section J after last paragraph, as follows:

J. International Considerations

The Governments of the United States and Mexico, pursuant to provisions in the Treaty of February 3, 1944, for the Utilization of the Waters of the Colorado and Tijuana Rivers and of the Rio Grande (59 Stat. 1237) have jointly undertaken measures and works in the Tijuana River area at the boundary for control of river floods for emergency deliveries of water and for resolving border sanitation problems.

Under the 1944 Treaty, the two Governments through their joint International Boundary and Water Commission undertook works in their respective territories for a coordinated plan for control of floods from the Tijuana River. Under the plan Mexico, between 1972 and 1979, constructed a concrete-lined channel for 2.5 miles to meet a similarly designed channel at the boundary, constructed by the United States as a dissipator structure between 1978 and 1979 so as to reduce the velocity of floods from Mexico and spreading these for their natural flow into the Tijuana Estuary.

Also, the two Governments through the International Boundary and Water Commission in 1972 (TIAS 8412) entered into an agreement for use of the Southern California aqueducts to deliver a portion of the waters of the Colorado River allotted to Mexico for use on an emergency basis in the City of Tijuana. That agreement remains in force on a standby basis.

With respect to sanitation problems, the two Governments through the International Boundary and Water Commission in 1965 entered into an agreement for emergency use by a rapidly growing City of Tijuana, Mexico of the sewage disposal system of the City of San Diego and jointly constructed an emergency connection line to effect toe agreement. The connection is designed to prevent overflows on the surface of sewage from Tijuana into the

United States during periods of breakdowns to the Tijuana Sewage disposal system that relies heavily on pumping.

In more recent years, the two Governments through the International Boundary and Water Commission in September 1979 reached agreement for the solution of border sanitation problems which specifically confers to this Joint Commission the responsibility and jurisdiction to effect the provision in the 1944 Water Treaty that the two Governments shall give preferential attention to the solution of border sanitation problems. Following instructions of the Presidents of the United States and Mexico, in September 1979 the International Boundary and Water Commission is at work seeking supplementary agreements for specific solutions to existing bordeer sanitation problems, including one at San Diego - Tijuana, where breakdowns to the sewage disposal system at Tijuana and the resulting excessive use of an emergency sewage connection to the City of San Diego present a threat to the health and well-being of inhabitants on both sides of the border and to the beneficial use of the waters of the Tijuana River and of the surf waters near the boundary.

At this time this Commission is engaged in negotiating an agreement for solution of the sanitation problem in the Tijuana area, with a view to completing an agreement this year. One of the possibilities for permanent solution of the problem is a joint waste treatment plant located in the lower Tijuana River Valley, to handle wastes from Both San Diego and Tijuana.

Page 49, under a. General Impacts revise last pararaph, deletions in brackets and additions underlined, so as to read:

The Advisory Committee and Subcommittees on Agriculture, Water Quality, and Research and Education, will provide a forum to [work toward] provide the technical advice to the appropriate agencies in the solution of environmental problems in the larger region. Special emphasis will be directed for re-

search and estuary [water] management between the United States and Mexico as may be appropriate with the understandings in Sub Section (e) (2) of the Coastal Zone Management Act of 1972, 16 USC 1456.

Page 57 under 5. Planning for Wastewater Treatment Facilities, add a new paragraph 4 after "... to expire on June 13, 1981," and revise last paragraph, deletions in brackets and additions underlined, so as to read:

The planning by the City of San Diego for additional wastewater treatment facilities in the Tijuana Valley assists the International Boundary and Water Commission in developing alternatives for a long term solution to the border sanitation problem at San Diego - Tijuana; a problem now being considered by this Joint Commission of the United States and Mexico for an agreement for a solution under the Commissioner's agreement approved by the two Governments in 1979 for solution of border sanitation problems. One of the possibilities for permanent solution of the problem is a joint waste treatment plant located in the lower Tijuana River Valley, to handle wastes for both San Diego and Tijuana.

Recent correspondence from EPA to the Coastal Commission (April 10, 1981) expresses interest in construction of a facility to serve both the United States and Mexico, perhaps at a site other than the reserved site of the Tijuana River and South San Diego County beaches as more sewage is pumped through Mexican connector lines, which are operating to capacity, to a surf discharge several miles below the border. Also, recent correspondence from the United States Section, International Boundary and Water Commission (May 8, 1981), advises that at this time that Commission is engaged in negotiating an agreement for solution of the sanitation problem in the Tijuana area, with a view to completing an agreement this year; further, it advises that in view of the hazard posed by the Tijuana sanitation problem to the health of citizens on

both sides of the boundary including those using the ocean beaches, and the estuary itself, and of the status of negotiations with Mexico toward a solution of the problem, this agency must oppose the designation of the Tijuana River estuary as a National Estuarine Sanctuary, if such designation would preclude the construction of a joint waste treatment plant in the lower Tijuana River Valley.

Page 58, revise second paragraph, deletions in brackets and additions underlined so as to read:

"The management structure of the Estuarine Sanctuary can [explicity] respond [s] to [the] water quality issues in the Tijuana Valley, though recognizing the prerogatives reserved to the International Boundary and Water Commission by Subsection (e) (2) of the Coastal Zone Management Act of 1972. A representatives of the water quality agencies, and a representative [of the government of Mexico], from Baja California will be invited to serve on the Sanctuary Advisory [Management authority] Committee. A water quality subcommittee will be established with membership invited from the EPA, the United States Section of the International Boundary and Water Commission, the Regional Water Quality Control Board, a member from Baja California, [a representative of the government of Mexico,] and a representative of [those agencies in] the Executive Branch of the State of California. [Government that have discussions underway with the government of Mexico.]

The following suggestions reflect comments on technical aspects.

Page 5, revise item 4, deletions in brackets and additions underlined so as to read:

"Encompass enough of the drainage area to make possible reasonable and consistent management of the immediate floodplain and [drainage basis] side drainage area.

Note: The proposed sanctuary area of 2,531 acres (4 square miles) only 0.2 percent of the 1,731 square mile drainage basin.

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Page 17, revise item 3, deletions in brackets and additions underlined so as to read:

"3. Determine expected sedimentation rates [under various strategies for managing the watershed and correlate these rates with disturbance in the watershed] in relation to flood flows to determine sediment inflows to the estuary, beaches replenishment, and impacts on the estuary.

Page 36, contains a description of the freshwater inflows into the estuary. It would be desirable to include the silt and sediment inflows and their impacts on aquatic organisms.

cc: NEPA
CZ/SP
GCZ

STATE OF CALIFORNIA — EDMUND G. BROWN JR., Governor

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
30 VAN NESS AVENUE
SAN FRANCISCO, CALIFORNIA 94102
PHONE: 557-3686

June 25, 1981

Mr. Robert W. Knecht
Acting Assistant Administrator
Office of Coastal Zone Management
3300 Whitehaven Street, N. W.
Washington, D. C. 20235

Dear Mr. Knecht:

We have received and reviewed the Draft Environmental Impact Statement on the Proposed Estuarine Sanctuary Grant Award to the State of California for a Tijuana River National Estuarine Sanctuary and have no comments on the document. We should appreciate receiving a copy of the Final Environmental Impact Statement.

Very truly yours,

JEFFRY S. BLANCHFIELD
Chief Planner

JSB/jr

cc: Joyce M. T. Wood
Milt Martin
Scott McCreary

21 July 1981

Scott McCreary
California Coastal Commission
631 Howard Street
San Francisco, California
94105

RECEIVED
JUL 23 1981
CALIF. COASTAL COMMISSION
SAN DIEGO DISTRICT

Dear Mr. McCreary:

Southern California has suffered more extensive loss of coastal wetlands than has been observed in any other area of this Nation. In order to address this problem of loss of these invaluable habitats with their diverse importance to birds, fish and shellfish, and interesting flora and the management of these resources, the California Wetlands Coalition was formed. The objectives of this coalition include the protection, maintenance, enhancement, and restoration of wetlands habitats throughout this State.

Please note our enthusiastic support of the establishment of the Tijuana Slough Estuarine Sanctuary. This area is extensive and in a nearly natural state. It has a long history of importance as habitat for those species which have adapted to and require these productive environments. Many of these species are now either rare, endangered, or no longer may be found in California. Some species which once depended upon these habitats are now extinct.

In order to avoid additional loss of the existent coastal wetlands and reduction of the valuable renewable resources which depend upon them, many laws have been passed. In addition, where it is obvious that acquisition of the properties involved is required to assure effective protection for the benefit of the general public, funds have been appropriated to implement such actions. In part, these acquisitions may be accomplished as a result of the national estuarine sanctuary program. We support this acquisition and designation of the area of the Tijuana Slough as an estuarine sanctuary for the people of California and the Nation.

Yours sincerely,

Rimmon C. Fay

Rimmon C. Fay, Ph.D.
California Wetlands Coalition
P. O. Box 536
Venice, California
90291

cc: Charles Schneebeck
John Bradshaw

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envirosphere company
A Division of EBASCO SERVICES INCORPORATED
130 Newport Center Drive, Newport Beach, CA 92660 (714) 759-7700

July 30, 1981

Ms. Joyce M. T. Wood
Director
Office of Ecology and Conservation
United States Department of Commerce
National Oceanic and Atmospheric Administration
Office of Coastal Zone Management
Washington, D. C. 20235

Dear Ms. Wood:

In response to your request for comments on the Draft EIS of the Tijuana River Estuarine Sanctuary, I would like to submit two items:

1. I have corrected the spellings of many of the family names listed in Table 2, "Flowering Plants of Tijuana Estuary". In addition, I have listed the current family names where appropriate (e. g., Poaceae for Graminese). Also, Cuscuta is now placed in the genus Convolvulaceae. All of these suggestions are from Munz, 1974, A Flora of Southern California, UC Press.

2. I am sending a list of species that you may want to incorporate in your final report. These were personally collected by me (or reported in the literature) during December 1979 through February 1980. On the list that I have sent you, these are marked with an arrow on the left margin. (Please disregard information in column 4, "Source" and 5, "Survey Site". The other species on this list lie outside the estuary and the Tijuana River area).

If I can be of further assistance, please do not hesitate to ask. Unfortunately, I was not be able to attend the Public Hearing on July 23, 1981.

Sincerely,

R. John Little, Ph.D.
Botanist

RFJ:vr
Enclosures
cc: [redacted]

TABLE 1
SPECIES LIST

Scientific Name[1]	Habit[2]	Native/ Introduced[3]	Source[4]	Survey Site[5]
AGAVACEAE				
Yucca schidigera	T/S	N	PMS	
AIZOACEAE				
Carpobrotus aequilaterus	PH	N	ECOS, PMS, RMB, URM	E6a
Carpobrotus edulis	PH	I	ECOS, RMB, URM	A4
Carpobrotus sp.[6]	PH	N/I	ECOS	A3, E5a, b
Drosanthemum floribundum	PH	I	ECOS	A3, A7
→ Gasoul crystallinum	H	I	WRM, PMS, ECOS	A3, B2, B3, C2, E2, E3, E4, E6b.
Gasoul nodiflorum	H	I	WRM, PMS ECOS	A3, E5a, b, E6b, c
AMARANTHACEAE				
Amaranthus albus	H	I	RMB	
Amaranthus blitoides	H	N	RMB	
→ Amaranthus sp.	H	N/I	ECOS	A4, C1
ANACARDIACEAE				
Rhus integrifolia	T/S	N	ECOS	A6, E6a, b, F
→ Rhus laurina	T/S	N	ECOS	A6, B1, D1, F
→ Schinus molle	T	I	PMS, ECOS	B1, E[illegible]
APIACEAE				
→ Apium graveolens	PH	I	ECOS	A4, E[illegible]
→ Foeniculum vulgare	PH	I	RMB, PMS, ECOS	A4, C[illegible], [illegible], E[illegible], E4, E[illegible]
→ Unknown genus	-	-	ECOS	C3, C[illegible], D2, E2
ARECACEAE				
Washingtonia filifera	T	N	ECOS	A1

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Scientific Name[1]	Habit[2]	Native/ Introduced[3]	Source[4]	Survey Site[5]
ASTERACEAE				
Amblyopappus pusillus	H	N	WRM, PMS	
Ambrosia chamissonis	PH	N	WRM, ECOS	E5a
Ambrosia psilostachya	PH	N	RMB, ECOS	C4
Ambrosia psilostachya var. californica	PH	N	ECOS	A4, B1, B2, C6, D2, E2, E3, E4, E5b, c
Ambrosia sp.	PH	N	ECOS	A4
→ Artemisia californica	S	N	PMS, ECOS	B2
Artemisia sp., UNKN #1	S	N/I	ECOS	B1
Artemisia sp., UNKN #2	S	N/I	ECOS	D2
→ Aster spinosus	PH	N	RMB, ECOS	B1, C6
→ Baccharis glutinosa	S	N	RMB, PMS ECOS	B1, B2, B3, C3 C4, C5, C6, D2 D3, E1, E2, E3, E4, E7
Baccharis sarthroides	S	N	RMB, PMS	
Baccharis sp.	PH or S	N	ECOS	F
Centaurea melitensis	H	I	PMS	
→ Centaurea sp.	H	I	ECOS	A1, A2, A7, B1 C6
Chrysanthemum carinatum	H	I	PMS	
→ Chrysanthemum coronarium	H	I	RMB, ECOS	A1, B1, [illegible] D1, D2, E2, E3, E5b
→ Conyza canadensis	H	I	ECOS	A1, A3, A7, B1, B3, C1, C2, C4, C5, C6, D2
→ Cotula coronopifolia	PH	I	RMB, PMS ECOS	A3, B1, C3, E1, E5b, E7
→ Eclipta alba	H	I	ECOS	C3, C4, E1
→ Gnaphalium beneolens	PH	N	RMB, ECOS	A3, C2, E1
Gnaphalium bicolor	PH	N	ECOS	A3, B1
→ Haplopappus venetus	S	N	ECOS	D2, E1, E2, E5b, E6b
→ Haplopappus venetus ssp. vernonioides	PH	N	RMB, PMT, PMS, ECOS	A3, A4, A7, B1, D2
Helianthus annus ssp. lenticularis	H	N	RMB	
→ Helianthus sp.	H	N/I	ECOS	D2, E1
→ Heterotheca grandiflora	H	N	RMB, PMS ECOS	A3, A4, A7, B3, C2, C3, C4, C5, C6, F

Scientific Name[1]	Habit[2]	Native/ Introduced[3]	Source[4]	Survey Site[5]
ASTERACEAE, Continued				
→ Hymenoclea monogyra	S	N	RMB, ECOS	D1
Iva hayesiana	S	N	RMB	
Jaumea carnosa	PH	N	JBS, WRM PMS	
Lactuca serriola	H	I	ECOS	A4
→ Lepidospartum squamatum	S	N	ECOS	A3, A7, B1, B2, C5, D2, E2
→ Pluchea sericea	T/S	N	RMB, WRM PMS, ECOS	A4, C5, C6
→ Senecio douglasii	PH	N	RMB, ECOS	C5
Sonchus oleraceus	H	I	RMB, ECOS	A3, A7, B3, E1, F
→ Stephanomeria virgata	H	N	ECOS	A3, A4, A7, B1, C4, C7, E3
→ Genus, UNKN #1	-	-	ECOS	C4
→ Genus, UNKN #2	-	-	ECOS	D2
→ Genus, UNKN #3	-	-	ECOS	E2
→ Xanthium strumarium	H	N	ECOS	E1, E2, E5a, b
→ Xanthium strumarium var. canadense	H	N	RMB, ECOS	A4, C3, C4, C5, C6, D3, E4, E7
BATIDACEAE				
Batis maritima	PH	N	JBZ, PMT, WRM, PMS, ECOS	A3
BORAGINACEAE				
→ Heliotropium curassavicum var. oculatum	PH	N	PMS, RMB, ECOS	A1, C2, E3, E5a, b, E5b, c
BRASSICACEAE				
Brassica geniculata	PH	I	ECOS	E3
→ Brassica nigra	H	I	RMB, ECOS	B2, D2, D1
Brassica rapa ssp. sylvestris	H	I	RMB	
→ Brassica spp.[8]	H	I	ECOS	A3, A4, A5, A7, C3, C4, C5, C6, E2, E3, E4, E7
Cakile edentula ssp. californica	H	N	WRM	
→ Cakile maritima	H	I	ECOS	E5, E6

Scientific Name[1]	Habit[2]	Native/ Introduced[3]	Source[4]	Survey Site[5]
BRASSICACEAE, Continued				
Hutchinsia procumbens	H	N	PMS	
Lobularia maritima	PH	I	PMS	
→ Raphanus sativus	H	I	ECOS	A3, A4, C3, D1
BUXACEAE				
Simmondsia chinensis	S	N	ECOS	A6
CACTACEAE				
Opuntia ficus-indica	T/S	I	ECOS	B2
Opuntia littoralis var. littoralis	T/S	N	RMB, WRM	
Opuntia parryi var. serpentina	T/S	N	WRM	
Opuntia sp., UNKN #1	T/S	N/I	ECOS	B1
Opuntia sp., UNKN #2	T/S	N/I	ECOS	B2
Opuntia sp., UNKN #3	T/S	N/I	ECOS	C5, E2, E6a
CAPPARACEAE				
Isomeris arborea var. arborea	S	N	ECOS	D3, E2, E3, E6c
CAPRIFOLIACEAE				
Sambucus mexicanus	T/S	N	RMB, ECOS	B2, D3, E2, E3
CARYOPHYLLACEAE				
Cardionema ramosissimum	PH	N	PMS	
Spergularia marina	H	I	PMS, RMB	
Spergularia sp.	H or PH	N/I	ECOS	A4
CHENOPODIACEAE				
Atriplex canescens ssp. canescens	S	N	WRM, PMS ECOS, RMB	D3, E4, E5b
Atriplex rosea	H	N	RMB	
Atriplex semibaccata	PH	I	RMB, PMT, WRM, PMS, ECOS	A4, A5, C4, E3, E6b, c, F
Atriplex watsonii	PH	N	RMB, WRM, PMS	

Scientific Name[1]	Habit[2]	Native/ Introduced[3]	Source[4]	Survey Site[5]
CHENOPODIACEAE, Continued				
Atriplex spp.	UKN	N/I	PMS	
Bassia hyssopifolia	H	I	PMS, ECOS	A4
→ Chenopodium album	H	I	RMB, ECOS	B3, C1, C3, C4, E1, E4, E3, E4, E6c, E7
→ Chenopodium ambrosioides	H	I	RMB, ECOS	C5
Salicornia bigelovii	H	N	JBZ, PMT, WRM, PMS	
Salicornia europaea	H	I	PMS	
Salicornia subterminalis	PH	N	JBZ, PMT, WRM, PMS	
→ Salicornia virginica	PH	N	JBZ, PMT, WRM, PMS ECOS	A4, B1, E5b, E6c
Salicornia sp.	H or PH	N/I	ECOS	A7
→ Salsola iberica	H	I	RMB, PMS, ECOS	A1, A2, A3, A5, A6, A7, B2, B3, C1, C2, C3, C5, C6, C7, D2, D3, E6b, c, F
Suaeda californica	PH	N	JBZ, WRM PMS	
Suaeda torreyana	PH	N	PMT, WRM, PMS	
Suaeda sp.	PH or S	N/I	ECOS	A5, A7, E6b
CONVOLVULACEAE				
Cressa truxillensis var. vallicula	PH	N	JBZ, WRM, PMS	
Cuscuta campestris	H	N	RMB	
Cuscuta salina	H	N	JBZ, PMS ECOS	A3, A4, A7
CRASSULACEAE				
Crassula erecta	H	N	PMS	
CUCURBITACEAE				
Marah macrocarpus	PH	N	ECOS	A6
CYPERACEAE				
Cyperus esculentus	PH	N	ECOS	B3

Scientific Name[1]	Habit[2]	Native/ Introduced[3]	Source[4]	Survey Site[5]
CYPERACEAE Continued				
→ Cyperus spp.	H or PH	N/I	ECOS	C3, C4, C5, E1, E5b, E7
Scirpus americanus	PH	N	RMB	
Scirpus californicus	PH	N	PMS	
→ Scirpus olneyi	PH	N	RMB, ECOS	C3
Scirpus robustus	PH	N	ECOS	A3
→ Scirpus spp.	PH	N/I	PMT, ECOS	A1, C3, E1, E5b E7
EUPHORBIACEAE				
Croton californicus	PH	N	ECOS	C5
Croton californicus var. tenuis	PH	N	RMB, ECOS	C6
Euphorbia sp.	H	N/I	ECOS	F
→ Ricinus communis	T/S	I	RMB, ECOS	B3, C3, C4, C6, D1, D2, E3, E4, E5b, G
FABACEAE				
Astragalus trichopodus ssp. leucopsis	PH	N	ECOS	C6
Astragalus trichopodus ssp. trichopodus	PH	N	ECOS	A7
Lotus nuttallianus	H	N	PMS	
→ Lotus sp. UNKN #1	PH	N/I	ECOS	C5
→ Lotus sp. UNKN #2.	H or PH	N/I	ECOS	E5a
Lupinus sp.	H or PH	N	ECOS	C6
→ Melilotus albus	H	I	RMB, ECOS	C3, C4, E1, E5b
Melilotus indicus	H	I	ECOS	F
Prosopis pubescens	T/S	N	RMB	
→ Prosopis sp.	S or T	N/I	ECOS	C6
→ Trifolium sp.	H or PH	N/I	ECOS	C4, E7
FRANKENIACEAE				
→ Frankenia grandifolia	PH	N	JBZ, PMT, WRM, PMS ECOS	A1, C3, E4, E5b E7b
Frankenia palmeri	S	N	PMS	

Scientific Name[1]	Habit[2]	Native/ Introduced[3]	Source[4]	Survey Site[5]
JUNCACEAE				
Juncus acutis	PH	N	PMS	
→ Juncus acutis var sphaerocarpus	PH	N	RMB, WRM, ECOS	A4, E6
JUNCAGINACEAE				
Triglochin maritimum	PH	N	JBZ, WRM, PMS	
LAMIACEAE				
→ Marrubium vulgare	PH	I	RMB, ECOS	A4, A6, B2, B3, C3, C5, D2, D3, E2
Salvia mellifera	PH	N	PMS	
MALVACEAE				
Malva sp.	H	I	ECOS	
MYRTACEAE				
→ Eucalyptus spp.	T	I	ECOS	E1, C3, E3
NYCTAGINACEAE				
→ Abronia maritima	PH	N	ECOS	E5a
Abronia umbellata	PH	N	PMT, WRM	
ONAGRACEAE				
Camissonia cheiranthifolia	PH	N	PMS	
→ Camissonia cheiranthifolia ssp. suffruticosa	PH	N	RMB, PMT, ECOS	C5, C6, E5a, B3, E6a
PHYTOLACCACEAE				
→ Phytolacca americana	PH	I	ECOS	C5
PLANTAGINACEAE				
Plantago major	PH	I	ECOS	E1, E7
Plantago sp.	H or PH	N/I	ECOS	F

Scientific Name[1]	Habit[2]	Native/ Introduced[3]	Source[4]	Survey Site[5]
PLUMBAGINACEAE				
Limonium californicum	PH	N	JBZ, MRM, ECOS, PMS	A1, A2, A3, A7, E5b, E6b
POACEAE				
Arundo donax	PH	I	RMB, ECOS	A3, C5, C6, D1, D2, E3
Bromus rubens	H	I	PMS	
Bromus spp.	H	I	PMT,	
Cynodon dactylon	PH	N	ECOS	C5, C6
Distichlis spicata	PH	N	JBZ, PMT, PMS	
Distichlis spicata var. stricta	PH	N	RMB	
Hordeum leporinum	H	I	PMS	
Monanthochloe littoralis	PH	N	PMT, PMS ECOS	A7, A3
Parapholis incurva	H	I	PMS	
Polypogon monspeliensis	PH	I	PMS, PMS ECOS	A3, A4, B3, C3, D3, E1, E2, E3, E4, E5b, E6b, C, E7
Spartina foliosa	PH	N	JBZ, PMT, PMS	
Genus, UNKN #1	-	-	ECOS	E2
Genus, UNKN #2	-	-	ECOS	E2
Genus, UNKN #3	-	-	ECOS	E2
Various genera	-	-	ECOS	A1, B1, B2, B3, C3, E1, E3
POLYGONACEAE				
Eriogonum fasciculatum	S	N	PMT, MRM, PMS, ECOS	A1, A7, F
Eriogonum fasciculatum ssp. fasciculatum	S	N	RMB	
Nemacaulis denudata	H	N	PMS	
Polygonum aviculare	H	I	PMS	
Rumex crispus	PH	I	PMS, ECOS	A1, B1, C6, D2, E7
Rumex feuginus	H	N	RMB	

Scientific Name[1]	Habit[2]	Native/ Introduced[3]	Source[4]	Survey Site[5]
POLYGONACEAE, Continued				
Rumex pulcher	PH	I	ECOS	A3, C1, E7
Rumex sp., either R. crispus or R. pulcher	PH	I	ECOS	A6, C5, D2, E1, E4, E5b, E6b
POTAMOGETONACEAE				
Ruppia maritima	H	N	PMS	
ROSACEAE				
Heteromeles arbutifolia	T/S	N	ECOS	A6
SALICACEAE				
Populus fremontii	T	N	RMB, ECOS	C3, D2, E7
Salix exigua	S	N	RMB	
Salix gooddingii var. gooddingii	T	N	ECOS	D2
Salix gooddingii var. variabilis	T	N	RMB, ECOS	D1, D2, E1
Salix laevigata	T	N	ECOS	E3
Salix lasiolepis	T/S	N	PMS	
Salix spp.	T or S	N	PMS, ECOS	C3, E
SCROPHULARIACEAE				
Cordylanthus maritimus	H	N	PMT, PMT	
SOLANACEAE				
Datura meteloides	PH	N	RMB, ECOS	B1, D1, D2, E3
Lycium andersonii	S	N	PMS	
Lycium californicum	S	N	ECOS	E6b
Lycopersicon esculentum	H	I	RMB	
Nicotiana glauca	T/S	I	PMT, PMS ECOS	A3, A7, B1, B2, C1, C3, D1, D2, E1, E3, E5b, E6b
Petunia parviflora	H	N	ECOS	E7
Physalis philadelphica	H	I	ECOS	D1

Scientific Name[1]	Habit[2]	Native/ Introduced[3]	Source[4]	Survey Site[5]
SOLANACEAE, Continued				
Solanum nigrum	H	I	ECOS	B3
→ Solanum nodiflorum	PH	I	RMB,ECOS	C4
Solanum sarrachoides	H	I	RMB	
→ Solanum spp.	H or PH	N/I	ECOS	A4, C3, C5, D2, E2, E6b
TAMARICACEAE				
→ Tamarix aphylla	T	I	ECOS	D1, E7
Tamarix pentandra	T	I	RMB	
→ Tamarix spp.	S or T	I	WRM, PMS ECOS	A1, A5, C3, C4, C5, C6, E1, E4
TYPHACEAE				
Typha latifolia	PH	N	PMS	
→ Typha spp.	PH	N	PMT,ECOS	A3, A4, E1, E4
ZOSTERACEAE				
Zostera marina	PH	N	PMS	

1. All nomenclature from Munz, 1974,"A flora of Southern California," (7), except for Tamarix pentandra, taken from Mason, Herbert L. 1957. A flora of the marshes of California, University of California Press.
2. T=Tree; T/S-Treelike shrub; S=shrub; PH=Perennial herb; H=Herbaceous (annual); UKN=Unknown due to unidentified species; T or S=Either a tree or a shrub.
3. N=Native plant; I=Introduced plant; N/I=Either native or introduced.
4. ECOS=ECOS Management Criteria, 1979; RMB=Beauchamp, 1970 (1); WRM=McIlwee, 1970 (3); PMT=Mudie, 1970 (4); PMS=Mudie, 1970 (5); JBZ=Zedler, 1977 (11).
5. Sites surveyed during ECOS Management Criteria vegetation survey, 1979.
6. Sp.: One unidentified species in a genus.
7. UNKN: Unidentified species; one of several unidentified species in a genus, or one of several unidentified but different genera.
8. Spp.: Several unidentified species in a genus, grouped together. It is probable that some of the taxa so included have already been listed, but were not identifiable due to lack of fruit, flower or other distinguishing characters.

League of Women Voters of San Diego

YWCA Building
1012 C Street
San Diego, California 92101
(714) 235-VOTE

Dallas Miner
Sanctuary Manager
Office of Coastal Zone Management
3300 White House Street
North West, Washington D.C.

Dear Mr. Miner,

In refering to the Draft Environmental Impact Statement on the Tijuana River which concerns the proposed Estuarian Sanctuary Award for the Tijuana River Estuary in the State of California, submitted by the California Coastal Commission.

The League of Women Voters of San Diego supports the sanctuary status in keeping with the League support of preserving wetlands in their natural state.

Sincerely,

Betty Challberg
Natural Resources Chair

Pat Richardson
President

ACTION: MINER/MACFARLAND

SDSU

DEPARTMENT OF GEOGRAPHY
COLLEGE OF ARTS AND LETTERS
SAN DIEGO STATE UNIVERSITY
SAN DIEGO, CA 92182

(714) 265-5437

July 16, 1981

Mr. Milt Martin
Estuarine Sanctuary Project Officer
Office of Coastal Zone Management
3300 Whitehaven Street, N.W.
Washington, D.C. 20235

Dear Sir:

Although I will be away from San Diego on July 23 and unable to attend the hearing, I would like to indicate my support for the proposed Tijuana River Estuarine Sanctuary.

I teach courses in environmental studies, water resources, and land use planning at San Diego State University, and often bring classes to the lower Tijuana River valley for field study. I have found it to be one of the best areas in San Diego County for the study of the interaction of natural and human environments, as well as an outstanding example of an endangered and very productive southern California landform and ecosystem. I believe your proposal would help prevent this important natural area from becoming any more impacted by adverse human intrusion than is already the case, and I wholeheartedly endorse the Sanctuary concept.

May I request that this letter be included as part of the hearing record.

Sincerely yours,

Philip R. Pryde
Department of Geography
San Diego State University

Action: Miner/MacFarland

GRAY, CARY, AMES & FRYE
ATTORNEYS AT LAW
525 B STREET, SUITE 2100
SAN DIEGO, CALIFORNIA 92101
TELEPHONE [714] 236-1661
TELECOPIER [714] 236-1048
WUD TWX 910 335-1273

GORDON GRAY (1877-1967)
W. P. CARY (1882-1943)
WALTER AMES (1893-1980)
FRANK A. FRYE (1904-1970)

OTHER OFFICES
IN
LA JOLLA
EL CENTRO

July 20, 1981

Mr. Robert W. Knecht
Acting Assistant Administrator
Office of Coastal Zone Management
3300 Whitehaven Street, N.W.
Washington, D.C. 20235

Re: Draft Environmental Impact Statement -
Tijuana River Estuarine Sanctunary - June, 1981

Dear Senator Hayakawa:

Our office represents Mrs. Harley Knox and Francis Harris, co-trustees under the will of Harley Knox. The trust and Mrs. Knox individually own real property in the proposed Tijuana River Estuarine Sanctuary.

We are opposed to the proposed project because we believe that it represents a potential waste of government money, both state and federal. The basic concept is to obtain $1,500,000 from the federal government and match it with $1,500,000 from the State of California. The resulting $3,000,000 thus generated will be used to acquire 885 acres to be combined with existing public acreage to form the Sanctuary.

The proposal is not to acquire the property through eminent domain but rather through negotiated purchases from willing sellers. If one divides the $3,000,000 by the private acreage in the amount of 885 acres, the result is slightly over $3,000 per acre. Property in the area has been selling in excess of $15,000 per acre. Without much effort, therefore, it is obvious that the California Coastal Commission cannot acquire free title to the acreage necessary for the sanctuary. The proposal suggests that less than fee simple acquisitions will be pursued "if they are cost effective and provide appropriate protection for the sanctuary resource." It is our belief that such a goal is not only impossible, but also so vague

as to be meaningless. How the money will be spent in light of these circumstances is unknown.

It is our request that your office reject this proposal. We believe that the proposed project is impossible of accomplishment in the manner described in the Draft Environmental Impact Statement. If you desire additional information, we will be happy to cooperate in any way we can. Based upon the information available to us, adjacent property owners in the area feel as we do and would be cooperative in supplying information to make all of the facts available before the Department of Commerce takes action.

Thank you very much for your consideration of this matter.

Very truly yours,

Theodore J. Cranston
For
GRAY, CARY, AMES & FRYE

TJC:cg

Enclosures

cc: Mrs. Harley Knox
Francis Harris

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ACTION: MINER/MACFARLAND

H. G. FENTON MATERIAL COMPANY

P. O. BOX 64 • (702 WEST WASHINGTON STREET)

SAN DIEGO, CALIFORNIA 92112 • TELEPHONE 298-8824

July 30, 1981

Robert W. Knecht
Acting Assistant Administrator
OFFICE OF COASTAL ZONE MANAGEMENT
3300 Whitehaven Street, N. W.
Washington, D. C. 20235

Subject: PROPOSED TIJUANA RIVER ESTUARINE SANCTUARY; DRAFT ENVIRONMENTAL IMPACT STATEMENT

Enclosed is the text of a statement made at the July 23, 1981, Public Hearing on the subject Draft Environmental Impact Statement (DEIS), which reflects the H. G. FENTON MATERIAL COMPANY'S position on the proposed Estuarine Sanctuary. In short, our position is that our 52 acres is not necessary for the success of the Sanctuary and should be removed from consideration as part of the Sanctuary.

The DEIS infers that the proposed boundaries were developed from several principles (page 5). The principle which apparently led the preparer of the DEIS to include our property is "4. Encompass enough of the drainage area to make possible reasonable and consistant management of the immediate floodplain and drainage basin." You may or may not be aware of the Border Highlands Local Coastal Plan that received final California Coastal Commission approval on July 23, 1981. It is our contention that this Border Highlands LCP which includes our property will adequately mitigate erosion and siltation concerns. It would appear that the City of San Diego, San Diego Water Pollution Control Board and California Coastal Commission have adequate controls without the need for expenditure of public funds to purchase the property.

The property is not for sale, and it would appear that the DEIS makes a weak case for inclusion of our property within the boundary of the proposed Sanctuary.

As a side note, there is an error on page 4 of Appendix D of the DEIS. Assessor's Parcel Numbers 663-020-04, 05, 06 & 07 are not owned by R. E. Hazard Contracting Company (DEIS parcels WW, XX, YY & ZZ) but are owned in fee title by H. G. FENTON MATERIAL COMPANY.

We would appreciate receiving a copy of the Final EIS when it becomes available.

Yours very truly,

Tim Flanagan

TIM FLANAGAN, Property Engineer

TF/mcw

Enclosure.

CC: DAVID M. MILLER
HENRY F. HUNTE
T. R. HALE

With Enclosure.

PUBLIC HEARING STATEMENT REGARDING

PROPOSED TIJUANA RIVER ESTUARINE SANCTUARY DRAFT EIS

AT IMPERIAL BEACH CITY HALL - 7:00 P.M. JULY 23, 1981

My name is TIMOTHY C. FLANAGAN, Property Engineer for H. G. FENTON MATERIAL COMPANY, P. O. Box 64, San Diego, California 92112.

Our company owns approximately 52 acres of land located at the extreme south east corner of the proposed Sanctuary as shown on Page 6 of the DRAFT EIS. Our property is adjacent to the International Border on the south, and Monument Boulevard on the north. The area is commonly known as the BORDER HIGHLANDS, and the elevation of most of our property is significantly higher than the nearby floodplain.

We are in the sand and gravel business and we have a City of San Diego Conditional Use Permit to mine aggregate from our property.

The points I wish to make are as follows:

1. We are not opposed in general to the creation of a Sanctuary, but we are most definitely opposed to inclusion of our property in the Sanctuary because the property is on the fringe of the proposed sanctuary, is not riparian habitat by any stretch of the imagination, and is an active gravel pit. Only this morning in Los Angeles, the Coastal Commission approved the City of San Diego's L.C.P. for the BORDER HIGHLANDS area of the TIAJUANA RIVER VALLEY COMMUNITY PLAN and L.C.P. This plan recognizes the natural resource value of the aggregate materials of the BORDER HIGHLANDS to the south San Diego communities, and we wish to continue sand and gravel extraction without any additional "management".

   We take on faith the statement on iii of the Summary which states that... "California does not intend to exercise its power of eminent domain (condemnation) to acquire any of the land, but will rely on negotiated sales with willing sellers".

   We are most definitely not "willing sellers" and since we are on the fringe of the proposed sanctuary, excluding our property from the Sanctuary will have little if any effect on the remainder of the proposed sanctuary area.

2. The second point is that the grant request is significantly low when compared to the value of the land which would have to be purchased to create the proposed Sanctuary. As an example, if the entire Three Million Dollars were spread over the theoretical 885 acres of "privately held land" it would compute out to about $3,500 per acre, which is in itself woefully low. While I don't speak for the City of San Diego who owns 120 acres, I do know that the City policy is to consider all property they own similar to the way private property owners do...that is...whether

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PUBLIC HEARING STATEMENT

PAGE TWO

2. (Continued)
their lands are used for industrial parks (as at Torrey Pines) or local, regional or state parks, the land is not free, but must be purchased at the fair market value. The effect of the policy is that the 3.0 Million Dollars would have to purchase not 885 acres, but 1005 acres, which computes to an average of less than $3,000 per acre available for land purchase.

Either the scope of the project needs to be reduced to fit the proposed budget, or the budget needs to be enlarged to fit the proposed scope.

Thank you.

Timothy C Flanagan

TIMOTHY C. FLANAGAN, Property Engineer
H. G. FENTON MATERIAL COMPANY

TCF/mcw

Gloria
cc: NEPA
LC7/SP
GC2

LAW OFFICES OF
LEONARD HORWIN LAW CORPORATION
121 SOUTH BEVERLY DRIVE
BEVERLY HILLS, CALIFORNIA 90212
(213) 272-7607 OR (213) 278-5132

July 8, 1981

Robert W. Knecht
Acting Assistant Administrator
Office of Coastal Zone Management
3300 Whitehaven Street N.W.
Washington D. C. 20235

Re : Draft Environmental Impact Statement
Tijuana River Estuarine Sanctuary

Dear Mr. Knecht:

Mrs. Horwin and I, are owners in community property, of property, within the proposed boundaries of the "Sanctuary" and accordingly are among the noticed parties mentioned in the Draft Statement.

We join in the view expressed by Tim Lichty, in his letter of July 2, 1981, opposing the Statement and State of California Application for Grant From U. S. Department of Commerce, insofar as it includes deprivation of property without payment of fair market value.

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Sincerely yours,

LEONARD HORWIN, for
Property Owners

LH/aw

cc: Mr. Tim Lichty

cc: NEPA
GCZ
LCZ/SP

TIM LICHTY
Suite 535, Spreckels Building
San Diego, California 92101
Telephone: (714) 239-0307

July 2, 1981

Mr. Robert W. Knecht
Acting Assistant Administrator
Office of Coastal Zone Management
3300 Whitehaven Street, N.W.
Washington, D. C. 20235

Re: Draft Environmental Impact Statement
Tijuana River Estuarine Sanctuary

Dear Mr. Knecht:

I am a property owner within the proposed boundaries of the Tijuana River Estuarine Sanctuary. The Draft Environmental Impact Statement indicates the State of California has submitted an application for a grant from the U. S. Department of Commerce to establish an estuarine sanctuary in the Tijuana River. I wish to oppose this application based upon the stated intent of the State of California to impose the estuarine sanctuary without fair market value compensation to the private property owners within the proposed sanctuary boundary. This appears to be in violation of Section 921.12 15 CFR Part 921. California's intent is described on page 111, paragraph one of the Draft Environmental Impact Statement wherein it states:

> "California does not intent to exercise its power of domain (condemnation) to acquire any of the land, but will rely on negotiated sales with willing sellers. The State would consider acquiring either fee simple title or less than fee interests such as conservation easements, or life estates in privately owned lands, etc. Less than fee simple acquisitions are preferred if they are cost effective and provide appropriate protection of the sanctuary resource."

What this paragraph means is the State will offer to purchase the privately owned lands at a value substantially lower than the fair market value. If the owner refuses to sell his property it will nevertheless be included in the sanctuary and the owner will be prevented from his normal use and enjoyment of his property.

California has requested a $1.5 million grant to be matched by $1.5 million in State funds for the acquisition of 885 acres of private real property within the Estuary boundary. This averages $3390 per acre. This disparity of value is indicated by the fact that in late 1979 the U. S. Department of Interior purchased 505 acres within

the Estuary boundary for $7.6 million ($15,049 per acre) and in February of 1980 the U. S. Navy had to pay $8.5 million for taking 265 acres within the Estuary boundary ($32,075 per acre).

The taking of private property without fair consideration is a violation of the 5th amendment to the United States Constitution. The Federal Government should not be a party with the State of California to the taking of private property unless the State is forced to acquire all of the private property within the sanctuary boundary at the fair market value.

I am sending a copy of this letter to each of the private property owners as listed in the Draft Environmental Impact Statement. If you should choose to respond, please send a copy of your response to each property owner.

Sincerely,

Tim Lichty

TL:vb

123

Cassie Morton
1266 First Street
Imperial Beach, California 92032
Aug. 4, 1981

Director
Sanctuary Program Office
Office of Coastal Zone Management
3300 Whitehaven St., NW
Washington, D.C. 20235

Dear Sir:

I would like to add my name to those who have already enthusiastically supported the proposed estuarine sanctuary in the Tia Juana River Valley (I also endorse the name Oneonta as the indigenous Indian name). My home faces "the slough" and I have grown to love the serenity of the salt marsh as much as I appreciate the ocean front, our primary reason for relocating here. Furthermore, I feel that the residents of I B have been led down a primrose path leading nowhere, with the idea of a boat marina. It would be fraught with problems the likes of which noone here is prepared to handle.

Whatever the outcome, the seemingly small problem of access will have to be

Design Consultant

Cassie Morton
1266 First Street
Imperial Beach, California 92032

dealt with. Traffic along First Street is a large problem. There is no place to turn around, it is barely wide enough for two cars, and has no accommodation for parking. That no one has been hurt is incredible. The city is unable to do anything because it has no easement for the property that would have to be involved to make this street functional. You We first streeters would appreciate any help in that regard.

Sincerely,

Cassie H. Morton

Design Consultant

SPO

Robert Knecht

A Public hearing was held July 23, 1981 on the proposed Tijuana River Estuarine Sanctuary we own 11.70 acres on Sunset Ave and an interest in my father's trust of 80 acres, yet we were not sent anything informing us of the hearing, if all property owners were informed like us no wonder you read in the paper a over-whelming majority was in favor of the estuary and of course they have not worked 2 years building up a ranch 12 hours a day 7 days a week so they think nothing of trying to take it over for a lot of imaginary wild life, I have lived worked and rode horse back in that valley since 1937, how can they put down in the Tijuana River Estuarine draft environmental impact Statement that there is deer down there I know no deer are there so I wonder how about all the other wild life reported. We think the amount of land the Estuary has now is ample for the wild life there We are not in favor of giving up our retirement property

Galen + Louise Watts
1645 19th St P.O Box 363
Nestor, Calif 92053

Watts Boarding Stable
1550 Sunset Ave

San Diego Gas & Electric

July 23, 1981

FILE NO —

Mr. Robert W. Knecht
Acting Assistant Administrator
Office of Coastal Zone Management
3300 Whitehaven Street, N.W.
Washington, DC 20235

Dear Mr. Knecht:

San Diego Gas & Electric supports the efforts of the California Coastal Commission and the Office of Coastal Zone Management to preserve valuable ecosystems through the Estuarine Sanctuary Program. We thank you for the opportunity to participate as a property owner in the Sanctuary Advisory Committee.

We own approximately 200 acres in the Tijuana River Valley. The site was originally acquired for potential use as a power plant. Although the site has been designated as "not suitable" for a thermal power plant of 50MW or greater by the California Coastal Commission, we have retained the site for possible energy related uses.

In this time of rapidly developing energy technology, we perceive there are advantages to retaining an assembled 200 acre parcel of level land for possible future use. New, maybe yet undeveloped, energy production techniques or a substantially changed political climate, either domestic or international, may render the site feasible for development. While we believe retaining the land would increase our future energy-related options, we are willing to negotiate a sale of the site at fair market value.

In considering the accuracy and sufficiency of the Draft Environmental Impact Statement, I have noted several areas which either contain errors or need clarification. Most of these are minor. They are as follows:

I. p.ii - It is my understanding that the California Coastal Commission is filing a request for $3 million from NOAA/OCZM, to be matched by $3 million from State funds.

II. pp.8, 9&11 - At the most recent meeting of the Sanctuary Advisory Committee, it was agreed that the City of San Diego should have full representation on the Management Authority, since a large portion of the Sanctuary is within the City of San Diego jurisdiction. Changes in Pages 8, 9, & 11 are necessary to reflect this.

III. LCP. 9 - As referenced in Paragraph 4, South San Diego is not a "known" community in the area. Perhaps deleting "South" would add clarity.

IV. LCP. 24 - In the last paragraph, change "County" to "City." There is no unincorporated County land near the proposed Sanctuary. It is all either City of Imperial Beach or City of San Diego land.

V. LCP. 25 - Again, the reference to South San Diego. The City of San Diego Planning Department and the residents of this area refer to it as "Nestor."

VI. p. 51 - The Regional Commissions expired July 1, 1981, and will not be reviewing the City of Imperial Beach LCP.

VII. LCP. 61 - Paragraph D states that there are no resources that will be irreversibly or irretrieveably lost. SDG&E feels that our assembled, level 200 acre site is indeed a resource which might be critical to future energy production using new technologies.

Our comments I and VII are by far the most important for you to review. Comments II through VI are based on the political realities of dealing with adjoining local jurisdictions and address the problem of community identity being different from USGS place names.

I thank you for the opportunity to review this Draft Statement and look forward to reviewing the Final. If you have any questions, please contact me at (714)232-4252, Ext. 1887.

Sincerely,

Sandra L. Woodhouse
Land Planner

SLW:mel

cc: Mr. Scott McCreary
California Coastal Commission
631 Howard Street
San Francisco, CA 94105

Jackie Dewey

THE STAR-NEWS — Sunday, July 19, 1981 — C-1

Guess What

Sanctuary? Could be class act for IB

One of the first gigs I worked at as a beginning scribe was to do research and write position papers in favor of a marina in the Tia Juana Sloughs. (Oh, please, couldn't we call that the Oneonta Estuary? It is flushed by twice-daily tides and has a salt water marsh. Oneonta is a proud Indian tribal name. It wouldn't sound as though we were an annex or suburb of Tijuana.)

The matter of the marina is no longer the point. Stockholders in the marina venture have already spent or banked the money the Department of the Interior paid them for the real estate — both wet and dry — in question.

If you don't think the question is closed, look how the Navy got its hospital in Balboa Park despite the combined opposing clout of the Big Democrats and later even the San Diego Republicans close to President Reagan.

Long ago, the Navy took a bite out of the middle of the marina, said there would be none and there is none.

The point now? Will what has become the Tia Juana National Wildlife Refuge and Border Field State Park and much territory around and in between lie there under the *moon* and the sun, administered by a fragmented array of often divergent entities?

Or, after the 7 p.m. July 23 hearing for public input at Imperial Beach City Council Chambers (before members from the Office of Coastal Zone Management under the U.S. Dept. of Commerce), what if we were able to persuade the good folks to designate the area as an Estuarine Sanctuary?

After all, what's in a name? Actually, in this case quite a lot of federal money. And a cohesive and cooperative management team, if all were to go as planned in the draft environmental statement I read.

It would give us a handle we have never had before.

Imperial Beach would have some say-so in her own fate and future, voting on a team that would include people working together from Mexico and the U.S. at the federal, state and local level, the Army Corps of Engineers, the Water Quality Control Board, the U.S. Fish and Wildlife, the California Parks and Recreation Department and the State Fish and Game Department, the U.S. Water and Boundary Commission and local farming communities. All are projected to have a hand in managing the area. Instead of being piecemeal, management could be comprehensive.

The draft plan puts great importance on water quality. In fact, it might turn out to be Imperial Beach's very best defense against being turned into the county's buffer zone against sewage from Mexico.

Those of you who don't give a rat's whisker about clapper rails and mesa mint and other of God's critters except *homo sapiens* had better give a thought to how much Mexican sewage (raw — I repeat — raw) you are prepared to live with on your beaches and in the Tia Juana River Valley.

No way to fake it. Tijuana is still the second-largest city — after LA — on the Western Hemisphere's western coast and spreading like the Andromeda Strain.

It isn't fair to [illegible] Mexicans of indifference and ignorance. They are playing catch-up as fast as they can in an overwhelming situation. But the sad fact is that their sewage system consists only of pipes to carry the stuff — untreated — to the ocean less than five miles south of our border. We do have frequent strong northerly currents.

Even when there are no floods, their sewage often flows into the Tia Juana River Valley. But we need to get the Mexican and U.S. Feds into the act. It is not a local matter.

The draft plan calls for an Interpretive Center to be built. It could serve as a center for research. And for education from the preschool to the doctoral degree level. It could be an attraction for tourists, with books, slides and various displays, films and lectures and walking tours.

Because this sanctuary would be one of only 10 like it in the U.S., it would be unique and highly visible.

The impact on South County could be most affirmative. The possibilities for spin-offs and tie-ins are limitless. And they are international in scope. Tourism is Baja California's No. 1 industry. Our youth hostel is off to a modest start here. There is Southwestern College, the California University system, Baja's university system, The University in San Ysidro. The trolley.

The problem for Imperial Beach is that though we have the glory of being this country's most southwesterly *mainland city, we are off the* beaten path. We are not on the way TO anything. Our beach is a summer attraction, but the Sanctuary and the Interpretive Center could be a year-round attraction.

When you do something which is right and elegant, it has a way of snowballing. It moves along of its own momentum, gathers followers and attracts support.

If only the sanctuary could be the catalyst that gets the people in this town to haul in the same harness.

Sanctuary status for the (ahem) Oneonta Estuary could be a real class act for Imperial Beach.

© Copyright Jackie Dewey 1981

TO: Scott McCleary — ROOM/STA. NO.

FROM: Harriet Allen — ROOM/STA. NO.

REPRESENTING

DATE: 7/23 — TIME: 10:15 — PHONE

☒ Telephoned ☐ Please Call ☐ Was In
☐ Returned Call ☐ Will Call Again ☐ Wants To See You

☐ Information ☐ Note and ☐ Reply
☐ Comment ☐ Re-route ☐ My Signature
☐ Investigate ☐ Return ☐ Copy Me
☐ Contact Me ☐ File ☐ Forwarded Per Request

MESSAGE/REMARKS: Harriet Allen, Howard Allen and Douglas Allen are in support of the Tia Juana R.V. becoming a sanctuary

BY

STD 7 (REV. 10-79) COMBINATION OF STD 7 AND 118 (ROUTE SLIP) ANNUAL SAVINGS $6,300. STATE OF CALIFORNIA

MESSAGE

July 22, 1981

Robert W. Knecht
Acting Assistant Administrator
Office of Coastal Zone Management
3300 Whitehaven Street, N.W.
Washington, D.C. 20235

re: Tijuana River
Estuarine Sanctuary
DEIS June 1981

Dear Sir:

Whether we call it education or life enrichment, fully understanding and fully interacting with the unique area in which we live makes an enormous contribution to the health, longevity, and pleasure of living in Imperial Beach, Calif. It may also contribute to the income of the local residents.

Except for the war years in the Navy, I have spent my entire life in education -- the last eighteen years as a California university administrator. While studying for my doctorate and serving on the faculty of the University of Colorado, I witnessed the value of the continuing educational program emphasizing the clean air, the tundra vegetation and the snow caps, the bounding waterfalls and lakes, and the wild flowers in season. The children learned their names and they learned to respect and care for them. Experts came from abroad to study them and tourists came to enjoy them, but it was the local people, young and old, who knew them best and felt the health and longevity and life enrichment of the area in which they lived. And they profited immensely from the business it brought.

When I was considering retirement in 1977, I looked for a location that offered similar health and life enrichment opportunities. Along many miles of California coast I found railroads and freeways and industrial parks and smoke and smog and overwhelming noise. That is why I moved to Imperial Beach. My family and I enjoy the clear air and mild climate, and we are studying the plant and marine life in the area. We participated several years ago in the development of a nature study center in Placerita Park north of Los Angeles, and we have seen first hand what it meant and continues to mean to the thousands of young and old who visit it. And we have seen the commercial growth nearby. This is why my family and I want the same educational opportunity in this area.

Sincerely,

Willard Edwards

Dr. Willard Edwards
1163 Louden Lane
Imperial Beach, Ca. 92032

July 17, 1981

California Coastal Commission

Re: Proposed Tijuana River Estuarine Sanctuary

The educational value of the proposed Sanctuary has already been demonstrated by the many elementary, high school and university students and instructors who have studied the flora and fauna of the ecosystem in this area.

I personally have participated in many guided walks with elementary age children and adults. People come from all parts of San Diego County to study this unique and beautiful wetland. In addition to school groups several organizations have used the area for study; The San Diego Ornithological Club, Sierra Club, Operation Wildlife and The Native Plant Society.

I am a teacher and recognize and appreciate the marvelous educational value of the whole salt marsh and estuarine system.

I strongly urge the approval of the Tijuana River Estuarine Sanctuary to be established by the Federal Government.

Respectfully,

Laurel Granquist

Laurel Granquist
184 Citrus Ave.
Imperial Beach, CA 92032

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Dear Sirs,

AS houses and highways and business centers intrude on this once rural area, we have a unique opportunity to save some of that precious 'open space' for ourselves, our children, and for the other creatures that will find a santuary within .

This is also a unique opportunity to add an economic advantage to Imperial Beach. In the years to come, tourists, students and scientists (BOTH NATIONAL & INTERNATIONAL) will be drawn to the area. Support for this project will come from many sources, and groups. We are fortunate that we have such a 'natural Advantage'.

*

We hope that the Council and peoples of Imperial Beach will wholeheartedly stand behind this Estuarine Sanctuary.

Sincerely,

Sylvia Kaliss

Tad Hinman

1637 Hadley Street

San Diego, CA 92154

*AS A GRADUATE STUDENT IN HISTORY/ARCHAEOLOGY I BECAME AWARE THAT SOME OF THE EARLIEST SETTLEMENTS OF THE INDIANS OF THE ONEONTA COMMUNITY - WERE HERE IN THE SLOUGH AREA. I HOPE THERE WILL BE SOME SMALL PLACE IN THIS PLAN TO REMEMBER & RECORD OUR EARLY LOCAL HISTORY & the history of the earlier farmers and settlers.

Page. 11

Comments on the Draft EIS for the Tijuana River Estuarine Sanctuary
E. A. Keen, Professor of Geography, San Diego State University

Among the first Environmental Impact Statements that I ever read concerned the Tijuana River Estuary. It was the one prepared in 1969 (?) by the Corps of Engineers for the Tijuana River Flood Channel Project. The efficacy of the EIS as a part of the decision making process was proved by that EIS. The information in it, rudimentary though it was compared to the information in this one, brought out the economic and ecological irrationalities of the channelization project for this side of the border. It was the key factor in starting the process to reversal of the original decision made some years before EIS's were required as part of the planning process.

The EIS at issue here is a much more sophisticated document. It reflects the refinement of 12 years of experience in preparing EIS's; it also reflects 12 years of additional knowledge of the values -- economic and ecological -- of coastal wetlands in general of of the Tijuana River Estuary in particular. To read this EIS should convince anyone that the reversal of the decision to build a flood channel was a wise one. That the decision in favor of a sanctuary has been reached gives ample proof that local, state, and federal officials can work together with private citizens in a democratic framework. The end result of their efforts on this controversal issue will benefit present and future generalizations as no other decision concerning the Estuary could.

To conclude, the decision and the EIS concerning it are good. However, I would like to suggest two changes in the management structure and raise one question of fact.

First, may I suggest that the City of San Diego be included as a member of the Management Authority. This body as it now stands admittedly appears a bit unwieldy in its size and composition. However, San Diego does fit the main criteria cited for membership -- being a landowning public body in the proposed sancturay -- and will, I hope, donate this land to the Sanctuary. Also, it is the local government of primary jurisdiction of about half of the Sanctuary as proposed and of all of the river valley between the Sanctuary and the U. S.-Mexican border. What happens in this immediate upstream area, of course, is of great consequence to the Sanctuary.

Secondly, may I suggest that the U. S.-Mexico Boundary and Water Commission be included in the management structure in an advisory capacity. This Commission is at present the single most important agency for management of the waters of the Tijuana River Basin. It should be informed in all aspects of the Sanctuary and its management. May I also suggest that the Department of State, the U. S. agency responsible for the Commission, be furnished a copy of the draft and final version of the EIS.

The question of fact concerns land ownership. The last paragraph on page 25 states the 385 acres are still in private ownership "including the prime habitat adjacent to the estuary mouth." This appears to contradict the ownership map in Appendix D and, I hope, the reality of ownership in the proposed Sanctuary area.

E. A. Keen

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SDSU

DEPARTMENT OF BIOLOGY
COLLEGE OF SCIENCES
SAN DIEGO STATE UNIVERSITY
SAN DIEGO, CA 92182

(714) 265-5767

23 July 1981

To: Office of Coastal Zone Management
From: Joy Zedler, Ph.D., Professor of Biology
Re: Tijuana Estuarine Sanctuary

The Tijuana Estuary is an extremely valuable natural resource for research and educational purposes. As evidence for this statement, I cite the fact that I have used it for 10 years for exactly those purposes. Much of the work which my graduate students and I have carried out at Tijuana Estuary is cited in the EIS. The estuary has served as a focal point for several scientific articles, 1 Ph.D. dissertation, several Masters' of Science theses, and numerous undergraduate reports. Yet the many aspects that have been researched are only a fraction of the features of an estuary that can be investigated, and the facts in print are a miniscule portion of what remains to be learned from future study. Likewise, the number of students who have learned from their experiences at Tijuana Estary are only a drop in the bucket of upcoming generations who can benefit from what this ecosystem has to teach them.

Why is Tijuana Estary such a valuable resource for research and education? The answer is in its high quality habitat for native southern California species. I can't call it pristine; hardly a square ofoot of southern California meets the strictest definition of that concept. In southern California we have to speak in relative terms, and Tijuana Estuary scores very high as a relatively undisturbed ecosystem. For that reason, I chose it as a model to compare other, more heavily impacted wetlands in my recent research projects. It continues to serve as an example of how our estuaries probably functioned prior to the arrival of white man, and as such will teach us how to enhance more degraded systems in southern California.

In speaking out in favor of making Tijuana Estuary a sanctuary whose purpose is to insure sites for future research and education, my motive is only to see that this last remaining, relatively natural, ecosystem be given the opportunity to provide answers and experiences for future generations of investigators. Its status as a sanctuary will not bring me or my colleagues any new research funds; nor is our future research dependent on its becoming a sanctuary. Ecologists are a flexible lot--we find things to study even in the most degraded, stinking wetlands. I've been lucky--I've had the opportunity to examine firsthand something much closer to a pristine ecosystem, so I know what those more degraded systems were once like, how they might be enhanced, how they might be restored. Others in the future may not be so fortunate, unless the Tijuana Estuary is set aside as a National Estuarine Sanctuary.

July 7, 1981

Southwest Wetlands Interpretive Association

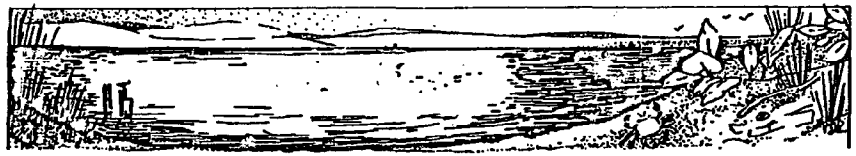
In regard to my usage of the Tijuana Estuary as a classroom I am enclosing the following accounting of the numbers, dates & times. My adult school classes have made it a tradition to visit the area for the entire day, combining the 2 groups, bringing friends & relatives and having a gourmet lunch at Border field Park (complete with plastic lace table cloths & wines). They are very interested in the welfare of the area and a few have joined the Association.

Nov 5	9:30 - 3:30	35 adults	San Dieguito High School Adult Education
March 25	9:30 - 3:30	35 adults	
May 20	9:30 - 3:30	25 adults	

On August 6th I will have 60 children from the South Bay YMCA Camp Surf in the Estuary after a 2 hour session discussing the critical problems & importance of San Diego County's wetlands.

Please [illegible] designate the Tijuana River Estuary as an Estuarine Sanct. Calif.

Barbara Moore
2438 Logana Road
Del Mar
92014 755-7133



SOUTHWEST WETLANDS INTERPRETIVE ASSOCIATION

Post Office Box 575
Imperial Beach, California 92032

July 23, 1981

Sirs:

As chairperson of the Southwest Wetlands Interpretive Association, I'm representing the association in favor of the Estuarine Sanctuary Program for Tijuana River Estuary including the core wetlands and floodplain.

The wetlands association is working to further the preservation and appreciation of these wetlands through educational activities, guided walks and the distribution of informational literature. The long-term goal of the association is directed toward the construction of a bio-museum within the sanctuary.

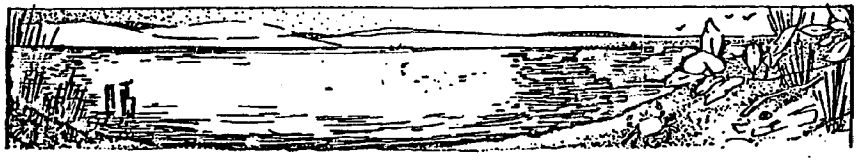
The Coastal zone management Act, which establishes the Estuarine Sanctuary Program, would enhance the possibilities of reaching these goals. This would be accomplished through the program by establishing an esturine sanctuary at the Tijuana River Estuary and associated wetlands.

The funding of the program would provide a suitable outdoor laboratory for teaching and research.

This would, in turn, provide a thorough understanding of ecological relationships within the estuarine environment.

Proper management would encourage multiple use of the sanctuary to the extent that such use would be compatible with research and education. Another important,aspect is that the consequence of the proposed action would be long-term preservation of the area and its resources in their natural state for scientific and educational uses.

The grants and funding would permit protective guided walkways which would increase public use through controlled access.points, and certainly, increased usage would also bring economic benefits to Imperial Beach and the surrounding region.



SOUTHWEST WETLANDS INTERPRETIVE ASSOCIATION

Post Office Box 575
Imperial Beach, California 92032

Although the Wetland Association's main goal is primarily educational, the association realizes the value of multiple uses compatible with preservation such as low intensity recreation, fishing, and wildlife observation.

However, the association views the sanctuary status as the most important vehicle for increasing public knowledge and awareness of the complex nature of estuarine systems, their benefits to people and nature, and the problems confronting the ecosystem. Therefore, the Southwest Wetlands Interpretive Association recommends that the Office of Coastal Zone Management approve the application from the State of California to establish a National Estuarine Sanctuary in the Tijuana River area and the associated wetlands and flood plain.

Sincerely,

Reuben Bingham

Reuben Bingham
Chairperson, Southwest Wetlands
Interpretive Association

RB/ca

July 23, 1981

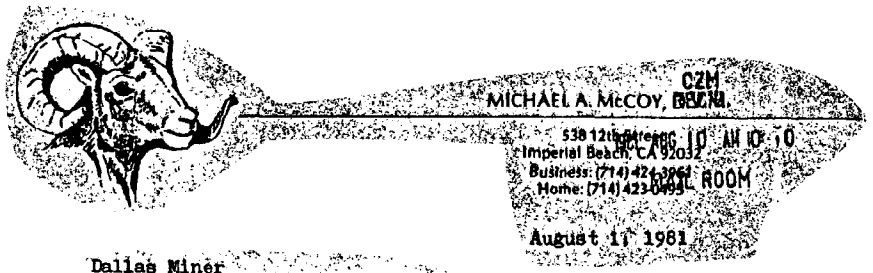
Public Hearing Panel on Tia Juana Estuary:

I would like this letter read at the public hearing if possible. I work nights and am unable to attend in person.

I feel that I am in complete agreement with Jackie Deweys' article in Sundays' (June 19, 1981) Star News. Let us do all we can to preserve our last open space in our area. Once we give up even part of it for developement or a marina it can never be the same. It has a beauty all its' own at all times of the year. I have lived facing that area for almost 20 years and still find it to be something worth looking at regardless of the time of day or the season of the year. Let us all work together to do all we can to keep it as it is, unspoiled by human progress. When man tries to improve on nature he usually makes a mess of it.

Jean Strongylos
1072 3rd St.
Imperial Beach, Ca.
92032

Jean A. Strongylos



MICHAEL A. McCOY, D.C.N.
538 12th Street
Imperial Beach, CA 92032
Business: (714) 424-3061
Home: (714) 423-0493

CZM
AUG 10 AM 10
ROOM

August 11, 1981

Dallas Miner
Acting Assistant Administrator
Office of Coastal Zone Management
3300 Whitehaven Street, N.W.
Washington, D.C. 20235

Dear Mr Miner,

This letter is written with reference to comments on the Tijuana River Estuarine Sanctuary. I am a member of the Advisory Committee appointed by the Coastal Commission, a founding member of the Southwest Wetlands Interpretive Association and a board member of the State affiliate of the National Wildlife Federation. NWF represents well over four million people nationwide and supports the estuarine sanctuary concept.

I want the following comments and materials incorporated into the record.

1. A concerted effort must be made to establish a positive relationship between the sanctuary management authority, local communities and private landowners surrounding the sanctuary boundaries. Many of the local residents are confused about the concept of the sanctuary. They fear eminent domain and they need help in understanding how the sanctuary can augment the local tax base. A good relationship will establish a strong, positive planning model for the region, and for other sanctuaries.

2. Protection is critical for Border Highlands, an upland area. Sand and gravel extraction must be monitored and comply with the 1975 Surface Mining Act. Impacts will affect the sanctuary in the following areas:
1. Sedimentation
2. Water table
3. Haul roads
4. Endangered plant species in buffer zones.

The management authority must be capable of citing violations which threaten the integrity of the wetlands and buffer zone.

3. There should be an annual meeting where representatives from the management of all estuarine and marine sanctuaries can gather to discuss ways to make the program better.

4. The concept of an applied multiple use research program should be established to protect wetlands.

a. As demands for food production increase pressures on wetlands will also increase. Model agricultural and aquacultural programs must be developed which are compatible with maintenance of a healthy, functional estuary.

b. The relationship between the estuary and the commercial and sport fisheries is important.

c. A model research program is needed to evaluate and correct urban impacts on the immediate watershed and the wetland. This would include monitoring toxic wastes, urban runoff, sewage, solid waste and other urban impacts.

d. The pure and applied research programs should be combined to give a practical comprehensive overview for more effective management, restoration and compatible use of wetland areas.

5. The riparian habitat east of 19th Street along the Tia Juana River and including the freshwater ponds near Dairy Mart Road must be protected. A plan should be worked out with the farmers in the valley to do this.

6. The bi-national water and sewage plan is one of the most important parts of the sanctuary program. The local people see this as an opportunity to deal with this issue.

a. The 27th and Sunset site should not be developed but should be held for a treatment plant. This will take the pressure off using the Hollister and Monument Road site. Holding the site should become a condition of granting the secondary plant waiver to the City of San Diego by the E.P.A. (see enclosed article)

7. Habitat restoration and protection will be very important. The upland areas in the northern end of the sanctuary have been severely degraded. There are several sites in this area which could be good candidates for an interpretive center. Some of these areas have been badly degraded. I have talked to Scott McCreary about this in detail.

8. Additonal sources of funding for land acquisition and

management must be explored. Easments, deed restrictions, land trusts and other creative financing strategies will be important adjuncts.

9. I have enclosed additional materials which have been discussed with local leaders and residents.

I appreciate the opportunity to give input on something that has been part of my life for the past ten years.

Sincerely,

Michael A. McCoy, DVM

Michael A. McCoy, D.V.M.

I have talked with William Penn Mott, prsident of the California State Parks Foundation, about an interpretive center for this area. I think he would be a good person for you to contact.

William Penn Mott
California State Parks Foundation
1706 Broadway, Room 610
Oakland, CA 94612
Ph- 415-834-4411

My personal thanks to Scott McCreary for a great job!

I wrote this in 1979 while I was on the [illegible] Review Committee. This was expanded to include [illegible] the "Tijuana Estuarine Sanctuary Education Center" [illegible]

Natural Resources/ Aesthetic, Cultural & Recreation

The community of Imperial Beach is fighting a constant battle with tax base and community instability. Income to increase tax base, community stability and quality life styles for the community members can come from environmentally supportive revenues. They do not always have to be revenues generated from destruction of complex ecological life support systems.

Marshland habitat is poorly understood by many. We happen to be blessed with one of the largest and almost intact marsh-land habitats on this coast. The intrinsic value of this habitat should be understood and enjoyed in its natural state by everyone.

Successful projects build a successful community over a period of years. The more practical altruism a project can incorporate the more recognized the area will be. A modified slum never does seem to attract many people, I mean people from all walks of life from all over the world.. A well plannned attraction will. The ramifications a venture might have on community stability and satisfaction on one hand and on public education, enjoyment, understanding and appreciation on the other could be quite gratifying.

To the point:

The Arizona Sonora Desert Museum in Tucson has capitalized on its surroundings with a venture which offers a tremendous lesson in practical altruism and development of environmental and community integrity.with profit for the community and the visitor. The total picture is drawn between the relation-ship of a plant or animal to its micro and macro environment. An animal in a non-endemic environment is as out of context as a misused word in a sentence. It changes the meaning, or more likely offers no meaning at all. This has been my experience working as a zoo veterinarian.

The Desert Museum offers enjoyment and in addition truth, education and understanding. It explains the biome of desert. No plants or animals or even soil particles are usurped and put in meaningless habitat. Rather one understands the truth intact habitat has to offer.

The concept started by the Desert Museum is excellent and can be used in our own marsh with the building of a bio museum here in Imperial Beach. It would not be along the lines of either zoo or circus, but of the quality offered by Scripps Aquarium. This type of museum would permanently protect the marsh against any intrusion and create understanding

of the marsh by people from all over the world. It would bring a prestigious attraction to Imperial Beach and foster higher quality in our community and greater respect outside.

One of the real benefits would be the creation of a tax base without destruction of land.

Obviously such a venture will take a great deal of co-operation and work from the community.
I would suggest setting up a committee to investigate the feasibility of a bio museum. If the idea is considered a good one, both practical and valuable
then the committee would present the idea to the community.
We would need to see the Arizona Sonora Desert Museum and talk to officials there for advice and direction.

A working integration of forces from Imperial Beach, U.S. Dept. of the Interior, U.S. Dept. of Defense, California State Parks Commission and Helix Corp. and the Desert Museum could make this viable. Outside help from San Diego State University, U.C.S.D., and Scripps Institute of Oceanography to mention a few organizations, would be helpful.

My initial site proposal would be adjacent to the Sports Park. This piece of land is used as a dumping ground. It seems to indicate the level of environmental awareness in the city. People who treat their surroundings like this usually don't care about themselves or the city where they live. It is our job to help change this.

People can appreciate a museum and the great marsh without ever setting foot in the latter. In fact, with high quality explanantion a plan like this would provide the incentive to respect and protect the marsh.

Respectfully submitted:

Michael A. McCoy, DVM

Michael A. McCoy, D.V.M.

Dr. Charles Schroeder, past director of the San Diego Zoological Society, has expressed an helpful interest in this.

TIA JUANA ESTUARINE SANCTUARY EDUCATION CENTER

In order to maintain the health and integrity of our natural environment it is necessary to demonstrate and promote ecologically sound ways of meeting human needs for water, food, energy, housing, transportation, recreation, and so forth.

Pursuant to this need for public education we are proposing that an educational center be developed as an adjunct to the Tia Juana Estuarine Sanctuary project.

The purpose of the educational center would be:

1) To serve as an educational model for ecologically sound building practices and energy efficient architectural design. As such, it would incorporate passive solar water heating. In addition, the materials used in the construction would be selected for their environmental compatibility.

2) To provide information to the public on how the estuary functions, and on how our use of products in the home and workplace impact estuary ecology. Information on ecologically sound alternatives (i.e. bio-degradable cleaning products) would also be provided.

3) To develop and demonstrate appropriate technologies adapted to the needs and unique characteristics of the San Diego/Tijuana region. Energy production, waste management and recycling, and energy and water conserving landscaping are possible areas of investigation.

4) To work with local farmers to develop sustainable and economically viable systems of agriculture which are compatible with the estuary. This would consist of the center seeking joint funding with local farmers to experiment in such areas as integrated pest management, and the use of organic materials for soil building.

5) To conduct experiments which would determine the feasibility of using healthy estuarine systems for aquaculture.

The Lutheran Resources Commission in Washington D.C., has expressed a desire to initiate a grant for a resource center of this type through the Cooperative Campus Ministries at San Diego State University. This group is very supportive of this project and anticipates implementation of this model.

Staff members of the State Office of Appropriate Technology in Sacramento have also expressed a great interest in such a project.

I am investigating the possibility of incorporating funding for such a center through the Cornucopia Project, sponsored by Organic Gardening, Inc. One of the main emphasis of this project is to address future food production in a time of limited resources without disruption of biological systems.

The San Diego Center for Appropriate Technology is also very interested in participating in this project.

I would appreciate your evaluation and consideration of this project. If there is an interest we can work out the details later.

MICHAEL A. McCOY, D.V.M.
538 12th Street
Imperial Beach, CA 92032
Business (714) 424-3961
Home: (714) 423-0495

May 25, 1981

Scott McCreary
State Coastal Commission
631 Howard Street
San Francisco, CA 94105

Dear Scott:

I would like to request the following stipulation be incorporated into the management plan for the estuarine sanctuary.

Any individual appointed by an agency, department, or local jurisdiction must have a basic understanding of biological systems and hopefully a college background in the biological sciences. The individual must have a history of taking a positive interest in protecting and managing biological and geophysical resources. The Coastal Commission must be able to refuse the appointment of those who might jeopardize the ultimate goals of resource management, education and research protecting the natural integrity of the entire system. This system of appointment would create a compatible management team, a capable liason between local government, state and federal agencies and the ability to determine viable uses for the sanctuary.

I feel that some language encompassing the above concern must be incorporated as a part of the management policy. This will protect the planned goals, policy and implementation from political manipulation. If the people wielding the voting power do not have the interests of the resources at heart the management will not be as effective or efficient economically.

I would like this to be discussed briefly at our next meeting. It would save time and problems created by incompatibility in any future management programs.

Sincerely,

Mike

EDITORIAL

Water And Sewage — A Binational Issue

The issues of water and sewage for both the United States and Mexico are particularly critical during this decade. The traditional solution to supplying water to San Diego can no longer be relied upon. Even the issue of expanding the sewage capacity of the metropolitan area is still involved. Similarly, Tijuana is expanding its water supply but it lacks a basic sewer system.

Everyone recognizes that inadequate sewage treatment facilities can produce environmental problems that cannot be separated by a line on a map. That imaginary line, however, has been a real barrier to the resolution of the water/sewage problem. How can we address the issues? How will the city and county of San Diego avoid the pending threat of a water shortage? How soon will Tijuana build a sewer system that can adequately meet the needs of its expanding population? Apart from the International Boundary and Water Commission, what local, cooperative mechanism or institutional arrangements can be formed to identify and manage mutual binational problems?

These are just a few of the many questions that require immediate attention because, left unattended, they can peril relationships between the two border communities and their respective countries. The problems of Tijuana and San Diego are regional and so are the solutions. These two interdependent cities represent different cultures, languages, and political systems, yet they share common social and economic goals and objectives. If we can dismiss the international boundary for a moment and take an aerial view of the region we will find a common geographical environment. If we examine the fabric of human relationships we will also find a tremendous opportunity for an exchange of technical and social information and mutually agreeable approaches to progress.

While many pressing problems exist on both sides of the border and the priorities are determined differently, we may wish to establish a new beginning for joint solutions to common problems. A good place to start is with the water and sewer issue. Such an undertaking would also be very appropriate in view of the United Nations proclamation of the 1980's as the Water Decade and the call to governments to cooperatively attack the problem of providing clean drinking water and sanitation for all by 1990.

During this decade, water will become an increasingly precious commodity with the prospect of dwindling fresh water supplies. The California Department of Water Resources has estimated that within the next ten years, San Diego County should begin recycling at least 36 million gallons of wastewater per day to avoid serious water shortages. Water will not be available as the state's water supplies begin using these resources themselves. By 1985, the Central Arizona Project will begin draining what will eventually be almost half of Southern California's existing Colorado River water allocation for the use of the Phoenix metropolitan area. Contracts for diminishing water supplies will be more costly which suggests a six-fold increase in water rates that can effectively eliminate agriculture in San Diego County. It will represent major financial disincentives for water-intensive industries seeking to locate in San Diego. It will place a significant hardship on many low and moderate income residential users.

San Diego imports much of its water from the far-off Colorado River — a distance of over 500 miles — across mountain ranges and earthquake faults at a great cost. Ironically, a large portion of it goes into the ocean as basic treated sewage. Raw sewage consists of 99.9 percent water, and only 1/10 of one percent solids. San Diego possesses a primary sewage plant that presently is operating at its maximum capacity, but with plans for expansion. On the other hand, Tijuana is being connected to a new fresh water supply which will result in more demands for services from a growing population due to greater water availability. Unfortunately, Tijuana doesn't have a sewage treatment plant and only 40 percent of its population is connected to sewage lines.

Clearly, both cities share common needs and predicaments. What can San Diego and Tijuana do to meet these challenges and ensure a continued, reliable and adequate water supply and to dispose wastewater adequately? Among the alternatives, it makes sense to look into water reuse and reclamation possibilities.

The San Diego Metropolitan Plan of January, 1977, recommends that the city of San Diego work diligently toward achieving a major reclamation program leading to massive recycling of the domestic water supply. In addition, the Area Water Quality Management Plan (AWQMP) adopted by the San Diego Association of Governments *(SAN DAG)* Board of Directors in June, 1978, and approved by the State Water Resources Control Board (SWRCB) encouraged water conservation (presently under study) and water reclamation as key elements.

In short, what is needed is cooperative binational studies of pollution control and environmental management. The cities of Tijuana and San Diego have a golden opportunity to capitalize on a long history of interlocking interests and establish action plans for progress to improve the quality of life in the binational region both as a local imperative and as a response to the global concern symbolized by the United Nations Water Decade proclamation.

T. A. MacCalen

OTAY MESA HOMEOWNERS ASSOCIATION

P.O. BOX 445
NESTOR, CA.
92053.
Ruth J. Schneider
President

Aug 3 1981

CZM
REC'D.

Otay Mesa-Nestor Planning Group
Ruth J. Schneider, Chairperson
1043 Piccard Ave
San Diego, Ca 92154

Office of Coastal Zone Management
3300 Whitehaven St., N.W.
Washington, D.C. 20235
Attn Dallas Miner, Acting Administrator

Dear Dallas Miner:

Please include these comments for consideration regarding the Tia Juana River Estuarine Sanctuary Environmental Impact Review

I The Management Structure

A. Administrative lead members should include the City of San Diego.

1. The Estuary lies mainly in San Diego
2. San Diego has demonstrated a concern about the area by the adoption of the area plan with limited use of the land,
3. Imperial Beach has allowed uses of the Estuary for urbanization and has continued to allow for uses such as a marina in the Estuary.

4. San Diego has the largest number of citizens in this area and they should be represented on the lead Committee
5. If San Diego not placed on lead Committee then the removal of Imperial Beach to secondary Committee with San Diego should be done.

B. Selection of a representative for San Diego and Imperial Beach

1. A public hearing should be held by these cities to select a representative. These representatives should have
   A. Educational background in natural Science
   B. Demonstrate an interest to serve
   C. Be an area resident

C. Time and Place of meeting advertised in a major publication

1. Insure Citizen participation

II Boundries

A. Be enlarged to include natural part of the river valley

1. South - Highland area
2. East - Area Bounded by Habitat

3. East - south of Dairy Mart Road
Fresh water ponds along
River bed.
(a) Breeding area for small animals & birds
(b) Rich with water life

4. North - (Eastern section) Between
Sunset Road and Leon Ave
(a) Natural form boundry

III Sand and Gravel Extraction: not be allowed!

A. Riverbed
1. Siltation (not proposed at this time but this plan should cover a long period and I feel a stand should be established now)

B. Highland Area (South border)
1. Only area south of La Jolla that provides a view. The Coastline at sea level or below from La Jolla south. Highland area also provide a visual relief along the Estuary
2. Coastal protection laws of California promise preservation of wetland areas. Coastal Commission failed to keep this law in regard to this area.

3. Extraction would cost loss of natural site.
(a) After extraction, restoration would be from 30 feet to 300 feet lower in height
(b) Grading to be done to allow natural regrowth
1. How natural could disturbed site be?
2. Loss of rare plants
3. Loss of animal life
4. Nothing in the plan to prevent pits from becoming a large hole

4. There are a number of other sites, owned by these same companies, in San Diego County held for future extraction.
(a) Companies admit need may not develop for extraction at this pit in the next 10 or 20 years

5. Roads
(a) Extraction hauling demands extensive road building to handle the heavy trucks

Page 5

III - B-5 Con

5(Con) and traffic these trucks generate

1. two trips every 20 minutes
2. Pollution - Dust from truck travel & load.
3. Safety
   a. Trucks versus Wildlife
   b. Trucks versus farm equipment and farm animals
   c. Trucks versus Walkers
   d. Trucks versus bycycles
   e. Trucks versus horses and horseback riders
   f. Trucks versus Family auto and or School bus.

Get the picture? ____

IV Other things: A Aquired land - Leased to

A. Farming - (a) be encouraged on areas not in wet lands. Lease money be kept in program

B. Equestian, bycycle & walking routes

Page 6

IV Con

B(con) be planned & developed in early part of program. These routes be plainly marked.

1. Motor or Trail bikes be prohibited. Also ban 4 wheel drive vehicles

C. Work with Border Patrol to try to discourage the Continuous parade of illegal aliens from tramping through the estuary.

I've tried to outlined my comments for the most direct statements. Most details are available from material of the San Diego Tia Juana River Valley Plan adopted March 1977

The Highland Report by San Diego for the California Coastal Commission. Spring 1981

By the way - the river and valley name is not the same as the Mexican border City

It's TIA JUANA River & Valley!

Sincerely,
Ruth J Schneider,
President.

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PART VIII: APPENDICES

A. Estuarine Sanctuary Guidelines, 1974 and 1977

B. Table 1 - Endangered and Rare Species Inhabiting Tijuana Estuary and Adjacent River Valley

Table 2 - Flowering Plants of Tijuana Estuary

Table 3 - Common Algae of Tijuana

Table 4 - Marine Invertebrates of Tijuana Estuary

Table 5 - Fishes of Tijuana Estuary

Table 6 - Birds of Tijuana River Valley

Table 7 - Mammals of the Lower Tijuana River Valley

Table 8 - Amphibian and Reptiles of the Lower Tijuana River Valley

Table 9 - Archaeological Sites Near Tijuana Estuary

Table 10- Academic Research Conducted at Tijuana Estuary

Table 11- Summary of Educational Use of Tijuana Estuary

Table 12- Soil Attributes in the Tijuana Valley and Vicinity

Table 13- Proposed Framework for a Research and Education Program

C. Estuarine Sanctuary Advisory Committee

D. Lower Tijuana River Valley Ownership List

APPENDIX A

Estuarine Sanctuary Guidelines, 1974 and 1977

necessary to the objectives of the grant project. As used herein the terms "cost" and "grant project" pertain to both the Federal grant and the matching share. The allowability of cost will be determined in accordance with the provisions of FMC 74-4: Cost Principles applicable to Grants and Contracts with State and Local Governments, and with the guidance contained in section 920 42(b)(3).

(f) The Form SF-424, Application for Federal Assistance (Non-Construction Programs), constitutes the formal application and must be submitted 60 days prior to the desired grant beginning date. The application must be accompanied by evidence of compliance with A-95 requirements including the resolution of any problems raised by the proposed project. The Associate Administrator will not accept application substantially deficient in adherence to A-95 requirements.

(g) In Part IV, Program Narrative of the Form SF-424, the applicant should repond to the following requirements:

(1) Set forth a work program describing the activities to be undertaken during the grant period. This work program shall include:

(i) A precise description of each major task to be undertaken to resolve section 306 deficiencies, and a specific timetable for remedying these deficiencies;

(ii) A precise description of implementation activities for approved management components, including a demonstration that these implementation funds will not be applied outside the approved coastal management boundaries;

(iii) A precise description of any other tasks necessary for and allowable under subsection 305(d);

(iv) For each task, identify any "Other Entities," as defined in the "Manual," that will be allocated responsibility for carrying out all or portions of the task, and indicate the estimated cost of the subcontract for each allocation. Identify, if any, that portion of the task that will be carried out under contract with consultants and indicate the estimated cost of such contract(s); and

(v) For each task, indicate the estimated total cost. Also, indicate the estimated total months of effort, if any, allocated to the task from the applicant's staff.

(2) The sum of all task costs in the above paragraph should equal the total estimated grant project cost.

(3) Using two categories, Professional and Clerical, indicate the total number of personnel in each category on the applicant's staff that will be assigned to the grant project. Also indicate the number assigned full time and the number assigned less than full time in the two categories. Additionally, indicate the number of new positions created in the two categories as a result of the grant project.

PART 921—ESTUARINE SANCTUARY GUIDELINES

Subpart A—General

Sec.

921.1 Policy and objectives.
921.2 Definitions.
921.3 Objectives and implementation of the program.
921.4 Biogeographic classification.
921.5 Multiple use.
921.6 Relationship to other provisions of the Act and to marine sanctuaries.

Subpart B—Application for Grants

921.10 General.
921.11 Application for initial acquisition, development and operation grants.
921.12 Application for subsequent development and operation grants.
921.13 Federally owned lands.
921.14 Application time schedule and procedure.

Subpart C—Selection Criteria

921.20 Criteria for selection.
921.21 Public participation.

Subpart D—Operation

921.30 General.
921.31 Changes in the sanctuary boundary, management policy or research program.
921.32 Program review.

AUTHORITY: Sec. 312, Pub. L. 92-583, as amended; 86 Stat. 1280 (16 USC 1461).

SOURCE: 39 FR 19924, June 4, 1974, unless otherwise noted.

Subpart A—General

§ 921.1 Policy and Objectives.

The estuarine sanctuaries program will provide grants to States on a matching basis to acquire, develop and operate natural areas as estuarine sanctuaries in order that scientists and students may be provided the opportunity to examine over a period of time the ecological relationships within the area. The purpose of these guidelines is to establish the rules and regulations for implementation of the program.

§ 921.2 Definitions.

(a) In addition to the definitions found in the Act and in the regulations dealing with Coastal Zone Management Program Development Grants published November 29, 1973 (Part 920 of this chapter) the term "estuarine sanctuary" as defined in the Act, means a research area which may include any part or all of an estuary, adjoining transitional areas, and adjacent uplands, constituting to the extent feasible a natural unit, set aside to provide scientists and students the opportunity to examine over a period of time the ecological relationships within the area.

(b) For the purposes of this section, "estuary" means that part of a river or stream or other body of water having unimpaired connection with the open sea where the seawater is measurably diluted with freshwater derived from land drainage. The term includes estuary-type areas of the Great Lakes as well as lagoons in more arid coastal regions.

(c) The term "multiple use" as used in this section shall mean the simultaneous utilization of an area or resource for a variety of compatible purposes or to provide more than one benefit. The term implies the long-term, continued uses of such resources in such a fashion that other uses will not interfere with, diminish or prevent the primary purpose, which is the long-term protection of the area for scientific and educational use.

§ 921.3 Objectives and implementation of the program.

(a) General. The purpose of the estuarine sanctuaries program is to create natural field laboratories in which to gather data and make studies of the natural and human processes occurring within the estuaries of the coastal zone. This shall be accomplished by the establishment of a series of estuarine sanctuaries which will be designated so that at least one representative of each type of estuarine ecosystem will endure into the future for scientific and educational purposes. The primary use of estuarine sanctuaries shall be for research and educational purposes, especially to provide some of the information essential to coastal zone management decision-making. Specific examples of such purposes and uses include but are not limited to:

(1) To gain a thorough understanding of the ecological relationships within the estuarine environment.

(2) To make baseline ecological measurements.

(3) To monitor significant or vital changes in the estuarine environment.

(4) To assess the effects of man's stresses on the ecosystem and to forecast and mitigate possible deterioration from human activities.

(5) To provide a vehicle for increasing public knowledge and awareness of the complex nature of estuarine systems, their values and benefits to man and nature, and the problems which confront them.

(b) The emphasis within the program will be on the designation as estuarine sanctuaries of areas which will serve as natural field laboratories for studies and investigations over an extended period. The area chosen as an estuarine sanctuary shall, to the extent feasible, include water and land masses constituting a natural ecological unit.

(c) In order that the estuarine sanctuary will be available for future studies, research involving the destruction of any portion of an estuarine sanctuary which would permanently alter the nature of the ecosystem shall not normally be permitted. In the unusual circumstances where permitted, ma-

nipulative field research shall be carefully controlled. No experiment which involves manipulative research shall be initiated until the termination date is specified and evidence given that the environment will be returned to its condition which existed prior to the experiment.

(d) It is anticipated that most of the areas selected as sanctuaries will be relatively undisturbed by human activities at the time of acquisition. Therefore, most of the areas selected will be areas with a minimum of development, industry or habitation.

(e) If sufficient permanence and control by the State can be assured, the acquisition of a sanctuary may involve less than the acquisition of a fee simple interest. Such interest may be, for example, the acquisition of a conservation easement, "development rights", or other partial interest sufficient to assure the protection of the natural system. Leasing, which would not assure permanent protection of the system, would not be an acceptable alternative.

§ 921.4 Biogeographic classification.

(a) It is intended that estuarine sanctuaries should not be chosen at random, but should reflect regional differentiation and a variety of ecosystems so as to cover all significant variations. To ensure adequate representation of all estuarine types reflecting regional differentiation and a variety of ecosystems, selections will be made by the Secretary from the following biogeographic classifications:

1. *Arcadian.* Northeast Atlantic coast south to Cape Cod, glaciated shoreline subject to winter icing; well developed algal flora; boreal biota.

2. *Virginian.* Middle Atlantic coast from Cape Cod to Cape Hatteras; lowland streams, coastal marshes and muddy bottoms; characteristics transitional between 1 and 3; biota primarily temperate with some boreal representatives.

3. *Carolinian.* South Atlantic coast, from Cape Hatteras to Cape Kennedy; extensive marshes and swamps; waters turbid and productive; biota temperate with seasonal tropical elements.

4. *West Indian.* South Florida coast from Cape Kennedy to Cedar Key; and Caribbean Islands; shoreland low-lying limestone; calcareous sands, marls and coral reefs; coastal marshes and mangroves; tropical biota.

5. *Louisianian.* Northern Gulf of Mexico, from Cedar Key to Mexico; characteristics of 3, with components of 4; strongly influenced by terrigenous factors; biota primarily temperate.

6. *Californian.* South Pacific coast from Mexico to Cape Mendocino; shoreland influenced by coastal mountains; rocky coasts with reduced fresh-water runoff; general absence of marshes and swamps; biota temperate.

7. *Columbian.* North Pacific coast from Cape Mendocino to Canada; mountainous shoreland; rocky coasts; extensive algal communities; biota primarily temperate with some boreal.

8. *Fiords.* South coast Alaska and Aleutians; precipitous mountains; deep estuaries, some with glaciers; shoreline heavily indented and subject to winter icing; biota boreal to sub-Arctic.

9. *Subarctic.* West and north coasts of Alaska; ice stressed coasts; biota Arctic and sub-Arctic.

10. *Insular.* Larger islands, sometimes with precipitous mountains; considerable wave action; frequently with endemic species; larger island groups primarily with tropical biota.

11. *Great Lakes.* Great Lakes of North America; bluff-dune or rocky, glaciated shoreline; limited wetlands; freshwater only; biota a mixture of boreal and temperate species with anadromous species and some marine invaders.

(b) Various sub-categories will be developed and utilized as appropriate.

§ 921.5 Multiple use.

(a) While the primary purpose of estuarine sanctuaries is to provide long-term protection for natural areas so that they may be used for scientific and educational purposes, multiple use of estuarine sanctuaries will be encouraged to the extent that such use is compatible with this primary sanctuary purpose. The capacity of a given sanctuary to accommodate additional uses, and the kinds and intensity of such use, will be determined on a case by case basis. While it is anticipated that compatible uses may generally include activities such as low intensity recreation, fishing, hunting, and wildlife observation, it is recognized that the exclusive use of an area for scientific or educational purposes may provide the optimum benefit to coastal zone management and resource use and may on occasion be necessary.

(b) There shall be no effort to balance or optimize uses of an estuarine sanctuary on economic or other bases. All additional uses of the sanctuary are clearly secondary to the primary purpose and uses, which are long-term maintenance of the ecosystem for scientific and educational uses. Non-compatible uses, including those uses which would cause significant short or long-term ecological change or would otherwise detract from or restrict the use of the sanctuary as a natural field laboratory, will be prohibited.

§ 921.6 Relationship to other provisions of the act and to marine sanctuaries.

(a) The estuarine sanctuary program must interact with the overall coastal zone management program in two ways: (1) the intended research use of the sanctuary should provide relevant data and conclusions of assistance to coastal zone management decision-making, and (2) when developed, the State's coastal zone management program must recognize and be designed to protect the estuarine sanctuary; appropriate land and water use regulations and planning considerations must apply to adjacent lands. Although estuarine sanctuaries should be incorporated into the State coastal zone management program, their designation need not await the development and approval of the management program where operation of the estuarine sanctuary would aid in the development of a program.

(b) The estuarine sanctuaries program will be conducted in close cooperation with the marine sanctuaries program (Title III of the Marine Protection, Research Act of 1972, Pub. L. 92-532, which is also administered by the Office of Coastal Zone Management, NOAA), which recognizes that certain areas of the ocean waters, as far seaward as the outer edge of the Continental Shelf, or other coastal waters where the tide ebbs and flows, or of the Great Lakes and their connecting waters, need to be preserved or restored for their conservation, recreational, ecologic or esthetic values. It is anticipated that the Secretary on occasion may establish marine sanctuaries to complement the designation by States of estuarine sanctuaries, where this may be mutually beneficial.

Subpart B—Application for Grants

§ 921.10 General.

Section 312 authorizes Federal grants to coastal States so that the States may establish sanctuaries according to regulations promulgated by the Secretary. Coastal States may file applications for grants with the Director, Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, Rockville, Maryland 20852. That agency which has been certified to the Office of Coastal Zone Management as the entity responsible for administration of the State coastal zone management program may either submit an application directly, or must endorse and approve applications submitted by other agencies within the State.

§ 921.11 Application for initial acquisition, development and operation grants.

(a) Grants may be awarded on a matching basis to cover the costs of acquisition, development and operation of estuarine sanctuaries. States may use donations of land or money to satisfy all or part of the matching cost requirements.

(b) In general, lands acquired pursuant to this section, including State owned lands but not State owned submerged lands or bay bottoms, that occur within the proposed sanctuary boundary are legitimate costs and their fair market value may be included as match. However, the value of lands donated to or by the State for inclusion in the sanctuary may only be used to match other costs of land acquisition. In the event that lands already exist in a protected status, their value cannot be used as match for sanctuary development and operation grants, which will require their own matching funds.

(c) Development and operation costs may include the administrative expenses necessary to minitor the sanctuary, to ensure its continued viability

and to protect the integrity of the ecosystem. Research will not normally be funded by Section 312 grants. It is anticipated that other sources of Federal, State and private funds will be available for research in estuarine sanctuaries.

(d) Initial applications should contain the following information:

(1) Description of the proposed sanctuary include location, boundaries, size and cost of acquisition, operation and development. A map should be included, as well as an aerial photograph, if available.

(2) Classification of the proposed sanctuary according to the biogeographic scheme set forth in § 921.4.

(3) Description of the major physical, geographic and biological characteristics and resources of the proposed sanctuary.

(4) Identification of ownership patterns; proportion of land already in the public domain.

(5) Description of intended research uses, potential research organizations or agencies and benefits to the overall coastal zone management program.

(6) Demonstration of necessary authority to acquire or control and manage the sanctuary.

(7) Description of proposed management techniques, including the management agency, principles and proposed budget including both State and Federal shares.

(8) Description of existing and potential uses of and conflicts within the area if it were not declared an estuarine sanctuary; potential use, use restrictions and conflicts if the sanctuary is established.

(9) Assessment of the environmental and socio-economic impacts of declaring the area an estuarine sanctuary, including the economic impact of such a designation on the surrounding community and its tax base.

(9) Description of planned or anticipated land and water use and controls for contiguous lands surrounding the proposed sanctuary (including if appropriate an analysis of the desirability of creating a marine sanctuary in adjacent areas).

(10) List of protected sites, either within the estuarine sanctuaries program or within other Federal, State or private programs, which are located in the same regional or biogeographic classification.

(i) It is essential that the opportunity be provided for public involvement and input in the development of the sanctuary proposal and application. Where the application is controversial or where controversial issues are addressed, the State should provide adequate means to ensure that all interested parties have the opportunity to present their views. This may be in the form of an adequately advertised public hearing.

(ii) During the development of an estuarine sanctuary application, all landowners within the proposed boundaries should be informed in writing of the proposed grant application.

(iii) The application should indicate the manner in which the State solicited the views of all interested parties prior to the actual submission of the application.

(e) In order to develop a truly representative scheme of estuarine sanctuaries, the States should attempt to coordinate their activities. This will help to minimize the possibility of similar estuarine types being proposed for designation in the same region. The application should indicate the extent to which neighboring States were consulted.

(f) Discussion, including cost and feasibility, of alternative methods for acquisition, control and protection of the area to provide similar uses. Use of the marine sanctuary authority and funds from the Land and Water Conservation Fund Act should be specifically addressed.

§ 921.12 Application for subsequent development and operation grants.

(a) Although the initial grant application for creation of an estuarine sanctuary should include initial development and operation costs, subsequent applications may be submitted following acquisition and establishment of an estuarine sanctuary for additional development and operation funds. As indicated in § 921.11, these costs may include administrative costs necessary to monitor the sanctuary and to protect the integrity of the ecosystem. Extensive management programs, capital expenses, or research will not normally be funded by section 312 grants.

(b) After the creation of an estuarine sanctuary established under this program, applications for such development and operation grants should include at least the following information:

(1) Identification of the boundary.

(2) Specifications of the management program, including managing agency and techniques.

(3) Detailed budget.

(4) Discussion of recent and projected use of the sanctuary.

(5) Perceived threats to the integrity of the sanctuary.

§ 921.13 Federally owned lands.

(a) Where federally owned lands are a part of or adjacent to the area proposed for designation as an estuarine sanctuary, or where the control of land and water uses on such lands is necessary to protect the natural system within the sanctuary, the State should contact the Federal agency maintaining control of the land to request cooperation in providing coordinated management policies. Such lands and State request, and the Federal agency response, should be identified and conveyed to the Office of Coastal Zone Management.

(b) Where such proposed use or control of federally owned lands would not conflict with the Federal use of their lands, such cooperation and coordination is encouraged to the maximum extent feasible.

(c) Section 312 grants may not be awarded to federal agencies for creation of estuarine sanctuaries in Federally owned lands; however, a similar status may be provided on a voluntary basis for Federally owned lands under the provisions of the Federal Committee on Ecological Preserves program.

§ 921.14 Application time schedule and procedure.

(a) Effective January 1, 1975, the review and selection of estuarine sanctuary applications will be conducted on a twice yearly basis. All applications received between January 1 and June 30 of any year will be considered together beginning July 1 of that year; applications received between July 1 and December 31 will be considered together beginning January 1 of the following year.

(b) All applications received during any application period will be subject to simultaneous review and consideration. At the end of each application period, a suitable number of applications, based on the level of funding available, will be selected for further review and processing. Unless sufficiently distinguished as major subcategories, no more than one application from each biogeographic category will be selected for final processing during each review period. Normally, the applications selected will be processed and the grants awarded within 6 months from the end of the application period, that is before the next review period begins. Applications which are not selected for processing may be resubmitted for consideration during the next review period.

(c) At least ninety (90) days prior to submission of an application under this section, an applicant state must notify in writing the OCZM, appropriate state and regional A-95 clearinghouses, and other states within the same biogeographic category (see Table 1) of its intention to file an application for an estuarine sanctuary grant. Such notification should include at least the identification of the state agency applying for the grant; the geographic location of the proposed sanctuary and its boundaries; proposed objectives of the sanctuary, including intended research uses; estimated cost of sanctuary; and estimated date for submission of application. Copies of the A-95 notifications to the state and regional clearinghouse would be considered sufficient and desirable notification to OCZM and to the other states.

TABLE 1—LIST OF STATES BY BIOGEOGRAPHIC CLASSIFICATION

1. Acadian—Maine, New Hampshire, Massachusetts.

2. Virginian—Massachusetts, Rhode Island, Connecticut, New York, New Jersey,

Delaware, Maryland, Virginia, North Carolina.
3. Carolinian—North Carolina, South Carolina, Georgia, Florida.
4. West Indian—Florida, Puerto Rico, Virgin Islands.
5. Louisianian—Florida, Mississippi, Alabama.
6. Californian—California.
7. Columbian—California, Oregon, Washington.
8. Fiord—Alaska.
9. Sub-Arctic—Alaska.
10. Insular—Hawaii, Guam, American Samoa.
11. Great Lakes—Minnesota, Wisconsin, Michigan, Illinois, Indiana, Ohio, Pennsylvania, New York.

(d) The Director of OCZM may, upon the finding of extenuating circumstances relating to applications for assistance, waive appropriate administrative requirements contained herein.

[39 FR 45214, Dec. 31, 1974]

Subpart C—Selection Criteria

§ 921.20 Criteria for selection.

Applications for grants to establish estuarine sanctuaries will be reviewed and judged on criteria including:

(a) Benefit to the coastal zone management program. Applications should demonstrate the benefit of the proposal to the development or operations of the overall coastal zone management program, including how well the proposal fits into the national program of representative estuarine types; the national or regional benefits; and the usefulness in research.

(b) The ecological characteristics of the ecosystem, including its biological productivity, diversity and representativeness. Extent of alteration of the natural system, its ability to remain a viable and healthy system in view of the present and possible development of external stresses.

(c) Size and choice of boundaries. To the extent feasible, estuarine sanctuaries should approximate a natural ecological unit. The minimal acceptable size will vary greatly and will depend on the nature of the ecosystem.

(d) Cost. Although the Act limits the Federal share of the cost for each sanctuary to $2,000,000, it is anticipated that in practice the average grant will be substantially less than this.

(e) Enhancement of non-competitive uses.

(f) Proximity and access to existing research facilities.

(g) Availability of suitable alternative sites already protected which might be capable of providing the same use or benefit. Unnecessary duplication of existing activities under other programs should be avoided. However, estuarine sanctuaries might be established adjacent to existing preserved lands where mutual enhancement or benefit of each might occur.

(h) Conflict with existing or potential competing uses.

(i) Compatibility with existing or proposed land and water use in contiguous areas.

If the initial review demonstrates the feasibility of the application, an environmental impact statement will be prepared by the Office of Coastal Zone Management in accordance with the National Environmental Policy Act of 1969 and implementing CEQ guidelines.

§ 921.21 Public participation.

Public participation will be an essential factor in the selection of estuarine sanctuaries. In addition to the participation during the application development process (§ 921.11(e)), public participation will be ensured at the Federal level by the NEPA process and by public hearings where desirable subsequent to NEPA. Such public hearings shall be held by the Office of Coastal Zone Management in the area to be affected by the proposed sanctuary no sooner than 30 days after it issues a draft environmental impact statement on the sanctuary proposal. It will be the responsibility of the Office of Coastal Zone Management, with the assistance of the applicant State, to issue adequate public notice of its intention to hold a public hearing. Such public notice shall be distributed widely, especially in the area of the proposed sanctuary; affected property owners and those agencies, organizations or individuals with an identified interest in the area or estuarine sanctuary program shall be notified of the public hearing. The public notice shall contain the name, address and phone number of the appropriate Federal and State officials to contact for additional information about the proposal.

Subpart D—Operation

§ 921.30 General.

Management of estuarine sanctuaries shall be the responsibility of the applicant State or its agent. However, the research uses and management program must be in conformance with these guidelines and regulations, and others implemented by the provisions of individual grants. It is suggested that prior to the grant award, representatives of the proposed sanctuary management team and the Office of Coastal Zone Management meet to discuss management policy and standards. It is anticipated that the grant provisions will vary with individual circumstances and will be mutually agreed to by the applicant and the granting agency. As a minimum, the grant document for each sanctuary shall:

(a) Define the intended research purposes of the estuarine sanctuary.

(b) Define permitted, compatible, restricted and prohibited uses of the sanctuary.

(c) Include a provision for monitoring the uses of the sanctuary, to ensure compliance with the intended uses.

(d) Ensure ready access to land use of the sanctuary by scientists, students and the general public as desirable and permissible for coordinated research and education uses, as well as for other compatible purposes.

(e) Ensure public availability and reasonable distribution of research results for timely use in the development of coastal zone management programs.

(f) Provide a basis for annual review of the status of the sanctuary, its value to the coastal zone program.

(g) Specify how the integrity of the system which the sanctuary represents will be maintained.

(h) Provide adequate authority and intent to enforce management policy and use restrictions.

§ 921.31 Changes in the sanctuary boundary, management policy or research program.

(a) The approved sanctuary boundaries; management policy, including permissible and prohibited uses; and research program may only be changed after public notice and the opportunity of public review and participation such as outlined in § 921.21.

(b) Individuals or organizations which are concerned about possible improper use or restriction of use of estuarine sanctuaries may petition the State management agency and the Office of Coastal Zone Management directly for review of the management program.

§ 921.32 Program review.

It is anticipated that reports will be required from the applicant State on a regular basis, no more frequently than annually, on the status of each estuarine sanctuary. The estuarine sanctuary program will be regularly reviewed to ensure that the objectives of the program are being met and that the program itself is scientifically sound. The key to the success of the estuarine sanctuaries program is to assure that the results of the studies and research conducted in these sanctuaries are available in a timely fashion so that the States can develop and administer land and water use programs for the coastal zone. Accordingly, all information and reports, including annual reports, relating to estuarine sanctuaries shall be part of the public record and available at all times for inspection by the public.

PART 922—MARINE SANCTUARIES

Subpart A—General

Sec.
922.1 Policy and objectives.
922.2 Programmatic objectives.

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[15 CFR Part 921]

ESTUARINE SANCTUARY GUIDELINES

Policies and Procedures for Selection Acquisition and Management

AGENCY: National Oceanic and Atmospheric Administration, Department of Commerce.

ACTION: Proposed rule.

SUMMARY: This proposed rule will allow the National Oceanic and Atmospheric Administration to make a preliminary acquisition grant to a State to undertake a fair market value appraisal, and to develop a uniform relocation act plan, a detailed management plan and a research framework for a proposed estuarine sanctuary, developed pursuant to Section 315 of the Coastal Zone Management Act of 1972, as amended.

DATE: Comments must be received on or before October 1, 1977.

FOR FURTHER INFORMATION CONTACT:

Robert R. Kifer, Physical Scientist, Policy and Programs Development Office, Office of Coastal Zone Management, 3300 Whitehaven Parkway, Page One Building, Washington, D.C. 20235 (202–634–4241).

SUPPLEMENTARY INFORMATION: On June 4, 1974, The National Oceanic and Atmospheric Administration (NOAA) published 15 CFR Part 921 entitled, "Estuarine Sanctuary Guidelines" pursuant to then section 312 of the Coastal Zone Management Act of 1972, as amended, for the purpose of establishing policy and procedures for the selection, acquisition, and management of estuarine sanctuaries.

Under new subsection 315(1) of the Act, the Secretary of Commerce is authorized to make available to coastal States grants of up to 50 per centum of the cost of acquisition, development, and operation of estuarine sanctuaries. In general, subsection 315(1) provides that grants may be awarded to States on a matching basis to acquire, develop, and operate natural areas as estuarine sanctuaries in order that scientists and students may be provided the opportunity to examine over a period of time ecological relationships within the area. The purpose of these guidelines is to implement this program.

As a result of two years of program implementation, the regulations are proposed to be modified to specifically authorize the granting of acquisition money to States in two stages:

(i) An initial grant for such preliminary purposes, as surveying and assessing the land to be acquired, and the development of management procedures and research programs; and

(ii) A second grant for the actual acquisition of the land. The Federal share of the sum of the two grants shall not exceed 50 percent of the acquisition costs involved. Any State receiving an initial grant shall be obligated to repay it if, due to any fault of the State, the sanctuary is not established.

As a result of this new grant procedure, much more information relating to costs, values, management procedures, and research programs will be available at the time of the publication of a draft environmental impact statement. Proposals made public to date in the form of an Environmental Impact Statement (EIS) have been criticized for lack of specificity in these areas. By making a small preliminary acquisition grant to a State, the estuarine sanctuary proposal can be more fully developed and the public can become more aware of the costs and the exact nature of the long-term management.

In response to State questions about estuarine sanctuary research, the proposed regulations provide that such research can be funded if it can be shown to be related to program administration.

NOAA has reviewed these proposed regulations pursuant to the National Environmental Policy Act of 1969 and has determined that promulgation of these regulations will have no significant impact on the environment.

Compliance with Executive Order 11821. The economic and inflationary impact of these proposed regulations has been evaluated in accordance with OMB Circular A–107 and it has been determined that no major inflationary impact will result.

Dated: August 26, 1977.

T. P. GLEITER,
Assistant Administrator for Administration.

It is proposed to amend 15 CFR Part 921 as follows:

(1) By revising the table of contents and authority citation to read as follows:

Subpart A—General

Sec.
921.1 Policy and objectives.
921.2 Definitions.
921.3 Objectives and implementation of the program.
921.4 Biogeographic classification.
921.5 Multiple use.
921.6 Relationship to other provisions of the Act and to marine sanctuaries.

Subpart B—Application for Grants

921.10 General.
921.11 Application for preliminary acquisition grants.
921.12 Application for land acquisition grants.
921.13 Application for operational grants.
921.14 Federally-owned lands.

Subpart C—Selection Criteria

921.20 Criteria for selection.
921.21 Public participation.

Subpart D—Operation

921.30 General.
921.31 Changes in the sanctuary boundary, management policy, or research program.
921.32 Program review.

AUTHORITY: Sec. 315(1), Coastal Zone Management Act of 1972, as amended (90 Stat. 1030, (16 U.S.C. 1461) Pub. L. 94-370).

(2) By revising Subpart B—Application for Grants—as follows:

Subpart B—Application for Grants

§ 921.10 General.

Section 315 authorizes Federal grants to coastal States so that the States may establish sanctuaries according to regulations promulgated by the Secretary. Coastal States may file applications for grants with the Associate Administrator for Coastal Zone Management (OCZM), Office of Coastal Zone Management, Page 1, 3300 Whitehaven Parkway NW, Washington, D.C. 20235. That agency which has been certified to the Office of Coastal Zone Management as the entity responsible for administration of the State coastal zone management program may either submit an application directly, or must endorse and approve applications submitted by other agencies within the State.

§ 921.11 Application for preliminary acquisition grants.

(a) A grant may be awarded on a matching basis to cover costs necessary to preliminary actual acquisition of land. As match to the Federal grant, a State may use money, the cost of necessary services, the value of foregone revenue, and/or the value of land either already in its possession or acquired by the State specifically for use in the sanctuary. If the land to be used as match already is in the State's possession and is in a protected status, the State may use such land as match only to the extent of any revenue from the land foregone by the State in order to include it in the sanctuary. Application for a preliminary acquisition grant shall be made on form SF 424 application for Federal assistance (non-construction programs).

(b) A preliminary acquisition grant may be made for the defrayal of the cost of:

(1) An appraisal of the land, or of the value of any foregone use of the land, to be used in the sanctuary;

(2) The development of a Uniform Relocation Assistance and Real Property Acquisition Policies Act plan;

(3) The development of a sanctuary management plan;

(4) The development of a research and educational program; and/or,

(5) Such other activity of a preliminary nature as may be approved in writing by OCZM. Any grant made pursuant to this subsection shall be refunded by the State to whatever extent it has spent in relation to land not acquired for the sanctuary, and if OCZM requests such refund.

(c) The application should contain:

(1) Evidence that the State has conducted a scientific evaluation of its estuaries and selected one of those most representative.

(2) Description of the proposed sanctuary including location, proposed boundaries, and size. A map(s) should be included, as well as an aerial photograph if available.

(3) Classification of the proposed sanctuary according to the biogeographic scheme set forth in § 921.4.

(4) Description of the major physical, geographic, biological characteristics and resources of the proposed sanctuary.

(5) Demonstration of the necessary authority to acquire or control and manage the sanctuary.

(6) Description of existing and potential uses of, and conflicts within, the area if it were not declared an estuarine sanctuary; and potential use restriction and conflicts if the sanctuary is established.

(7) List of protected sites, either within the estuarine sanctuaries program or within other Federal, State, or private programs, which are located in the same region or biogeographic classification.

(8) The manner in which the State solicited the views of interested parties.

(9) In addition to the standard A-95 review procedures, the grant application should be sent to the State Historic Preservation Office for comment to insure compliance with section 106 of the National Preservation Act of 1966.

(d) In order to develop a truly representative scheme of estuarine sanctuaries, the States should coordinate their activities. This will help to minimize the possibility of similar estuarine types being proposed in the same region. The extent to which neighboring States were consulted should be indicated.

§ 921.12 Application for land acquisition grants.

(a) Acquisition grants will be made to acquire land and facilities for estuarine sanctuaries that have been thoroughly described in a preliminary acquisition grant application, or where equivalent information is available. Application for an acquisition grant shall be made on SF 424 application for Federal assistance (construction program).

In general, lands acquired pursuant to this subsection are legitimate costs and their fair market value, developed according to Federal appraisal standards, may be included as match. The value of lands donated to the State and cash donations may also be used as match. If the State already owns land which is to be used in the sanctuary, the value of any use of the land foregone by the State in order to include such land in the sanctuary, capitalized over the next 20 years, may be used by the State as match. The value of lands purchased by a State within the boundaries of proposed sanctuaries while an application for a preliminary acquisition grant or land acquisition grant is being considered may also be used as match.

(b) An acquisition application should contain the following information:

(1) Description of any changes in proposed sanctuary from that presented in the preliminary acquisition grant application. If such an application has not been made, then, information equivalent to that required in such a grant application should be provided.

(2) Identification of ownership patterns, proportions of land already in the public domain; fair market value appraisal and Uniform Relocation Act plan.

(3) Description of research programs, potential and committed research organizations or agencies, and benefits to the overall coastal zone management program.

(4) Description of proposed management techniques, including the management agency and proposed budget—including both State and Federal shares.

(5) Description of planned or anticipated land and water use and controls for contiguous lands surrounding the proposed sanctuary (including, if appropriate, an analysis of the desirability of creating a marine sanctuary in adjacent areas).

(6) Assessment of the environmental, and socio-economic impacts of declaring the area an estuarine sanctuary, including the economic impact on the surrounding community and its tax base.

(7) Discussion, including cost and feasibility of alternative methods for acquisition and protection of the area.

§ 921.13 Application for operation grants.

(a) Although an acquisition grant application for creation of an estuarine sanctuary should include initial operation costs, subsequent applications may be submitted following acquisition and establishment of an estuarine sanctuary for additional operational funds. As indicated in § 921.11, these costs may include administrative costs necessary to monitor the sanctuary and to protect the integrity of the ecosystem. Extensive management programs, capital expenses, or research will not normally be funded by section 315 grants.

(b) After the creation of an estuarine sanctuary established under this program, applications (Form SF 424) for Federal assistance (non-construction program), for such operational grants should include at least the following information:

(1) Identification of the boundary (map).

(2) Specifications of the research and management programs, including managing agency and techniques.

(3) Detailed budget.

(4) Discussion of recent and projected use of the sanctuary.

(5) Perceived threats to the integrity of the sanctuary.

§ 921.14 Federally-owned lands.

(a) Where Federally-owned lands are a part of or adjacent to the area proposed for designation as an estuarine sanctuary, or where the control of land and water uses on such lands is necessary to protect the natural system within the sanctuary, the State should contact the Federal agency maintaining control of the land to request cooperation in providing coordinated management policies. Such lands and State request, and the Federal agency response, should be identified and conveyed to the Office of Coastal Zone Management.

(b) Where such proposed use or control of Federally-owned lands would not conflict with the Federal use of their lands, such cooperation and coordination is encouraged to the maximum extent feasible.

(c) Section 315 grants may not be awarded to Federally-owned lands; however, a similar status may be provided on a voluntary basis for Federally-owned lands under the provisions of the Federal Committee on Ecological Perserves program.

§ 921.20 [Amended]

(4) Subpart C—Selection Criteria—is amended by changing the first sentence in § 921.20 to read: "Applications for preliminary acquisition or land acquisition grants to establish estuarine sanctuaries will be reviewed and judged on criteria including:"

(5) Section 921.21 is revised, as follows:

§ 921.21 Public participation.

(a) Public participation in the selection of an estuarine sanctuary is required. In the selection process, the selecting entity (see § 921.10) shall seek the views of possibly affected landowners, local governments, and Federal agencies, and shall seek the views of possibly interested other parties and organizations. The latter would include, but need not be limited to, private citizens and business, social, and environmental organizations in the area of the site being considered for selection. This solicitation of views may be accomplished by whatever means the selecting entity deems appropriate, but shall include at least one public hearing in the area. Notice of such hearing shall include information as to the time, place, and subject matter, and shall be published in the principal area media. The hearing shall be held no sooner than 15 days following the publication of notice.

(b) The Office of Coastal Zone Management (OCZM) shall prepare draft and final environmental impact statements pertaining to the site finally selected for the estuarine sanctuary following public participation in the selection of that site, and shall distribute these as appropriate. OCZM may hold a public hearing in the area of such site at which both the draft environmental impact statement (DEIS) and the merits of the site selection may be addressed by those in attendance. OCZM shall hold such a hearing if: (1) In its view, the DEIS is controversial, or (2) if there appears to be a need for further informing the public with regard to either the DEIS or one or more aspects of the site selected, or (3) if such a hearing is requested in writing (to either the selecting entity or (CZM) by an affected or interested party, or (4) for other good cause. If held, such hearing shall be held no sooner than 30 days following the issuance of the DEIS and no sooner than 15 days after appropriate notice of such hearing has been given in the area by OCZM with the assistance of the selecting entity.

[FR Doc.77-26123 Filed 9-8-77;8:45 am]

national estuarine sanctuary program

In sheltered areas where rivers, streams, or other bodies of fresh water meet the open seas, living creatures flourish. The diluted salt water they thrive in is constantly stirred by the tides, causing the land's waterborne humus, topsoil, and other necessities for life to mix with the ocean's minerals and organic products of underwater decay. The resulting broth is perfect for protozoa, which are eaten by plankton, which, in turn, are eaten by very young and/or small fish, and so on up the scale to shrimp, oysters, flounder, lobsters, and, of course, man.

Ecologists have found that many of these natural areas provide man with more food per acre than the best Midwestern farmland (in addition to providing, at no expense to the taxpayer, such services as wastewater treatment and storm protection). Also, it has been estimated that more than two-thirds of the commercial and recreational fish caught and eaten by Americans today directly depend on these areas, which are known as estuaries.

But there is a problem with this lifegiving process: nearly all of our estuaries are being destroyed, damaged, or reduced in size through development and pollution. These prime food sources and beautiful natural areas are in danger.

In the late 1960s, two Federal studies depicting this unfortunate situation convinced Congress that something must be done for our estuaries. The result is the National Estuarine Sanctuary Program, established through the Coastal Zone Management Act of 1972 (and amended in 1976). This program was designed to make 50 percent matching grants to coastal States for the purposes of acquiring, developing, or operating estuarine areas to be set aside "to serve as natural field laboratories in which to study and gather data on the natural and human processes occurring within the estuaries of the coastal zone." The data gathered at these sanctuaries will be useful in management decisions concerning the coasts.

At least 20 estuaries are planned to be preserved in perpetuity for education and research, and they will be chosen in such a manner that they represent all of the nation's biological and geographic regions, including the Great Lakes. (For the purposes of the Estuarine Sanctuary Program, the term *estuaries* is defined to include "estuary-type" areas of the Great Lakes.) In this way, the information obtained within these sanctuaries should be useful in making decisions concerning the welfare not only of all the nation's estuaries, but of the entire coastal zone as well.

The national program is administered by the Estuarine Sanctuary Program Office in the Office of Coastal Zone Management, a component of the National Oceanic and Atmospheric Administration of the Department of Commerce.

Sanctuary Utilization

The estuaries will be kept as undisturbed as possible so that scientists will be able to study the naturally functioning system and also will be able to use the areas as controls against which to measure ecological changes in other estuaries. In addition, the sanctuaries will provide students and the general public with places where they can learn about ecology and the environment in a natural setting. A further benefit of these sanctuaries is the protection of vital habitats for estuarine-dependent plant and animal life, including endangered species. Also, multiple uses can take place in the sanctuaries as long as the activities do not detract from their research and educational uses.

Estuarine Sanctuaries Grants

The sanctuaries are owned and managed by the individual States, but the States are financially assisted (through 50 percent matching funds) by the federal government in three ways: preacquisition, acquisition, and operations grants. The preacquisition grant may be used for real estate appraisals, refinement of boundaries, and for the development of management plans or programs for research and education. The acquisition grant is to cover the actual and related costs of land acquisition. Finally, operations grants are for those costs necessary for monitoring the sanctuary and protecting the health of its ecosystem, and for the establishment and maintenance of an educational and scientific program.

The Individual Sanctuaries

At present, there are nine sanctuaries in operation and several in the planning stages for funding in the not-too-distant future. Each of the sanctuaries is biologically and geographically unique, so that the benefits of each will accrue both to the region in which it is located and to the nation as a whole.

SOUTH SLOUGH, OREGON

The first estuarine sanctuary funded under the program is South

Slough, within Coos Bay, Oregon. Truly enabling researchers to study both "natural and human processes," this 4,200-acre sanctuary preserves freshwater and saltwater marshes, an island covered with a climax forest, numerous species of plants and animals, and in addition, a prehistoric Indian midden, an abandoned gold mine, and the sites of old railroad logging dumps. This timber country sanctuary is managed by the South Slough Estuarine Sanctuary Management Commission, which is comprised of several State agencies, local agencies, private sector representation, and a member of the Oregon University system. Because South Slough is one of the first large natural areas to be preserved in this manner, its multidisciplinary management commission may become a prototype for the planners and managers of other ecosystems to be protected in the future.

SAPELO ISLAND, GEORGIA

The concept of a "wetlands research park" became a reality in the unspoiled marshes and beach stretches of Sapelo Island, Georgia. Here, for more than 20 years, scientists have been pursuing a variety of studies in the biological sciences on the island's isolated wetlands environment. This research has been based at the University of Georgia Marine Institute, on the island's southern end, within the sanctuary. The sanctuary itself preserves 7,400 acres of Sapelo Island, encompassing the Duplin River. But the whole island, in addition to two adjacent islands, is preserved by various State and Federal agencies. Sapelo is the site of prehistoric Indian mounds, an oyster shell ring, and numerous plantation ruins from the late 18th and early 19th century. The only privately held property on the island, within a community called Hog Hammock, belongs to approximately 200 black people whose families have lived and worked on the islands since the early 1800s.

WAIMANU, HAWAII

Waimanu, Hawaii, a mountain-enclosed stream valley, is so isolated that land access is gained only by a strenuous 6- to 8-hour hike. Because of this isolation, this 5,900-acre estuarine sanctuary is nearly pristine. Adjacent to Waimanu, however, is a nearly identical valley, Waipio, which has within it a few small taro (poi) farms. Because one is inhabited and the other is not, these two estuaries could, in the future, provide a "natural experiment" to examine the effects of farming and habitation on the estuarine ecology in comparison with an undisturbed system. Waimanu was recently featured in *America's Majestic Canyons*, published by the National Geographic Society.

OLD WOMAN CREEK, OHIO

Old Woman Creek, Ohio, is relatively small—only 637 acres—but ecologically it is extremely valuable. The sanctuary area is one of the few comparatively natural estuaries remaining on the heavily populated shores of Lake Erie. As such, it is of great importance as a control, or baseline area, for measuring the success of coastal land and water management efforts for the Great Lakes biogeographic region. Ohio is currently exploring the use of Old Woman Creek Estuarine Sanctuary as the State's freshwater research center. Since it is near urban centers, the educational aspects of estuaries also will be heavily emphasized.

ROOKERY BAY, FLORIDA

Covering more than 8,500 acres, Florida's Rookery Bay sanctuary preserves a large mangrove-filled bay and two creeks, along with their drainage corridors, from Florida's ever expanding land development. Management of the sanctuary is by the Florida Department of Natural Resources, the Collier County Conservancy, and the National Audubon Society. This unusual management structure originally was created when the two private organizations granted a dollar-per-year, 99-year lease of the land to the State. Federal and State funds will add additional key acreage to the existing core area. The diversity of the area's fauna can be recognized by the porpoises that feed there and the b...

eagles and whitetailed deer that make Rookery Bay their permanent residences. Within the sanctuary is the Rookery Bay Marine Laboratory, which, even before the sanctuary's establishment, provided data used in important coastal management decisions—a primary objective of Congress in legislating the existence of the National Estuarine Sanctuary Program.

APALACHICOLA BAY/RIVER, FLORIDA

The largest sanctuary, at more than 190,000 acres, Florida's Apalachicola Bay/River estuary has been called one of the largest remaining naturally functioning systems in the nation, and it is also the first sanctuary on the mouth of a major navigable river. Because of this, its establishment served to promote improved cooperation among the States of Florida, Alabama, and Georgia over river navigation. The major business activity of the town of Apalachicola, adjacent to the sanctuary, centers around the oyster industry, and it is expected that the sanctuary will benefit this and other fishing industries by protecting the environment and by providing research information that will help assure the continued productivity of this river/bay ecosystem. Within the Apalachicola Estuarine Sanctuary boundaries are an existing U.S. Fish and Wildlife Refuge and a State Park, which, together, represent a unique cooperative effort at ecosystem protection.

ELKHORN SLOUGH, CALIFORNIA

One of the more recent estuarine sanctuaries to be funded is Elkhorn Slough, California. The sanctuary itself, which is on the south and east portions of the slough, covers 1,510 acres, but these will be contiguous with a proposed U.S. Fish and Wildlife Service Refuge on the north and west portions so that the whole slough system will be protected. In the future, joint management practices for both areas will be pursued by the State and the U.S. Fish and Wildlife Service. The small town of Moss Landing, at the mouth of the slough, contains within it Moss Landing Marine Laboratory, which has been and will continue doing research on the slough. Because, in general, the salt concentration of Elkhorn is close to marine, one researcher has called it "a portion of the ocean bottom conveniently located for study."

Study here, and at the other estuarine sanctuaries, will help to better understand coastal areas, so that they may remain functioning ecosystems while humans continue to enjoy their many benefits.

PADILLA BAY, WASHINGTON

The Padilla Bay sanctuary consists of 11,612 acres of tidal marsh and upland areas. Its extensive eelgrass beds, which are perhaps the largest within the continental United States, are primary habitats for substantial numbers of water fowl. On an average winter day there are over 50,000 ducks in Padilla Bay, including scamps, golden eyes, buffleheads and the endangered canvasback.

Padilla Bay is the most important habitat in the northwest for the scarce black brant duck, since this species is dependent on shallow, coastal bays with a supply of eelgrass. Other uncommon inhabitants of Padilla Bay include the American bald eagle, red fox, great blue heron, snowy owls and harbor seals.

The establishment of Padilla Bay was unique in land acquisition programs. A steering committee composed of local, State and Federal representatives was established and given authority to make all decisions about boundaries and sanctuary uses, as long as they were consistent with NOAA sanctuary guidelines and other Federal and State laws. The committee adopted a philosophy calling for coexistence of the sanctuary with other community needs such as agriculture and industry.

The Padilla Bay sanctuary is located in northern Puget Sound, 5 miles from the community of Anacortes. The sanctuary is under the administration of the State Department of Game. The Skagit County Board of Commissioners serves as an oversight committee.

NARRAGANSETT BAY, RHODE ISLAND

The Narragansett Bay Estuarine Sanctuary consists of two islands and the portion of a third lying in the center of the bay. The bay itself extends for 25 miles from Newport on the ocean to Providence.

With the assistance of the National Estuarine Sanctuary Program, almost all of Patience Island was purchased in 1980. It is combined with State-owned lands and waters on Hope and North Prudence Islands to form the 1,629-acre sanctuary, the first of its kind (Virginian classification which extends from Cape Cod to Cape Hatteras) in the National Estuarine Sanctuary Program.

The islands contain the largest salt marshes in Rhode Island and the largest rookery in the Northeast. They are generally in an undisturbed natural condition, or were once developed but are gradually returning to a natural state which the sanctu-

ary protection will encourage. The waters included within the sanctuary will provide an excellent opportunity for research, reflecting as they do a high water quality to compare with the more polluted condition of the north part of the Narragansett Bay. The sanctuary will be run by a full-time manager for the Rhode Island Department of Environmental Management. In addition to research, the sanctuary will provide educational opportunities for the 600,000 people that live within 10 miles of the islands.

ESTUARINE SANCTUARY NAMES AND ADDRESSES

For more information concerning the individual sanctuaries or the National Estuarine Sanctuary Program in general, contact the appropriate State coastal zone management agency or the Federal Office of Coastal Zone Management, Estuarine Sanctuaries Program Manager, 3300 Whitehaven Street, N.W. Washington, D.C. 20235.
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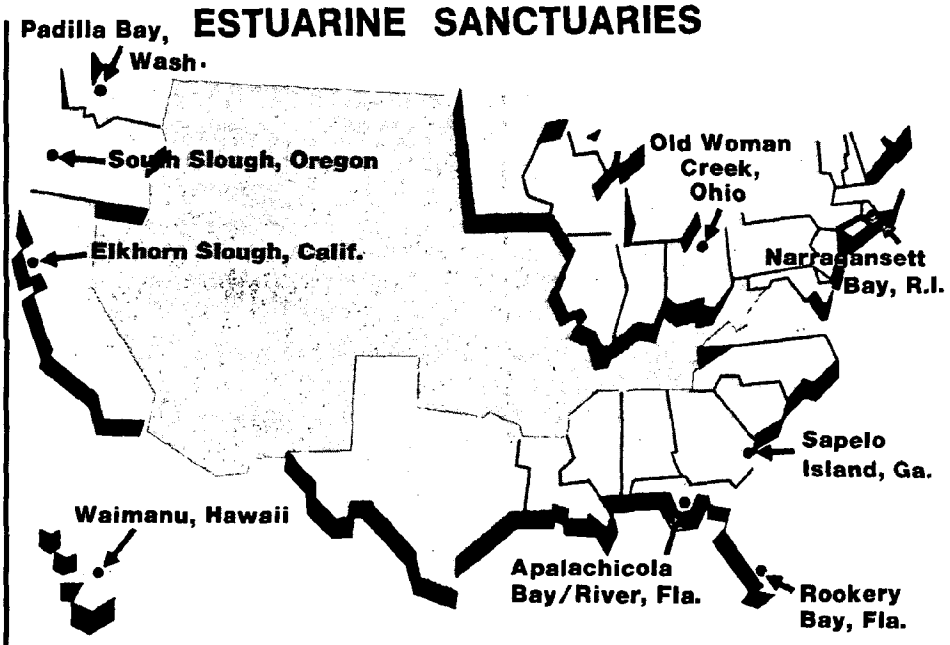

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NARRAGANSETT BAY, RHODE ISLAND

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TABLE 1

Endangered and Rare Species Inhabiting Tijuana Estuary
and Adjacent River Valley

Birds	U.S. Endangered	State Endangered	San Diego Field Ornithology Locally Endangered
Brown Pelican *Pelecanus occidentalis*	X	X	
American Peregrine Falcon *Falco peregrinus anatum*	X	X	
Light-footed Clapper Rail *Rallus longirostris levipes*	X	X	
Snowy Plover *Charadrius alexandrinus*			X
California Least Tern *Sterna albifrons browni*	X	X	
Elegant Tern *Thalasseus elegans*			X
Bell's Vireo *Vireo bellii*			X
Belding's Savannah Sparrow *Passerculus sandwichensis beldingi*		X	
PLANTS			
Salt Marsh Bird's Beak *Cordylanthus maritimus maritimus*	X		

TABLE 2

Flowering Plants of Tijuana Estuary

Family	Species	Common Names	Habitat	Abundance
MONOCOTS				
Juncaginaceae	Triglochin coninnum	Arrow grass		
	Triglochin maritima	Arrow grass		
Zosteraceae	Zostera marina	Eelgrass	shallow water	
Juncaceae	Juncus acutus	Spiny rush	salt marsh	
Cyperaceae	Scirpus californicus	California bulrush	brackish pond*	1c
	Scirpus robustus	Alkali bulrush	brackish pond*	c
Poaceae	Bromus mollis	Soft chess	grassy uplands*	c
	Bromus rigidus	Ripgut grass	grassy uplands*	c
	Bromus rubens	Foxtail chess	grassy uplands*	c
	Monanthochloe littoralis	Salt cedar	middle marsh*	1
	Distichlis spicata	Salt marsh grass	middle/high marsh*	c/1c
	Hordeum murinum	Wild barley	uplands/salt flats*	c
	Parapholis incurva	Sickle grass	salt marsh	
	Spartina foliosa	California cordgrass	low marsh/middle	c/1c
DICOTS				
Tamaricaceae	Tamarix sp.	Tamarisk	upland areas*	c
Frankeniaceae	Frankenia grandifolia	Alkali heath	middle/high marsh *	c/1a

TABLE 2 (Con't)

Family	Species	Common Name	Habitat	Abundance
Cruciferae (Brassicacene)	Cakile edentula	Sea rocket	dune areas*	c
Caryophyllaceae	Sperguliaria marina	Saltmarsh sand spurrey	coastal strand	
Aizoaceae	Gasoul nodiflorum	Little ice plant	coastal strand	
	Gasoul crystallinum	Ice plant	coastal strand	
	Gasoul chilense	Sea-fig	dunes and bluffs	
	Gasoul edule	Hottentot fig	dune areas	
Cactaceae	Opuntia serpentina	San Diego cholla	coastal sage scrub	
	Opuntia occidentalis	coastal pricky pear	coastal sage scrub	
Polygonaceae	Eriogonum fascicalatum	Coastal buckwheat	upland border*	c
Chenopodiaceae	Atriplex semibaccata	Australian saltbush	salt marsh	
	Atriplex watsonii	Watson saltbush	salt marsh	
	Atriplex canescens	Saltbush	coastal strand	
	Salicorna subterminalis	Glasswort	high marsh/ salt flats*	va
	Salicornia virginica	Pickleweeed	mid marsh/ low and high marsh*	va/c
	Salicornia bigelovii	Annual pickleweed	low marsh/ creek banks*	c/la
	Suaeda torreyana	Torreye sea-blite	disturbed high	c/a
	Suaeda californica	California sea-blite	middle/high marsh*	1c/c

TABLE 2 (Con't)

Family	Species	Common Name	Habitat	Abundance
Nyctaginaceae	Abronia umbellata	Beach sand-verbena	sand dunes*	c
Batidaceae	Batis maritima	Salt wort	salt marsh/strand	
Plumbaginaceae	Limonium californicum	Sea lavender	middle high marsh*	c
Convolvulaceae	Creassa truxillensis	Alkali weed	highmarsh/sand flats*	1c
Convolvulaceae	Cuscuta salina	Salt marsh dodder	high marsh*	1c
Boraginaceae	Helotropium curassavicum	Seaside helitrope	strand	
Solanaceae	Lycium californicum	California box-thorn	high marsh*	
Scorphulariaceae	Cordylanthus maritimus	Salt marsh bird's beak (endangered by state)	high marsh central slough*	1c
Fabaceae	Lotus scoparius	Deerweed	upland brush*	c
*Onagraceae	Oenothera cheiranthifolia	Beach evening primrose	dune*	c

TABLE 2 (Con't)

Family	Species	Common Name	Habitat	Abundance
Asteraceaee	Iva hayesiana	Southern poverty weed	high marsh*	r
	Franceria chamissonis	Beach sand bur	dunes*	1c
	Jaumea carnosa	Jaumea	low/middle marsh*	c
	Amblyopappus pusillus	Amblyopappus	salt flats*	c
	Haplopappus venetus	Goldenbush	coastal sage scrub	
	Artemesia californica	coastal sagescrub	California sagebrush	
	Pluchea purpurascens	Marsh-fleabane	brackish pond*	c

Key to Abundance

va - very abundant
a - abundant
1a - less abundant
c - common
1c - less common
r - rare

Source of data on habitats:

*Habitat reported in Peta Mudie. Preliminary report of the vegetation of the Tijuana River Estuary. Unpublished manuscript. No date.

No asterisk indicates habitat inferred from Phillip A. Munz and David A. Keck, A California Flora and Supplement. University of California Press. 1968.

Source of data on abundance: Mudie, no date.

TABLE 3

Common Algae of Tijuana Estuary

Taxonomic Group	Species/(Common Name)	Abundance
Diatoms	*Trachyneis aspera*	Most common diatom
	Denticula subtilis	Second most common diatom
	Nitzschia vermicularis	1
	Diploneis smithii	1
	Nitzschia incrustans	1
	Navicula ramosissima	1
	Achnanthes sp. #1	1
	Mastogloia exigua	1
	Nitzschia subtilis	1
	Amphora turgida	2
	Gyrosigma obliquum	2
	Nitaschia obtusa v. *nana*	2
	Sururella fastuosa	2
	Diploneis interrupta	2
	Navicula millos	2
	Nitzschia longissima	3
	Nitzschia punctata v. *coaractata*	3
	Achnanthes sp. #2	3

TABLE 3 (Con't)

Taxonomic Group	Species/(Common Name)	Abundance
	Nitzschia fonticola	3
	Achnanthes brevipes	3
	Nitzschia fonticola	3
	Achnanthes brevipes	3
	Nitzschia fasciculata	3
	Caloneis westii	3
	Amphora exigua	3
	Navicula digito-radiata	3
	Rhopalodia musculus	3
	Nitzschia angularis	4
	Amphora coffaeformis	4
	Pinnularia ambigua	4
	Nitzschia obtusa v. scapelliformis	4
	Diploneis bombus	4
	Nitzschia acuminata	4
	Diploneis lineata	4

TABLE 3 (Con't)

Taxonomic Group	Species/(Common Name)	Abundance
Bluegreen Algae	Microcoleus lyngbyaceus	1
	Schizothriz mexicana	2
	Schizothrix arenaria	2
	Schizothrix calcicola	2
Green Algae	Rhizoclonium riparium	2
	Enteromorpha clathrata v. crinata	4
	Ulva latissima	Abundant
	Cladophora sp.	Abundant
	Enteromorpha sp.	Abundant

Key to abundance

1. Among 10 most abundant species
2. Among 11th to 20th most abundant species
3. Among 21st to 30th most abundant species
4. Among 31st to 40th most abundant species

Source of data on abundance: Joy Zedler. Salt marsh algal mat composition: spatial and temporal comparisons. Unpublished, San Diego State University. 1979; U.S. Fish and Wildlife Service, 1980

TABLE 4

Marine Invertebrates of Tijuana Estuary

Taxonomic Group	Species	Common Name
PHYLUM ANNELIDA		
Capitellidae	*Notomastus tenuis*	Red mudworm
Chaetopteridae	*Chaetopterus variopelatus*	Parchment tubeworm
Glyceridae	*Glycera dibranchiata*	Bloodworm
Nephtyidae	*Nepthys punctata*	
	Dioptara ornata	Shell tubeworm
Onuphidae	*Diopatra splendidissima*	Shell tubeworm
Opheliidae	*Ophelia limocina*	
Maldanidae	*Axiothella rubrocincta*	Joint worm
Owneiidae	*Owenia fusiformis*	Sand tubeworm
Orbiniidae	*Haploscoloplos elongata*	
PHYLUM ARTHROPODA		
Brachyura	*Loxorhynchus crispatus*	Moss crab
	Pachygrapsus crassipes	Shore crab
	Hemigrapsus oregonensis	Mudflat crab
	Cancer sp.	Cancer crab
	Scleroplax granulata	Pea crab
	Pinnixa franciscana	Pea crab
	Portunus xantusi	Swimming crab
	Speocarcinus californiensis	Mudflat crab
	Uca crenulata	Fiddler crab

TABLE 4 (Con't)

Taxonomic Group	Species	Common Name
Anomura	Callianassa californiensis	Ghost shrimp
	Emerita analoga	Mole (sand) crab
	Upogettia pugettensis	Blue mud shrimp
PHYLUM MOLLUSCA		
Pelecypoda		
Mytilidae	Mytilus edulis	Bay mussel
Ostreidae	Ostrea lurida	Native oyster
Cardiidae	Laevicardium substriatum	Egg cockle
Veneridae	Protothaca staminea	Common littleneck
	Saxidomus nuttalli	Washington clam
	Chione undatella	Wavy chione
Cooperellidae	Cooperella subdeaphana	
Mactridae	Tresus nuttali	Gayper
Tellinidae	Macoma nasuta	Bent-nose clam
	Macoma secta	White sand clam
	Tellina carpenteri	
	Florimetis obesa	Yellow apolymetis
	Apolymetis biangulata	
	Donax californicus	Wedge clam
Psammobiidae	Tagelus californianus	California jackknife calm
	Sanguinolaria nuttallii	Purple clam
Solenidae	Siliqua patula	Northern razor clam

TABLE 4 (Con't)

Taxonomic Group	Species	Common Name
Myidae	Cryptomya californica	False mya
Gastropoda		
Cerithiidae	Cerithidae californica	California horn shell
Calyptraeidae	Crepidula onyx	Slipper shell
Naticidae	Polinices lewisi	Lewis' moon snail
Olividae	Olivella biplicata Olivella baetica	Purple olivella Beatic olivella
Nassariidae	Nassarius fossatus Nassarius tegula	Channeled nassa Mud nassa
Ellobiidae	Melampus olivaceus	Salt marsh snail
Bullaridae	Bulla gouldiana	Bubble snail
Actoecinidae	Acteocina inculta	
Aplysiidae	Aplysia californica	Sea hare
Aglajidae	Navanax inermis	Striped sea slug

TABLE 4 (Con't)

Taxonomic Group	Species	Common Name
PHYLUM SIPUNCULOIDEA		
	Sipunculus nudus	Irridescent peanut worm
PHYLUM ECHINODERMATA		
	Dendraster excentricus	Sand dollar

Sources: Peterson, 1969; Ocean Science and Engineering, 1971; U.S. Fish and Wildlife Service; 1980; Rehse, 1981.

TABLE 5

Fishes of Tijuana Estuary

Family & Species	Common Name	Status
Rhinobatidae		
Rhinobatos productus	Shovelnose guitar fish	R
Myliobatididae		
Myliobatis californica	Bat ray	R
Dasyatididae		
Urolophus halleri	Round stingray	U
Engraulididae		
Anchoa compressa	Deepbody anchovy	C
Anchoa delicatissima	Slough anchovy	C
Batrachoididae		
Porichtys myriaster	Specklefin midshipman	U
Cyprinodontidae		
Fundulus parvipinnis	California killifish	A
Atherinidae		
Atherinops affinis	Topsmelt	A
Syngnathidae		
Syngnathus leptorhynchus	Bay pipefish	U
Syngnathus griseolineatus	Bay pipefish	
Cottidae		
Leptocottus armatus	Staghorn sculpin	A
Serranidae		
Paralabrax clathratus	Kelp bass	U
Paralabrax maculatofasciatus	Spotted sand bass	C
Paralabrax nebulifer	Barred sand bass	C
Scianenidae		
Menticirrhus undulatus	California corbina	U
Genyonemus lineatus	Whitecroaker	U
Girellidae		
Girella nigricans	Opaleye	C

TABLE 6

Birds of Tijuana River Valley

Order & Species	Common Name	Abundance
PODICIPEDIFORMES		
Aechmorphorus occidentalis	Western Grebe	R
Podilymbus podiceps	Pied-billed grebe	C
Podiceps nigricollis	Eared grebe	R
CICONIFORMES		
Nycticorax nycticorax	Black crowned night heron	R
Phalacrocorax auritus	Double vested cormant	R
Ardea herodias	Great blue heron	R
Butorides virescens	Green heron	-
Bubulcus ibis	Cattle egret	-
Casmerodius albus	Great egret	R
Leucophoyx thula	Snowy egret	C
ANSERIFORMES		
Bucephala albeola	Bufflehead	R
Mergus serrator	Red Breasted merganser	R
Melanitta perspicillata	Surf Scoter	R
Anas acuta	Pintail	R
Anas carolinensis	Green-winged teal	R
Anas cyanoptera	Cinnamon teal	R
Anas american	American widgeon	R
Anas clypeata	Northern shoveler	R
Oxyura jamaicensis	Ruddy duck	-
Aix sponsa	Wood duck	-
Aythya affinis	Lesser scaup	C
FALCONIFORMES		
Cathartes aura	Turkey vulture	-
Elanus leucurus	White-tailed kite	-
Buteo jamaicensis	Red-tailed hawk	-
Buteo lineatus	Red shouldered hawk	-

TABLE 6 (Con't)

Order & Species	Common Names	Abundance
Buteo swainsoni	Swainson's hawk	-
Buteo albonotatus	Zone-tailed hawk	-
Buteo regalis	Ferruginous hawk	-
Parabuteo unicinctus	Harris' hawk	-
Aquila chrysaetos	Golden eagle	R
Circus cyaneus	Marsh hawk	R
Falco mixicanus	Prairie falcon	-
Falco peregrinus	Peregrine falcon	-
Falco columbarius	Merlin	-
Falco sparverius	American kestrel	R
Pandion haliaetus	Osprey	R
GALLIFORMES		
Lophortyx californicus	California quail	-
GRUIFORMES		
Rallus longirostris levipes	Light Footed Clapper rail	R
Rallus limicola	Virginia rail	-
Porzana carolina	Sora	-
Gallinula chloropus	Common gallinule	-
Fulica americana	American coot	-
Calidris alba	Sanderling	C
Arenaria interpres	Ruddy turnstone	R
CHARADRIIFORMES		
Recurvirostra americana	American avocet	R
Charadrius vociferus	Killdeer	C
Charadrius montanus	Mountain plover	-
Charadrius semipalmatus	Semipalmated plover	R
Charadrius alexandrinus	Snowy plover	R
Pluvialis dominica	American golden plover	-
Pluvialis squatarola	Black-bellied plover	C

TABLE 6 (Con't)

Order & Species	Common Names	Abundance
Capella gallinago	Common snipe	-
Numenius americanus	Long-billed curlew	R
Numenius phaeopus	Whimbrel	R
Actitis macularia	Spotted sandpiper	-
Catoptrophorus semipalmatus	Willet	A
Tringa solitaria	Solitary sandpiper	-
Tringa melanoleucus	Greater yellowlegs	R
Tringa flavipes	Lesser yellowlegs	R
Calidris canutus	Red knot	R
Calidris melanotos	Pectoral sandpiper	A
Calidris minutilla	Least sandpiper	A
Calidris mauri	Western sandpiper	A
Calidris alpina	Dunlin	A
Limnodromus griseus	Short-billed dowitcher	A
Limnodromus scolopaceus	Long-billed dowitcher	A
Limosa fedoa	Marbled godwit	A
Philomachus pugnax	Ruff	-
Himantopus mexicanus	Black-necked stilt	C
Larus glaucescens	Glaucous-winged gull	-
Larus delwarensis	Ring-billed gull	R
Larus occidentails	Western gull	R
Sterna albifrons	Least tern	R
Sterna forsteri	Forster's tern	R
Sterna caspia	Caspian tern	R
COLUMBIFORMES		
Steganopus tricolor	Western phalarope	-
Lobipes Lobatus	Northern phalarope	-
Columba livia	Rock dove	-
Columbina passerina	Ground dove	-
Columbia fasciata	Band-tailed pigeon	-
Zenaida asiatica	White-winged dove	-
Zenaida macroura	Mourning dove	-

TABLE 6 (Con't)

Order & Species	Common Name	Abundance
CACULIFORMES		
Geococcyx californianus	Roadrunner	-
STRIGIFORMES		
Tyto alba	Barn owl	-
Speotyto cunicularia	Burrowing owl	-
Asio flammeneus	Short-eared owl	-
APODIFORMES		
Chaetura vauxi	Vaux's swift	-
Aeronautes saxatalis	White-throated swift	-
Archilochus alexandri	Black-chinned hummingbird	-
Calypte costae	Costa's hummingbird	-
Calypte anna	Anna's hummingbird	-
Selasphorus rufus	Rufous hummingbird	-
Selasphorus sasin	Allen's hummingbird	-
Cynanthus latirostris	Broad-billed hummingbird	-
CORACIIFORMES		
Megaceryle alcyon	Belted kingfish	R
PICIFORMES		
Colaptes aratus	Common flicker	-
Sphyrapicus varius	Yellow-bellied sapsucker	-
Dendrocopos scalaris	Ladder-backed woodpecker	-
Dendrocopos nuttallii	Nuttall's woodpecker	-

TABLE 6 (Con't)

Order & Species	Common Name	Abundance
PASSERIFORMES		
Tyrannus tyrannus	Eastern kingbird	-
Tyrannus melancholicus	Tropical kingbird	-
Tyrannus verticalis	Western kingbird	-
Tyrannus crassirostris	Thick-billed kingfish	-
Tyrannus vociferans	Cassin's kingfish	-
Muscivora forficata	Scissor-tailed flycatcher	-
Myiarchus cinerascens	Ash-throated flycatcher	-
Sayornis phoebe	Eastern phoebe	-
Sayornia saya	Say's phoebe	-
Empidonax traillii	Willow flycatcher	-
Empidonax minimus	Least flycatcher	-
Empidonax hammondii	Hammond's flycatcher	-
Empidonax oberholseri	Dusky flycatcher	-
Empidonax wrighii	Gray flycatcher	-
Empidonax difficilis	Western flycatcher	-
Nuttallornis borealis	Olive-sided flycatcher	-
Pyrocephalus rubinus	Vermilion flycatcher	-
Eremophila alpestris	Horned lark	R
Tachycineta thalassina	Violet-green swallow	-
Tridoprocne bicolor	Tree swallow	-
Riparia riparaia	Bank swallow	-
Stelgidopteryx ruficollis	Rough-winged swallow	-
Hirundo rustica	Barn swallow	R
Petrochelidon pyrrhonota	Cliff swallow	C
Progne subis	Purple martin	-
Aphelocoma coerulescens	Scrub jay	-
Corvus corax	Common raven	-
Auriparius flavceps	Verdin	-

TABLE 6 (Con't)

Order & Species	Common Names	Abundance
Psaltriparus minimus	Bushtit	-
Troglodytes aedon	House wren	-
Troglodytes troglodytes	Winter wren	-
Thryomanes bewickii	Bewick's wren	-
Telmatodytes palustris	Long-billed marsh wren	R
Mimus polyglottos	Mockingbird	-
Demetalla carolinensis	Catbird	-
Toxostoma bendirel	Bendire's thrasher	-
Toxxostoma ridivivum	California thrasher	-
Oreoscoptes montanus	Sage thrasher	-
Turdus migratorium	American robin	-
Hylocichla mustelina	Wood thrush	-
Hylocichla ustulta	Swainson's thrush	-
Hylocichia guttata	Hermit thrush	-
Sialia currocoides	Mountain bluebird	-
Myadestes townsendi	Townsend's solitaire	-
Polioptila caerulea	Blue-gray gnatcatcher	-
Polioptila melanura	Black-tailed gnatcatcher	-
Regulus calendula	Ruby-crowned kinglet	-
Anthus spinoletta	Water pipit	R
Anthus cervinus	Red-throated pipit	-
Anthus sprangueii	Sprague's pipit	-
Bombycilla cedrorum	Cedar waxwing	-
Phainopepla nitens	Phainopepla	-
Lanius ludovicianus	Loggerhead shrike	-
Sturnus vulgaris	Starling	-
Vireo bellii	Bell's vireo	-
Vireo solitarius	Solitary vireo	-
Vireo flavoviridis	Yellow-green vireo	-
Vireo olivaceus	Red-eyed vireo	-

TABLE 6 (Con't)

Order & Species	Common Names	Abundance
Vireo philadelphicus	Philadelphia vireo	-
Vireo gilvus	Warbling vireo	-
Mniotilta varia	Black-and-white warbler	-
Helmitheros vermivours	Worm-eating-warbler	-
Vermivora pinus	Blue-winged warbler	-
Vermivora peregrina	Tennessee warbler	-
Vermivora celata	Orange-crowned warbler	-
Vermovora ruficapilla	Nashville warbler	-
Vermivora virginiae	Virginia's warbler	-
Vermivora luciae	Lucy's warbler	-
Parula americana	Parula warbler	-
Dendroica petechia	Yellow warbler	-
Dendroica magnolia	Magnolia warbler	-
Dendroica tigrina	Cape may warbler	-
Dendroica caerulescens	Black-throated blue warbler	-
Dendroica coronata	Yellow-rumped warbler	-
Dendrocia nigrescens	Black-throated gray warbler	-
Dendroica virens	Black-throated green warbler	-
Dendroica towensendi	Townsend's warbler	-
Dendroica occidentalis	Hermit Warbler	-
Dendroica fusca	Blackburnian warbler	-
Dendroica graciae	Grace's warbler	-
Dendroica pensylvanica	Chestnut-sided warbler	-
Dendroica castanea	Bay-breasted warbler	-
Dendroica pinus	Pine warbler	-
Dendroica discolor	Prairie warbler	-
Dendroica palmarum	Palm warbler	-
Seiurus aurocapillus	Ovenbird	-
Seiurus noveboracensis	Northern waterthrush	-
Oporornis agilis	Connecticut warbler	-
Oporornis tolmiei	MacGillivary's warbler	-
Geothlypis trichas	Common yellowthroat	-
Icteria virens	Yellow-breasted chat	-
Wilsonia pusilla	Wilson's warbler	-
Wilsonia canadensis	Canada warbler	-

TABLE 6 (Con't)

Order & Species	Common Name	Abundance
Setophaga ruticilla	American redstart	-
Setophaga picta	Painted redstart	-
Passer domesticus	House sparrow	-
Dolichonyx oryzivorus	Bobolink	-
Sturnella neglecta	Western meadowlark	-
Xanthocephalus xanthocephalis	Yellow-headed blackbird	-
Agelaius phoeniceus	Red-winged blackbird	-
Agelaius trider	Tricolored blackbird	-
Icterus spurius	Orchard oriole	-
Icterus cucvllatus	Hooded oriole	-
Icterus pustulatus	Scarlet-headed oriole	-
Icterus bullockii	Bullock's oriole	-
Icterus galbula	Baltimore oriole	-
Euphagus cyanocephalus	Brewer's blackbird	-
Molothrus ater	Brown-headed cowbird	-
Piranga ludoviciana	Western tanager	-
Piranga rubra	Summer tanager	-
Pheucticus ludovicianus	Rose-breasted grosbeak	-
Pheucticus melanocephalus	Black-headed grosbeak	-
Guiraca caerulea	Blue grosbeak	-
Passerina cyanea	Indigo bunting	-
Passerina amoena	Lazuli bunting	-
Passerina ciris	Painted bunting	-
Spiza americana	Dickcissel	-
Carpodacus mexicanus	House finch	-
Spinus pinus	Pine siskin	-
Spinus tristis	American goldfinch	-
Spinus psaltria	Lesser goldfinch	-
Spinus lawrencei	Lawrence's goldfinch	-
Chlorura chorura	Green-tailed towhee	-
Pipilo erythrophthalmus	Rufous-sided towhee	-
Passerculus sandwichensis	Beldings savannah sparrow	C
Ammospiza caudacuta	Sharp-tailed sparrow	-
Pooecetes gramineus	Vesper sparrow	-

TABLE 6 (Con't)

Order of Species	Common Name	Abundance
Chondestes grammacus	Lark sparrow	-
Amphispiza bilineata	Black-throated sparrow	-
Amphispiza belli	Sage sparrow	-
Junco oreganus	Oregon junco	-
Junco caniceps	Gray-headed junco	-
Spizella passerina	Chipping sparrow	-
Spizella pallida	Clay-colored sparrow	-
Spizella breweri	Brewer's sparrow	-
Zonotrichia leucophrys	White-crowned sparrow	-
Zonotrichia querula	Harris' sparrow	-
Zonotrichia altricapilla	Golden-crowned sparrow	-
Zonotrichia albicollis	White-throated sparrow	-
Passerella iliaca	Fox sparrow	-
Melospiza lincolnii	Lincoln's sparrow	-
Melospiza melodia	Song sparrow	-
Calcarius mccownii	McCown's longspur	-
Calcarius lapponicus	Lapland longspur	-
Calcarius ornatus	Chestnut-collared longspur	-

Key to Abundance in the tidal portions of Tijuana Estuary: shore, sand and mud channels, and salt marsh

A - Abundant: over 100 individuals likely to be present in sample
C - Common: between 10 and 100 individuals likely to be persent in sample
R - Rare: between 1 and 10 individuals
- Very rare.

Source of data on abundance: John Boland. San Diego State University. Personal Communication, March, 1981.

TABLE 7

Mammals of the Lower Tijuana River Valley

Family	Species	Common Name
Didelphiidae	*Didelphis marsupialis*	Opposum
Procyonidae	*Procyon lotor*	Raccoon
Mustelidae	*Mustel frenata*	Long-tailed weasel
	Mephitis mephitis	Striped skunk
	Taxidea taxus	Badger
Canidae	*Urocyon cinereoargenteus*	Gray fox
	Canis patrans	Coyote
Felidae	*Lynx rufus*	Bobcat
Sciuridae	*Spermophilus beecheyi*	California ground squirrel
Geomyidae	*Thomomys bottae*	Valley pocket gopher
Heteromyidae	*Perognathus longimembris*	Little pocket mouse
	Perognathus fallax	San Diego pocket mouse
Cricetidae	*Peromyscus californicus*	California mouse
	Peromyscus eremicus	Cactus mouse
	Peromyscus maniculatus	
	Microtus californicus	
Leporidae	*Sylvilagus bachmain*	Brush rabbit
	Sylvilagus audubonl	Desert cottontail rabbit
	Lepus californicus	Blacktailed jackrabbit
Cervidae	*Odocoileus hemionus*	Mule deer

TABLE 8

Amphibian and Reptiles of the Lower Tijuana River Valley

Family	Species	Common Name
Hylidae	Hyla regilla	Pacific treefrog
Iguanidae	Sceloporus orcutti	Granite spiny lizard
	Sceloporus occidentalis	Great basin fence lizard
	Uta stansburiana	Side-blotched lizard
	Phrynosoma coronatum	Coast horned lizard
Anguidae	Gerrhonotus multigarinatus	Southern alligator lizard
Colubridae	Pituophis melanoleucus	Gopher snake
Viperidae	Crotalus ruber	Red diamond rattlesnake
	Crotalus viridis	Southern pacific rattlesnake

TABLE 9

Archaeological Sites Near Tijuana Estuary

Site	Cultural Affiliation	Artifacts	Conditon
SDM-W-157/SDi-4281	San Dieguito II La Jolla II	Manos, metates.	
SDM-W-158/SDi-4281	San Dieguito II and III La Jollan II	Metates, manos.	
SDM-W-388	San Drieguito	Quarry-workshop.	
SDM-W-1243/SDi-4933	Unknown cores/flakes	Lithic scatter: Cores, flakes.	No depth
SDM-W-1369	San Dieguito	Cores, flakes.	
SDM-W-1371	Probably San Dieguito	Cores, scraper.	
SDM-W-1372	Probably San Dieguito	Lithic scatter: cores and flakes.	
SDM-W-1373	San Dieguito	Quarry site: cores and flakes, debritage.	
SDM-W-1374	San Dieguito	Quarry site: cores cores and flakes.	
SDM-W-1375	San Dieguito	Workshop: cores, Scrapers, hamerstone and flakes.	Has some depth
SDM-W-1376	Unknown	Flake concentrations.	

TABLE 9 (Con't)

Site	Cultural Affiliation	Artifacts	Condition
SDM-W-2293	Early Man	Single large core	
SDM-W-2418	Possibly La Jolla	Scraper, flake, core.	
SDi-2611	Pre-San Dieguito	Scrapers, choppers, fluted cores	
SDi-3627	San Dieguito	Scrapers, choppers cores, hammerstones, flakes.	Damaged by looting.
SDM-W-2899		Chopper, primary flake.	Distributed by road construction and agriculture.
SDW-W-2900		Shell, flakes.	
SDM-W-2901		Cores, scrapers, flakes.	Entirely surficial.
SDM-W-2902		Moderate density of shell and lithic tools.	Severely impacted by a grading road construction and agriculture.
SDM-W-2903		Skill cores, flakes, cobble chopper one, single hammer.	Little disturbance.
SDM-W-2904		Two hammers and felsite scraper.	No evidence of depth. Limited disturbance.
SDM-W-2905		Moderate density cores, flakes, manos, scraper.	

TABLE 9 (Con't)

Site	Cultural Affiliations	Artifacts	Condition
SDM-W-2906		Small lithic workshop arvil, cores, hammers flakes.	Disturbed by dirt access road and land form modification but still one of the most pristine.
SDW-W-2907		Large high density scatter.	Disturbed by road construction and agriculture.
SDM-W-2908	San Dieguito III	Quarry: numerous hammers and cores.	Largest site, comparatively deep.
SDM-W-2418	San Dieguito		
SDM-W-388-B		Erosional deposits; hammerstone and cores	Extremely impacted.

TABLE 10

Academic Research Conducted at Tijuana Estuary

Research Issue	Researchers	Funding	Report Title and Date
Primary Productivity	Zedler, Winfield, and Mauriello	Sea Grant	Primary Productivity in Southern California estuary. Proceedings Coastal Zone 78, 1978.
Primary Productivity	Winfield	Sea Grant, Joint Doctoral Assistance	Chapter on productivity in Ph.D. thesis.
Salt marsh productivity	Zelder, Winfield, Williams	Sea Grant	Salt marsh productivity with natural and altered tidal circulation. Oecologia, 1980 .
Algal mat productivity	Zedler	Sea Grant	Algal mat productivity: comparisons in a salt marsh. Estuaries, 1980.
Salt marsh community structure	Zedler	None	Salt marsh community structure in the Tijuana Estuary, California. Estuarine and Coastal Marine Science, 1977.
Algal mat composition	Zedler	Sea Grant	Salt marsh algal mat composition: spatial and temporal comparisons. Unpublished report, 1979.
Nursery function of the estuary	Nordby	Sea Grant Traineeship	Larval fish use of Tijuana Estuary M.S. submittal, 1981.
Habitat preference of birds	Boland	Sea Grant Traineeship	Seasonal abundances, habitat utilization feeding, strategies and interspecific competition within a wintering shorebird community and their possible relationships with the latitudinal distribution of shorebird species. San Diego State University M.S. Thesis, 1981.

TABLE 10 (Con't)

Research Issue	Researchers	Funding	Report Title and Date
Nutrient exchange	Mauriello and Winfield	Sea Grant	Nutrient exchange in the Tijuana Estuary. Proceedings of Coastal Zone '78. 1978
Nutrient exchange	Winfield	Sea Grant joint doctoral assistantship	Dynamics of carbon and nitrogen in a southern California salt marsh. San Diego State University Ph.D. Thesis, 1979.
Habitat Use by Clapper Rails	Jorgensen	None	Habitat preference of the light footed clapper rail in Tijuana Marsh, California San Diego State University, M.S. Thesis, 1975.
Endangered species management	Zedler, Nordby, Williams	U.S. Fish and Wildlife Service	Clapper rail habitat: requirements and improvements, Unpublished report, 1979.
Effects of disturbance on estuarine function	Zedler, Williams, Boland	Sea Grant	Coastal wetlands management: effects of disturbance on estuarine functioning. Sea Grant Annual Report, 1979.
Coastal wetlands restoration	Zedler, Williams, Boland, Nordby, Rehse		
Invertebrate ecology	Rehse	Dept. of Fish and Game	Recovery of commercially harvestable clams and shrimp following flooding in Tijuana estuary. Study ongoing.

TABLE 10 (Con't)

Research Issue	Researchers	Funding	Report Title and Date
Invertebrate ecology	Williams	Sea Grant Traineeship	Detritus utilization by Mytilus edulis. Estuarine and Coastal Marine Science. In press. San Diego State University, M.S. Thesis, 1979.
Invertebrate ecology	Homziak, J.	SDSU Teaching Assistantship	Substrate relationships an competition among three species of callianassid shrimp. San Diego State University, M.A. Thesis, 1977.
Invertebrate ecology	Hosmer, S.	SDSU Teaching Assistantship	Pelecypod - sediment relat ships at Tijuana estuary. San Diego State University, M.S. Thesis, 1977.
Invertebrate ecology	Smith, S.	SDSU Teaching Assistantship	The growth and mortality o littleneck clam, Protothaca staminea Tia Juana slough, California San Diego State University, M.S. Thesis, 1974.

TABLE 11

Summary of Educational Use of Tijuana Estuary

Organization	Number of Students Number of Classes	Duration of Use	Classes or Topics	Comments
Southwestern College, Sweetwater Community College District, Chula Vista	Three field trips are taken each semester, 25 students/trip. Total 150 students/year	Since 1966	Zoology, Natural History Field Botany, Marine Biology Field trips to observe migratory birds, waterfowl, marine organisms, and other flora and fawna	The only significant coastal ecosystem within convenient distance of Southwestern College (Otten 3-24-81) 4-3-81
Grossmont College, El Cajon	450 students/semester or 900 students/year	Since 1969	Marine Biology, General Biology, Environmental Biology. Emphasis on adaptions to estuarine conditions.	One instructor used Tijuana Estuary since 1960; estimates 1500 students visit the estuary in a given
U.C. Extension				
Scripps Aquarium	50 students/year	Since 1975	Marine Biology for Teachers, Marine Biology for students & parents, docent training natural history	Docent program and better management of educational and research use is desirable. (Moore, 3-30-81)
San Dieguito Adult High School				
South Bay Union (Elementary) School District, Imperial Beach	300 students/year	Since 1970	Identification of plants and animals, understanding of open space values and plant-soil relationships	District interested in developing a field guide, similar to the one prepared for South San Diego Bay. Potential (Doyle 3-19-81; 4-2-81)

TABLE 11 (continued)

Organization	Number of Students/ Number of Classes	Duration of Use	Classes/ Topics	Comments
Sweetwater Union High School District,	District has 8 high schools with an average visitation of 2 classes per semester, of 480 students/semester or 960 students/year	Sweetwater High School began in 1957	Biology, Advanced Biology, Environmental Science	Possible use as high as 1,500 students/ semester once the word gets out. (Doyle 4-6-81)
Coronado City Schools		Since 1977	Biology, Special Biology studies (Tijuana Estuary as a breeding area)	Interest in developing a mechanism to channel funds for educational programs to schools districts. (Watson 4-9-81)
San Diego State University	One or two visits by a few dozen students (graduate and undergraduate)	Since 1975	Marine Invertebrate Zoology, Biological Oceanography Thesis Research	A field guide is in preparation for the general public. (Zedler 1-26-81)
	40-50 students per year	Since 1972	Geography of San Diego County, Land Use Planning	Special emphasis on hydrology and watershed processes.
University of San Diego		Since early 1970s	Environmental Science	
University of California at San Diego		1977-78	Invertebrate Zoology	
Point Loma College		1978-79	Marine Biology, Marine Zoology, Field Biology for Teachers	Interest in interpretive center and improved management of educational use. (Lewis 3-15-81)

TABLE 11 (continued)

Organization	Number of Students/ Number of Classes	Duraton of Use	Classes/ Topics	Comments
Southwest Wetlands Interpretive Association	Field trips on monthly or bimonthly basis with 25-75 members, or 600 users/year	1980 to present	Bird Census Christmas Counts	Interpretation
San Diego County Ornithological Club				
Sierra Club	Infrequent walks up to 100 people	Since 1970s	General ecology	
Operation Wildlife		Since 1970s		Professionals concerned about Coast-wide wetlands issue, Tijuana example
California Native Plant Society	Small groups 10-15 times per year	Since 1970s	Native plants, rsp. rare and endangered plants	Interpretation 2nd low level research

TABLE 12

Soil Attributes in the Tijuana Valley and Vicinity

Abr.	Location	Soil Type	Erod.	Factor Responsible	Hydro	Av	Ct	Tr	T	Fl
CbB	Border Highlands	Carlsbad gravelly loamy sand, 2 to 5 percent slope	Severe	Surface layer texture	C	-	F	G	-	F
CfB	Spooners Mesa	Chesterton fine sandy loam, 2 to 5 percent slope	Severe	Depth to hard rock	D	-	-	G	F	G
Cha	Basin east of Border Highlands	Chino fine sandy loam 0 to 2 percent slope	Severe	Grade of structure in surface layer	C	-	G	G	G	G
CKA	Floodplain	Chino fine sandy loam saline	Severe	Surface layer texture	A	Not considered arable				
Cr	Coastal Beaches	Coastal Beaches	Severe	Surface layer texture	A	Not considered arable				
HrC2	Eastern Border Highlands, north side of floodplain	Huerhuero loam, 5-9 percent slope, eroded	Severe	Surface layer texture	D	-	-	F	G	F
HrDZ2	N. side of floodplain	Huerhuero loam, 9-15 per percent slope	Severe	Depth to hard rock	D	-	-	-	-	-
MlC	Border below State Park	Marina loamy course sand, 2-9 percent slope	Severe	Surface layer texture	A	G	F	G	F	G
OhC	Lower slopes, eastern Border Highlands	Oliventrain cobbly loam, 2-9 ercent slope	Severe	Surface layer texture; Grade of structur in surface layer	D	-	F	-	-	-
OhE	Eastern Border	Oliventrain cobby loam, 9 - 30 percent slope	Severe	Grade of structure in surface layer	D	-	F	-	-	-
OhF	Eastern Border Highlands	Oliventrain cobby loam, 30 - 50 percent slope	Severe	Slope	D	Not considered arable				

TABLE 12 (Con't)

Abr.	Location	Soil Type	Erod.	Factor Responsible	Hydro	Av	Ct	Tr	T	Fl
RaB	East of Naval Air Station	Ramona sandy loam, 2 to 5 percent slope	Severe	Grade of structure in surface layer	C	-	F	F	F	G
Rm	Smugglers Gulch/ Goat Canyon	Riverwash	Severe	Surface layer texture	A	Not considered arable				
TeF	Spooners Mesa	Terrace escarpments	Severe	Slope	D	Not considered arable				
Tf	Estuarine system	Tidal flats	Severe	Surface layer texture		Not considered arable				
TuB	Floodplain	Tujunga sand	Severe	Surface layer texture	A	G	-	F	-	G
YaA	N. side floodplain above Tijunga sand	Visalia sanda loam,	Severe	Grade of texture in surface layer	B	G	G	G	F	G
YbB	Valley adjacent to eastern Border Highlands	Visalia gravelly loam	Severe		B	G	G	G	F	G

Notes: Erod: Erodability

Crop Suitability

Av: Avocadoes
Ct: Citrus
Tr: Truck crops
T : Tomatoes
Fl: Flowers
G : Good
F : Fair
- Not suitable

TABLE 13

Proposed Framework for a Research and Education Program[1]

1. Create a mechanism to enable research findings to be used by the Sanctuary Management Authority and agencies responsible for managing resources in the lower Tijuana Valley and watershed. Provide opportunities for resource managers to investigate research issues, and for researchers, through analysis of research efforts to provide the results of research projects and consultation to government agencies and the private sector.

2. Convene workshops with scientists, members of the management authority, agency staff, and representatives of public and private foundations to present research findings and draw up agendas for future research.

3. Invite scientists and advanced students investigating arid region wetlands in Mexico to participate in drawing up a long-term cooperative research agenda.

4. Assess the feasibility of forming non-profit foundations, with authority to apply for, accept, and disburse funds for research in Tijuana Sanctuary.

5. Foster the development of a newsletter to communicate research findings and important management questions to other groups charged with managing estuaries and similar resource areas throughout the State and Mexico.

6. Foster the interaction of scientists and members of the local community. Invite researchers to discuss the relevance of their work to management of the estuary, and invite citizens to pose questions about estuarine ecology.

7. Assess the feasibility of creating a single information clearing-house for Tijuana Estuary, to serve as a depository of all published and unpublished reports about the system.

8. Work towards a coherent program of monitoring of land use changes, discharge sedimentation, extent of marsh communities, and water quality parameters. Pursue interagency agreements and private sources of funds to make possible an ongoing monitoring program.

9. Prepare guidelines for ensuring that research efforts will be compatible with long-term resource protection in Tijuana Estuary. New research proposals should be subject to review consistent with the guidelines.

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[1]Portions of this table appear in Part II of the FEIS.

10. Develop interpretive facilities for Tijuana Estuary, to include a space for storing experimental equipment, carrying out small experiments, and briefing visitors.

Research Objectives

Tijuana Estuary is both a representative of other California estuarine system and a unique subject of research in its own right. For this reason, a research agenda drawn from both statewide needs and from interests of scientists familiar with Tijuana Estuary is appropriate.

Statewide Research Objectives

1. Develop a thorough understanding of general estuarine dynamics.

2. Develop an understanding of the role and need for freshwater inflow.

3. Develop sound management schemes for modified estuaries to achieve the best possible ecological balance over the long term.

(Source: Felix Smith, U. S. Fish and Wildlife Service. Personal communication, July 28, 1977.)

4. Develop and test methodologies for coastal wetland restoration.

5. Characterize desirable physical conditions for wetlands, including the extent of tidal prism, nutrient flux, and water quality.

6. Assess the tolerance of marsh plants to salinity changes.

7. Determine expected sedimentation rates under various strategies for managing the watershed and correlate these rates with disturbance in the watershed.

8. Assess the tolerance of important benthic species such as ghost shrimp and clams to overharvesting.

9. Assess the tolerance of wetland wildlife to humans and domestic animals.

10. Evaluate the compatibility of aquaculture with long-term estuarine protection and utilization.

11. Evaluate the habitat requirements of wetland wildlife species.

(Source: Bruce Browning, Department of Fish and Game, personal communication, July 28, 1977; E. C. Fullerton, Department of Fish and Game, Personal communication, July 17, 1981.

12. Develop and test methodologies of wetland restoration.

Research Needs Identified Specifically for Tijuana Estuarine Sanctuary

A fundamental premise in developing a research agenda is that both long-term study of the salt marsh and examination of the entire wetland system are essential in understanding estuarine structure and function. A second concern is that special emphasis should be placed on research that will explain the relationships between land use management in the watershed and the components of the estuary. In support of the goals of the sanctuary program, studies that test the effectiveness of sanctuary status as a tool for resource management and open space preservation should also have high priority. The outline below presents specific research issues that should be addressed at Tijuana Estuary.

Community Structure and Primary Productivity

1. Given that freshwater inflow is largely responsible for controlling the structure and function of wetlands in Southern California, what is the threshold of freshwater release and restriction that maintain the wetland?

2. Community dynamics are related to primary productivity, which is in turn related to the physiography of an estuary. How does the food web change in response to shifts in the relative abundance of flowering plants and algae in the estuary?

Habitat Management and Enhancement

3. The relative abundance of important inhabitants of the estuary (birds, fish, shellfish, selected species) is related to habitat composition. For a series of management alternatives that favor different species, what is the optimal mix of habitat types?

Management to Maintain and Enhance Populations of Endangered Species

4. What degree of disturbance can be tolerated by the endangered birds at Tijuana Estuary: Least tern, Beldings savannah sparrow, and the Light footed clapper rail?

5. What is the critical size of the Spartina patch necessary to attract the Light footed clapper rail? Given the ability to transplant some area of Spartina, should one establish a few large patches or many small patches?

6. When do larger animals (mammals and birds) begin to use new Spartina patches?

7. What changes in algal mat and invertebrate communities occur on mudflats as Spartina foliosa becomes established?

Estuary - Watershed Relationships

8. What important impacts does watershed development have on wetlands ecosystems? What are the present risks to the Tijuana River for sedimentation, heavy metals, toxins and pathogens?

9. How effective are the erosion control measures in effect for the lower Tijuana Valley?

10. How do different watershed management practices affect the rates of sedimentation in the wetlands? What are the strengths and weaknesses of a program to define state boundaries between riparian habitat and agricultural land for low flow situations?

11. What are the ecological interactions between the wetland and upland ecosystems, in terms of the use of habitats by shorebirds, waterfowl and perching birds, birds of prey, reptiles and mammals?

12. What is the role of predators in determining the composition of plant and animal communities?

13. How do various patterns of rainfall and groundwater use affect groundwater levels and salt water intrusion in the lower Tijuana Valley?

14. What is the long-term effect of upstream dams on the lower basin, the estuary, and the beach?

Role of Tijuana Estuary in a Larger Ecological Settings

15. What role does Tijuana Estuary play in supporting marine foodchains through the nursery functions and spawning areas it offers?

16. Current research suggests that food limits Pacific shorebird populations, and that intertidal habitats are supplemented by river and pool habitats in providing bird foods. What is the role of the river and pool habitats in the Tijuana Valley in supporting shorebirds?

17. What is the role of Tijuana Estuary in supporting migratory birds, as part of the network of wetland systems along the Pacific Coast of North and South America?

18. What role do insects play in the food web of the salt marsh? What is the impact of mosquito control on salt marsh structure and function? What is the most appropriate method of mosquito and gnat control in the estuary and lower valley?

Nutrient Cycling

19. To what extent does the estuary act as a nutrient sink for materials borne by fresh or tidal water?

Framework for an Education Program at Tijuana Estuarine Sanctuary

1. Recognize the different needs of between class visits and tours by members of the general public, and develop materials and presentations appropriate for each group.

2. Encourage educational organizations with similar interests to participate in combined field or interpretive activities. This may take the form of joint field trips for biology classes in different school districts, sharing of educational materials, or cooperative development of curriculum.

3. Design, install, and maintain a series of interpretive signs for the wetland environment. Such an interpretive program should confine the use of signs to a limited area within the wetland ecosystem, and involve wetlands ecologists in the design process.

4. Design a trail system to protect sensitive habitats and species while allowing observation of representative portions of the estuarine environment. Borrowing on the experience of other public access programs for wetlands, consider a network of wood boardwalks to confine access and minimize trampling of vegetation.

5. Continue to develop the docent programs, designed to train lay people as guides to the wetland environment, building on those already offered by Scripps Aquarium and the Southwest wetland interpretive Association. Encourage participation of residents of Imperial Beach and South San Diego.

6. Prepare illustrated field guides and other written materials, and print the text and captions in both English and Spanish.

7. Design and develop a site plan for a museum and interpretive center. Prepare a site plan for an upland area adjacent to the wetlands considered able to tolerate limited development. Consider siting the facility in a way that complements other visitor-serving facilities in Imperial Beach, including a program of urban waterfront restoration.

8. Limit the nature and extent of field exercises that require collection of samples of vegetation or wildlife to selected advanced classes.

9. Restrict activities incompatible with education, especially within portions of the estuarine sys tem best suited to class learning and field trips.

10. Encourage the participation of the communities of Imperial Beach and South San Diego, including the local news media, in all aspects of the education program.

11. Create a Research and Education subcommittee drawn from local school districts, community colleges, universities, and environmental groups. Develop a mechanism such as a newsletter to communicate with non-local education.

12. Investigate the feasibility of establishing a non-profit organization, able to apply for, receive, and disburse grant funds to foster educational programs at Tijuana River Estuarine Sanctuary. Seek funding from state programs, such as the environmental license plate program (environmental protection program) and from private sources to develop the interpretive facility and trail system.

Educational Objectives

Specific educational objectives have been articulated for various levels of students as follows:

Elementary Level

1. Familiarize students with common plants and animals of the salt marsh, and enable students to identify the bird species and animals that inhabit the marsh.

2. Study how certain groups of plants and animals live together in a common environment, and enable students to understand the role of plants in protecting soil from erosion, emphasizing that man and animals depend on the soil.

3. Enable students to understand the values of open space.

4. Study the history and culture of Native Americans who used the Tijuana River area, including the Oneonb and San Dieguito cultures.

Secondary Level

1. Explain and understand the physiological adaptations for estuarine life.

2. Study the importance of Tijuana Estuary as a breeding area for birds, fish, and shellfish.

3. Study the distribution of plants and wildlife in relation to physical conditions in the estuary.

4. Study the variation of bird and wildlife use of the estuary as a function of the season.

General Public

1. Explain floodplain management.

2. Explain the effect of urbanization on watersheds adjacent to marshlands and in marshlands themselves.

3. Explain how natural evolutionary processes effect marshlands.

4. Emphasize the relationship between marshland resources and oceanographic resources.

5. Emphasize the importance of keeping a continuity of healthy coastal marshland resources in southern California, in the western hemisphere, and around the world.

6. Provide an understanding of the subtle gradation of plant communities and their importance in maintaining ecological stability in marshlands.

Although extensive use of specific areas of the proposed sanctuary by elementary and secondary school systems has existed in the past, this is not assurance that this valuable research area will be available in future years. Therefore, the only fail-safe mechanism to assure permanent utilization and protection for public research and educational efforts is through direct public ownership and management.

Appendix C

Estuarine Sanctuary Advisory Committee

Introduction

In developing this sanctuary proposal, the California Coastal Commission invited representatives of private and public interests to participate in an Advisory Committee. The main responsibility of this group involved reviewing alternative proposals for the boundary and management structure and recommending the alternative that best serves the goals of the groups represented and the sanctuary program. Membership includes proposed sanctuary boundaries, agricultural interests, elected officials, local planning directors, an estuarine ecologist, a representative of local environmental groups, and several agency staff. The proposed action described in this DEIS draws heavily on the recommendations of the Sanctuary Advisory Committee.

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OWNERSHIP

Lower Tijuana River Valley

Symbol	Assessor's Parcel Number	Owner	Acres
A.	632-040-03	U.S. Fish and Wildlife Service	*
B.	632-040-04	U.S. Fish and Wildlife Service	*
C.		U.S. Navy, leased to State Dept. of Parks and Recreation	263.00
D.	635-20-14	U.S. Fish and Wildlife Service	5.21
E.	635-020-10	U.S. Fish and Wildlife Service	72.72
F.	635-020-04	U.S. Fish and Wildlife Service	44.28
G.	635-020-16	U.S. Fish and Wildlife Service	33.03
H.	635-020-16	U.S. Fish and Wildlife Service	15.94
I.	636-101-15	U.S. Government	120.00
J.	636- 01-10	Hollis Peaey 1695 19th St., Nestor, CA	.79
K.	636-02-59 636-02-54/636-02-56	Gaylen Watts 1645 19th Street, Nestor, CA	10.00 1.74/1.74
L.	636-02-65	H.M. Davidson 5755 Amarillo, La Mesa, CA	1.17
L.	636-020-60	Carl W. and Shirley Harry 5918 Wheatstock, Bonita, CA	2.31
M.	636-020-66	Clara M. Davidson 1531 Reoullus Dr., San Diego, CA	2.50
N.	636-020-63	Robert Egger Trust 1701 Sauterne Boulevard San Diego, California 92154	1.83
O.	636-020-31	U.S. Fish and Wildlife Service	20.00
P.	636-020-20	California Leasing Corporation 11362 Western Avenue Stanton, California 90680	20.00

* Total acreage for all U.S. Fish and Wildlife Service holdings: 505 acres.

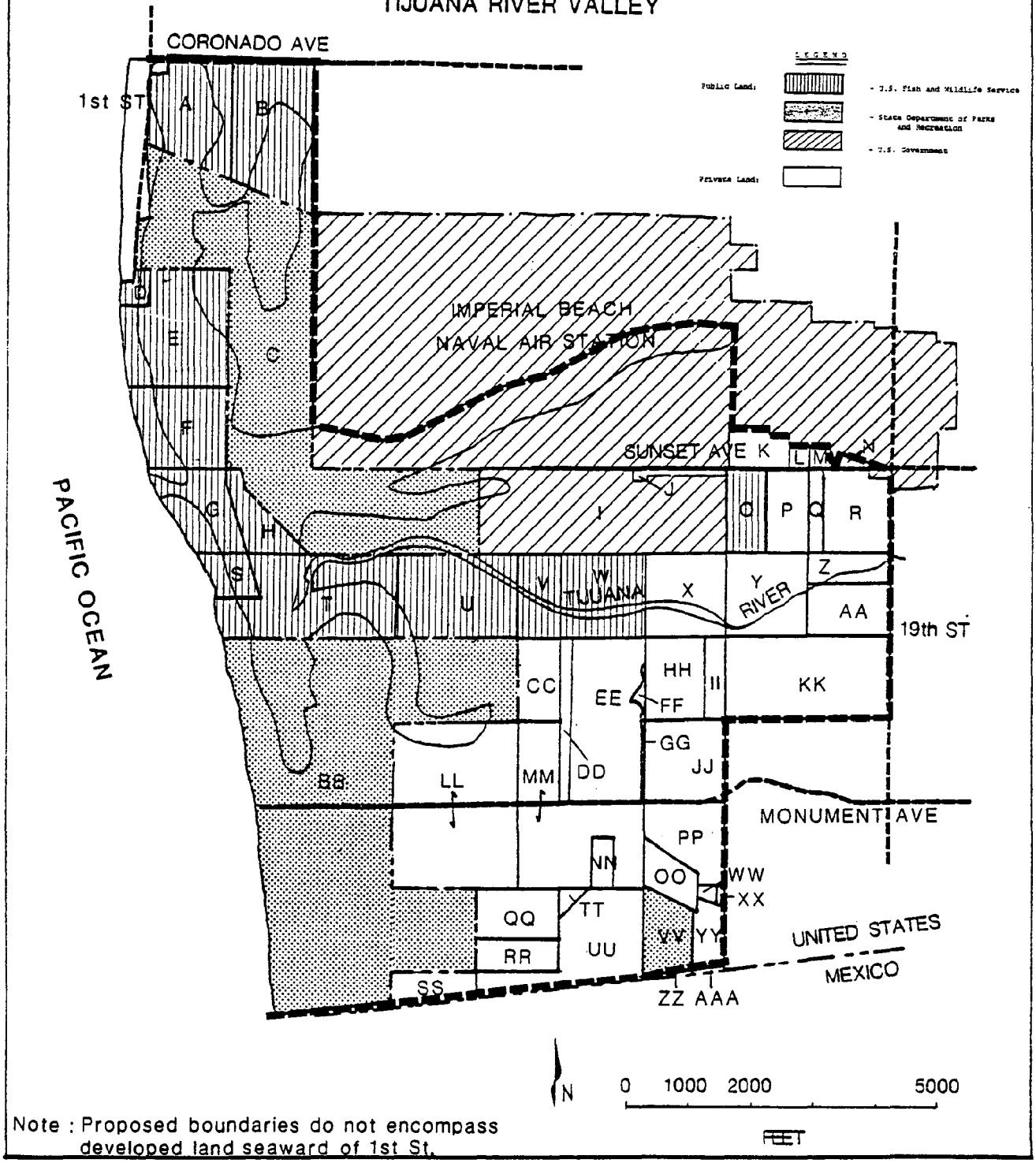
Symbol	Assessor's Parcel Number	Owner	Acres
Q.	636-020-19	L.M. Trout	(7.5)
R.	636-020-48	General Telephone	26.30
S.	636-010-14	U.S. Fish and Wildlife Service	10.13
T.	662-010-03	U.S. Fish and Wildlife Service	75.24
U.	662-020-01	U.S. Fish and Wildlife Service	61.54
V.	662-020-02	U.S. Fish and Wildlife Service	20.00
W.	662-020-03	U.S. Fish and Wildlife Service	40.53
X.	662-020-04	City of San Diego	40.41
Y.	663-010-01	City of San Diego	40.00
Z.	663-010-02	City of San Diego	14.77
AA.	663-010-03	City of San Diego	24.62
BB.		State Department of Parks and Recreation	396.00
CC.	662-020-09	Leonard and Ursula Horwin 121 S. Beverly Drive Beverly Hills, CA	(79.00)
DD.	662-020-21	Cesco Development Corp. 110 West C Street, Suite 1220 San Diego, CA.	9.00
EE.	662-020-22	Donald Kenedy, James Vernetti, Robert Brandt, et al, c/o Coronado Realty 1307 Orange Ave., Coronado, CA 92118	70.73
FF.	662-020-16	Conde Investment Corp. 111 Elm Street, San Diego, CA	1.60
GG.	662-020-13	Randolph and Amelia West, Jr. 271 Eucalyptus Court Chula Vista, CA 92010	.60
HH.	662-020-05	Randolph and Amelia West, Jr. 271 Eucalyptus Court Chula Vista, CA 92010	30.30

Symbol	Assessor's Parcel Number	Owner	Acres
II.	662-020-06	Randolph and Amelia West, Jr. 271 Eucalyptus Court Chula Vista, CA 92010	10.10
JJ.	662-020-12	Ross Spooner, c/o Fern, G.D.N. 4322 Hortensia Street San Diego, CA 92103	39.83
KK.	663-020-11		79.39
LL.	662-020-23	San Diego Gas and Electric 101 Ash, San Diego, CA 92101	122.16
MM.	662-020-24	Japatul Corp. P.O. Box 849, San Diego, CA 92101	79.01
NN.	662-020-19	Japatul Corp. P.O. Box 849, San Diego, CA 92101	2.43
OO.	662-020-20	H.G. Chaffee Company Bessie Knox & Francis Harris, 845 Bangor Street, San Diego, CA	11.40
PP.	662-020-14	H.G. Fenton Material Company P.O. Box 64, San Diego, CA 92112	32.88
QQ.	663-020-12	Raymond A. Hagen 17067 Marina Bay Drive Huntington Beach, CA	25.00
RR.	663-020-11	H. G. Chaffee Co., Bessie Knox and Francis Harris, 845 Bangor Street, San Diego, CA	15.71
SS.	663-020-02	Wirt G. Bowman and J. L. Jaffee c/o Tom Lichty, Spreckles Bldg. Ste. 535, 121 Broadway, San Diego, CA	14.30
TT.	663-020-09	H.G. Chaffee Company c/o Bessie Knox and Francis Harris 845 Bangor Street, San Diego, CA	3.63
UU.	663-020-10	H.G. Chaffee Company c/o Bessie Knox and Francis Harris 845 Bangor Street, San Diego, CA	53.62
VV.	663-020-14	State Park	22.40

Symbol	Assessor's Parcel Number	Owner	Acres
WW.	663-020-04	H. G. Fenton Material Company P.O. Box 64, San Diego, CA 92112	2.34
XX.	663-020-05	H. G. Fenton Material Company P.O. Box 64, San Diego, CA 92112	.81
YY.	663-020-06	H. G. Fenton Material Company P.O. Box 64, San Diego, CA 92112	16.09
ZZ.	663-020-07	H. G. Fenton Material Company P.O. Box 64, San Diego, CA 92112	.76
AAA.	663-020-13	U.S. Military	1.09

Ownership

TIJUANA RIVER VALLEY



Note : Proposed boundaries do not encompass developed land seaward of 1st St.

Estuarine Sanctuary Preaquisition Study
California Coastal Commission

SOURCE: San Diego County Assessor's Records, U.S. Navy

PART VIII: BIBLIOGRAPHY

Boland, John. Seasonal Abundances, Habitat Utilization, Feeding Strategies, and Interspecific Competition Within A Wintering Shorebird Community and Their Possible Relationships With the Latitudinal Distribution of Shorebird Species, San Diego State University M.S. Thesis, 1981.

Bradshaw, J.S. and P.J Mudie. Some aspects of pollution in San Diego County lagoons. Cal. Mar. Res. Comm., CalCOFI Report 16: 84-94. 1972.

Bureau of Sport Fisheries and Wildlife-California Department of Fish and Game. Acquisition priorities for coastal wetlands of California. April 1974.

California Coastal Commission. Staff Recommendation: Tia Juana River Valley Plan. 1979.

California Department of Parks and Recreation. Resource management plan and general development plan for Border Field State Park. 1974.

California Least Tern Recovery Team. California Least Tern Census and nesting survey. U.S. Fish and Wildlife. 1976.

Carpelan, L.H. Physical characteristics of Southern California coastal lagoons. Lagunas Costeras, Un Simposio. Mem. Simp. Intern. Legunas Costeras, UNAM-UNESCO, Nov, 28-30, 1967, Mexico. D.F.: 319-334. 1969.

City of San Diego, Tia Juana River Valley Land Use and Flood Control Alternatives. San Diego City Planning Department. May 1973.

City of San Diego Study. Tia Juana River Valley Plan and Environmental Impact Report, San Diego City Planning Department. January, 1976.

City of San Diego Planning Department. Tia Juana River Valley Plan. March, 1977.

County of San Diego. Agricultural Crop Report. 1977.

Dexter, D.M. Biological baseline studies of the Imperial Beach erosion control project area. Final report for U.S. Army Corps of Engineers on Project DAC09-76-M-1323. 160pp. 1977.

Dexter, D.M. The infauna of a subtidal sand-bottom community at Imperial Beach, California. California Fish & Game 64(4): 268-279. 1978.

Everett, W.T. The California Least Tern. Sterna albifrons browni at Mission Bay San Diego, California. For Hubbs-Sea World Research Institute. 1979.

Henrickson, J. Ecology of southern California coastal salt marshes. In: Plant Communities of Southern California: Symposium Proceedings. California Native Plant Soc., Special Pub. No. 2. pp. 49-64. 1976.

International Boundary and Water Commission, map entitled, "Detailed Subdivision of Drainage Areas", dated January 8, 1953.

International Boundary and Water Commission, Flow of the Colorado River and Other Western Boundary Streams and Related Data, I.B.W.C., 1972.

International Boundary and Water Commission, Information Brochure, Tijuana River Flood Control Project, I.B.W.C. (United States Section), March 1976.

International Boundary and Water Commission, Final Environmental Statement, Tijuana River Flood Control Project, I.B.W.C. (United States Section), May 1976.

Intersea Research Corporation, "Nearshore Processes along the Silver Strand Littoral Cell", prepared for the U.S. Army Corps of Engineers, 1974.

Jorgensen, P., Habitat preference of the light-footed clapper rail in Tijuana Estuary marsh, California. M.S. thesis, San Diego State University. 115 pp., 1975.

Kennedy, Michael P. and Sean Siang Tan. Map showing character and recency of faulting in the San Diego area, California. State of California Resources Agency, Division of Mines and Geology, 1975.

Kennedy, Michael P., Sean S. Tan, Roger H. Chapman, and Gordon W. Chase. Character and recency of faulting, San Diego Metropolitan Area, California. State of California Resources Agency, Division of Mines and Geology. Special Report 123, 1975

Kennedy, Michael P. and E. E. Welday. Recency and character of faulting offshore metropolitan San Diego, California. State of California Resources Agency, Division of Mines and Geology, 1977.

LaForce, J.C., "Appraisal of Agricultural Use of the Tia Juana Valley, San Diego County, California", report prepared for the City of San Diego, 1973.

Beach Leighton & Associates, and Woodward- Gizienski & Associates, Seismic Safety Study for the City of San Diego, May 17, 1974.

Massey, B.W. The Belding's Savannah Sparrow. For: U.S. Army Corps of Engineers, Los Angeles District. 1979.

Mauriello, David, and Ted Winfield. Nutrient exchange in the Tijuana Estuary. Coastal Zone 78, Vol. III: 2221-2238. Am. Soc. of Civil Engineers, New York, 1978.

McIlwee, W. San Diego County Coastal Wetlands Inventory. For: California Fish and Game. 1970.

McIntyre, M. Bruce. The biotic and physical effects of trampling salt marsh (Salicornia virginica L.) M.S. Thesis, San Diego State University, 97 pp., 1977

Mudie, Peta, Preliminary Report on the Vegetation of the Tijuana River Estuary. 1971.

New Horizons Planning Consultants, Inc. Border Highlands Sand and Gravel Resource Extraction Master Plan. Prepared for Conrock Co., Nelson & Sloan, and H.G. Fenton Material Company. November, 1980.

Nordby, Chris, Joy Zedler, Phil Williams, John Boland. Coastal Wetlands Restoration and Enhancement. Final Report to the Wildlife and Natural Resource Office, Staff Civil Engineer, U.S. Navy. November, 1980.

Ocean Science and Engineering, "Environmental Inventory of the Lower Tijuana River Valley", prepared for the U.S. Army Corps of Engineers, 1971.

Ocean Science and Engineering. Draft Environmental Impact Statement for the Proposed Tijuana River Flood Control Channel. Prepared for the Los Angeles District Corps of Engineers, 1971.

Petersen, C.H. Stability of species and of community for the benthos of two Southern California lagoons. Ecology Vol. 56: 958-966.

Polan et. al. An Archaeological Reconnaissance of Border Highlands. Heritage Environmental Services, 1981.

Prestegaard, Karen A. Stream and Lagoon Channels of the Los Penasquitos Watershed, California with an Evaluation of Possible Effects of Proposed Urbanization. California Coastal Commission Special Study Series, 1979.

Purer, E. A. Studies of certain coastal sand dune plants of southern California. Ecol. Monogr. 6: 1-88, 1936.

Purer, E.A. Plant ecology of the coastal salt marshlands of San Diego County, California. Ecol. Monogr. 12: 81-111, 1942.

Pryde, Philip R., "Examination of the Meteorological Assumptions Underlying the Derivation of the Standard Project Flood for the San Diego River", San Diego County Floodplain Technical Committee, October 1972.

Pryde, Phillip R. International approaches to flood control on the Tijuana River. Unpublished manuscript, 1976

State of California, Department of Fish and Game, At the Crossroads A Report on California's Endangered and Rare Fish and Wildlife, January 1972.

State of California, Department of Parks and Recreation. Resource Management Plan and General Development Plan for Border Field State Park, 1974.

State of California, San Diego County Investigation, Bulletin No. 48, California Division of Water Resources, pp. 128-130. 1935.

State of California, Water Quality Control Policy for Tijuana River Basin in California, San Diego Regional Water Quality Control Board, 1967.

Stevenson, M. (California Coastal Commission). San Diego County regional coastal wetlands workshop. Draft working paper-Tijuana Estuary, 1978.

Stewart, J.G. and J.R. Stewart. Evaluation of Tijuana River estuarine salt marsh, San Diego County, California. For: eligibility for registered Natural Landmark Designation. For: U.S. Nat. Parks Service, 1972.

Tan, Sian S. and Michael P. Kennedy. Geology of National City, Imperial Beach, and Otay Mesa Quadrangles, southern San Diego Metropolitan Area, California. State of California Resources Agency, Division of Mines and Geology. 1977.

White, G.F., "Flood Damage Prevention Policies", Nature and Resources, Vol. XI, No. 1 (Jan-Mar, 1975), pp.2-7.

Williams, Phil. Detritus utilization by Mytilus edulis. Estuarine and Coastal Marine Science, 1981.

Winfield, T.P. and J.B. Zedler. Comparative productivity of salt marsh vegetation in the Tijuana Estuary (Southern California). Western Society of Naturalists' meeting presentation (unpub.)

Winfield, Ted. Dynamics of carbon and nitrogen in a southern California salt marsh. Ph.D. Thesis, San Diego State University and the University of California, Riverside, 1979.

U.S. Army Corps of Engineers, Survey for Flood Control, Tia Juana River, California, U.S. Army Engineer District, Los Angeles, October 1941.

U.S. Army Corps of Engineers, Report on Flood Control, Tijuana River Basin, Calif., U.S. Army Engineer District, Los Angeles, May 1964.

U.S. Department of Agriculture, Soil Conservation Service, Soil Interpretation Study Maps, San Diego Soil Survey Area, July 1970.

U.S. Department of Agriculture Soil Conservation Service. Soil Survey, San Diego Area, California, 1970.

U.S. Department of the Interior, Fish and Wildlife Service, Threatened Wildlife of the United States, 1973.

U.S. Department of the Interior, Fish and Wildlife Service, Wayne S. White, author preliminary Fish and Wildlife Resources of Tijuana Estuary, California, June 1975.

U.S. Department of the Interior, Fish and Wildlife Service. Environmental assessment: Proposed land acquisition, Tijuana Estuary, San Diego County, California, 1979.

U.S. Department of the Interior, Fish and Wildlife Service. Proposed land acquisition: California light-footed clapper rail, 1980.

United States Section, International Boundary and Water Commission, U.S. Army Engineer District, Los Angeles, Calif., Draft Environmental Statement, Tijuana River Flood Control Project, San Diego County, California, 1974.

U.S. Section, International Boundary and Water Commission. Information brochure: Tijuana River flood control project San Diego County, California, 1976.

United States Section International Boundary and Water Commission. Draft Environmental Statement. Tijuana River Flood Control Project, San Diego County, California, January, 1974.

Yamagata, Larry M., Tia Juana River Valley: A Conflict in Change, Master's Thesis, January 1973.

Zedler, Joy B. Salt marsh community structure in the Tijuana Estuary, California. Estuarine and Coastal Marine Science, Vol. 5, pp. 39-53, 1977.

Zedler, Joy B. Salt marsh algal mat composition: spatial and temporal comparisons. Unpublished, S.D. State University, September, 1979.

Zedler, Joy B. Algal mat productivity: comparisons in a salt marsh. Estuaries, Vol. 3, No. 2, pp. 122-131, June 1980.

Zedler, Joy B., Chris Nordby, and Phil Williams. Clapper Rail Habitat: Requirements and Improvement. Final Report to the U.S. Fish and Wildlife Service, Department of the Interior, December, 1979.

Zedler, Joy B., Phil Williams, John Boland. Coastal Wetlands Management: effects of disturbance on estuarine functioning. Project Report to NOAA Sea Grant Program, November, 1979.

Zedler, Joy B., Phil Williams, John Boland, Chris Nordby. Coastal wetlands management: restoration and establishment. Progress Report to NOAA Sea Grant Program, November, 1980.

Zedler, Joy B., Ted Winfield, and David Mauriello. Primary productivity in a Southern California Estuary. Coastal Zone '78, Vol. II: 649-662.

Zedler, Joy B., Ted Winfield, and Phil Williams. Salt marsh productivity with natural and altered tidal conditions. Oecologia Vol. 44, pp. 236-240, 1980.

Zullo, J.M. Lower Tijuana River Valley. A geographical account. Student Report, San Diego State University, Geography Department, For: Drs. P.R. Pryde and B.R. O'Brien, 1974.

---- Supplemental List of Birds of San Diego County, California. Trans. San Diego Soc. Nat. Hist. 14(12): 157-168, 1966.

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