San Diego Bay Integrated Natural Resources Management Plan

September 2000

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San Diego Bay Integrated Natural Resources Management Plan

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Executive Summary

Marinas, submarines, hotels, Navy SEALS, cruise ships, docks, freighters, yachts, aircraft carriers, jet skis, terminals, parks...

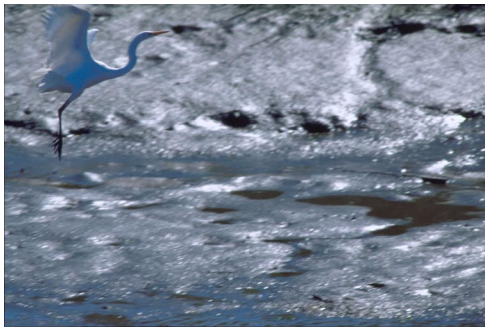
Harbor seals, black brant, bay gobies, tunicates, brittle stars, mud shrimp, bay mussels, sea pansies, eelgrass, salt marsh bird's beak, sargassum...

—One bay, many values. Can they all thrive?

This San Diego Bay Ecosystem Plan is a long-term strategy sponsored by two of the major managers of the San Diego Bay: the US Navy and San Diego Unified Port District (SDUPD). Its intent is to provide direction for the good stewardship that natural resources require, while also supporting the ability of the Navy and Port to meet their missions and continue functioning within the Bay. The ecosystem approach reflected in the Plan looks at the interconnections among all of the natural resources and human uses of the Bay, across ownership and jurisdictional boundaries. San Diego Bay is viewed as an ecosystem rather than as a collection of individual species or sites or projects.

The Bay Ecosystem Plan's goal is to:

Ensure the long-term health, recovery and protection of San Diego Bay's ecosystem in concert with the Bay's economic, Naval, recreational, navigational, and fisheries needs.

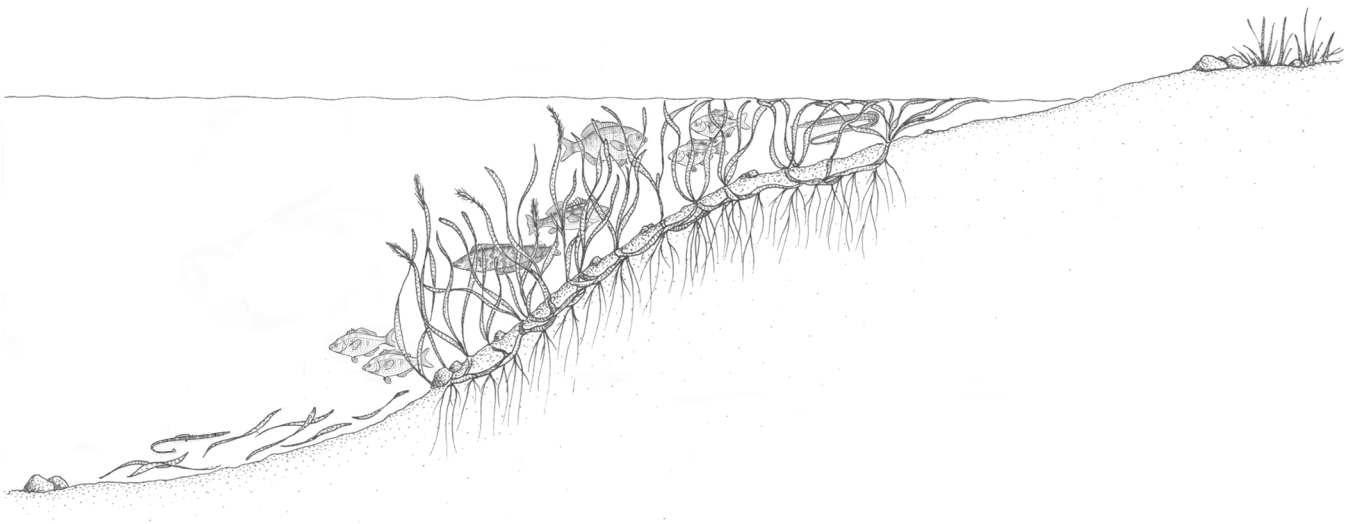


This Plan is intended to be an agent of change. To this end, beginning in Chapter 1, the Plan's vision for San Diego Bay is outlined. The current state of the ecosystem is described in Chapters 2 and 3, spelling out the existing baseline from which managers and users can measure progress. Chapters 4, 5, and 6 lay out a pathway to change for proceeding toward the Plan's goal and vision. They flesh out a progression not towards the historical Bay, because that is gone forever, but towards one that is wilder, with softer shorelines, richer and more abundant in native life. They also describe a Bay that, while used for thriving urban, commercial, and military needs, has an increasing proportion of uses that are passive. It is moving towards a place with more opportunities for public access, recreation, education and enjoyment of the myriad benefits of a healthy, dynamic ecosystem. Finally, the Bay's managers and stakeholders will make sounder decisions because of positive collaboration among themselves, a clearer understanding of the cumulative effects of their actions, and information support from focused research and long-term monitoring. The Plan contains over 1,000 strategies for better management of the Bay. Task forces, committees, partnerships, cooperative agreements, memoranda of understanding, monitoring strategies, research projects, award programs, information exchange mechanisms and endowment funds are among the strategies described.

The core strategies are to:

- Manage and restore habitats, populations, and ecosystem processes (Chapter 4);
- Plan and coordinate projects and activities so that they are compatible with natural resources (Chapter 5);
- Improve information sharing, coordination and dissemination (Chapters 5 and 6);
- Conduct research and long-term monitoring that supports decision-making (Chapter 6); and
- Put in place a Stakeholders' Committee and Focus Subcommittees for collaborative, ecosystem-based problem-solving in pursuit of the goal and objectives (Chapter 7).

A cooperative effort of many people brought this Plan together. Besides representatives from the Navy and SDUPD, regulatory and resource agencies formed the lead "umbrella" group called the *Technical Oversight Committee (TOC)*. Representatives from nonprofit organizations and the environmental community also participated in this diverse group of 13 organizations, represented by 18 individuals. The TOC members' varying perspectives helped ensure that ecosystem management strategies were considered in institutional, social, and economic contexts to validate the Plan's ecosystem approach. Another advisory committee was the *Navy Installation Oversight Committee (NIOC),* composed of representatives from each of the major Navy installations around the Bay as well as from the US Coast Guard (USCG) and Cabrillo National Monument. University and consultant scientists were asked to participate on the *Science Advisory and Review Team*. Their role was to help develop the scientific basis of the Plan. *Public com-*



ment by those interests not represented on any of the committees was actively sought. Public workshops were sponsored by the TOC in July 1997, July 1998, and September 1999. Verbal and written comments helped identify new data sources, important issues for the Plan, and some recommendations on strategy.

Several related, regional efforts have gone on concurrently with this Plan. The *San Diego Bay Interagency Water Quality Panel (SDBIWQP or "Bay Panel")* met for five years to develop a Comprehensive Management Plan for San Diego Bay (SDBIWQP 1998). Water quality issues were the main focus of this effort, but a range of natural resource, wildlife, and human use issues were also addressed. On related issues, this Bay Ecosystem Plan incorporates many of the recommendations of the Bay Panel; however, the intent is not to overlap with water quality regulatory issues.

Key Findings and Strategies

Habitats and Populations

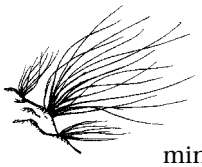
The shallower habitats and the Bay's natural shoreline have been severely depleted or modified. Compared to historic acreages, there has been a 70% loss of salt marsh, 84% loss of intertidal areas other than salt marsh, and a 42% loss of shallow subtidal areas. In contrast, deep water habitat has doubled since the Bay's first dredging in 1914. Also, 74% of the shoreline is now armored with artificial hard structures, a type of substrate not native to the Bay. Upland transition areas needed by many species are now scarce and converted to urban uses.

Habitats

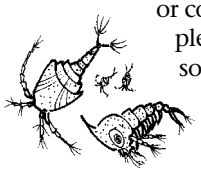
- A formal policy for protection of ***unvegetated shallows, intertidal flats,*** and ***upland transition*** areas should be adopted by the resource and regulatory agencies because current protection is considered inadequate. A draft policy is in Appendix H.
- The Plan allows for no net loss of shallow subtidal habitat in acreage or in existing biological functions and values, and seeks long-term enhancement of ***eelgrass*** habitat. Continued enforcement of mitigation standards under the Southern California Eelgrass Mitigation Policy is necessary.
- This Plan seeks a long-term net gain of area, function, value and permanence of ***intertidal flats***, and the physical conditions which support this habitat. Intertidal habitat encompasses the area between high and low tides. Losses in this zone have been the most severe of all Bay habitats, and most of what remains has been modified by structures for shoreline stabilization or access. The Plan seeks to set targets for support of sensitive or declining species in this habitat, such as the western snowy plover, foraging California least tern, shorebirds, and juvenile California halibut. Intertidal enhancement projects using dredge material are a top priority.
- The Plan seeks an improvement in the habitat value of developed shorelines and marine structures and their functional contribution to the ecosystem. New ***shoreline stabilization structures*** should be minimized, and existing structures should be enhanced as habitat for fish and wildlife. When new armoring or reconstruction of degraded armoring is demonstrably unavoidable, it should be designed to incorporate maximum practical habitat value for native species, giving priority to solutions that use materials of the type indigenous to the Bay. There should be a means to provide incentive for habitat enhancement of existing shoreline stabilization structures, which currently vary greatly in their ability to support native species.
- A San Diego Bay ***Shoreline Stabilization and Restoration Plan*** should be developed that involves SDUPD, US Navy, regulators and resource agencies. The Plan should set goals for protecting and enhancing natural shoreline functions, prevent new shoreline impacts, restore shoreline functions as redevelopment occurs, arrest erosion and accretion problems around the Bay, and allow regulators to view the Bay as a whole system, rather than piecemeal. The Plan should provide techniques for adding habitat value to structures as they need to be replaced, and identify means to provide economic incentive to improving the habitat value of existing structures.
- ***Moderately-deep subtidal habitat*** should be targeted for potential habitat enhancement by converting to shallower depths that are more productive due to enhanced light penetration. Appropriate preplanning should be conducted to take advantage of opportunities for filling moderately-deep habitats to shallow or intertidal elevations.
- ***Salt marsh*** acreage should be expanded and enhanced, as should the linkages between salt marsh and other habitats. Some priority sites for enhancement include the north end of D-Street,

north side of Gunpowder Point, E-Street marsh on the south side of Gunpowder Point, J-Street Marsh, the South Bay Marine Biological Study Area, and Emory Cove. Greater setbacks that effectively protect habitat values should be required in California Coastal Commission (CCC) permits for new construction, especially for sensitive habitats such as the salt marsh.

- ***Uplands*** which border the Bay are important as a buffer between the natural and constructed environment, and for the large number and diversity of birds that require them. In these transition areas, appropriate landscaping designs ("bayscaping") should be encouraged. Bayscaping uses a minimum of pesticides and fertilizers on properties within a vegetation management corridor along the Bay's shoreline to enhance habitat value, prevent pollution, conserve water, and control exotic introductions. A demonstration brochure should be distributed, and an award system should be promoted that recognizes the best use of appropriate landscape designs. High priority enhancement sites in the upland transition are vacant parcels along the southwest shore such as: Emory Reserve, South Bay Marine Biological Study Area, and the parcel leased by the US Navy to California Department of Parks and Recreation until that lease expires.



- The ***salt ponds*** at the south end of the Bay should be analyzed for an optimal arrangement and combination of salt marsh, tidal flat, salt pond, and dike habitats. Consideration should be given to enhancing the interconnection between the salt ponds and nearby mudflat and salt marsh habitat. The nature of the salt extraction process has facilitated use of this artificial habitat by many shorebirds, seabirds, and waterfowl. It represents one of the few large feeding, roosting, and nesting areas remaining along the urbanized southern California coast. Enhancement should be targeted for shorebird foraging, seabird nesting, and endangered or threatened species support.
- The function and values of ***river and stream mouths*** as natural corridors and buffers between salt water and freshwater habitats should be examined and enhanced to more nearly approach their natural role. Today, streams draining into the Bay are channelized or confined to storm drains and sometimes completely missing. Stormwater outfalls provide some flows and nutrients to the Bay, but not with natural seasonality, timing, frequency, or content. Opportunities to replace the corridor, buffer, filtering, and episodic siltation function formerly played by uncontrolled streams should be identified and implemented. The ecological functioning of the Otay River 100-year floodplain should be restored.



- Creation of new ***deep-water*** environments by dredging should be minimized, while protecting the functions these habitats provide. These functions include the transport of plankton into and out of the Bay for coastal species (such as the larvae of many fishes and crustaceans) that depend on access to the warm, sheltered, shallow waters during early life cycle stages. Consideration should be given to keeping new navigation channels to the east side of the Bay, where they are currently aligned. Some unused navigation channels could be enhanced to benefit fish and wildlife by shoring them up to shallower, more productive depths for these species, and some could be realigned for enhancement purposes.

Populations

- This Plan places a high priority on the long-term protection and monitoring of both plant plankton and zooplankton. Zooplankton include the eggs and larvae of fish and crustaceans that need to drift into shallow or intertidal Bay waters from the open ocean to complete their juvenile life stages.
- ***Algae*** that indicate pollution should be minimized, while algal mats in otherwise unvegetated shallows add structure to the habitat and should be protected.
- Protection of ***invertebrate communities*** should be founded on protecting the substrate and water quality upon which they depend. Invertebrates should be monitored for their safety for human consumption through studies that assess the effects of toxics and their severity.

- San Diego Bay's function as a crucial nursery and refuge for marine fishes, including those that live elsewhere as adults, requires protection and enhancement. The warm water temperatures and high productivity during the spring and summer months in shallow and intertidal waters enable the Bay to support large numbers of ***larval and juvenile fishes***. Many of these abundant fishes are important forage for fishes of commercial or sport fishing value and for seabirds. The Bay also supports large numbers of fish eggs and larvae in planktonic form. Another important characteristic of the fishes inhabiting San Diego Bay is that they form unique species assemblages not found outside of southern California, and thus contribute to the biodiversity of fish populations.
- This Plan targets an increase in the Bay's carrying capacity for shorebirds, nesting seabirds, and marsh and upland transition resident ***birds***. It advocates establishing specific population targets for priority

bird populations and to secure and conduct the necessary management, enhancement, or expansion of habitat to support those targets.

San Diego Bay provides the largest expanse of protected Bay waters in southern California for migratory birds on the Pacific Flyway. More than 305 bird species have been documented using the Bay. The majority of Bay birds, representing 30 families, are migratory and rely on the Bay as an important resting and feeding stopover. Others, especially those arriving from tropical latitudes, spend the winter, breed or nest. One-third of birds dependent on San Diego Bay have been identified as sensitive or declining by the federal or state governments or by the Audubon Society.

- Secure nesting sites for ***colonial seabirds*** should be provided that allow for population recovery by managing predators and enhancing habitat. Cooperative agreements on predator management that result in more effective protection of nesting birds should be put in place.
- This Plan seeks to head off the invasion and proliferation of ***exotic species*** as a serious threat to the integrity of the ecosystem. At least 82 nonindigenous species are found in the Bay's planning zone.

  Ballast water controls are necessary. The USCG should be supported in its effort to begin sampling ships and to promulgate mandatory regulations as necessary. The Navy's ballast water exchange policy for open-ocean exchange should continue, and the implementation of a ballast water management program that explicitly addresses the nonindigenous invasive species problem is encouraged.

  The number of new invasive exotic species should be reduced or prevented by educational and preventive methods. For example, appropriate landscaping and restoration practices that control the introduction of invasive exotic plants are encouraged.

  The City of San Diego should designate the Bay as "open space" for the purposes of its Biological Mitigation Ordinance, prohibiting the use of invasive exotic plants near a designated "open space" area.

  A San Diego Bay Exotic Species Task Force should be formed which is composed of resource managers, researchers and interested public to implement the above strategy. The Task Force should oversee an Exotic Species Control Endowment Fund.
- Support of seven ***species federally listed as threatened or endangered*** that occur within the Bay Ecosystem Plan footprint is an important Bay function. Many other sensitive species occur in and around the Bay as defined by state, federal, and other organizational lists.

  This Plan seeks enhanced protection of the local foraging population of the green sea turtle.

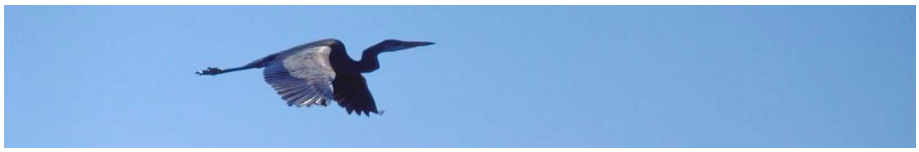
  An increase in fledgling productivity and pair numbers of the California least tern is sought, in part by adopting a Baywide approach to predator management.

  Other management activities for the protection of sensitive species are habitat-based, as described above.

Compatible Use of the Bay's Natural Resources

Mitigation and Enhancement

An improvement is sought in the effectiveness and success of mitigation and enhancement projects by building a consensus of prioritized need among regulators and project proponents.



- Aggressive avoidance should remain the primary strategy to avoid loss of natural resource functions and values in the Bay.
- The use of dredge material for beneficial reuse in the Bay should be maximized, consistent with the habitat objectives and policies of this Plan and other comprehensive, regional planning efforts. A multiuser beneficial reuse site for habitat restoration or enhancement in the Bay should be identified so that project sponsors from multiple jurisdictions may contribute jointly to an enhancement project over time and as dredge material accumulates.

Dredging

When dredging is necessary it should be conducted in an environmentally sound manner.

- Ecosystem processes, habitat values and species that are affected by dredging should be documented and described in sufficient detail to ensure adequate mitigation. For example, at intertidal sites the habitat functions and values for fishes, invertebrates and shorebirds should be detailed so that all are addressed and protected.
- Dredging should be first avoided, then minimized close to shore, in order not to contribute to further loss of intertidal habitats and the need to armor the shoreline. Prioritize new dredging at locations where the shoreline is already armored. Maximize use of existing channels rather than creating new ones.
- New locations for both upland and nearshore confined disposal sites should be investigated. Seek a means to combine habitat enhancement with nearshore confined disposal sites.

Recreational Harvesting

Harvest management is targeted to support viable, self-sustaining populations and promote native species richness.

- More effective measurement of all types of recreational harvesting within the Bay should be promoted. Examples are: 1) to expand periodic censusing (e.g. boat and dock checks) of all species; 2) increase censusing of California halibut and sand bass; 3) require that data collectors keep separate data for the San Diego Bay sport fishery so that their catches can be considered separately from those in the ocean; and 4) encourage a bait fishery monitoring program, such as for ghost shrimp. To accomplish this, stable revenue sources to supplement license revenues for the California Department of Fish and Game's (CDFG) enforcement efforts are sought.

Ship and Boat Maintenance

Water and sediment quality are targeted for improvement with improved ship and boat maintenance practices.

- Marina operators are encouraged to use Best Management Practices (BMPs) that are beyond the minimum practices often expected, such as: 1) adding green vegetated buffers at marina sites where possible to filter runoff into the Bay, and 2) moving power wash pads for boat hulls away from the bulkhead and adding filters to capture paint chips.
- Pollution prevention is a major priority for boatyards and shipyards. Support improved practices at boatyards and shipyards by recognizing significant efforts through an annual Better Bay Award program.
- A field demonstration/pilot project of promising nontoxic coatings on ships and boats in San Diego Bay should be promoted to help evaluate the coating's effectiveness in terms of durability, bonding and repellency of fouling organisms under local conditions.

Surface Water Use

The various surface uses of the Bay by watercraft need to be properly balanced with conservation priorities for water- and shorebirds.

- The Plan advocates seasonal restrictions for watercraft in priority bird-use areas. Practical steps, such as watercraft speed reduction, noise and light reduction or shielding, and avoidance of bird assemblages and habitat disturbance should be taken to protect sensitive bird populations.
- SDUPD's Boater's Guide should be expanded to include avoidance of surface bird use, as well as eelgrass, green sea turtle areas, and marshes.
- Any effects of lighting and other disturbance should be minimized by establishing setbacks for new construction and other strategies near important nesting and roosting sites. The CCC should increase its setback requirements near marshes.

Ecotourism

- The potential for ecotourism development related to birdwatching should be pursued, and use of public lands for this purpose encouraged in a manner consistent with maintaining local resource values.

Water and Sediment Quality Management

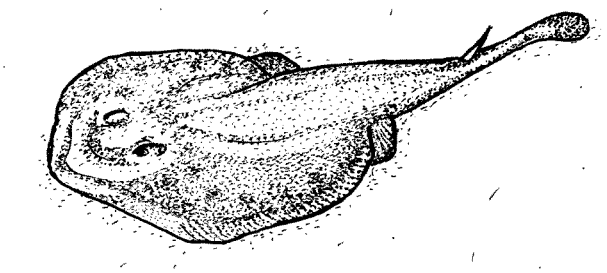
This Plan seeks to reduce and minimize harmful stormwater pollutants from entering the Bay from watershed users.

- The San Diego Bay Watershed Task Force should be encouraged to develop a pilot program aimed at solving contamination of the Bay from runoff. The existing Municipal Stormwater Education Committee should be a core group of the Task Force. The Task Force should develop watershed problem and need assessments, as well as identify and implement BMPs.
- Baseline contaminant levels in selected San Diego Bay seafood species should be established, so that changes over time can be detected in support of protecting the public from health risks associated with consuming seafood.
- Fish and wildlife should be monitored for and protected from contaminants.

Cumulative Effects

The format by which cumulative effects are discussed in environmental documentation should be standardized so that they can be better evaluated, avoided, and minimized.

- A format is proposed in this Plan. It includes standardized and multiple scales of analysis, and an information clearinghouse on local extirpations or declines of species at risk. Project areas should be properly identified and bounded such that all other projects that overlap in time and space with a project area boundary are considered. The target management species identified in this Plan should be used to help focus the analysis of potential impacts.



Environmental Education

Education of the public is one of the highest priorities of the Plan, because only an aware public can ensure that the most necessary steps are taken to protect the Bay.

- Development of educational partnerships among nonprofit organizations, government, schools, and businesses that focus on the Bay are encouraged. Workshops, seminars, literature, a web page, interpretive signs, wildlife observation decks and boardwalks are proposed.
- A community-based restoration project should be implemented, using as a model the ongoing success of the Paradise Creek project.
- Long-term funding should be put in place to ensure the continuance of environmental education programs about San Diego Bay. Explore use of a "bed-tax" from visitors' hotel tax as a source of interpretation funds.

The Ecosystem as a Functional Whole

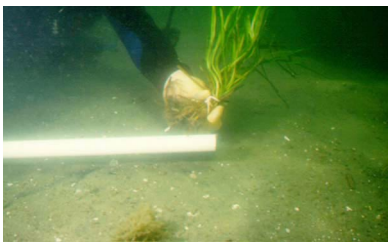
This Plan adopts an ecosystem approach to managing natural resources in two primary ways:

1. Planning, management, monitoring, and research are proposed at several hierarchical scales and time frames that are biologically meaningful, such as whole-Bay, Bay subregion, habitat, and site scales. The Plan also encourages that necessary changes occur beyond its current footprint such as up the watershed, and in conjunction and communication with surrounding systems such as Mission Bay, Tijuana Estuary, Los Penasquitos Lagoon, and others.
2. Ecosystem components are viewed not just as isolated elements, but as interdependent components linked by food web, nutrient cycling, and other processes. For example, the ecological indicators proposed to act as management cues represent both parts of the ecosystem and the processes that link these parts.

Long-term Monitoring

A long-term monitoring program is a key element of the Bay Ecosystem Plan's strategies for better Bay management. The primary objectives of such a program are to detect ecological trends and determine their cause.

- Indicators, or markers, of ecological health are identified for long-term monitoring. They are intended to provide cues for adaptively managing the Bay's natural resources. These include monitoring a core set of elements, such as the physical and chemical characteristics of the water column and sediment, chlorophyll, habitat quantity or quality change, changes in land use both around the Bay and in the upper watershed, and changes in populations such as zooplankton, invertebrates, exotics, algae, vegetation, fishes, birds, and marine mammals.
- A biannual report on the State of San Diego Bay should be produced with the results and synopses of long-term monitoring and ongoing research. It should be presented in a manner useful to managers and the public.
- Target management species should be selected for long-term or periodic monitoring to provide a focus for management activities. Certain species are identified to help focus planning, management, monitoring and research that represent particular habitats, processes, interdependencies or vulnerabilities in the Bay. Examples are juvenile California halibut, light-footed clapper rail, and black brant.
- Both public and private jurisdictions should implement monitoring, including a citizen-based program to help plug gaps in coverage.



- A committee should be established to make decisions on long-term monitoring, priorities, phasing or stepwise implementation of monitoring elements, quality assurance and quality control, and effective dissemination of monitoring results to a broad audience. This committee will not make management recommendations.

Research Program

This plan seeks improved targeting of research to support management objectives and decision-making.

- A means to prioritize research projects is proposed that involves a Priority Problem List and the ranking of management objectives.
- A committee of scientists, managers, landowners and users, and the involved public is needed to prioritize research needs. The purpose of the Research Committee will be to set research priorities in relation to management concerns, decide what management concerns make a Priority Problem List and ranking of issues on the list, assure the quality of research conducted and tie-in to management, and to communicate research results effectively to a broad audience.
- Project-related research and monitoring can enhance learning and experience, such as to better define the area affected by a project and cumulative effects, the strength of dependencies among habitats and organisms (productivity, physical material transport, tidal circulation, biological linkages such as migration and feeding dependencies, etc.).

- Standardized and cost-effective protocols should be used to encourage reliable comparisons among projects, and between short- and long-term monitoring programs.
- Experimentation and implementation of alternative shoreline and underwater habitat structures that are more beneficial to the environment should be facilitated. If shown to be environmentally safe, durable, strong and cost-effective, a replacement program for all chemically-treated wood pilings with plastics within the Bay should be promoted. A high priority for experimental use of plastic pilings may be areas designated as Polynuclear Aromatic Hydrocarbons (PAHs) "hot spots."

Information Sharing

To improve the effective and efficient allocation of resources, information on the Bay should be well-organized and accessible.

- A central clearinghouse should be set up for data, reports and publications on the Bay's natural resources that is accessible to a broad range of users, both technical and nontechnical. The criteria for selection of an institution for managing a data clearinghouse should include: longevity, objectivity, ability to work with the public, and cost-benefit.
- Events are needed to promote data sharing, technology transfer, and communication for a broad range of involved parties, including a newsletter to report on progress in implementing this Plan and other Bay activities, biannual reporting on the "State of San Diego Bay," workshops and conferences, and cross-disciplinary field programs.

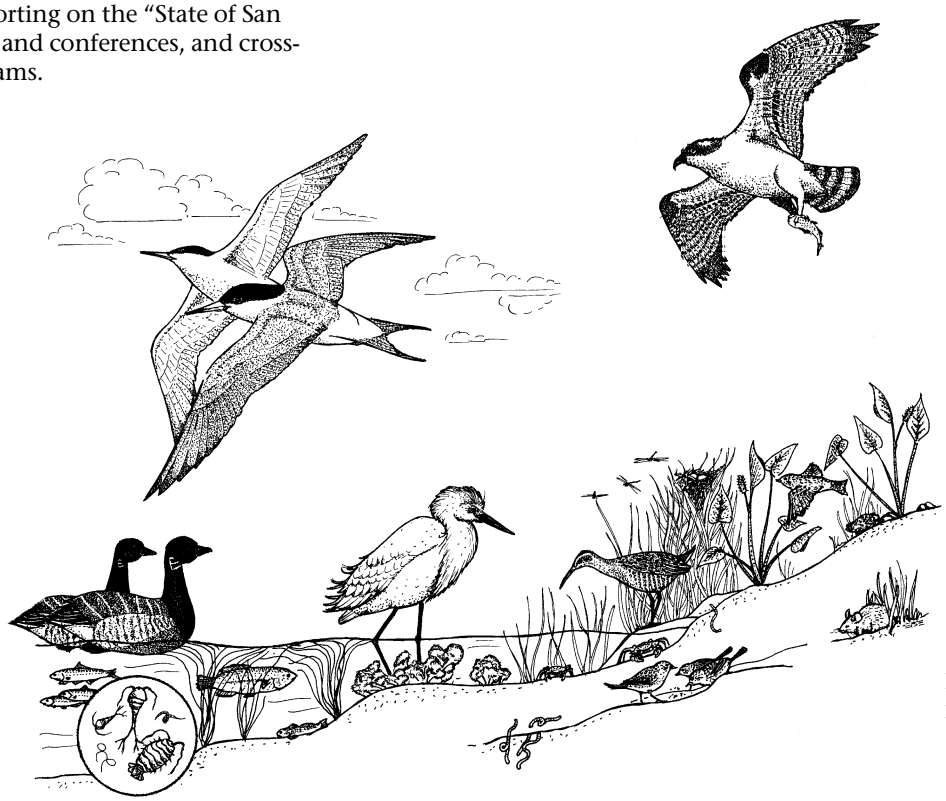
Planning and Coordinating Projects and Activities

By virtue of its comprehensive, interagency, and interdisciplinary approach, this Plan accomplishes one of its primary purposes--to be an effective tool for project planners and Bay managers.

Tools for Accomplishing the Plan's Goal and Objectives

It is the desire of everyone who worked long and hard on this Plan that it be successful.

- A new Stakeholders' Committee and Focus Subcommittees to lead Plan implementation are proposed.
- A first-year program of implementable items to kick off Plan implementation are presented in Chapter 7.
- A number of new cooperative agreements, task forces, committees, endowment funds, and joint memoranda are proposed, with roles for agency, public, private, and nonprofit organizations.



Part I: Introduction