This document contains overall and specific condition of the Santa Monica Bay Restoration Commission from the National Estuary Program Coastal Condition Report. The entire report can be downloaded from ***http://www.epa.gov/owow/oceans/nepccr/index.html***

National Estuary Program Coastal Condition Report

Chapter 6: West Coast National Estuary Program Coastal Condition, Santa Monica Bay Restoration Commission

June 2007

Santa Monica Bay Restoration Commission

Santa Monica Bay Restoration Commission

www.santamonicabay.org

Background

Santa Monica Bay is a 306-mi^2 estuary located west of Los Angeles on the Pacific Coast of California and bordered on the north by the Santa Monica mountains. The Bay reaches depths of up to 1,640 feet and has a total volume of about 6.8 trillion gallons. The Santa Monica Bay watershed encompasses more than 400 mi^2 and includes a large number of highly populated communities, including Beverly Hills, Calabasas, Culver City, El Segundo, Malibu, Redondo Beach, Santa Monica, West Hollywood, and part of Los Angeles. More than 3 million people live within the watershed, and between 50 to 60 million visits are made to Santa Monica Bay each year. The Bay receives freshwater inputs from 28 stream drainage basins, with the largest flows coming from Malibu Creek and Ballona Creek (Martin et al., 1996).

The Santa Monica region features a range of habitat types, including coastal scrub, wetland and rocky intertidal zones, kelp beds, open water, and both hard- and soft-bottom areas (Martin et al., 1996). The Bay serves as home to more than 5,000 species of birds, fish, mammals, plants, and other wildlife. The Bay's 50 miles of coastline provide recreational opportunities for an

estimated 500,000 visitors a day at the height of the summer season (ANEP, 2001d). Sport fisheries are a booming industry, and the Bay is home to chub mackerel, barred sand bass, kelp bass, and California spiny lobster, among other species (Martin et al., 1996). Human development has replaced more than 95% of the Bay's historic coastal wetlands and degraded the remaining 5%, putting some species in danger of local extinction (ANEP, 2001d). Only a few thousand acres of wetlands (e.g., riparian zones, lakes, ponds, coastal marshes, and lagoons) remain in the watershed (Martin et al., 1996).

The State of California and EPA established the Santa Monica Bay Restoration Project (SMBRP) as an NEP in December 1988. The project was formed to develop a plan that would ensure the long-term health of the Bay and its watershed. In January 2003, the SMBRP formally became an independent state organization and is now known as the Santa Monica Bay Restoration Commission (SMBRC) (SMBRC, 2006).

Environmental Concerns

Research suggests that there are 19 pollutants of immediate concern in Santa Monica Bay (SMBRC, 2006). Sources and pathways of contaminants include industrial discharges, urban runoff into creeks and storm drains, municipal WWTPs, boating and shipping activities, dredging, and advection of pollutants from other areas (Martin et al., 1996). About 645 million gallons of treated wastewater are discharged to Santa Monica Bay each day via 7 major point-source facilities and more than 160 permitted smaller commercial and industrial facilities (Martin et al., 1996; SMBRC, 2006). Urban and stormwater runoff carried through the region's massive storm drain systems and few remaining streams is a serious year-round concern. Each year, an average of 30 billion gallons of storm water and urban runoff are discharged through more than 200 outlets into Santa Monica Bay (Martin et al., 1996).

Population Pressures

The population of the 4 NOAA-designated coastal counties (Los Angeles, Orange, San Bernardino, and Ventura) coincident with the SMBRC study area increased by 99.2% during a 40-year period, from 7.4 million people in 1960 to 14.8 million people in 2000 (Figure 6-48) (U.S. Census Bureau 1991; 2000). This rate of population growth for the SMBRC study area was slightly less than the average growth rate of 100.3% observed for the collective NEP-coincident coastal counties of the West Coast region; however, the SMBRC-coincident coastal counties had the second-highest population density in 2000 with 553 persons/mi^2 (U.S. Census Bureau, 2001). This estuary is surrounded by a large, sprawling metropolitan area and is a major recreational area for the local coastal community.

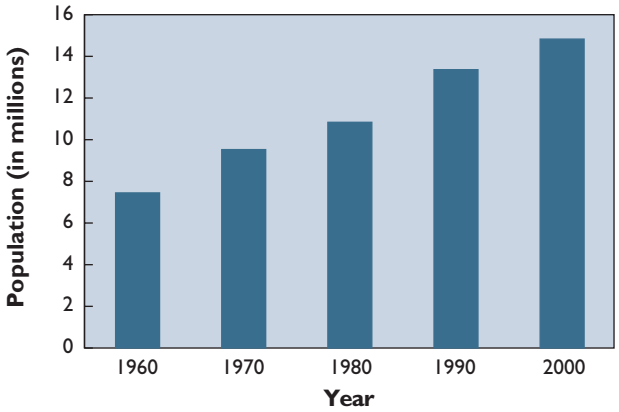

Figure 6-48. Population of NOAA-designated coastal counties of the SMBRC study area, 1960–2000 (U.S. Census Bureau, 1991; 2001).

NCA Indices of Estuarine Condition—Santa Monica Bay

The overall condition of Santa Monica Bay is rated fair based on three of the indices of estuarine condition used by the NCA (Figure 6-49). The water quality index is rated good, and the sediment quality and fish tissue contaminants indices are rated poor. Although data on the condition of the benthic community were collected for this estuary, Santa Monica Bay could not be rated using an index based on deviations from the expected species richness. Figure 6-50 provides a summary of the percentage of estuarine area rated good, fair, poor, or missing for each parameter considered. This assessment is based on data collected by the Moss Landing Marine Laboratories, under contract to the SCWRRP, from 47 sites sampled the SMBRC estuarine area in 2003. Please refer to Tables 1-24, 1-25, and 1-26 (Chapter 1) for a summary of the criteria used to develop the rating for each index and component indicator.

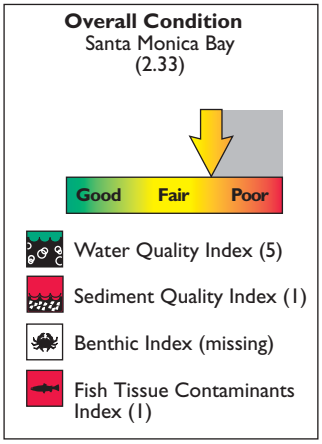

Figure 6-49. The overall condition of the SMBRC estuarine area is fair (U.S. EPA/NCA).

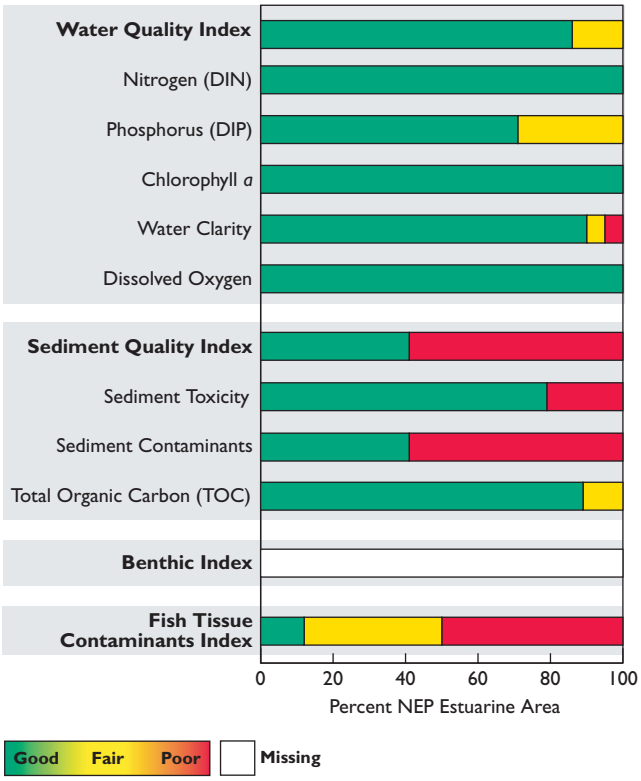

Figure 6-50. Percentage of NEP estuarine area achieving each ranking for all indices and component indicators — Santa Monica Bay (U.S. EPA/NCA).

Water Quality Index

Based on NCA survey results, the water quality index for Santa Monica Bay is rated good. This index was developed using NCA data on five component indicators: DIN, DIP, chlorophyll *a*, water clarity, and dissolved oxygen. Fourteen percent of the estuarine area was rated fair for water quality, and 86% of the area was rated good (Figure 6-51).

Dissolved Nitrogen and Phosphorus | DIN

and DIP concentrations in Santa Monica Bay are rated good. All of the estuarine area was rated good for DIN concentrations, whereas 29% of the area was rated fair for DIP concentrations. In addition to natural inputs of nutrients from offshore coastal upwelling, high levels of urban and agricultural runoff may also be major contributors to the nutrient levels found in Santa Monica Bay.

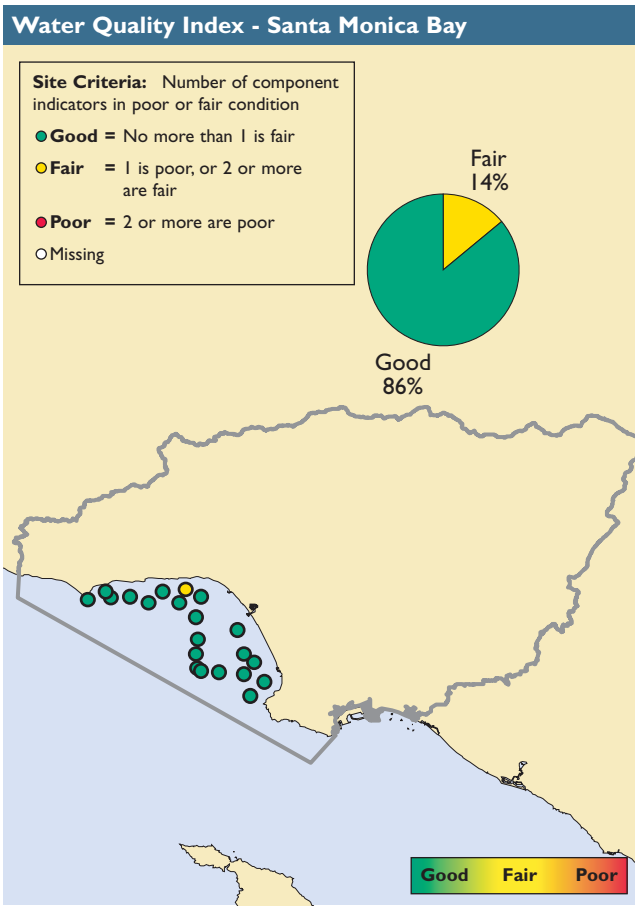

Figure 6-51. Water quality index data for Santa Monica Bay, 2003 (U.S. EPA/NCA).

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Chlorophyll a | Chlorophyll *a* concentrations in Santa Monica Bay are rated good, with 100% of the estuarine area rated good for this component indicator.

Water Clarity | Water clarity in Santa Monica Bay is rated good. Approximately 5% of the estuarine area was rated poor for this component indicator, and 5% of the area was rated fair.

Dissolved Oxygen | Dissolved oxygen conditions in Santa Monica Bay are rated good, with 100% of the estuarine area rated good for this component indicator. It should be noted that these measured values reflect daytime dissolved oxygen conditions, and some areas of the Bay may still experience hypoxic conditions at night.

Sediment Quality Index

The sediment quality index for Santa Monica Bay is rated poor. This index was developed using NCA data on three component indicators: sediment toxicity, sediment contaminants, and sediment TOC. Fifty-nine percent of the estuarine area exceeded thresholds for at least one of these component indicators and was rated poor, and 41% of the estuarine area was rated good (Figure 6-52).

Plover (Brad Ashbaugh).

Sediment Toxicity | Sediment toxicity for Santa Monica Bay is rated poor, with 21% of the estuarine area rated poor for this component indicator.

Sediment Contaminants | Santa Monica Bay is rated poor for sediment contaminant concentrations, with 59% of the estuarine area rated poor for this component indicator.

Total Organic Carbon | Sediment TOC for Santa Monica Bay is rated good, with 89% of the estuarine area rated good for this component indicator.

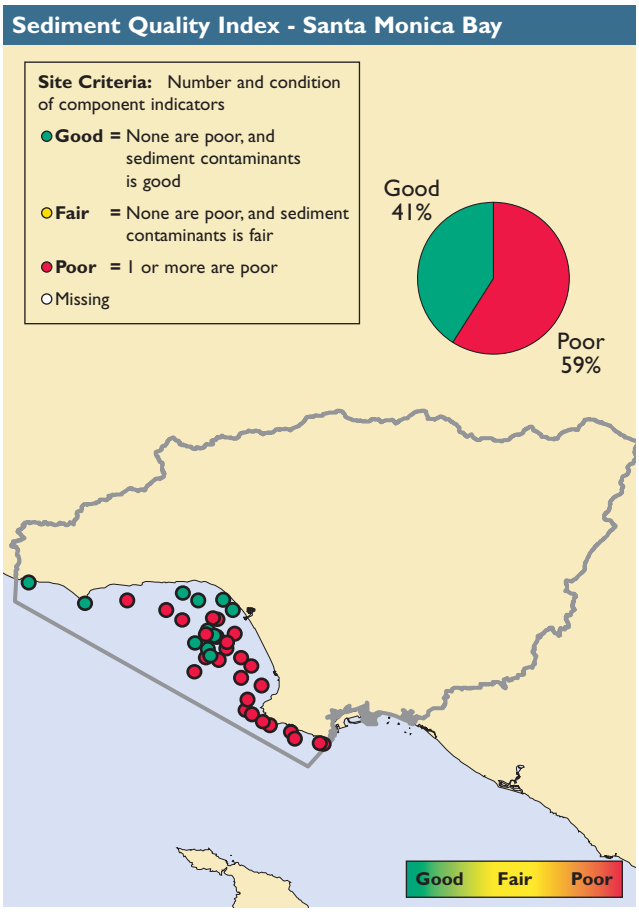

Figure 6-52. Sediment quality index data for Santa Monica Bay, 2003 (U.S. EPA/NCA).

Benthic Index

Presently, the condition of the benthic invertebrate communities in Santa Monica Bay can not be rated using an index based on deviations from the expected species richness because this approach requires a significant regression between salinity and the log of species richness. This relationship was not significant in the Santa Monica Bay data collected during the 2003 NCA survey.

Fish Tissue Contaminants Index

The fish tissue contaminants index for Santa Monica Bay is rated poor because 50% of the stations where fish were caught were rated poor (Figure 6-53). However, this rating should be interpreted cautiously because of the small number of Bay stations (8) where fish tissues were collected.

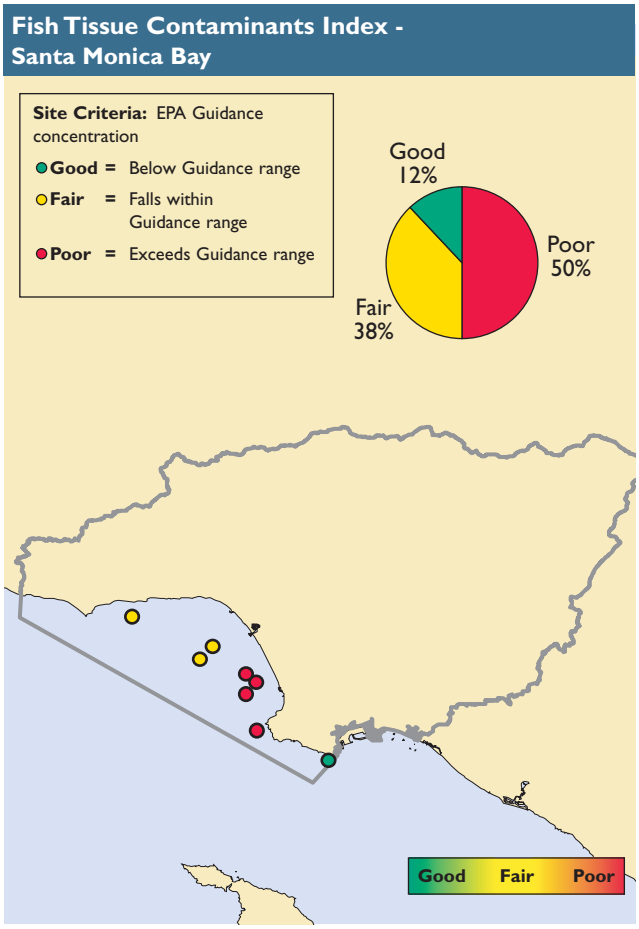

Figure 6-53. Fish tissue contaminants index data for Santa Monica Bay, 2003 (U.S. EPA/NCA).

Santa Monica Bay Restoration Commission Indicators of Estuarine Condition

The SMBRC is using or developing several indicators to evaluate water and sediment quality, habitat conditions, and stressors for the SMBRC estuarine area. Indicators are typically ranked with regard to availability of data for reporting on the state of the Bay; some of the indicators of higher quality are described below.

Water and Sediment Quality

Indicators used by the SMBRC for water and sediment quality include the following:

- Concentrations of five heavy metals: cadmium, copper, lead, silver, and zinc
- Concentrations of fecal and total coliform bacteria and *Enterococci* (pathogen indicators)
- Beach Report Card grades (summer and winter) based on measurement of bacterial indicators
- Number and effectiveness of pathogen-reduction projects along the Bay's beaches (SMBRC, 2004).

Since the early 1970s, the loading of seven heavy metals from the two largest WWTPs has decreased by 67% to 99%, and the loading of total suspended solids has decreased by more than 80%. As a result, impaired estuary bottom habitats near discharge outfalls have shown signs of recovery (SMBRC, 2006).

Monitoring of bacterial indicators on beaches is usually conducted on a daily basis (Heal the Bay, 2004). In general, the number of days per year during which at least one beach is closed due to sewage spills has greatly decreased (ANEP, 2001d). The environmental group Heal the Bay compiles grades for a Beach Report Card system based on bacterial indicator measurements. The 2003–2004 Annual Beach Report Card (Heal the Bay, 2004) shows that most beaches had very good water quality, with 268 of 373 (72%) locations receiving A grades for the year during dry weather. In addition, other grade ratings included 44 B grades (12%), 27 C grades (7%), 15 D grades (4%), and 19 F grades (5%). The monitored beach with the poorest dry weather water quality during 2003 and 2004 was Surfrider Beach (Heal the Bay, 2004).

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HIGHLIGHT

Santa Monica Bay Stormwater Projects

The SMBRC is taking many different approaches to address the issue of pollutants found in stormwater runoff (see table). Since 1992, the SMBRC has secured more than $30 million in state and local bond funding for more than 30 pollution-control projects, including dry-weather runoff diversions from storm drain outlets along Santa Monica Bay beaches, a state-of-the-art urban runoff treatment and reclamation facility in Santa Monica, and many devices to capture trash, oil, grease, and sediments in storm drains throughout the watershed (SMBRC, 2006).

Many of the SMBRC projects funded to date have been in the Ballona Creek watershed. Before its extensive settlement and urbanization, Ballona Creek was a meandering perennial stream that was lined with dense vegetation and met the Pacific Ocean in a broad expanse of tidal lagoons, salt marshes, and wetlands. Today, Ballona Creek is a nine-mile long flood-protection channel that drains the Los Angeles basin, including all or parts Beverly Hills, Culver City, Inglewood, Los Angeles, Santa Monica, West Hollywood, and unincorporated Los Angeles County. To address impairments to waterbodies in the Ballona Creek watershed, the SMBRC, in partnership with the Los Angeles County Department of Public Works, the City of Los Angeles, and the Ballona Creek Renaissance, led the efforts of the Ballona Creek Task Force and developed a comprehensive watershed management plan for Ballona Creek. This work is essential towards efforts to restore the water quality and ecology of Santa Monica Bay and its watershed (SMBRC, 2006).

Examples of Approaches to Managing Stormwater Runoff

- Structural BMPs, such as dry-weather runoff diversion, installation of in-stream trash capture devices and catchbasin retrofits, and installation of filtration devices along roadways or in parking lots
- Public education and outreach
- Elimination of illicit connections and illegal discharges to the storm drains via enhanced storm drain inspections and improved ordinances
- Non-structural BMPs, such as catchbasin stenciling, enhanced catchbasin/trash can cleanings, and street sweeping
- New land-use practices to increase on-site stormwater infiltration and reduce erosion
- Promotion and enforced implementation of BMPs at industrial facilities and construction sites (SMBRC, 2006).

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Recent Stormwater Pollution-Prevention Projects (SMBRC, 2006)

Project	Jurisdiction	Cost	Treatment Device(s)	Purpose
Ballona Creek Litter Collection Project	County of Los Angeles	$600,000	200 catchbasin debris-excluder devices and several vortex separation systems	Capture, analyze, and characterize trash from eight different land-use types
Ballona Creek Water Quality Improvement Project	City of Culver City	$168,500	Continuous deflective separation (CDS) device	Reduce total suspended solids, hydrocarbons, oil, grease, and trash
Pollutant Removal Devices in Storm Drain System	City of Los Angeles	$1,336,000	Urban stormwater devices in Ballona Creek watershed. Trash collection devices will be installed at four locations in south central Los Angeles and a gravity system will be installed in an industrial land-use area of Manchester	Remove sediment, metals, oil, and grease
Pollutant Removal Devices in Storm Drain System	City of Santa Monica	$500,000	Two-stage filter system to remove pollutants from a catchment discharging to Ballona Creek	Remove gross solids and floatables (Stage 1) and additional trash, sediment, and soluble compounds (Stage 2)
Pollutant Removal Devices in Storm Drain System	City of Manhattan Beach	$215,000	CDS devices	Reduce total suspended solids, hydrocarbons, oil, grease, and trash
Catchbasin Debris Excluder Devices	City of West Hollywood	$30,000	20 catchbasin debris-excluder devices	Reduce the amount of litter and debris

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Habitat Quality

A variety of indicator measures are being evaluated by the SMBRC to help monitor the range and condition of habitats that exist in this estuary system. Examples of the indicator measures being considered for habitat loss or change over time are the following:

- Acres of wetlands gained or lost and the number of acres of riparian habitat (e.g., wetlands and open habitat areas)
- Size of kelp canopy and abundance of kelp beds along the Palos Verdes Shelf and Malibu coast
- Concentration of metals in Bay sediments and condition of benthic community (benthic habitat) (SMBRC, 2004).

Measurements of the size and abundance of kelp beds in this estuary system are considered to be good indicators for evaluating this important habitat and resource. From the mid-1970s to 1997, improved wastewater treatment processes resulted in an 80% reduction in discharge of total suspended solids from the White Point outfall. This reduction, along with kelp replanting efforts in the 1970s, resulted in a remarkable increase in kelp canopy, from a low of 5 acres in 1974 to a peak of more than 1,100 acres in 1989 (SMBRC, 2006).

Concentrations of heavy metals (e.g., lead, copper, zinc, mercury) in Bay sediments are considered an important indicator for evaluating the condition of benthic habitats. The City of Los Angeles' Environmental Monitoring Division has data from 1974–2003 and has indicated that soft-bottom habitats have been one of the most highly impacted habitats in this estuary, primarily due to discharges from STPs. The Marina Del Rey Harbor, the Palos Verdes Shelf, and the Ballona Creek Entrance Channel have typically been some of the hot spots for concentrations of DDT, PCBs, copper, zinc, or other contaminants in sediment (SMBRC, 2006).

Living Resources

One of the key indicators used by the SMBRC for evaluating living resources is the CPUE of select resident species in Santa Monica Bay. Species that can serve as indicators include rockfish, surf perches, kelp bass, sand bass, sheepshead, and halibut. Species that could be potential indicators, but for which no current data exist, include red sea urchins and spiny lobsters (SMBRC, 2006).

Changes in the abundance of target species (e.g., rockfish, sea stars, mussels) and in species diversity within intertidal zones are considered two good quality indicators, but adequate data are not yet available. The

The SMBRC evaluates the size and abundance of kelp beds in Santa Monica Bay (NOAA).

condition of runs for the amazing grunion fish population is also an indicator being considered (SMBRC, 2004). Evidence suggests that many rockfish species have been experiencing significant population declines due to overfishing along the West Coast, including species in Santa Monica Bay. According to federal assessments, bocaccio (one type of rockfish) has declined to about 5% of its historic abundance (SMBRC, 2006). Another source of concern is the rapid decline of black abalone, a rocky intertidal species. Although the cause of the decline of this species is not completely understood, researchers have speculated that a combination of over-harvesting, predation, competition, environmental changes, and disease may be responsible (SMBRC, 2006).

One of the major environmental concerns facing the SMBRC is improving the status of threatened and endangered species in Santa Monica Bay, while minimizing and/or eliminating the varied effects of invasive species. The measurement of the number of acres of invasive plant species and the number of invasive predators are indicators under development to assess the threats to the ecosystems and living resources in Santa Monica Bay. Invasive plants and animals (e.g., the giant reed, castor bean, wild tree tobacco, crayfish, bullfrog, mosquito fish, and largemouth bass) have decreased the biological diversity of native ecosystems by outcompeting or displacing native species. They also reduce habitat availability and water quality for native species in Santa Monica Bay (SMBRC, 2006).

Data on levels of DDT and PCBs in white croaker and kelp bass tissue are reported by the Los Angeles County Sanitation Districts, EPA, and the Montrose Settlements Restoration Program. These indicators are considered to be the most useful for evaluating health risks associated with seafood consumption (SMBRC, 2004). Average concentrations of DDT and PCBs in most seafood species have fallen to near or below levels of concern for human consumption, but remain high in white croaker collected on the Palos Verdes shelf (ANEP, 2001d; U.S. EPA, 2006e). Fish consumption advisories have been posted in the Bay area since 1985 (U.S. EPA, 2005a).

Environmental Stressors

Information collected on the amount of trash in Bay waterways shows that more than 4,000 tons of trash are collected from Santa Monica Bay beaches each year (Martin et al., 1996). Additionally, a 1994 survey found that 25% of bottom sediments sampled in Santa Monica Bay contained man-made materials of some kind (SMBRC, 2006).

Pelicans following a fishing boat into the harbor (William B. Folsom, NMFS).

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Current Projects, Accomplishments, and Future Goals

Some of the environmental accomplishments and restoration efforts in the Santa Monica Bay area include the following:

- Development of a comprehensive Bay-wide monitoring program and funding for an in-depth study to assess the loading of toxic air pollutants to the watershed (ANEP, 2001d).
- Completion of upgrades to full secondary treatment by the Los Angeles Hyperion Wastewater Treatment Plant and Wastewater Pollution Control Plant operated by the Los Angeles County Sanitation District, which greatly reduces the amount of direct waste discharge to the Bay.
- Approval of a Santa Monica ordinance to reduce the amount of urban runoff pollution that reaches Santa Monica Bay, requiring a 0.75" reduction in rainfall leaving impermeable surfaces of newly developed parcels in the city (City of Santa Monica, 2006).
- An EPA-conducted pilot program to cap contaminated sediments with clean sediment in DDT/PCB-contaminated areas of the Palos Verdes shelf.
- Provision of more than $450,000 by the SMBRC to community groups, local governments, and schools to educate and inspire people of all ages to take care of Santa Monica Bay (ANEP, 2001d).
- Acquisition by the State of California of 483 acres of the Ballona wetlands, the largest remaining coastal wetland in the Santa Monica Bay ecosystem (The Trust for Public Land, 2003).
- Restoration of the Zuma Lagoon and wetland, the first coastal freshwater wetland project in the area (ANEP, 2001).

Conclusion

Santa Monica Bay faces a series of environmental challenges. Sediment quality in the Bay is still threatened by levels of DDT, PCBs, copper, and zinc. Most recreational beaches in the estuary have very good water quality, as evidenced by the local Beach Report Card system, but the amount of trash and debris entering the Bay is still a significant concern. The monitoring of certain target species of fish and wildlife (e.g., rockfish, black abalone) and other threatened resources in this estuary is important to control population declines. In addition, invasive species still have an impact on the natural plant and animal populations in the watershed because they crowd out native biota and damage functioning ecosystems. Habitat conditions in the Santa Monica Bay estuary are being continually monitored by the SMBRC and its partners to prevent declines in the size and quality of wetlands, riparian habitat, kelp beds, and intertidal habitats. In addition, the SMBRC is faced with educating Los Angeles' diverse audiences about the importance of pollution prevention and environmental restoration, as well as implementing a comprehensive monitoring program to more effectively assess the condition across the Bay. Based on data from the NCA estuarine survey, the overall condition of Santa Monica Bay is rated fair.

Seagulls rest on a sand bar (John H. McShane).