

MORRO BAY:

WORKING TOGETHER FOR A HEALTHY ECOSYSTEM



The natural beauty of Morro Bay on a summer evening is enjoyed by a lone kayaker.



Morro Bay is located on the central coast of California, USA.



The kelp forests of Estero Bay provide refuge for many species.



Morro Rock marks the entrance to the estuary of Morro Bay.

Many people and organizations are working together to ensure the Morro Bay ecosystem remains healthy. This newsletter describes the three major groups' activities, and provides a conceptual overview of the key features of this ecosystem.



The San Luis Obispo Science and Ecosystem Alliance (SLOSEA) strives to build an integrated group of scientists, stakeholders, and managers in the Morro Bay Ecosystem, which includes the watershed, estuary, harbor, and coastal ocean. The program's primary goal is to develop and share high-quality information to improve understanding of the ecosystem, and to employ this knowledge to facilitate conservation, restoration, and sustainable use of the ecosystem.

The SLOSEA program builds on the watershed-based work of the Morro Bay National Estuary Program and the coastal ocean efforts of the Marine Interest Group of San Luis Obispo to conduct focused scientific research and to develop increased institutional linkages between and among academic scientists, resource management agencies, and stakeholders.



The Morro Bay National Estuary Program (MBNEP) is a collaborative organization that brings local citizens, government agencies and landowners together to protect and restore the physical, biological, economic, and recreational resources of the Morro Bay estuary and watershed. The MBNEP's work is guided by the state and federally approved Conservation and Management Plan for Morro Bay. MBNEP programs include restoring and protecting water quality and habitat, community outreach and education, and environmental monitoring.



The mission of the Marine Interest Group of San Luis Obispo (MIG) is to protect and enhance the marine resources of San Luis Obispo County.

The group is composed of elected officials, business people, conservationists, fishermen, scientists, and local residents. The MIG has been instrumental in developing and supporting collaborative (constituent-based) research examining the status of nearshore fish and bird populations in the Morro Bay Ecosystem.



Commercial and recreational boats use the safe harbor of Morro Bay.

THE MORRO BAY ECOSYSTEM

ESTERO BAY

Estero Bay is an ecologically rich and diverse region stretching along California's central coast. The broad Bay is edged by sandy beaches and rocky intertidal zones 4-6ft, both strongly influenced by high wave energy and wind. Productivity is enhanced by coastal upwelling and marine life abounds, including in the Bay's sandy bottom communities and kelp forests.

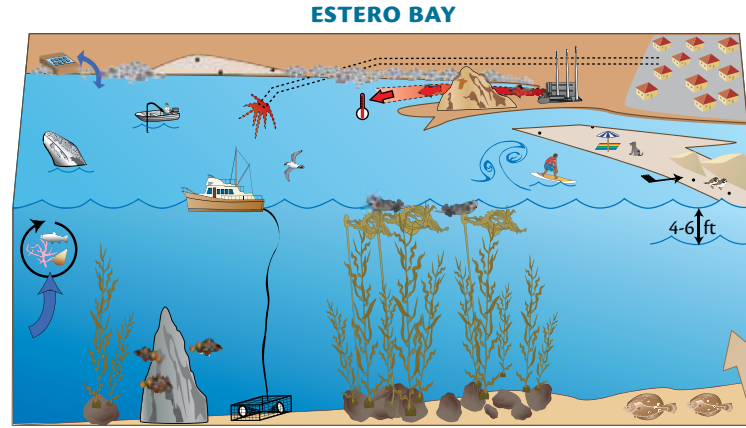
Estero Bay is surrounded by low bluffs, coastal terraces, and sand dunes, and it is the endpoint for several perennial

and intermittent streams. The Bay and surrounding beaches provide habitat for a number of endangered species, including the California sea otter and the western snowy plover.

The productive waters and rocky underwater banks and seamounts draw commercial and recreational fishing to the region. Much of the nation's supply of commercial abalone is produced at an Estero Bay farm. Recreational boating and surfing are popular, while Morro Strand on Estero Bay is one of San Luis Obispo County's favorite beaches. The town of Cayucos and a portion of the city of Morro Bay, with their power plant and sewage outflows, are also located on the shores of Estero Bay.



Rock crabs taken from Estero Bay.

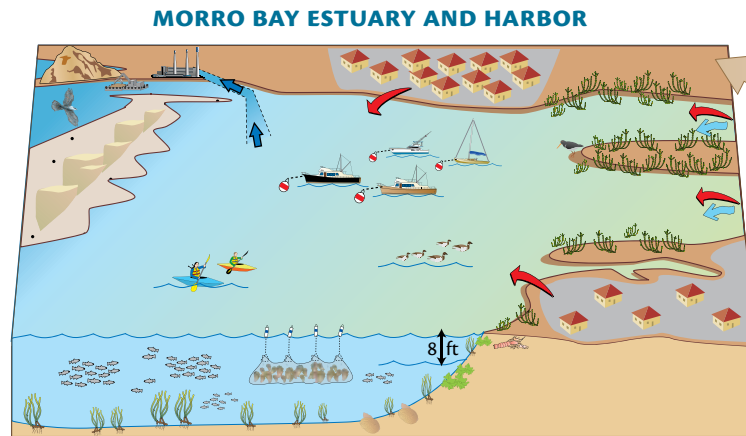


MORRO BAY ESTUARY AND HARBOR

Morro Bay is a small estuary and harbor of 2,300 acres which flows into the Pacific Ocean near the easternmost extent of Estero Bay. Morro Bay receives freshwater input from the perennial Los Osos and Chorro Creeks as well as from groundwater seeps. Much of the Bay is extremely shallow and the entire bay is influenced by tidal flushing. On its western edge, Morro Bay is protected from the ocean by large sand dunes. The mouth of the Bay is engineered and dredged. Adjacent to the mouth is picturesque Morro Rock, a 700-foot high volcanic neck that serves as a nesting site for numerous bird species including the endangered peregrine falcon.

Morro Bay is a pathway for many migratory species (e.g., brant geese and steelhead trout) and as a permanent home for a variety of fish, birds, mammals, invertebrates, and plants, including 16 federally threatened or endangered species, six of which are endemic to the area. Within the Bay, there are vast mud flats which support a tremendous diversity of life not found on the open coast. The estuary has extensive seagrass communities and one of the largest remaining salt marsh environments on the central coast of California. The presence of macroalgae (*Ulva*) indicates high nutrient input. Morro Bay is an active site for oyster aquaculture.

The community of Los Osos and a portion of the city of Morro Bay line the shores of the estuary and harbor. The Morro Bay power plant uses Bay water for cooling. The area is a popular outdoor recreation and tourism destination. Both local and transient commercial fishing fleets find protection in the harbor, as do many recreational boats. As a result, derelict boats are common.



The Forster Tern is a top predator in Morro Bay.

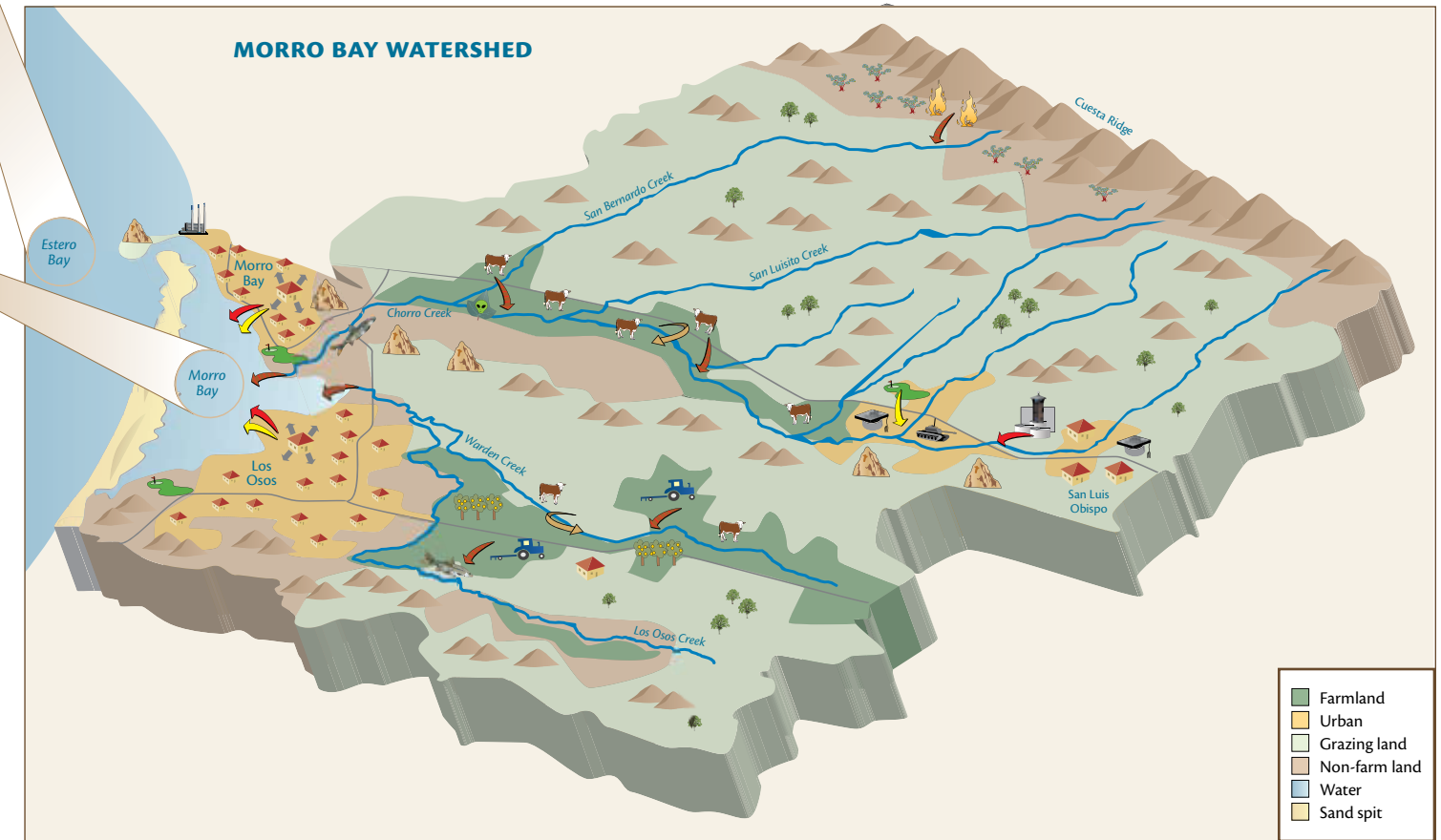


THE MORRO BAY WATERSHED

The Morro Bay watershed delivers water to one of the most significant wetland systems on California's central coast. The area is recognized as a globally significant hotspot for terrestrial biodiversity. The watershed is 48,000 acres, consisting of two primary tributaries—Chorro and Los Osos Creeks. Both creeks deliver nutrients and sediments to the estuary, as well as fertilizers and pesticides. Storm water runoff and septic systems from Los Osos also deposit toxicants and nutrients.

The watershed consists of riparian corridors, coastal chaparral, oak grasslands, agriculture lands, and relatively limited urbanization. Agricultural practices include both crop farming and cattle grazing which can cause erosion, thereby impacting water quality and endangered steelhead trout habitat. Some areas of the watershed are affected by invasive species.

The community of Los Osos and much of the city of Morro Bay are within the watershed boundaries. Cuesta College, Camp San Luis, California Men's Colony, and portions of Cal Poly State University are all located adjacent to Chorro Creek tributaries. A variety of wildlife occurs within the watershed including mountain lions and the endangered California condor.



The estuary's wetlands and seagrass beds provide nursery habitat and food sources for fish.



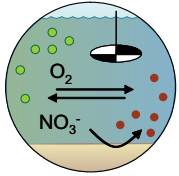
The 75 sq. mile watershed of Morro Bay has many crop and cattle farms.



Severely accelerated erosion and sedimentation are quickly filling Morro Bay.

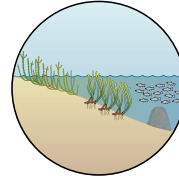
SLOSEA is working closely with the Morro Bay National Estuary Program and the Marine Interests Group to accomplish research and monitoring in six broad initiative areas. The initiatives were developed during a several-month planning process, which included resource managers, stakeholders, and academic scientists. Our overarching goal is develop a better understanding of the ecological dynamics of the Morro Bay Ecosystem to ensure that management decisions sustain a productive and resilient ecosystem and community. The goals for each of the initiatives are detailed below.

WATER QUALITY



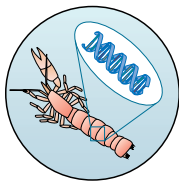
To determine spatial and temporal changes in physical and chemical characteristics of water quality in the Morro Bay Ecosystem. To identify the importance of both natural and anthropogenic sources in causing those changes so as to improve management and policy actions.

HABITAT



To determine the relevant extents, distributions, and characteristics of critical spawning and nursery areas for nearshore fish and invertebrates species in the Morro Bay Ecosystem. Determine the importance of the Morro Bay estuary as a nursery environment for coastal species of fish and invertebrates.

BIOINDICATORS



To develop and utilize representative bioindicators to monitor and track changes in ecosystem health. To determine the dynamics and response of secondary production in the Morro Bay Ecosystem.

HUMAN ACCESS



To determine the effects of human uses on marine biological communities in the Morro Bay estuary and the associated coastal habitats.

ECONOMIC INDICATORS



To determine how ecological health influences the economic wellbeing of people who live near and make a living from the Morro Bay estuary and near-shore ecosystem.

LINKING SCIENCE AND MANAGEMENT



To provide clear and concrete linkages between the science projects and the incorporation of their results into resource management and improved ecosystem health.

FURTHER INFORMATION

San Luis Obispo Science and Ecosystem Alliance (SLOSEA)

Dean Wendt

California Polytechnic State University

San Luis Obispo, CA 93407

Tel. 805.756.6068

Fax. 805.756.7314

info@slosea.org

www.slosea.org

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The SLOSEA Advisory Committee includes representatives from the following agencies and stakeholder groups:

Bay Foundation
California Coastal Commission
California Coastal Conservancy
California Department of Fish & Game
California State Parks
City of Morro Bay
Coastal San Luis Resource Conservation District
Los Osos Community Advisory Council
Marine Interests Group of San Luis Obispo County

Monterey Bay National Marine Sanctuary
Morro Bay Harbor District
Morro Bay National Estuary Program
NOAA Fisheries
Port San Luis Harbor District
Recreational Fishing
Regional Water Quality Control Board
San Luis Obispo County Planning
U.S. Fish & Wildlife Service



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Photographs courtesy of: Don Maruska, Lindi Merrick, Carlos Mireles, Mark Moline, Morro Bay National Estuary Program, John Penvenne, Dean Wendt, the Integration & Application Network, and VisitUSA.com.

The *Integration and Application Network (IAN)* is a collection of scientists interested in **solving**, not just **studying** environmental problems. The intent of IAN is to **inspire, manage and produce** timely syntheses and assessments on key environmental issues, with a special emphasis on Chesapeake Bay and its watershed. IAN is an initiative of the faculty of the University of Maryland Center for Environmental Science, but will link with other academic institutions, various resource management agencies and non-governmental organizations.



PREPARED BY

Integration & Application Network (IAN)
Bill Dennison
Graphics, design, and layout by Jane Hawkey, Jane Thomas, and Tim Carruthers
ian@umces.edu

www.ian.umces.edu