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

Morro Rock marks the entrance to the estuary of Morro Bay. The kelp forests of Estero Bay provide refuge for many species.

Support for this project was provided by the David and Lucille Packard Foundation.
**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, 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.

**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 MORRO BAY ECOSYSTEM**

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 chapparal, 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.
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**SLOSEA**

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**MORRO BAY: WORKING TOGETHER FOR A HEALTHY ECOSYSTEM**

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.

**FURTHER INFORMATION**

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The San Luis Obispo Science and Ecosystem Alliance (SLOSEA) 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.

**SLOSEA INIATIVES AND ACTIVITIES**

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

**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.

**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.

**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.

**ACKNOWLEDGEMENTS**

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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