

Santa Cruz Field Station

Recent attention has been given to the poor health of earth's ocean ecosystems, which face a variety of threats including overfishing, climate change, pollution, emergent diseases, invasive species, and loss of bio-diversity. The sea otter is increasingly recognized as a bellwether for the health of near-shore marine ecosystems of western North America. Sea otters are useful as a sentinel species because they are relatively easy to observe, their sensitivity to many of the same factors that threaten other marine species as well as human health, and their important role as "keystone predators" in these systems. The term keystone reflects the fact that sea otter populations, when abundant, can limit herbivorous species such as urchins and thereby promote more extensive kelp forests (leading to an associated increase in primary productivity and species diversity). However, in parts of the northeast Pacific,



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including California and southwest Alaska, sea otter populations have been reduced to the point that they are not effective in this keystone role; in fact, their numbers are so low that they are considered to be threatened under the Endangered Species Act. Understanding the complex suite of factors that are limiting recovery of sea otter populations is a key component of the research conducted at the Santa Cruz Field Station.

Research on sea otters is mandated by the U.S. Endangered Species Act and the Marine Mammal Protection Act. For California, this research is the responsibility of the USGS Western Ecological Research Center. The research program is headquartered at the Santa Cruz Field Station, whose offices are located at the Center for Ocean Health at the University of California, Santa Cruz. This location provides access to California sea otters for field studies and allows for significant collaboration with university researchers and students. The lead scientist and staff at the Santa Cruz Field Station conduct research on marine and coastal ecosystems, with special emphasis on the threatened southern sea otter in California. Long-term monitoring of sea otter numbers (through range-wide population surveys) and mortality (through beached-carcass collection) is conducted by Santa Cruz Field Station personnel, in collaboration with the California Department of Fish and Game and the Monterey Bay Aquarium. Science expertise includes behavioral ecology, population biology of marine mammals, ecology of marine and coastal ecosystems, wildlife telemetry, and applied statistics.



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The main clients are the U.S. Fish and Wildlife Service, Minerals Management Service, California Department of Fish and Game, California Coastal Conservancy, Monterey Bay Aquarium, Monterey Bay National Marine Sanctuary, other scientists, and various conservation organizations (most notably Defenders of Wildlife). The sea otter program also coordinates closely with the U.S. Marine Mammal Commission.

Current research projects include studying the health and ecology of southern sea otters and their nearshore habitat off central California. Demographic, behavioral, dietary and life history data are collected from these animals using state-of-the-art telemetric methods, and are integrated with information collected by collaborators (data on pollutants, disease pathogens, and invertebrate abundance) to evaluate key risk factors influencing population recovery. Research on sea otter abundance, health, behavior, and habitat status is also conducted in southwest Alaska, in conjunction with collaborators at the USGS Alaska Science Center, Alaska SeaLife Center, and U.S. Fish and Wildlife Service. Furthermore, in a collaborative effort with Alaska SeaLife Center, U.S. Fish and Wildlife Service, Monterey Bay Aquarium, and Russian colleagues, scientists at the Santa Cruz

Field Station are studying a sea otter population at the Commander Islands, Russia. This population is being compared to the rapidly declining sea otter population in the Aleutian Archipelago, to better understand the causes and consequences of this decline.

Lead Scientist

M. Tim Tinker, Ph.D., Research Biologist

- Animal behavior and community ecology
- Population modeling
- GIS and applied statistics

For more information, contact:

USGS WERC Santa Cruz Field Station
Long Marine Laboratory, UCSC

100 Shaffer Road

Santa Cruz, CA 95060

Phone: 831.459.2357 Fax: 831.459.2249

Email: ttinker@usgs.gov

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