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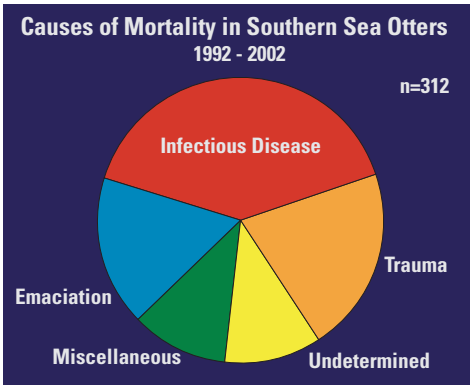
Sea Otter Mortality

High frequency and variety of fatal infectious diseases in southern sea otters may jeopardize recovery of this threatened population.

The southern sea otter, a California coastal species, was listed as threatened by the U.S. Fish and Wildlife Service in 1977. Although this population has increased since the late 1970s, the rate of recovery has been slower than expected and surveys indicate that the population declined substantially between 1995 and 2000. Concern that high mortality was hindering population recovery led to an effort begun in 1992 by the USGS National Wildlife Health Center (NWHC) to document the causes of death in southern sea otters.

Examination of southern sea otter carcasses by NWHC scientists from 1992 through 2002 yielded alarming results. More than 40 percent of the animals died from parasitic, fungal, or bacterial infections, an unusual finding in terms of both frequency and variety for wildlife species. The unexpected pattern of infectious disease lead to speculation that an underlying problem might be making the otters more vulnerable.



Toxicologic analyses for two classes of marine contaminants with immunosuppressive properties (butyltins and organochlorine compounds) were performed by scientists at Michigan State University on tissues from a subset of adult sea otters that had undergone necropsy at NWHC. The tests showed elevated levels of butyltins and geographically localized exposure to polychlorinated biphenyls (PCBs). Otters that died from infectious diseases contained significantly higher concentrations of butyltins. This finding suggests a potential link between marine contaminants and infectious disease.

NWHC's identification of disease and contaminant threats to the southern sea otter population caught the attention of the public, resource managers and other scientists, and was instrumental in obtaining a 5-year Congressional appropriation of research funds to the USGS to study factors in this animal's decline. Although NWHC has shifted activities to monitoring causes of death in the expanding population of sea otters along the Washington coast, we continue to investigate the significance of disease and contaminant findings in sea otters through:

- Collaboration with the USGS-Wisconsin Cooperative Wildlife Research Unit in using necropsy findings to determine the role of infectious diseases and other mortality factors in the southern sea otter population's slow recovery and recent decline;
- Characterization of disease syndromes, identification of new diseases, and comparisons of disease and parasitism between declining and expanding sea otter populations;
- Collaboration in toxicologic analyses of tissues from NWHC-necropsied sea otters to further assess environmental contaminant burdens and potential health effects (funded by the Sanctuary Integrated Monitoring Network, Monterey Bay National Marine Sanctuary);
- Evaluation for pathogenicity markers in bacterial isolates of the species *Vibrio* from sea otters (funded by The Otter Project).

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Selected Publications:

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Dubey, J.P., D.S. Lindsay, B.M. Rosenthal, and N.J. Thomas. 2003. Sarcocysts of an unidentified species of Sarcocystis in the sea otter (*Enhydra lutris*). J Parasit 89: 397-399.

Dubey, J.P., R. Zarnke, N.J. Thomas, S.K.Wong, W. Van Bonn, M. Briggs, J.W. Davis, R. Ewing, M. Mense, O.C.H. Kowk, S. Romand, P. Thulliez. 2003. *Toxoplasma gondii*, *Neospora caninum*, *Sarcocystis neurona*, and *Sarcocystis canis*-like infections in marine mammals. Veterinary Parasitology 116: 275-296.

Kannan, K., N. Kajiwara, M. Watanabe, H. Nakata, N.J. Thomas, M. Stephenson, D.A. Jessup, and S. Tanabe. 2004. Profiles of polychlorinated biphenyl congeners, organochlorine pesticides and butyltins in southern sea otters and their prey. Environmental Toxicology and Chemistry 23: 49-56.

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