



The Southern Sea Otter – Protected But Not Recovering

by Lester W. Reed, Ph.D.

The Southern Sea Otter population off the California coast has been protected for over 95 years, as have its cousins in northern populations. However, unlike those northern relatives the southern tribe has not shown a sustained gain in numbers, and most recently, has started to decline. Also, there has been a notable decline in the general health of this popular marine mammal. As with all living organisms, the viability of their populations rests on a specific set of complex and interrelated factors. Such is the case for this whimsical creature.

The initial loss of sea otters was primarily due to over-hunting. Once numbering more than 300,000 world wide, Southern Sea Otters, along with other populations, were hunted to near extinction in the 18th century for their luxurious pelts. By 1900, the world population had been reduced to 13 remnant populations of no more than a few hundred each. In 1911, the International Fur Seal Treaty halted commercial hunting of sea otters. In 1977, sea otters were listed as threatened under the Endangered Species Act. Additionally, restrictions on certain types of fishing gear were put in place to prevent unintentional injury and death of the otters. Providing protection from hunting and inadvertent killings, and designating a protected habitat for the otter was considered to be the solution to their near extinction. This fix seems to be the right approach for the northern populations, and was initially successful for those off the California coast as their numbers increased to a peak of 2377 individuals in the spring of 1995. But then, as the saying goes, things “turned south”. By the spring of 2002, recovery of the southern population stagnated and then slid backward.

Over seven years a 10 percent drop from the 1995 high had occurred.

Why does the traditional approach to restoring endangered species seem to be failing for the Southern Sea Otter? Researchers from governmental agencies such as the National Oceanic and Atmospheric Administration and United States Geological Survey,



University of California – Davis, and the Monterey Bay Aquarium, among others, believe they have discovered the reason – cats. The scientists’ best guess is that parasite eggs in cat droppings are being washed by sprinklers and rains into coastal-bound storm drains and creeks. Although many animals — such as birds and rodents — can serve as intermediate hosts, cats are the only animals known to shed the *Toxoplasma gondii* parasite’s eggs in their droppings. (This cat-parasite link is the reason pregnant women are advised against cleaning cat-litter boxes).

Among the reported evidence for the link to this specific parasite was a study by University of California at Davis professor Patricia Conrad. In 233 live and dead otters from Santa Barbara to Half Moon Bay, California, the researchers found that a staggering 76 percent of otters near heavy freshwater outflows — storm drains and river mouths — had *Toxoplasma gondii* antibodies. There was also a surprisingly high rate of infestation in the general otter population.

Continued on page 3

Seafood Gone by 2048?

by Wynn W. Cudmore, Ph.D.

Marine coastal ecosystems are among the most productive ecosystems on Earth. As such, they provide a wide range of ecological, social and economic benefits to humans. Perhaps most important among these “ecosystem services” is the production of food. Worldwide, more than a billion people rely on fish as their principal source of animal protein. Marine fish provide humanity with more animal protein than any other source including beef and pork. Marine and coastal ecosystems are also important drivers of local economies. The fishing and fish products industry, for example, provides direct employment to 38 million people. When indirect involvement is included, the number of people employed increases to 162 million.

Despite their importance to human well-being, most goods and services derived from marine and coastal ecosystems are being degraded and used in an unsustainable manner. This deterioration is occurring at a rate that exceeds that of most other ecosystems. A synthesis report on marine and coastal ecosystems entitled, “Marine and Coastal Ecosystems and Human Well-being Synthesis” is based on the Millennium Ecosystem Assessment Report (www.maweb.org) and provides an excellent “big picture” overview of the status, causes and proposed solutions for issues specific to these ecosystems.

The most recent evaluation of the global status of commercial fish stocks conducted by the Food and Agriculture Organization of the United Nations indicated that 25% were either depleted or overexploited. Most other stocks (52%) are “fully exploited”, leaving little room for additional fishing pressure and requiring stringent management limits to prevent declines into the more serious categories. With more than 75% of the world fish stocks

reported as already fully exploited or overexploited, most fisheries scientists now recognize that the maximum wild capture fisheries potential for the world’s oceans has been reached.

While a number of factors such as coastal development, water pollution and climate change have had an impact on marine fisheries, overfishing and destructive fishing practices have been identified as the main driver of the decline of marine and coastal fish stocks. In addition to immediate impacts on fish populations, some forms of bottom trawling, dredging and the use of explosives and fish poisons impact ecosystems by altering the physical environment or changing community structure. Such changes also diminish the ability for these ecosystems to recover.



Peruvian seiner harvests chub mackerel. Pelagic species like this have dominated global fish landings since 1950.

In recent years, calls for an ecosystem-based approach to the management of oceans have become commonplace. Reports by the U.S. Commission on Ocean Policy (2004) and the Pew Oceans Commission (2003) have documented the need for a new, ecosystem-based approach to the management of U.S. territorial waters. A new report in the journal *Science* (www.sciencemag.org) by an international group of ecologists and economists adds to this call. The report concludes that unless a change in direction





is made soon, the combination of overfishing and deteriorating ocean conditions will lead to the demise of marine ecosystems. As these ecosystems collapse, they are less able to provide services valued by humans such as producing seafood, filtering nutrients and resisting the spread of disease. Lead author, Boris Worm of Dalhousie University, Halifax, Nova Scotia predicts that unless a shift in ocean management is made, the demise of many of our major fisheries will occur within the next 50 years.

The report is based on a four-year synthesis of all available data related to marine ecosystems and fish populations. Among its findings are that by 2003, 29% of all fished species populations had collapsed (defined as a 90% decline in catches) and that the rate of population collapses had accelerated. Also, the loss of individual species within marine ecosystems makes them less able to provide ecosystem services and to resist other disturbances.

Although the report provides a less than optimistic outlook for fish populations, the authors suggest that recovery is possible if the political will is generated for an ecosystem-based approach to management. More specifically, researchers call for limits on overfishing, stricter pollution controls and marine reserves to address the declines. →

NCSR Submits New Grant Proposal

The staff of NCSR has submitted a proposal for funding from the National Science Foundation's (NSF) Advanced Technological Education (ATE) program. The proposal would support the Center's natural resource curriculum support efforts for three years beginning in the fall of 2008. In its grant request, NCSR proposes to develop materials focused on issues associated with mitigation of the loss of wetlands, construction of new wetlands, and recovery of marine ecosystems that support restoration of fish populations. These curriculum materials will be designed for use in college programs that educate advanced technicians, students who transfer to four-year colleges and universities in natural resource majors, and those already in the four-year programs. Other materials will be focused on integrating natural resource management concepts into secondary education science courses such as biology to ensure a wide range of understanding of ecosystem-based resource sustainability. These secondary materials will feature a community-based approach. If funded, the Center will conduct a series of institutes for natural resource educators designed to support an increased understanding of the curriculum materials and their adaptation at the secondary and college level. 

The topic of marine fisheries issues will be examined in detail in a series of forthcoming NCSR modules designed for inclusion in *Environmental Science*, *General Biology* and *Natural Resource* courses. The new modules will include an overview of the marine fisheries issue, detailed case studies, "classroom-ready" PowerPoint presentations and links to pertinent print, video and web resources. Please stay tuned. 

Continued from page 1 "Sea Otter..."

Forty-two percent of live otters surveyed had antibodies to the parasite, an almost certain sign of infection. (<http://www.magazine.noaa.gov/stories/mag72.htm>)

The plight of the Southern Sea Otter is a striking example of the impact on water quality by non-point pollution. This topic has been covered in a recent NCSR instructional module, *The Impact of Land Use on Water Quality – a Watershed Evaluation from Canoes* authored by Wynn W. Cudmore, Ph.D., and available on our website www.ncsr.org.

To learn more about the Southern Sea Otter and their interaction with non-point sources of pollution see:

Historical Information

<http://alaska.fws.gov/fisheries/mmm/seaotters/history.htm>

<http://bell.lib.umn.edu/Products/SeaOtter.html>

Research Findings

<http://www.sciencedaily.com/releases/>

Keyword "Sea Otters"

<http://biology.usgs.gov/s+t/SNT/noframe/ca165.htm> 

The Continuing Saga – Sea Lions versus Salmon

by Lester W. Reed, Ph.D.

With spring not only do swallows return to Capistrano but spring Chinook salmon and steelhead return to Columbia River's Bonneville Dam. Once at the dam, the fish



California sea lion taking a Chinook salmon near Bonneville Dam

congregate as they try to navigate the man-made fish ladders and continue their spawning migration upstream. Not far behind are the California sea lions. As reported in early issues of the Newsletter, state and federal fish managers have tried to harass the sea lions away from the lucrative feeding grounds below the dam – all to no avail. As a result, Washington, Oregon and Idaho have applied to the federal government for authority to remove individual California sea lions, by lethal means if necessary. To speed approval, two Northwest Congressional representatives have introduced a bill to waive the Marine Mammal Protection Act provisions for the Columbia River sea lions. As they wait for authority to kill sea lions the managers continue to engage in dawn-to-dusk daily hazing – a tactic which has famously flopped in the past. Returning to the manager's arsenal of tools this year is the branding iron. By branding the sea lions, officials say they can identify the biggest trouble makers and mark them for "lethal removal" when the authority to shoot is given. So far there's no sign of C404, aka "Cecil", who approached celebrity status by figuring out how to get into the dam's fish ladders for easy pickings. But, officials are watching for him.

Once a local story, the sea lion versus salmon saga is now national news. Images of agents firing rubber bullets at sea lions as they devour salmon or branding sea lions after capturing them in specially-designed cages, are widely broadcast. The drama on the Columbia River is an excellent situation for adaptation into the new NCSR modules *Evaluation of Media Coverage of an Environmental Issue* and *Town Meeting: an Approach to Exploring Environmental Issues*. Both modules provide a structure for creating student awareness of the complexities of environmental issues as they exist in the public arena. Both modules are available on our website www.ncsr.org.



Fire Ecology Institute Full House

NCSR's has accepted the maximum number of participants for its summer Fire Ecology Institute. The institute is designed to help faculty integrate scientific information on the role of fire in the ecosystem and the latest approaches to managing recovery of the natural environment from fire.

STAFF

Lester Reed, Ph.D. Program Director
Wynn Cudmore, Ph.D. Principal Investigator

Jon Yoder, M.T.A. Co-Principal Investigator
Valisa Brown Administrative Assistant

CONTACT INFO

Chemeketa Community College
NCSR - 5/256A
P.O. Box 14007
Salem, Oregon 97309-7070



Phone: (503) 399-5270
Fax: (503) 589-7622

www.ncsr.org
ncsradm@chemeketa.edu

This project was supported, in part, by the **National Science Foundation**. Opinions expressed are those of the authors and not necessarily those of the Foundation.