The *Exxon Valdez* Spill: 10 Years Later

by Catherine Berg

The body of an oil-soaked sea otter recovered from Prince William Sound after the Exxon Valdez spill.
USFWS photo

Restoration research projects yielding valuable knowledge include:

The Sound Ecosystem Assessment is a $21.4 million, 7-year project studying the productivity of Pacific herring and pink salmon in Prince William Sound. The research is providing new insights into ocean currents, nutrients, mixing, salinity, and temperatures and how these physical factors influence plant and animal plankton, prey, and predators in the food web.

Alaska Predator Experiment concentrates on the

Shortly after midnight on March 24, 1989, the oil tanker *Exxon Valdez* ran aground on Bligh Reef in Prince William Sound, Alaska, spilling almost 11 million gallons of North Slope crude oil. It was the largest tanker spill in United States history. That spring, the oil moved southward along the Alaskan coast, oiling more than 1,500 miles (2,415 kilometers) of shoreline in Prince William Sound and along the Kenai Peninsula, lower Cook Inlet, Kodiak Archipelago, and Alaska Peninsula. Oiled areas included a national forest, four national wildlife refuges, three national parks, five State parks, four State critical habitat areas, and a State game sanctuary. Oil eventually reached shorelines nearly 600 miles (965 km) southwest of where the spill occurred.

The *Exxon Valdez* ran aground just before the most biologically active season of the year. The resulting oil spill occurred during the seaward migration of salmon fry, major migrations of birds, and the primary breeding season of most species of birds, mammals, fish, and marine invertebrates in the spill's path. Marine birds and sea otters were killed by direct oiling on open water. Birds and mammals that were covered with oil may have ingested toxic quantities as they tried to clean themselves and may have died of cold stress after the oil damaged the insulation provided by their feathers or fur. Shoreline oiling had devastating impacts on the upper intertidal zone and intertidal communities, both from direct oiling and from beach cleaning, particularly high-pressure, hot-water washing. "Injuries" to natural resources did not always occur immediately. Delayed injuries were caused by such factors as a reduction in critical food sources caused by the spill and persistent oil in the intertidal areas.

Biological resources were considered injured by the *Exxon Valdez* oil spill only if scientific research demonstrated a population-level injury or continuing chronic effects. Such injured biological resources included bald eagles *(Haliaeetus leucocephalus)*, black oystercatchers *(Haematopus bachmani)*, common loons *(Gavia immer)*, clams, common murres *(Uria aalge)*, cormorants *(Phalacrocorax*, three species*)*, cutthroat trout *(Oncorhynchus clarkii)*, Dolly Varden trout *(Salvelinus malma)*, harlequin ducks *(Histrionicus histrionicus)*, harbor seals *(Phoca vitulina)*, Kittlitz's murrelets *(Brachyramphus brevirostris)*, marbled murrelets *(Brachyramphus marmoratus marmoratus)*, killer whales *(Orcinus orca)*, mussels *(Mytilus edulis)*, Pacific herring *(Clupea harengus)*, river otters *(Lutra canadensis)*, pigeon guillemots *(Cepphus columba)*, pink salmon *(Oncorhynchus gorbuscha)*, rockfish *(Sebastes* sp.*)*, sea otters *(Enhydra lutris)*, and sockeye salmon *(Oncorhynchus nerka)*.

Wildlife was not the only resource injured by the spill. Some archaeological sites were damaged directly by oil and others were subject to looting and vandalism during and after the clean up. Oil was deposited high above the tide line in designated wilderness areas. The massive intrusion of people and equipment associated with the clean up resulted in an unprecedented disturbance of undeveloped and normally uninhabited areas, and some visible impacts of this disturbance still linger. Sediments were also considered an

injured resource. Oil penetrated deeply into the subsurface of cobble and boulder beaches, especially in sheltered habitats, and oil persists in many tidal locations. Commercial fishing, subsistence uses (hunting, fishing, and gathering), passive use, recreation, and tourism also suffered harm.

To remedy the effects of the spill, a settlement among Exxon, the United States government, and the State of Alaska was approved by the U.S. District Court on October 9, 1991. The settlement resolved criminal charges and civil claims for recovery of natural resource damages resulting from the oil spill. Most of the $900 million civil settlement, paid out in annual payments over a 10-year period, is dedicated to implementation of a restoration plan that was developed by the Trustee Council agencies: the National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Forest Service, Alaska Department of Fish and Game, Alaska Department of Environmental Contaminants, and Alaska Department of Natural Resources.

Restoration actions under this plan include research and monitoring, general restoration, habitat protection, and a restoration reserve:

- **Research and Monitoring** Surveys and other monitoring of fish and wildlife in the spill region provides basic information to determine population trends, productivity, and health. Research has focused on identifying the biological needs of individual species and how each species contributes to the Gulf of Alaska ecosystem.
- **General Restoration** This category includes projects to protect archaeological resources, improve subsistence resources, enhance salmon runs, reduce marine pollution, and restore damaged habitat.
- **Habitat Protection** Protection of habitat is recognized as a means to help prevent additional injury to species due to intrusive development or other loss of habitat. Funds have been used to acquire title or conservation easements on land important for the restoration of injured resources and services. To date, more than 635,000 acres (257,000 hectares) have been acquired (including pending purchases) for a total of approximately $339.4 million. This includes 1,419 coastal miles (2,283 km) and more than 280 salmon streams. Almost 275,000 acres (442,475 ha) have been added to refuges, much of that within the Kodiak National Wildlife Refuge.
- **Restoration Reserve** The restoration reserve was established in recognition that full recovery from the oil spill would not occur for decades. The reserve fund will support long-term restoration activities after the final payment is received from Exxon in 2001. The reserve is expected to be worth approximately $140 million, most of which will be dedicated to a long-term science program in the northern Gulf of Alaska.

History will judge the *Exxon Valdez* oil spill as the worst kind of spill in one of the worst places for a spill—an incredibly rich ecosystem. Ten years later, it is clear that many injured species have not fully recovered. Over the past decade of intense studies, funded by the $900 million civil settlement with Exxon, scientists have made giant leaps in our knowledge of the marine environment on which we all depend. In 1989, we were completely unprepared to gage the environmental damage from the spill because of a lack of information about the populations of most bird and mammal species. Today, we not only have good data on these species but we also understand far better the role each plays in the ecosystem. The legacy of the *Exxon Valdez* spill will be not only the lasting damage to the region's environment but also the efforts of people working together for wildlife restoration.

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A 5-year Nearshore Vertebrate Predator Project is studying sea otters (above) and three other species (river otters, harlequin ducks, and guillimots) to better understand recovery factors on land and in the nearshore environment.
Corel Corp. photo

recovery of seabirds based on the availability of forage fish as a food source. This 8-year, $10.2 million project looks at wide-ranging ecological changes to explain why numbers of some species, such as cormorants, pigeon guillemots, and harbor seals, are still diminishing.

In marine mammal research, scientists are using fatty acid analysis to determine what a harbor seal eats by looking at its blubber. This has become an essential tool in understanding why harbor seal populations continue to decline.