Bureau of Ocean Energy Management, Regulation and Enforcement

Possible Effects of OCS Gas and Oil Activities on the California Sea Otter

Sea otters are vulnerable to adverse impacts resulting from both routine gas and oil activities on the outer continental shelf (OCS) and accidental events such as oil spills. In California, sea otters live in nearshore waters from Año Nuevo south to the Santa Maria River on the central coast, and at San Nicolas Island in the Southern California Bight.

The California sea otter population, which numbered more then 2,000, was listed as threatened under the Endangered Species Act in 1977. Routine offshore activities that involve noise and physical disturbance may affect sea otters. These include geophysical surveys, drilling, vessel and air traffic, and pipeline and platform construction and abandonment.

Acoustical pulses, or sound waves, which are used in seismic reflection surveys, are generated by airguns or waterguns. These have not been shown to affect sea otter behavior, even when the pulses have occurred less than one mile away. In California, sea otters rarely move more than 1 mile from shore, while OCS activities generally occur 3 miles or more from shore. Given their occurrence close to shore and the evidence that sea otters may not be sensitive to this type of noise, it is unlikely that seismic surveys would have an effect on the population.

There is no information on the potential impacts on sea otters from exploratory and development drilling or platform and subsea pipeline construction. One study, however, observed sea otters in the presence of drillship and production platform sounds and reported no changes in behavior at distances as close as a kilometer from the source. The otters continued to dive and feed during the playbacks.

Although there have been no systematic studies of the reactions of sea otters to aircraft, sea otters exhibited no obvious reactions to a two-engine survey aircraft during a series of aerial surveys of the California sea otter range conducted at an altitude of about 300 feet. No sea otter reactions were observed during one study using playbacks of helicopter noise.

Sea otters often allow close approaches by boats, but tend to avoid heavily disturbed areas. They do, however, reoccupy those areas in times of less traffic. Accidental collisions between sea otters and support-base boat traffic are unlikely, because of the otters' mobility, their nearshore distribution, and the distance between their range and gas and oil support bases in the Santa Barbara Channel.

Accidental oil spills have a greater negative effect, however. Sea otters must maintain a layer of warm, dry air in their dense underfur to insulate against the cold; they are the marine mammals most sensitive to the effects of oil contamination. Even partial fouling of 30 percent of an otter's body surface could result in death.

In 1989, during the Exxon Valdez oil spill in Alaska, many sea otters did not avoid oiled waters and were fouled. More than 1,000 dead sea otters were recovered, and another 350 oiled otters were rescued and taken to treatment centers for rehabilitation. Four critical factors were identified in the sea otter mortality during the spill in Alaska: pulmonary emphysema, caused by the inhalation of toxic fumes, occurred primarily during the first 2 weeks of the spill; low body temperature, or hypothermia, was a direct result of oil contamination of the fur, which decreased insulation; low blood sugar, or hypoglycemia, was probably caused by poor gastrointestinal function due to ingestion of oil; and lesions in other organs, including the liver, heart, spleen, kidney, and brain, were also probably caused by ingestion of oil and by stress. Oil spills can also affect sea otters indirectly by reducing available food resources, either killing prey organisms

or making them unpalatable. Sea otter habitat can also be lost temporarily if kelp forest communities become contaminated.

If an oil spill comes in contact with nearshore waters inhabited by sea otters, it is likely that some otters will die. The magnitude of sea otter mortality would vary with a number of factors. Time of year, volume of oil spilled, and winds and currents all contribute, as do the distance of the spill from shore. The volume and condition of oil contacting the shoreline, the success of containment operations, and the effectiveness of otter cleaning and rehabilitation are also significant factors.Because of the variety of factors involved, the range of possible impacts to the sea otter population is wide. Over time, spilled oil is weathered--hardened and rendered less toxic by exposure to the elements. A highly weathered spill might contact the shoreline and not affect the sea otter population at all. At the other extreme, a spill occurring close to shore within the sea otter range could oil and kill hundreds of animals.

There are reasons for optimism, however. As a result of preventive measures taken by the the Bureau and industry on the OCS, including stringent regulations, inspections, and safe operating procedures, there have been no large offshore oil spills in the Pacific Region since 1969. Additionally, California Senate Bill 2040, enacted in 1990, provides for the construction of a permanent facility to clean and rehabilitate oiled sea otters, and for the development of a statewide program to address the needs of all oiled wildlife. The sea otter facility, which will be located at U.C. Santa Cruz's Long Marine Laboratory on Monterey Bay, is scheduled to be operational in 1994. Once this facility and the program are in place, the California sea otter population will be better protected from the effects of oil spills. Oil tankers heading south from Alaska are now voluntarily rerouted 50 miles or more off the coast along the sea otter range, with the expectation of further reducing the chances of a spill affecting this population.

Selected Readings

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