Oil Spill Cast Histories

1967-1991

SUMMARIES of SIGNIFICANT
U.S. and INTERNATIONAL SPILLS

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Name of Spill: Mobiloil
Date of Spill (mmddyy): 03/19/84 0
Location of Spill: Warrior Rock, Columbia River, near Portland, Oregon
Latitude: 45 51 N
Longitude: 122 47 W
Oil Product: Heavy residual oil, industrial fuel oil, No. 6 Fuel Oil
Oil Type: Type 4
Barrels: 3925 0
Source of Spill: Tank Vessel
Resources at Risk: Wildlife refuge, deer, raptors, industrial water intakes, high-use recreational fishing areas, commercial fisheries, crab nursery areas, seal population concentration areas, waterfowl, waterfowl nesting beaches, waterfowl migratory routes, oysters, clams, recreational beaches, anadromous fish, spawning streams. 4
Dispersants: No
Bioremediation: No
In-situ Burning: No
Other Special Interest: Research conducted.
Shoreline Types Impacted: Marshes, fine sand beaches, vegetated riverbanks.
Keywords: Volunteers, sub-surface oil, boom, manual removal, reoiling, International Bird Rescue and Research Center (IBRRC), contingency plan, cannonball diaper sampler.

Incident Summary:

The Tank Vessel Mobiloil, while en route from Ferndale, Washington to Portland, Oregon, suffered a steering failure at 0005 on March 19, 1984 which resulted in the grounding of the vessel near Warrior Rock in the Columbia River approximately 10 miles downstream from Portland, Oregon. Punctures and gashes ruptured the number 1-5 starboard cargo tanks releasing 3,925 barrels of heavy residual oil, industrial fuel oil, and No. 6 fuel oil.

The vessel remained grounded perpendicular to the current until March 26, when it was refloated and escorted to dry dock in Portland. At the time of the spill the wind was from the south and the river current velocities were 1.5-3.0 knots. The incident occurred in a turbulent area of the river that experiences some tidal influence.

Behavior of Oil:

No. 6 fuel oil is a heavy product with an API gravity that ranges from 7 to 14. Spilled oil was distributed on the surface of the river, throughout the water column, and on the river bottom. The shoreline was not impacted as severely as anticipated. Areas thought to be thick oil were actually sheen. The only black oil observed on the surface occurred as small tar balls that were commonly found clinging to debris.

The sinking nature of the oil made estimates of the spill size difficult. Initial Mobil and USCG estimates of 1,000 barrels were revised after additional

information suggested that the majority of the oil had been incorporated into the water column and in the river bed. The primary transport mechanism for spilled oil was the flow of the Columbia River.

Shoreline areas downstream from the spill site were impacted by surface oil. These areas included sandy beaches, sloughs and islands. Beached oil was commonly found mixed with debris. Fluctuations in river height stranded oil on the river banks and caused re-oiling of affected areas.

A significant amount of oil remained on the surface and moved rapidly downstream. Surface oil exited the river or was trapped along the shoreline within two or three days. Southerly winds tended to concentrate the oil on the northern side of the river causing shoreline impacts mainly on the Washington shorelines. Pancake shaped tarballs of up to 6 inches in diameter impacted some downstream locations.

Sub-surface oil moved downstream in the same manner as the surface oil within a meter of the bottom. iffid-water oils rose to the surface in the area of seawater intrusion. Oil on the river bottom formed a pool in the eddy area created by the hull of the Mobiloil. National Oceanic and Atmospheric Administration (NOAA) personnel estimated the pool to contain between 250 and 1,000 barrels of oil. This oil moved downstream when the vessel was refloated.

Predicted flushing rates for the spilled oil ranged from a few days for surface oil to several weeks for bottom concentrations. Spilled materials that exited the river were deflected north within the river plume and impacted the beaches of the Washington coast mainly in the form of tarballs. Long-term trajectory estimates by NOAA personnel suggested the possibility of widely scattered tarball impacts on the beaches to the south of the river due to seasonal changes in the prevailing currents along the coastline.

Countermeasures and Mitigation:
Due to the swift current conditions, open water recovery was not effective. Much of the oil escaped under booms placed downstream from the vessel. The distribution of oil throughout the water column made recovery difficult.

Environmental Emergency Services (EES) was contracted by Mobil Oil to conduct the cleanup operation. The local experience and knowledge of the river provided by EES personnel proved valuable in placing booms in the dark. Shoreline cleanup was accomplished through manual removal of oil and debris. Cleanup operations were hampered by strong currents, the inaccessibility of many impacted areas, and the large quantities of debris involved. The shoreline cleanup operation extended over a distance of 120 miles. Cleanup crews were transported to many sites by boat. Heavy equipment was used in areas that contained very large amounts of oiled debris. Heavy equipment operations at areas not accessible from shore required a crane barge, storage barge, and bulldozer. Oil on hatchery ponds was recovered with sorbent rolls.

There were no reported attempts to recover oil in the water column. Discovery of the oil that sank to the river bottom was attempted by lowering weighted sorbents to the bottom. This method proved successful when oil escaped from the vessel during dry docking.

Oregon Department of Environmental Quality (ODEQ) estimated that 3,000 cubic yards of oiled debris were removed from Washington shorelines during the effort that recovered a total of 833 barrels of oil. NOAA personnel reported low oil-to-debris ratios for the riverbank recovery and higher (up to 60%) ratios for the outer beaches. Mobil estimates of the volume recovered were based on two gallons of oil in each 20 gallon plastic bag of debris.

NOAA personnel conducted a fate and effects study which concluded that the initial Mobil spill estimate of 1,000 barrels was too low, and that as of April 2 the majority of the oil had either been recovered or flushed from the river. Analysis of water samples found no presence of the highly toxic water soluble fractions. Heavy aromatics were found in the tissue of sturgeon, and data indicated that naphthalenes could be dissolved in water. The National Marine Fisheries Service (NMFS) conducted benthic sampling and monitoring of fishes and Dungeness Crab by trawl survey.

The Oregon Department of Fish and Wildlife (ODFW) monitored fish by test-fishing and continued annual monitoring of spring Chinook salmon runs. The ODEQ updated the Columbia River Oil Spill Contingency Plan. The U.S. Fish and Wildlife Service (USFWS) performed continued monitoring of impacts on seabirds. Washington Department of Ecology (WDOE) conducted chemical monitoring of fishes and shoreline surveys. WDOE and Washington Department of Fisheries (WDF) staff deployed cages containing live fish to monitor toxicity. No mortality was observed during these 96-hour tests.

Due to the number of Federal and state agencies having jurisdiction in the Columbia River, a meeting was called on March 23 to coordinate the effort. The meeting involved Federal agency representatives from the Department of Interior (DOI), USCG, and NOAA, as well as state agencies from Oregon and Washington. The state agencies and DOI representatives were to continue biological assessment and record any oil impacts. NOAA personnel continued to study the transport, trajectory, and fate of the oil, and acted as central coordinator for all agencies. NOAA also developed an environmental sampling plan to ensure that any research gaps would be filled.

Other Special Interest Issues:

There was wide agreement among the agencies involved that the presence of a Columbia River Oil Spill Contingency Plan expedited the organization of the cleanup and resource assessment. The quick response and assumption of liability by Mobil Oil allowed Federal and the state agencies to concentrate on monitoring and data collection. The agencies agreed to share information and coordinate research activities regarding the fate and effects of the spill.

The resulting study was planned and executed within a few days. NOAA pursued the methodology used for possible future operating procedures.

Seabirds and waterfowl were impacted along the river and on the outer coast. Reports of the number of affected birds range from 698 birds received, 475 treated and released (NOAA) to 450 received and 284 released (Mobil). Species involved were Western Grebes, Surf Scoters, Common Murres, White-winged Scoters, and Black Scoters. Initially, bird cleaning and treatment were carried out by personnel from the Portland Audubon Society until a rescue center could be established by the International Bird Rescue Research Center. No effects on Bald Eagles or Snowy Plovers were observed.

Recovery of oiled birds involved the use of volunteers, USCG personnel, Audubon Society members, and representatives from the International Bird Rescue Research Center. Initially, volunteers collected and transported the birds to the centers. Due to the large area involved, the USCG agreed to collect and transport any birds brought to their stations. Sixty-three to sixty-eight per cent of the birds taken to the centers were reportedly treated and released.

Catches of various fish were received by state agencies including sturgeon, petrale sole, and surf perch. Chemical sampling of sturgeon showed high concentrations of heavy naphthalenes. Oiling of shellfish beds on the coastal beaches occurred at Willapa Bay and Grays Harbor. The oiling of oyster shell material at Grays Harbor was considered a minimal loss of substrate for juvenile oyster recruitment. Two reports of oiling proved to be natural occurrences, one of jellyfish (Vellela) and the second, an algal bloom.

The resources at risk included harbor seal populations that contained mostly pregnant females preparing to pup, the immediate scheduled hatchery release of several million juvenile salmon, the Lewis and Clark National Wildlife Refuge, and the Columbia Whitetail Deer National Wildlife Refuge. Several threatened or endangered species including the Bald Eagle, Snowy Plover, Columbia Whitetail Deer, and Peregrine Falcon were of concern. Feeding and nursery areas for shellfish, fish, birds, and mammals occur along the river and the coastal beaches. Also at risk were resources important to sport and commercial fisheries.

Oil in the water column caused the contamination of the water intake system of one industrial facility. Filters on the system were alternately cleaned to mitigate any further potential problem. Hatchery ponds at the Trojan Nuclear Power Plant were oiled with sheen. The salmon that were introduced to the ponds the day of the incident were examined nine days later and found to be within acceptable physiological limits.

Mobiloil

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References:

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*Park, W.C. 1985. Response to the Mobiloil spill incident, Oil Spill Conference Proceedings, 1985, pp. 335-339
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