IMPACTS ON WATERBIRDS FROM THE 1984 COLUMBIA RIVER AND WHIDBEY ISLAND, WASHINGTON, OIL SPILLS

STEVEN M. SPEICH, 4817 Sucia Drive, Ferndale, Washington 98248

STEVEN P. THOMPSON, Nisqually National Wildlife Refuge, 100 Brown Farm Road, Olympia, Washington 98506 (present address: Stillwater Wildlife Management Area, P.O. Box 1236, Fallon, Nevada 89406)

Two major oil pollution events in Washington in 1984 resulted in significant oiling of waterbirds. The first occurred 19 March 1984 when a tanker ran aground near St. Helens, Oregon, releasing oil into the Columbia River. The second occurred 21 December 1984 when a vessel released oil into southern Admiralty Inlet off the south end of Whidbey Island in Puget Sound, Washington. During both spills many waterbirds were found dead, and many others were found incapacitated. This paper documents the species of waterbirds oiled in each event. Although some impacts of oil spills on waterbirds on the Pacific Coast of North America have been documented (Aldrich 1938, Moffitt and Orr 1938, Richardson 1956, Smail et al. 1972, Vermeer and Vermeer 1975, PRBO 1985), many others are undocumented and doubtless will remain so (Vermeer and Vermeer 1975, Speich unpubl. data).

THE OIL SPILLS

The Columbia River Spill

The tanker *Mobiloil* ran aground in the Columbia River near St. Helens, Oregon, on Warrior Rock (river mile 88.2) on 19 March 1984 (Figure 1). Its tanks ruptured, releasing an estimated 170,000 to 233,000 gallons of heavy residual oil, number six fuel oil, and an industrial fuel oil into the river (Kennedy and Baca 1984). A portion of the released oil sank but the rest floated downstream, reaching the mouth of the Columbia River 21 March 1984. It was then carried north by ocean currents, reaching Ocean Shores, Washington, by 25 March 1984. Oil was deposited on much of the Washington shoreline of the Columbia River, and lesser amounts were found on ocean beaches. Small amounts of oil were observed in Grays Harbor and in Willapa Bay. Later, a small number of oil globs and tar balls were reported on ocean beaches north to Cape Flattery, at the entrance to the Strait of Juan de Fuca. Small amounts of oil were also reported as far south as Cannon Beach, Oregon.

The Whidbey Island Spill

An unidentified vessel released about 5000 gallons of number six fuel oil into Puget Sound near Whidbey Island on 21 December 1984 (Figure 1). When first reported that day a slick extended about 10 miles from Seattle north to Possession Sound. About 1500 gallons came ashore on south Whidbey Island on 22 December 1984, and large amounts appeared on shore there over the next 5 days. The majority of the oil covered shorelines

from Columbia Beach to Scatchet Head on the southern end of Whidbey Island. Additional small amounts were found on other beaches on south Whidbey Island and on beaches of other land areas such as Marrowstone Island, Bainbridge Island, and the Kitsap Peninsula.

EFFECTS ON WATERBIRDS

Columbia River Impacts

Part of the response to both spills was the cleaning of oil from shorelines and from shoreline and marsh vegetation. For the Columbia River spill this process started 24 March 1984 and continued daily through 16 April 1984, with crews, hired by Mobil Oil Co., working along the Columbia River and on the Washington ocean beaches, especially of the Long Beach Peninsula, just north of the mouth of the Columbia River. The crews disposed of many dead oiled birds without recording their identity, numbers, sex, age, etc.

Altogether, 450 oiled live birds were retrieved and taken to the cleaning center set up at the Columbia White-tailed Deer National Wildlife Refuge (A. Berkner pers. comm., Table 1). The center opened 23 March 1984 and operated until 23 April 1984, although no new birds were accepted after 9 April 1984. The most numerous species were Western Grebe (50%), White-winged Scoter (17%), and Common Murre (26%). The birds were released as soon as possible after treatment. In total, 284 (68%) birds were released, but the species' identities were not recorded, the birds were released unbanded, and no data were collected on the survival rates of the released birds. Birds found oiled and alive after the center ceased accepting birds on 9 April 1984 were cared for by concerned citizens and a rehabilitation center in Tillamook, Oregon. Unfortunately, no data on the species involved, their numbers, or their fate are available. In addition, at least 200 lightly oiled, free-roaming waterbirds were observed, including Western Grebes, unidentified scaups, unidentified mergansers, and gulls.

Table 1 Numbers and Percentages of Bird Species Oiled, Captured, and Brought to the Cleaning Station for Treatment after the Columbia River Oil Spill

Species	Number	Percentage
Red-throated Loon (*Gavia stellata*)	4	<1%
Common Loon (*G. immer*)	2	<1
Western Grebe (*Aechmophorus occidentalis*)	227	50
Goose (domestic, species unknown)	1	<1
Mallard (*Anas platyrhynchos*)	3	1
Greater Scaup (*Aythya marila*)	1	<1
Common Scoter (*Melanitta nigra*)	9	2
Surf Scoter (*M. perspicillata*)	8	2
White-winged Scoter (*M. fusca*)	77	17
Common Murre (*Uria aalge*)	118	26
Total	450	

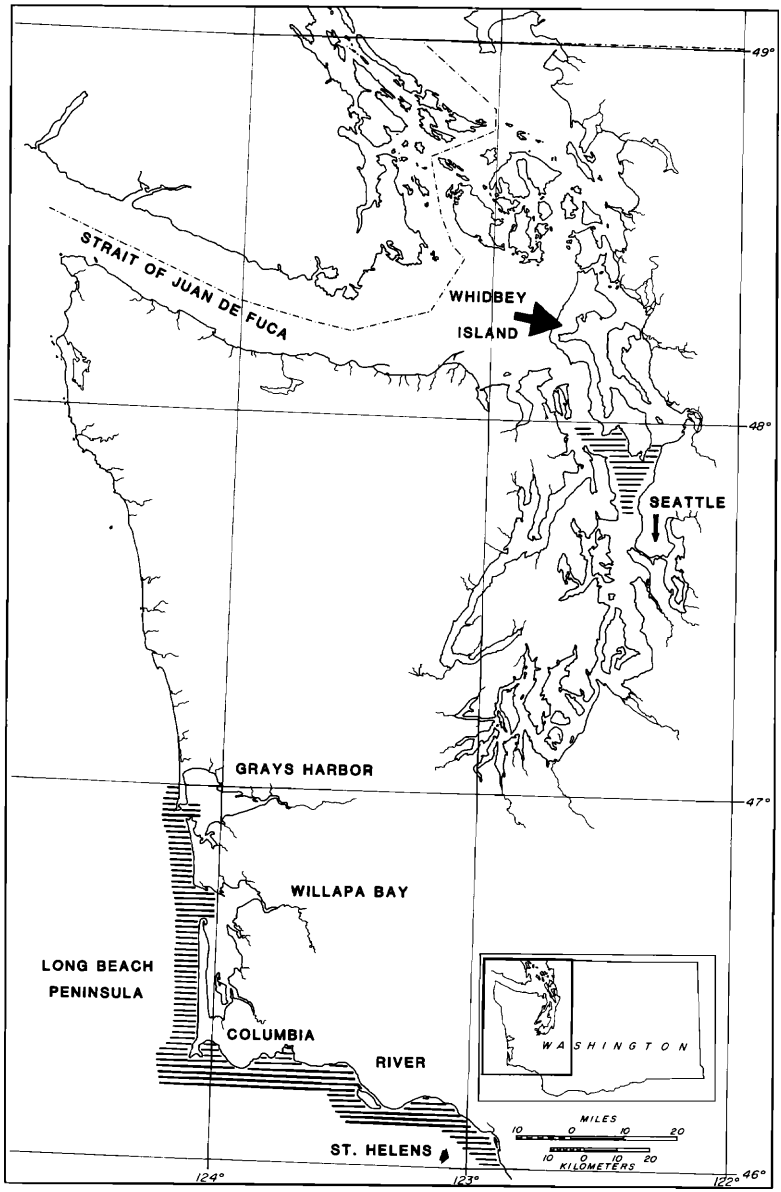

Figure 1. Approximate areas of water and shoreline oiled following the Columbia River and Whidbey Island, Washington, spills, 1984.

Table 2 Numbers and Percentages of Bird Species Observed after the Whidbey Island Oil Spill

Species	Oiled and free-roaming		Oiled and dead		Alive to cleaning station		Totals	
	N	%	*N*	%	*N*	%	*N*	%
Red-throated Loon (*Gavia stellata*)	—	—	—	—	1	<1	1	<1
Common Loon (*G. immer*)	33	5	1	<1	38	9	72	5
Unidentified loon	10	2	—	—	—	—	10	1
Horned Grebe (*Podiceps auritus*)	7	1	1	<1	47	11	54	4
Red-necked Grebe (*P. grisegena*)	7	1	2	<1	—	—	9	1
Western Grebe (*Aechmophorus occidentalis*)	15	2	2	<1	1	<1	18	1
Western/Red-necked Grebe	—	—	2	<1	95	21	97	6
Unidentified grebe	16	2	1	<1	—	—	17	1
Double-crested Cormorant (*Phalacrocorax auritus*)	2	<1	—	—	—	—	2	<1
Pelagic Cormorant (*P. pelagicus*)	+	<1	—	—	—	—	+	<1
Great Blue Heron (*Ardea herodias*)	1	<1	1	<1	—	—	2	<1
Domestic goose	—	—	1	<1	—	—	1	<1
Green-winged Teal (*Anas crecca*)	3	<1	—	—	—	—	3	<1
Unidentified teal	—	—	—	—	3	<1	3	<1
Mallard (*A. platyrhynchos*)	1	<1	—	—	2	<1	3	<1
Domestic duck	—	—	1	<1	—	—	1	<1
Northern Pintail (*A. acuta*)	4	1	—	—	—	—	4	<1
Gadwall (*A. strepera*)	1	<1	—	—	—	—	1	<1
American Wigeon (*A. americana*)	3	<1	—	—	4	<1	7	<1
Greater Scaup (*Aythya marila*)	+	<1	1	<1	—	—	1	<1
Lesser Scaup (*A. affinis*)	5	1	1	<1	—	—	6	<1
Unidentified scaup	55	8	6	1	31	7	92	6
Harlequin Duck (*Histrionicus histrionicus*)	1	<1	—	—	2	<1	3	<1

Table 2 (Cont.)

Species	Oiled and free-roaming		Oiled and dead		Alive to cleaning station		Totals	
	N	%	*N*	%	*N*	%	*N*	%
Oldsquaw (*Clangula hyemalis*)	4	1	—	—	3	1	7	<1
Black Scoter (*Melanitta nigra*)	6	1	—	—	77	17	83	6
Surf Scoter (*M. perspicillata*)	22	3	—	—	11	2	33	2
White-winged Scoter (*M. fusca*)	33	5	—	—	24	5	57	4
Unidentified scoter	19	5	18	4	—	—	37	2
Common Goldeneye (*Bucephala clangula*)	1	<1	—	—	38	9	39	3
Barrow's Goldeneye (*B. islandica*)	1	<1	—	—	—	—	1	<1
Unidentified goldeneye	23	4	2	<1	—	—	25	2
Bufflehead (*Bucephala albeola*)	9	1	1	<1	26	6	36	2
Hooded Merganser (*Lophodytes cucullatus*)	+	<1	—	—	—	—	+	<1
Common Merganser (*Mergus merganser*)	+	<1	—	—	3	1	3	<1
Red-breasted Merganser (*M. serrator*)	9	1	—	—	2	<1	11	1
Unidentified merganser	6	1	—	—	—	—	6	<1
American Coot (*Fulica americana*)	1	<1	—	—	—	—	1	<1
Black-bellied Plover (*Pluvialis squatarola*)	2	<1	—	—	—	—	2	<1
Killdeer (*Charadrius vociferus*)	3	<1	—	—	—	—	3	<1
Dunlin (*Calidris alpina*)	2	<1	—	—	—	—	2	<1
Glaucous-winged Gull (*Larus glaucescens*)	11	2	—	—	—	—	11	1
Unidentified gull	58	9	1	<1	—	—	59	4
Common Murre (*Uria aalge*)	—	—	—	—	16	4	16	1
Pigeon Guillemot (*Cepphus columba*)	+	<1	—	—	3	1	3	<1
Waterbirds, unknown species	282	43	364 +	90	20 +	4	652	43
Totals	656 +		406 +		447 +		1509 +	

One measure of the probable effects of the oil spill on waterbirds is the proportion of birds found oiled on ocean beaches before and after the spill. Starting in September 1981, G. Lippert (pers. comm.) surveyed selected ocean beaches on the Long Beach Peninsula each month for live and dead waterbirds and for the presence of oil on the birds found. In 1981, only 1 of 110 (1%) birds, in 1982, 8 of 396 (2%), and in 1983, 2 of 577 (<1%) were found oiled. The proportion found oiled increased greatly in 1984, when 87 of 581 (15%) were oiled. Other evidence of the effect of the oil spill on waterbirds is the number of oiled live birds found on ocean beaches. Between September 1981 and the end of February 1984 Lippert found 1136 dead birds but no live disabled birds. Between 22 and 26 March 1984, however, he found 40 oiled live birds on a portion of the same beaches (G. Lippert pers. comm.).

Whidbey Island Impacts

As with the Columbia River spill, part of the response to the Whidbey Island oil spill was the removal of oil and oiled vegetation from affected shorelines. Clean-up crews, contracted by the Coast Guard, removed material primarily on the southern end of Whidbey Island from 23 December 1984 to 9 January 1985. In the process over 360 unidentified oiled birds were removed (L. Kittle pers. comm., Table 2). In addition, after the spill we, Kittle, and L. Leschner (pers. comm.) found another 42 individuals of at least 13 species (Table 2). Dead birds were also removed from beaches by concerned persons who came to observe the oil spill's effects; species and numbers are unknown. Thus, over 400 oiled dead birds were removed from beaches near the oil spill.

In response to this spill, by D. Yearout and K. Baxter (pers. comm.) established and operated a bird cleaning station at Mukilteo, Snohomish Co., from 23 December through 29 December 1984. Of 428 oiled birds (Table 2) brought to the cleaning station, 81 died in the clinic, and 347 were transported to local rehabilitation centers for intensive long-term care (D. Yearout and K. Baxter pers. comm.). At least another 20 birds were taken to another center, but their fate is unknown. Additionally, some people took an unknown number of oiled birds home to care for them, so we can report only that 448 oiled birds of 20 species were taken to cleaning stations for treatment. The principal species were Western and Red-necked grebes (21%), Black Scoter (17%), Horned Grebe (11%), Common Loon (9%), and Common Goldeneye (9%) (Table 2). D. Yearout (pers. comm.) estimated that only about 50 of the birds transferred to the rehabilitation centers were released.

We, Kittle, and Leschner searched the south end of Whidbey Island by boat and on foot on 23, 24, and 26 December 1984 and 4 January 1985, and from a helicopter on 27 and 28 December 1984. We saw more than 650 oiled, free-roaming individuals of 34 species (Table 2).

The behavior of many oiled birds observed after the Whidbey Island oil spill appeared to change drastically. Many oiled individuals were able to avoid capture by humans but spent considerable time loafing in the same area. Many severely oiled, flightless birds roosted in unlikely locations on shore. Some sought shelter in recesses on the upper beach. Several of these

birds were apparently taken by Bald Eagles (*Haliaeetus leucocephalus*), as eagles were observed eating oiled birds on the beaches after dead birds had been removed.

In 1978 and 1979 Speich and Wahl (1986) surveyed more than 470 km of several beaches north of this spill site for oiled and incapacitated birds. They found only 110 dead and no live incapacitated birds. Immediately after this spill more than 400 dead oiled birds and about 450 oiled live but incapacitated birds were found on just a few kilometers of beach, demonstrating the spill's effect.

DISCUSSION

Studies of oiled and dead waterbirds (Coulson et al. 1968, Hope Jones et al. 1970, Bibby and Lloyd 1977) in England demonstrated that between 11 and 58% of carasses sink at sea (see also Dunnet 1982, Bourne 1970), so probably many more birds were oiled and killed than actual carcass counts document. The British data suggest that factors of 2 to 9 might be applied to the counts. However, we doubt that the mortality from these two spills, especially the Whidbey Island event, was as great, because these factors were derived from data collected on beaches facing the North Atlantic Ocean and the Irish Sea, whereas the Washington spills occurred in relatively sheltered and enclosed areas. In the Columbia River birds were undoubtedly often oiled within a few meters of shore, but an unknown number was probably oiled at sea. At Whidbey Island, birds may have encountered the oil from a few meters to perhaps a few kilometers off shore. Oiled birds were probably in the water for relatively short periods of time before they were beached, decreasing the sinking rate. In enclosed waters such as these a higher proportion of the birds oiled may reach shore alive. Indeed, during the Whidbey Island oil spill oiled birds were found on beaches the same day the spill was reported, and 40-50 were found oiled and alive and 30-40 were found oiled and dead in the first 24 hours after the spill (J. James pers. comm.). Oiled birds were first found on ocean beaches 3 days after the spill occurred on the Columbia River (G. Lippert pers. comm.).

CONCLUSIONS

Only 450 oiled birds were documented from the Columbia River oil spill, which is clearly a minimal total. More than 1500 birds were oiled as a result of the Whidbey Island oil spill, also a minimal total. Of the more than 1500 oiled waterbirds, 650 were observed free-roaming, about 450 were brought to cleaning stations, and at least 400 birds were found dead. It is unclear how these figures should be used to indicate the numbers of birds actually affected.

More effort is needed to document the loss of waterbirds from oil spills; the effort in these spills was inadequate. An emergency response team of experienced waterbird biologists should be on call to respond to spills. Standard waterbird survey techniques and beach transects on foot would result in data adequate for analysis of the immediate impacts of oil spills on waterbirds. Standardized methods would allow comparison of impacts on waterbirds from different spills and better evaluation of the impacts on waterbirds of in-

dividual oil spills. Although difficult to determine, the survivability and reproductive potential of released rehabilitated oiled birds and of free-roaming oiled birds are important but unknown variables.

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