

Oiled Wildlife on and around Alcatraz Island after the Cosco Busan Spill



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Introduction & Methods

The *Cosco Busan* freighter spilled 58,000 gallons of oil into San Francisco Bay on November 7, 2007. PRBO responded by conducting surveys for oiled wildlife on Alcatraz Island. In summary, these included standardized walking shoreline surveys and visual colony surveys to record all waterbirds present, and to detect dead and sub-lethally oiled waterbirds and marine mammals. Live oiled wildlife in the waters surrounding Alcatraz was also documented. Surveys were conducted once every 3 days by staff biologists, with intermittent monitoring by Alcatraz ABC volunteers, such that coverage was approximately 3-5 days/week through mid-December. In January – February, surveys were conducted once/week. Surveys were conducted in accordance with the Oil Spill Heightened Awareness Protocol for Alcatraz (**Appendix A**), adapted from a similar document for SE Farallon Island authored by PRBO and USFWS.

Results

A total of 24020 live wildlife observations were recorded. Pinnipeds accounted for 51 of these live observations and the rest were waterbirds. Of the live birds, 149 were observed to be oiled, it was unknown if 1708 were oiled or not (due to various conditions including fog, glare, bird behavior such as diving, etc.), and 22163 live birds were not observed to be oiled. Please note that some birds may have been sighted more than once, e.g., Western Gulls that may reside on the island. A total of 21 dead wildlife observations were recorded. One dead pinniped was observed, a harbor seal floating in the water which had been scavenged so we were unable to tell if it was oiled. Of the dead bird observations, 1 bird was oiled, 1 bird was oiled but it was unknown if oil was the cause of death (i.e., it was also tangled in fishing line), and 18 birds were old carcasses that were not oiled. **Table 1** details the amount of oiling observed on birds.

Table 1. Estimated percentage of oil covering the bodies of birds observed on and around Alcatraz Island, November 2007 – February 2008.

1-5%	6-24%	25-49%	50-74%	75-99%	100%	Oiled (but unk. %)	Total oiled
116	9	6	5	2	2	9	149

Many more oiled birds were observed in November and December than in January and February, although total counts of live birds were higher in December – February (**Figure 1**). Island oil cleanup began on 8 December, 2007, and relatively high numbers of oiled birds (>5/survey) were still observed on that day and on 14 December. **Figure 2** separates oiled bird observations made by staff versus those from volunteer surveys.

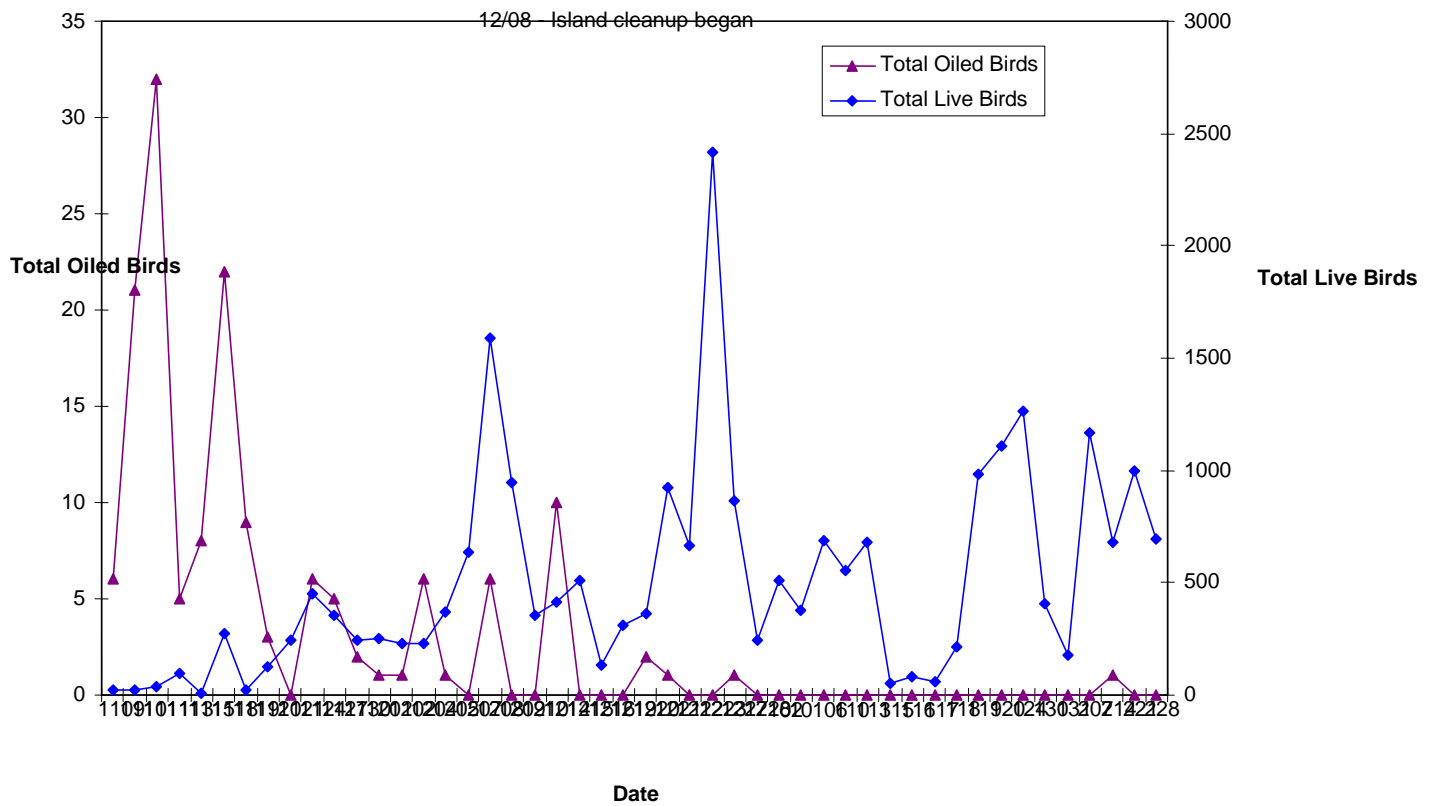


Figure 1. Observations of total numbers of live birds and oiled birds observed on and around Alcatraz Island Nov. 2007 – Feb. 2008. The y-axes correspond to either the total number of live or oiled birds.

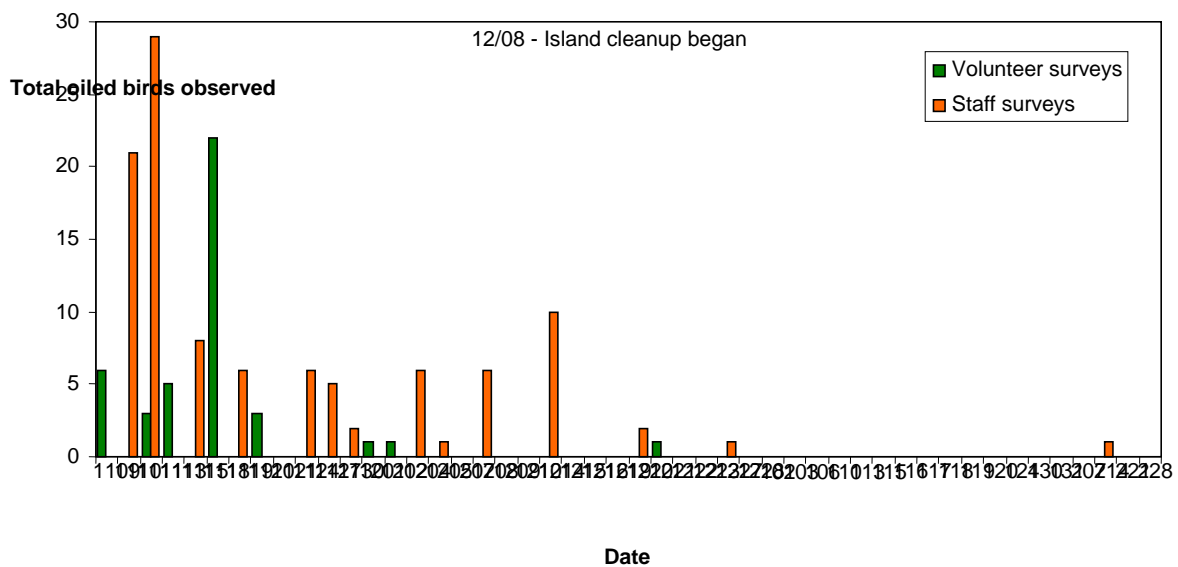


Figure 2. Observations of total numbers of oiled birds observed on staff versus volunteer surveys at Alcatraz Island Nov. 2007 – Feb. 2008.

Wildlife species observed during surveys are shown in **Table 2**. Alcatraz breeding waterbird species observed were Brandt’s and Pelagic Cormorants (brac and peco, respectively), Western Gulls (wegu), Black Oystercatchers (bloy) of which some individuals were oiled, and Black-crowned Night-herons (bcnh) of which none were observed oiled. No pinnipeds were confirmed to be oiled.

Table 2. Observations of oiled and non-oiled wildlife from Alcatraz surveys in Nov. 2007 – Feb. 2008. Species are noted by 4-letter codes (see American Ornithologists’ Union website for more details).

	Species	Oiled	Unknown if Oiled	Not Oiled	Total
Alcatraz breeding species	brac	6	25	650	681
	peco	1	2	22	25
	wegu	81	31	13883	13995
	bloy	4	12	40	56
	bcnh			4	4
Pinnipeds	case			2	2
	hase		2	48	50
Other waterbirds	bltu	36	10	94	140
	dcco	8	1311	2583	3902
	wegr	5	296	4576	4877
	comu	5		2	7
	susc	2	9	57	68
	unk loon	1		2	3
	wata	1		9	10
	colo		6	18	24
	cora		2		2
	unk scaup		2	10	12
	palo		1		1
	unk scoter		1		1
	grsc			116	16
	cago			91	91
	rtlo			26	26
	surf			10	10
	cogo			7	7
	brpe			7	7
	mall			6	6
	unk corm			5	5
	clgr			3	3
	spsa			2	2
	cagu			2	2
	bago			2	2
	thgu			1	1
	pbgr			1	1
gwgu			1	1	
gbhe			1	1	

Discussion

Bird deaths related to oiling may negatively affect breeding populations on Alcatraz. Externally, oil sticks to feathers, causing them to mat and separate, impairing waterproofing and exposing the bird’s sensitive skin to extreme temperatures and resulting in death. Numbers of oiled wildlife observed are often much lower than actual numbers of wildlife actually affected by spills due to a number of causes. When birds try to remove oil from the feathers by preening, this results in ingestion of the oil and sometimes delayed mortality. Reported

effects of oil ingestion include hemolytic anemia, gastrointestinal irritation and hemorrhage, as well as liver and kidney disorders (Leighton et al. 1983, Jessup and Leighton 1996, Yamato et al. 1996, Balseiro et al. 2005). Overall, oil toxicosis has been shown to cause multiple sublethal changes that have an effect on the ability of seabirds to survive at sea, especially weak and young, inexperienced animals (Balseiro et al. 2005). Other difficulties in assessing numbers of birds affected include difficulties of complete spatial and temporal survey coverage of affected areas, scavenging and/or sinking of carcasses, etc.

In addition to such direct effects of mortality, oil spills can also affect seabird populations indirectly. The *Cosco Busan* spill occurred and subsequent surveys were conducted during the non-breeding season for seabirds. The numbers of oiled birds observed on and around Alcatraz decreased from November – December to January – February, so no direct effects to breeding activity were observed, which usually begins in February – April (depending on species). However, oiling has been shown to reduce seabird breeding success (Barham et al. 2007), including that of cormorants (Velando et al. 2005a). In another study, cormorants exhibited higher oil-related mortality of females than males, skewing sex ratios and reducing the number of females available to produce offspring in subsequent years (Martinez-Abraín et al. 2006). Such effects, especially when coupled with other concerns related to human activities, may amplify effects of oil spills on seabird populations beyond what is expected when taking into account only the number of birds killed (Martinez-Abraín et al. 2006).

Sublethal exposure to oil may also result in continued poor body condition, and reduced reproduction and survival of birds in the long term (Walton et al. 1997). Cormorants are inshore and coastal feeders and resident throughout the year, and therefore have increased opportunities for exposure as long as the oil remains in their foraging areas. In Prince William Sound, Alaska, Pigeon Guillemots, which are also inshore and coastal feeders, showed toxic signs of oil exposure 10 years after the *Exxon Valdez* disaster (Golet et al. 2002). Oil may also deplete food resources for seabirds or cause increased toxicity of prey (Velando et al. 2005b, Khan and Payne 2005).

Literature Cited

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Appendix A

Oil Spill Monitoring and Reporting Protocols for Alcatraz Island

Subsequent to the Cosco Busan spill in November 2007, heightened awareness protocols involve the following activities:

Shoreline surveys will be conducted to document all waterbirds present, and to detect dead and sub-lethally oiled birds. The continuous route will proceed from the Dock, along the Lower Walkway under the Sally Port and Officer's Club and Powerhouse, along North Perimeter and to the North Foghorn, and additionally from the Dock to the Agave Trail. These routes will include counts from the intertidal up the visible part of the hill to fence and/or wall of walkways immediately above, this will not include birds sitting on buildings or railings of walkways above.

Along the southwestern cliffs, exposed shoreline and intertidal areas will be surveyed from observation points above on the cliffs, as tidal height allows visibility. These areas include South Foghorn tidepools, Below South Colony, Barker Beach, Seawall, Below Model Industries. These observations will include birds on intertidal areas and/or flat area of Seawall only.

Visual scans (using binoculars and spotting scope) will be conducted of all bird breeding colonies and roosting areas, concentrating on monitored sub-colonies of all breeding species (Brandt's Cormorant, Pelagic Cormorant, Western Gull, Pigeon Guillemot, Black Oystercatcher). These will include regular censuses of seabirds present, as well as noting any oiled individuals. For Brandt's Cormorants and Pigeon Guillemots, these areas include the Southern sub-colony, Barker Beach, North sub-colony/Incinerator, Laundry Building/Seawall, Model Industries, North Foghorn. For Pelagic Cormorants, this includes Model Industries. For Black Oystercatchers, this includes the Seawall. For Western Gulls, these include the Parade Ground, Cistern, and Model Industries Plaza. For non-oiled gulls, count those within standardized sub-colony boundaries only (top flat area of Cistern, not slopes; MI Plaza within gated area, between MI Bldg and Fuel Tanks, PG within study plot boundaries only, see map).

Visual scans of the waters surrounding Alcatraz (using binoculars and spotting scope) out to 300ft will be conducted from the island simultaneously to the shoreline and colony surveys. All oiled wildlife (waterbirds and marine mammals) will be recorded.

Any oiled birds seen incidentally during surveys, even if not in regular survey area, will be recorded.

All surveyed areas are recorded on the datasheet, even if no wildlife is observed. Survey areas are standardized and start/stop times of surveys are recorded. Notes about oil in the vicinity (water, intertidal, etc.) will be recorded. **Flocks of un-oiled birds may be recorded on one row per species, listing the total number observed, minus any oiled individuals. Each oiled bird is recorded on a separate line.**

If oiled birds are observed, the **species, live/dead status, body location of the oil, and % body covered with oil** will be noted, as well as reporting the **time and observer and island area** on the accompanying standardized data sheet. **Please record 1 oiled bird per line.** *Please make sure to note if you think an entry is repeated from the previous day, e.g., if dead oiled birds are present but collection crews have not come out since the previous survey.* It may be difficult to determine oil residue on cormorants, guillemots and oystercatchers in some cases; a spotting scope will be used for close-up views, and behaviors noted (excessive preening, if bird is visibly foraging in oil, trouble walking or flying, etc).

Live oiled birds can be reported to the OWCN Response Coordinator at 415-701-2311, or within San Francisco City limits: 311.

If live oiled marine mammals are observed on the island, the OWCN Response Coordinator can be notified, who will contact the National Marine Fisheries Service (Joe Cordera) and the marine mammal biologist to discuss if further evaluation is warranted.

Surveys will be conducted once every 3 days by the Alcatraz biologist, with intermittent monitoring by Alcatraz ABC volunteers, such that coverage is approximately 3-5 days/week. This frequency will continue through mid-December, after which time surveys will be conducted once/week until the beginning of March when regular breeding season surveys begin.

Data will be collected using the attached template (ALCZoil_template.xls). Data sheets will be input and proofed weekly and archived at PRBO's online data entry site; data is also provided weekly to GGNRA (Daphne_Hatch@nps.gov) and to the data repository for this spill (CoscoBusan.data@gmail.com). Data from PRBO staff and volunteers will be provided separately.