



Marine Bird Surveys

California Current Ecosystem Survey - Marine Bird Surveys April 2008 and July-August 2008

Prepared by
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On behalf of Oregon Wave Energy Trust

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Oregon Wave Energy Trust (OWET) is a nonprofit public-private partnership funded by the Oregon Innovation Council. Its mission is to support the responsible development of wave energy in Oregon. OWET emphasizes an inclusive, collaborative model to ensure that Oregon maintains its competitive advantage and maximizes the economic development and environmental potential of this emerging industry. Our work includes stakeholder outreach and education, policy development, environmental assessment, applied research and market development.

Data report to OWET

CCES Marine Bird Surveys, April 2008 and July-August 2008

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NOAA Ships:

Miller Freeman (April 2008)
David Starr Jordan (July-August 2008)

Summary statement

As part of the California Current Ecosystem Survey, NOAA Fisheries sponsored pairs of seabird observers who collected quantitative information on marine bird species, abundance, and behavior during all daylight hours when the ship was under way. Observers participated on Leg 1 and Leg 2 of the April 2008 *Miller Freeman* survey, and Legs 1, 2, and 3 of the July-August *David Starr Jordan* survey. OWET provided funding for observers on Leg 2 of the April cruise and Legs 1 and 2 of the July cruise; data from non-OWET funded legs are included for completeness.

This report is meant to provide a concise data summary of methods, survey dates and locations, and relative abundance of bird species seen during the surveys. It is not a final analysis, nor have data been fully processed to provide absolute abundances.

Methods

Bird survey data were collected using strip transect methods (Tasker et al. 1984). Observations were recorded during daylight hours when the vessel was moving at speeds in excess of $8 \text{ m}\cdot\text{s}^{-1}$ (4 knots) and when weather conditions permitted observation. Observations began at dawn each morning. A pair of dedicated bird observers counted and identified all flying or sitting birds within a strip transect extending 300 m out from the bow to the beam of the ship (90° arc). Strip width was determined using a calibrated range-finder (Heinemann 1981). Observations were collected from the flying bridge of the NOAA Ship *Miller Freeman* and *David Starr Jordan*, on the side of the vessel with the least visual glare. Individual sightings were categorized into three distance bins from the ship: 0-100 m, 101-200 m, and 201-300 m. Sightings of interest were recorded opportunistically beyond 300 meters only when it did not compromise complete observer coverage of the primary survey area. Sightings of interest were also recorded opportunistically while off survey effort during daylight hours. Species identification, counts, and behaviors (e.g. resting, feeding, flight direction, etc), were noted and recorded. Binoculars of at least 8x magnification were used to aid in counting and species identification.

During survey efforts, the primary and secondary observer scanned the survey area for birds. When a bird was detected the primary observer verbally called out the sighting details to the secondary observer, who immediately typed the data into a weatherproof laptop computer running the "See-Bird" data acquisition program v 2.3.0 (Southwest Fisheries Science Center, La Jolla, CA). The computer was linked to the ship's GPS satellite data input so that each observation entered is associated with a time stamp and a latitude/longitude position. Observers traded primary scanning and data entry duties every few hours and took breaks where appropriate for meals.

Raw data were error-checked at the close of each day and upon return from sea while being entered into an MS-Access database. The data remain in the custody of Dr. Jeannette E. Zamon, NOAA Fisheries, Northwest Fisheries Science Center. Preliminary summaries of those data are presented in this report.

Data summary

Dates, locations, and kilometers of survey effort

Observers actively collected survey data from the *Miller Freeman* between 01 April and 02 May 2008. Coverage began at Cape Flattery, WA and ended in San Francisco, CA. This period includes data from a post-cruise transit from San Francisco, CA to Seattle, WA between 01 and 02 May 2008. On-effort sightings covered a total of 4,015.9 km survey distance. No data were collected during the in-port period of 15 to 17 April.

Survey data from the *David Starr Jordan* were collected between 05 July and 18 August 2008. On-effort sightings covered at total of 4,922.2 km survey distance. No data were collected during the in-port period of 02 to 05 August, and no data were collected on 10, 11, or 12 August.

Daily totals of linear kilometers surveyed are provided in Tables 1 and 2. Totals include only those periods for which observers were “on effort” actively collecting marine bird survey data.

Species counts by survey day

During April, 48 species of birds were identified during survey efforts. Most of these species were marine birds or water birds (waterfowl, shorebirds, etc.), but some land birds were sighted offshore (e.g. Anna’s hummingbird). Total species counts by survey day are shown in Table 3. Also included are marine mammal sightings that occurred within the 300 m survey zone.

Two endangered immature short-tailed albatross, *Phoebastria albatrus*, were seen during survey efforts; one bird was within 300 meters of the ship on 06 April 2008 approximately 184 km west of Grays Harbor, WA. A second immature short-tailed albatross was observed greater than 300 meters from the ship on 19 April 2008 approximately 36 kilometers southwest of Gold Beach, OR. Observers were able to photograph both birds. Twenty-two endangered marbled murrelets (*Brachyramphus marmoratus*) were seen: two on 03 April 2008 and twenty on 10 April 2008. The first pair was seen ~57 km west of the entrance to Juan de Fuca, and the others were seen within 22 km of the mouth of the Siuslaw River near Florence, OR. Some of these individuals were in breeding plumage, and some were still in winter plumage.

During July and August, 57 species of birds were identified during survey efforts. As in April, most of these species were marine birds or water birds, but some land birds were sighted offshore (e.g. mourning dove). Total species counts by survey day are shown in Table 4. Also included in this table are sightings of the ocean sunfish, *Mola mola*, and marine mammals that occurred within the 300 m survey zone.

Relative species composition

Two pie charts present the most common types of birds seen during the April and July/August research cruises, respectively (Figures 1, 2). Birds that made up more than one percent of sightings are presented as individual wedges in the chart.

During April, a total of 10,324 birds were detected during the survey. The most common bird was the red phalarope, *Phalaropus fulicarius* (29.1% of sightings), a planktivorous shorebird most likely on its spring migration to Arctic breeding grounds. The next most common bird was the common murre, *Uria aalge*, a piscivorous (and occasionally planktivorous) diving bird (15.8% of sightings). This bird is capable of capturing fish such as anchovy and sardine. Other species that are capable of capturing anchovy and sardine include the sooty shearwater (*Puffinus griseus*), the rhinoceros auklet (*Cerorhinca monocerata*), gulls (*Larus* species), the black-footed albatross (*Phoebastria nigripes*), the northern fulmar (*Fulmarus glacialis*), and the Pacific loon (*Gavia pacifica*).

During July and August, a total of 11,925 birds were detected during the survey. Unlike in April, when spring migrants accounted for almost half of the species seen, the summer resident sooty shearwater (28.5%) and common murre (19.8%) dominated the community in July and August. Both of these species consume pelagic schooling fishes such as anchovy and sardine. Other species capable of consuming anchovy or sardine include the gulls (*Larus* species), the pink-footed shearwater (*Puffinus creatopus*), the northern fulmar (*Fulmarus glacialis*), the Brandt's cormorant (*Phalacrocorax pencillatus*), the black-footed albatross (*Phoebastria nigripes*), and the rhinoceros auklet (*Cerorhinca monocerata*).

Heinemann, D. 1981. A Range finder for pelagic bird censusing. *J. Wildlife Manage.* 45(2): 489-493.

Tasker, M.L., Hope Jones, P., Dixon, T., Blake, B.F. 1984. Counting seabirds at sea from ships: a review of methods employed and a suggestion for a standardized approach. *Auk* 101(3): 567-577.

Table 1. Linear distance of on-effort marine bird survey, by survey day, April 2008. Data collection not sponsored by OWET is indicated in gray.

Date	Linear distance surveyed (km)
1-Apr-08	15.0
2-Apr-08	91.0
3-Apr-08	198.1
4-Apr-08	166.0
5-Apr-08	123.5
6-Apr-08	153.6
7-Apr-08	113.5
8-Apr-08	125.7
9-Apr-08	174.6
10-Apr-08	131.9
11-Apr-08	171.3
12-Apr-08	130.1
13-Apr-08	160.9
14-Apr-08	90.1
18-Apr-08	238.3
19-Apr-08	172.6
20-Apr-08	138.9
21-Apr-08	180.9
22-Apr-08	14.7
23-Apr-08	168.6
24-Apr-08	146.1
25-Apr-08	175.0
26-Apr-08	175.2
27-Apr-08	114.1
28-Apr-08	96.2
29-Apr-08	130.3
30-Apr-08	25.2
1-May-08	212.3
2-May-08	182.2
TOTAL	4015.9

Table 2. Linear distance of on-effort marine bird survey, by survey day, July/August 2008. Data collection not sponsored by OWET is indicated in gray.

Date	Linear distance surveyed (km)
5-Jul-08	151.0
6-Jul-08	140.5
7-Jul-08	148.5
8-Jul-08	94.4
9-Jul-08	129.1
10-Jul-08	148.8
11-Jul-08	109.6
12-Jul-08	123.8
13-Jul-08	159.9
14-Jul-08	138.7
15-Jul-08	86.0
16-Jul-08	66.2
17-Jul-08	135.0
18-Jul-08	140.1
19-Jul-08	146.9
20-Jul-08	143.9
21-Jul-08	109.3
22-Jul-08	7.4
23-Jul-08	143.8
24-Jul-08	155.8
25-Jul-08	102.2
26-Jul-08	134.8
27-Jul-08	132.7
28-Jul-08	118.0
29-Jul-08	146.7
30-Jul-08	148.7
31-Jul-08	136.0
1-Aug-08	129.8
6-Aug-08	77.3
7-Aug-08	141.4
8-Aug-08	137.9
9-Aug-08	72.3
13-Aug-08	46.5
14-Aug-08	156.6
15-Aug-08	174.4
16-Aug-08	162.7
17-Aug-08	220.3
18-Aug-08	204.8
TOTAL	4922.2

Table 3. Raw species counts by survey day, April 2008.

SCIENTIFIC NAME	COMMON NAME	SURVEY DAY																
		01-Apr-08	02-Apr-08	3-Apr-08	04-Apr-08	5-Apr-08	06-Apr-08	7-Apr-08	08-Apr-08	9-Apr-08	10-Apr-08	11-Apr-08	12-Apr-08	13-Apr-08	14-Apr-08	18-Apr-08	19-Apr-08	20-Apr-08
MARINE BIRDS																		
Class Aves	unidentified bird	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Gavia immer</i>	common loon	-	-	-	-	-	-	-	-	-	3	-	2	-	-	-	-	-
<i>Gavia stellata</i>	red-throated loon	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
<i>Gavia pacifica</i>	Pacific loon	-	-	-	-	1	-	-	2	-	28	-	86	-	-	-	4	-
<i>Phoebastria albatrus</i>	short-tailed albatross	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
<i>Phoebastria nigripes</i>	black-footed albatross	-	-	3	-	48	3	11	7	5	2	1	1	-	8	5	10	2
<i>Diomedea immutabilis</i>	Laysan albatross	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-
<i>Fulmarus glacialis</i>	northern fulmar	-	-	11	3	11	19	9	8	5	8	2	-	2	3	34	3	8
<i>Puffinus creatopus</i>	pink-footed shearwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Puffinus griseus</i>	sooty shearwater	-	-	124	2	224	15	9	28	7	203	2	3	15	26	9	14	-
<i>Puffinus spp.</i>	dark shearwater	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Puffinus tenuirostris</i>	short-tailed shearwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pterodroma inexpectata</i>	mottled petrel	-	-	-	-	-	-	-	-	2	-	1	-	-	-	3	-	-
<i>Pterodroma cookii</i>	Cook's petrel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pterodroma ultima</i>	Murphy's petrel	-	-	-	-	-	1	-	-	-	-	-	-	3	-	1	-	-
<i>Oceanodroma spp.</i>	unidentified storm-petrel	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2	-	1
<i>Oceanodroma furcata</i>	fork-tailed storm-petrel	-	-	-	8	-	2	6	26	17	-	1	-	13	-	38	7	14
<i>Oceanodroma leucorhoa</i>	Leach's storm-petrel	-	-	-	-	-	11	63	7	17	-	1	-	7	-	31	13	255
<i>Oceanodroma homochroa</i>	ashy storm-petrel	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
<i>Phalacrocorax penicillatus</i>	Brandt's cormorant	-	1	-	-	10	-	-	2	-	2	-	-	-	-	-	-	-
<i>Phalacrocorax pelagicus</i>	pelagic cormorant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Anas spp.</i>	unidentified duck	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Melanitta fusca</i>	white-winged scoter	-	-	-	-	3	-	-	-	-	-	-	1	-	-	-	-	-
<i>Melanitta perspicillata</i>	surf scoter	-	-	-	-	-	-	-	-	-	31	-	63	-	-	-	-	-
Suborder Charadrii	unidentified shorebird	-	-	-	-	1	-	-	-	-	8	-	-	-	1	-	-	-
<i>Phalaropus spp.</i>	unidentified phalarope	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2
<i>Phalaropus fulicarius</i>	red phalarope	-	-	-	-	-	-	-	1	-	-	2	-	51	2	76	26	1
<i>Phalaropus lobatus</i>	red-necked phalarope	-	-	-	-	-	-	-	12	-	12	-	1	15	16	3	26	-
<i>Stercorarius pomarinus</i>	pomarine jaeger	-	-	-	-	1	-	1	1	-	-	-	-	-	-	-	-	-
<i>Stercorarius parasiticus</i>	parasitic jaeger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 3. Raw species counts by survey day, April 2008 (con't).

SCIENTIFIC NAME	COMMON NAME	SURVEY DAY																
		01-Apr-08	02-Apr-08	3-Apr-08	04-Apr-08	5-Apr-08	06-Apr-08	7-Apr-08	08-Apr-08	9-Apr-08	10-Apr-08	11-Apr-08	12-Apr-08	13-Apr-08	14-Apr-08	18-Apr-08	19-Apr-08	20-Apr-08
<i>Stercorarius longicaudus</i>	long-tailed jaeger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Larus occidentalis x glaucescens</i>	western x glaucous-winged gull	2	7	14	3	63	3	4	37	9	46	2	37	6	13	10	23	8
<i>Larus spp.</i>	unidentified gull	-	-	-	-	4	-	-	-	-	-	-	-	2	-	-	1	-
<i>Larus hyperboreus</i>	glaucous gull	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Larus glaucescens</i>	glaucous-winged gull	-	-	1	-	5	-	-	-	-	-	-	1	-	-	2	2	-
<i>Larus occidentalis</i>	western gull	-	-	-	-	-	-	-	7	-	7	-	7	-	-	11	12	7
<i>Larus argentatus</i>	herring gull	-	-	1	2	6	1	1	3	5	3	-	1	11	5	3	3	2
<i>Larus thayeri</i>	Thayer's gull	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Larus californicus</i>	California gull	-	-	1	-	-	-	1	1	-	-	-	-	4	4	29	6	1
<i>Larus canus</i>	mew gull	-	2	1	-	-	-	-	-	-	2	-	3	-	3	-	-	-
<i>Larus philadelphia</i>	Bonaparte's gull	-	-	-	-	-	-	-	1	-	-	-	-	-	11	-	16	2
<i>Xema sabini</i>	Sabine's gull	-	-	-	-	-	1	1	-	-	3	-	-	1	1	9	-	2
<i>Rissa tridactyla</i>	black-legged kittiwake	-	-	15	1	7	20	21	19	2	4	-	-	1	-	-	-	-
<i>Sterna spp.</i>	unidentified tern	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Family Alcidae	unidentified alcid	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-
<i>Uria aalge</i>	common murre	-	14	8	-	105	-	-	19	-	777	-	265	-	18	3	45	-
<i>Uria lomvia</i>	thick-billed murre	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Cephus columba</i>	pigeon guillemot	-	1	-	-	1	-	-	-	-	3	-	-	-	-	-	-	-
<i>Brachyramphus marmoratus</i>	marbled murrelet	-	-	2	-	-	-	-	-	-	20	-	-	-	-	-	-	-
<i>Synthliboramphus antiquus</i>	ancient murrelet	-	-	-	-	-	-	-	-	-	3	-	3	-	-	-	-	-
<i>Ptychoramphus aleuticus</i>	Cassin's auklet	-	-	35	3	13	-	2	10	3	233	-	2	3	15	11	14	-
<i>Cyclorhynchus psittacula</i>	parakeet auklet	-	-	-	-	19	1	-	-	-	3	-	-	-	-	2	-	-
<i>Cerorhinca monocerata</i>	rhinoceros auklet	8	25	107	-	140	2	12	15	7	202	-	23	-	9	26	50	-
<i>Fratercula corniculata</i>	horned puffin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Fratercula cirrhata</i>	tufted puffin	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-
<i>Calypte anna</i>	Anna's hummingbird	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Order Passeriformes	passerine	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 3. Raw species counts by survey day, April 2008 (con't).

SCIENTIFIC NAME	COMMON NAME	01-Apr-08	02-Apr-08	3-Apr-08	04-Apr-08	5-Apr-08	06-Apr-08	7-Apr-08	08-Apr-08	9-Apr-08	10-Apr-08	11-Apr-08	12-Apr-08	13-Apr-08	14-Apr-08	18-Apr-08	19-Apr-08	20-Apr-08
MARINE MAMMALS		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Phocoenoides dalli</i>	Dall's porpoise	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
<i>Megaptera novaeangliae</i>	hump-backed whale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Eumetopias jubatus</i>	Steller sea lion	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
<i>Callorhinus ursinus</i>	northern fur seal	-	-	-	2	-	1	1	-	1	-	2	-	1	-	1	1	-
TOTAL BY DAY		11	57	327	25	663	84	142	208	80	1603	14	501	134	137	313	282	305

Table 3. Raw species counts by survey day, April 2008 (con't).

SCIENTIFIC NAME	COMMON NAME	SURVEY DAY											TOTAL BY SPECIES	
		21-Apr-08	22-Apr-08	23-Apr-08	24-Apr-08	25-Apr-08	26-Apr-08	27-Apr-08	28-Apr-08	29-Apr-08	30-Apr-08	01-May-08		02-May-08
MARINE BIRDS														
Class Aves	unidentified bird	-	-	1	-	-	5	-	-	-	-	-	-	6
<i>Gavia immer</i>	common loon	-	-	-	-	2	-	-	-	-	-	-	-	7
<i>Gavia stellata</i>	red-throated loon	-	-	-	-	-	-	-	-	-	1	-	-	2
<i>Gavia pacifica</i>	Pacific loon	-	-	-	-	51	-	-	12	-	-	4	-	188
<i>Phoebastria albatrus</i>	short-tailed albatross	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>Phoebastria nigripes</i>	black-footed albatross	10	5	9	5	9	-	1	5	7	-	41	23	221
<i>Diomedea immutabilis</i>	Laysan albatross	-	-	-	-	-	-	-	-	-	-	-	-	2
<i>Fulmarus glacialis</i>	northern fulmar	4	-	12	1	11	7	2	9	-	-	3	1	176
<i>Puffinus creatopus</i>	pink-footed shearwater	-	-	-	-	1	-	-	1	-	-	3	2	7
<i>Puffinus griseus</i>	sooty shearwater	-	-	48	1	41	2	-	13	1	6	33	7	833
<i>Puffinus spp.</i>	dark shearwater	-	-	-	-	-	-	-	-	-	-	-	-	2
<i>Puffinus tenuirostris</i>	short-tailed shearwater	-	1	-	-	-	-	-	-	-	-	-	-	1
<i>Pterodroma inexpectata</i>	mottled petrel	-	-	-	-	-	-	-	-	-	-	-	-	6
<i>Pterodroma cookii</i>	Cook's petrel	-	-	-	-	-	-	-	-	30	-	-	-	30
<i>Pterodroma ultima</i>	Murphy's petrel	1	-	1	13	2	2	-	-	9	-	3	-	36
<i>Oceanodroma spp.</i>	unidentified storm-petrel	-	-	-	-	-	-	-	-	-	-	-	-	5
<i>Oceanodroma furcata</i>	fork-tailed storm-petrel	6	-	39	4	-	5	6	-	-	-	1	73	266
<i>Oceanodroma leucorhoa</i>	Leach's storm-petrel	38	-	34	302	-	47	15	-	38	-	-	-	879
<i>Oceanodroma homochroa</i>	ashy storm-petrel	-	-	-	-	-	-	-	-	4	-	-	-	5
<i>Phalacrocorax penicillatus</i>	Brandt's cormorant	-	-	-	-	-	-	-	-	1	-	-	-	16
<i>Phalacrocorax pelagicus</i>	pelagic cormorant	-	-	-	-	-	-	-	-	-	1	-	-	1
<i>Anas spp.</i>	unidentified duck	-	-	-	-	-	-	-	-	-	-	-	-	3
<i>Melanitta fusca</i>	white-winged scoter	-	-	-	-	-	-	-	-	-	-	-	-	4
<i>Melanitta perspicillata</i>	surf scoter	-	-	-	-	-	-	-	-	-	2	-	-	96
Suborder Charadrii	unidentified shorebird	-	-	-	-	-	-	-	-	2	-	-	-	12
<i>Phalaropus spp.</i>	unidentified phalarope	-	-	5	-	8	-	-	-	-	-	-	-	19
<i>Phalaropus fulicarius</i>	red phalarope	24	-	85	844	20	336	2	-	2	-	38	1497	3007
<i>Phalaropus lobatus</i>	red-necked phalarope	-	-	14	-	20	-	-	180	-	2	26	366	693
<i>Stercorarius pomarinus</i>	pomarine jaeger	-	-	-	-	-	1	-	-	-	-	-	-	4
<i>Stercorarius parasiticus</i>	parasitic jaeger	-	-	-	-	-	-	-	-	-	-	1	2	3

Table 3. Raw species counts by survey day, April 2008 (con't).

SCIENTIFIC NAME	COMMON NAME	SURVEY DAY											TOTAL BY SPECIES	
		21-Apr-08	22-Apr-08	23-Apr-08	24-Apr-08	25-Apr-08	26-Apr-08	27-Apr-08	28-Apr-08	29-Apr-08	30-Apr-08	01-May-08		02-May-08
<i>Stercorarius longicaudus</i>	long-tailed jaeger	-	-	-	1	1	1	1	1	-	-	-	-	6
<i>Larus occidentalis x glaucescens</i>	western x glaucous-winged gull	-	-	3	-	10	-	-	-	-	-	1	14	315
<i>Larus spp.</i>	unidentified gull	-	-	-	-	5	-	2	1	-	-	1	-	16
<i>Larus hyperboreus</i>	glaucous gull	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>Larus glaucescens</i>	glaucous-winged gull	-	-	2	-	-	-	-	-	-	-	-	-	13
<i>Larus occidentalis</i>	western gull	-	1	6	-	25	-	-	32	-	7	10	19	151
<i>Larus argentatus</i>	herring gull	-	-	3	-	2	-	5	2	-	-	19	8	86
<i>Larus thayeri</i>	Thayer's gull	-	-	-	-	1	-	-	-	-	-	-	-	3
<i>Larus californicus</i>	California gull	1	1	11	-	67	-	-	9	-	1	5	23	165
<i>Larus canus</i>	mew gull	-	-	-	-	-	-	-	-	-	-	-	-	11
<i>Larus philadelphia</i>	Bonaparte's gull	-	-	4	-	1	-	-	-	-	-	2	-	37
<i>Xema sabini</i>	Sabine's gull	-	-	5	-	18	-	-	-	-	-	3	16	60
<i>Rissa tridactyla</i>	black-legged kittiwake	1	-	-	-	1	-	-	-	-	-	-	-	92
<i>Sterna spp.</i>	unidentified tern	-	-	-	-	-	-	-	-	-	-	1	-	1
Family Alcidae	unidentified alcid	-	-	-	2	-	-	-	-	-	-	-	-	4
<i>Uria aalge</i>	common murre	-	-	-	-	54	-	-	187	-	139	-	-	1634
<i>Uria lomvia</i>	thick-billed murre	-	-	-	-	-	-	-	-	-	-	-	1	2
<i>Cephus columba</i>	pigeon guillemot	-	-	-	-	-	-	-	1	-	-	-	-	6
<i>Brachyramphus marmoratus</i>	marbled murrelet	-	-	-	-	-	-	-	-	-	-	-	-	22
<i>Synthliboramphus antiquus</i>	ancient murrelet	-	-	-	-	-	-	-	-	-	-	-	-	6
<i>Ptychoramphus aleuticus</i>	Cassin's auklet	7	1	5	-	12	-	-	27	-	1	-	6	403
<i>Cyclorhynchus psittacula</i>	parakeet auklet	-	-	-	-	-	-	-	-	-	-	-	-	25
<i>Cerorhinca monocerata</i>	rhinoceros auklet	-	2	1	1	19	-	-	6	-	-	9	58	722
<i>Fratercula corniculata</i>	horned puffin	-	-	-	5	-	1	-	-	-	-	-	-	6
<i>Fratercula cirrhata</i>	tufted puffin	-	-	-	-	-	-	-	-	-	-	-	-	2
<i>Calypte anna</i>	Anna's hummingbird	-	-	-	-	-	-	-	-	-	-	-	-	1
Order Passeriformes	passerine	-	-	-	-	-	-	-	-	-	-	-	-	3

Table 3. Raw species counts by survey day, April 2008 (con't).

SCIENTIFIC NAME	COMMON NAME	21-Apr-08	22-Apr-08	23-Apr-08	24-Apr-08	25-Apr-08	26-Apr-08	27-Apr-08	28-Apr-08	29-Apr-08	30-Apr-08	01-May-08	02-May-08	TOTAL BY SPECIES
MARINE MAMMALS														
<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin	10	-	-	-	36	-	-	-	4	-	3	-	53
<i>Phocoenoides dalli</i>	Dall's porpoise	-	-	-	-	-	-	13	-	-	-	-	2	18
<i>Megaptera novaeangliae</i>	hump-backed whale	-	-	-	-	-	-	-	-	-	-	1	-	1
<i>Eumetopias jubatus</i>	Steller sea lion	-	-	-	-	-	-	-	-	-	-	-	-	2
<i>Callorhinus ursinus</i>	northern fur seal	1	-	1	6	-	5	-	1	-	-	-	1	25
TOTAL BY DAY		103	11	289	1185	417	412	47	494	92	160	208	2119	10423

Table 4. Raw species counts by survey day, July/August 2008.

SCIENTIFIC NAME	COMMON NAME	SURVEY DAY																
		05-Jul-08	06-Jul-08	07-Jul-08	08-Jul-08	09-Jul-08	10-Jul-08	11-Jul-08	12-Jul-08	13-Jul-08	14-Jul-08	15-Jul-08	18-Jul-08	19-Jul-08	20-Jul-08	21-Jul-08	22-Jul-08	23-Jul-08
MARINE FISH																		
<i>Mola mola</i>	ocean sunfish	1	1	1		2			1								1	
MARINE BIRDS																		
Class Aves	unidentified bird					1												
<i>Gavia immer</i>	common loon	1			5													
<i>Aechmophorus occidentalis</i>	western grebe																	
<i>Phoebastria nigripes</i>	black-footed albatross	16	31	2		17	3		6	3			5	2	3	4	2	22
<i>Diomedea immutabilis</i>	Laysan albatross																	
<i>Fulmarus glacialis</i>	northern fulmar	6	7	2	1	5			3		20	3	40	8	222	29	1	46
<i>Puffinus creatopus</i>	pink-footed shearwater	161	5			4		1	7		110	1	17			19		30
<i>Puffinus carneipes</i>	flesh-footed shearwater																	1
<i>Puffinus bulleri</i>	Buller's shearwater								1									
<i>Puffinus griseus</i>	sooty shearwater	695	35		9	40		17	113	1	1014	41	26		116	126		56
<i>Puffinus tenuirostris</i>	short-tailed shearwater							1										
<i>Pterodroma cookii</i>	Cook's petrel																	
<i>Oceanodroma</i> spp.	unidentified storm-petrel		2															
<i>Oceanodroma furcata</i>	fork-tailed storm-petrel	2	74	10		14			9		26		2		19	100		5
<i>Oceanodroma leucorhoa</i>	Leach's storm-petrel		48	58		213	72		41	37			4		76	9	90	
<i>Oceanodroma homochroa</i>	ashy storm-petrel		2															
<i>Oceanodroma melania</i>	black storm-petrel																	
<i>Halocyptena microsoma</i>	least storm-petrel																	
<i>Oceanites oceanicus</i>	Wilson's storm-petrel																	
<i>Phaethon aethereus</i>	red-billed tropicbird																	
<i>Phaethon rubricauda</i>	red-tailed tropicbird																	
<i>Pelecanus occidentalis</i>	brown pelican	4							8									
<i>Phalacrocorax auritus</i>	double-crested cormorant																	
<i>Phalacrocorax penicillatus</i>	Brandt's cormorant											1						
<i>Phalacrocorax pelagicus</i>	pelagic cormorant																	
<i>Ardea herodias</i>	great blue heron											1						
Suborder Charadrii	unidentified shorebird									1		3	1			2		

Table 4. Raw species counts by survey day, July/August 2008 (con't).

SCIENTIFIC NAME	COMMON NAME	SURVEY DAY																
		05-Jul-08	06-Jul-08	07-Jul-08	08-Jul-08	09-Jul-08	10-Jul-08	11-Jul-08	12-Jul-08	13-Jul-08	14-Jul-08	15-Jul-08	18-Jul-08	19-Jul-08	20-Jul-08	21-Jul-08	22-Jul-08	23-Jul-08
<i>Numenius phaeopus</i>	whimbrel															1		
<i>Tringa flavipes</i>	lesser yellowlegs																	
<i>Tringa incana</i>	wandering tattler												1					
<i>Limnodromus</i> spp.	unidentified dowitcher															30		
<i>Phalaropus fulicarius</i>	red phalarope																13	
<i>Phalaropus lobatus</i>	red-necked phalarope		1									195						
<i>Stercorarius pomarinus</i>	pomarine jaeger																	
<i>Stercorarius parasiticus</i>	parasitic jaeger	1							2	6			1				2	5
<i>Stercorarius longicaudus</i>	long-tailed jaeger												1		3		1	
<i>Catharacta maccormicki</i>	south polar skua	2	1			1	1		2						1			
<i>Larus occidentalis x glaucescens</i>	western x glaucous-winged gull	92			22	3		132	7		9	3						2
<i>Larus</i> spp.	unidentified gull															1		
<i>Larus glaucescens</i>	glaucous-winged gull							1			1							
<i>Larus occidentalis</i>	western gull	21			1			56	36		43	19	5			11		14
<i>Larus argentatus</i>	herring gull								1		8	6						
<i>Larus californicus</i>	California gull	1			3			7	5		20	9	4		1	1		6
<i>Larus heermanni</i>	Heermann's gull																	2
<i>Xema sabini</i>	Sabine's gull	1																
<i>Sterna hirundo</i>	common tern	1																
<i>Sterna paradisaea</i>	arctic tern			1			1								7	1	1	
<i>Sterna caspia</i>	Caspian tern	7						75										
<i>Thalasseus elegans</i>	elegant tern																	
Family Alcidae	unidentified alcid				1													
<i>Uria aalge</i>	common murre	114			103	1		45	95		212	424	36		10	95		43
<i>Cephus columba</i>	pigeon guillemot				3													
<i>Synthliboramphus antiquus</i>	ancient murrelet														1			
<i>Synthliboramphus hypoleucus</i>	Xantus's murrelet																2	
<i>Ptychoramphus aleuticus</i>	Cassin's auklet	5	59	1	4	3			3			25	2		7	20	1	19
<i>Cerorhinca monocerata</i>	rhinoceros auklet	98	5		25	7			1		1	4					1	2
<i>Fratercula corniculata</i>	horned puffin												1					
<i>Fratercula cirrhata</i>	tufted puffin	4	1		1	1		1										
<i>Zenaida macroura</i>	morning dove																	

Table 4. Raw species counts by survey day, July/August 2008 (con't).

SCIENTIFIC NAME	COMMON NAME	SURVEY DAY																
		05-Jul-08	06-Jul-08	07-Jul-08	08-Jul-08	09-Jul-08	10-Jul-08	11-Jul-08	12-Jul-08	13-Jul-08	14-Jul-08	15-Jul-08	18-Jul-08	19-Jul-08	20-Jul-08	21-Jul-08	22-Jul-08	23-Jul-08
Order Passeriformes	passerine																	
<i>Vermivora celata</i>	orange-crowned warbler																	
<i>Dendroica petechia</i>	yellow warbler																	
<i>Molothrus ater</i>	brown-headed cowbird																	
MARINE MAMMALS																		
<i>Delphinus</i> spp.	common dolphin																	
<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin	3	5				5				2							
<i>Lissodelphis borealis</i>	northern right whale dolphin		1															
<i>Grampus griseus</i>	Risso's dolphin																	
<i>Phocoena phocoena</i>	harbor porpoise	1									1							
<i>Phocoenoides dalli</i>	Dall's porpoise		5	6			3		8						5	1		4
<i>Balaenoptera acutorostrata</i>	minke whale	1																
<i>Megaptera novaeangliae</i>	hump-backed whale										1							
<i>Zalophus californianus</i>	California sea lion																	
<i>Eumetopias jubatus</i>	Steller sea lion				1													
<i>Callorhinus ursinus</i>	northern fur seal						3								1			
<i>Phoca vitulina</i>	harbor seal								1									
TOTAL BY DAY		1238	283	81	179	312	89	344	333	56	1467	736	142	14	396	517	34	347

Table 4. Raw species counts by survey day, July/August 2008 (con't).

SCIENTIFIC NAME	COMMON NAME	SURVEY DAY																			
		24-Jul-08	25-Jul-08	26-Jul-08	27-Jul-08	28-Jul-08	29-Jul-08	30-Jul-08	31-Jul-08	01-Aug-08	02-Aug-08	03-Aug-08	06-Aug-08	07-Aug-08	08-Aug-08	09-Aug-08	13-Aug-08	14-Aug-08			
MARINE FISH																					
<i>Mola mola</i>	ocean sunfish				1	1					1										
MARINE BIRDS																					
Class Aves	unidentified bird																				
<i>Gavia immer</i>	common loon																				
<i>Aechmophorus occidentalis</i>	western grebe																4				
<i>Phoebastria nigripes</i>	black-footed albatross		1	1	11	1	2	1	31	3	4	24			6	7					
<i>Diomedea immutabilis</i>	Laysan albatross												1								
<i>Fulmarus glacialis</i>	northern fulmar		3		16	4			20		17			2							
<i>Puffinus creatopus</i>	pink-footed shearwater					3	16			13		23	19			5	6	11			
<i>Puffinus carneipes</i>	flesh-footed shearwater																				
<i>Puffinus bulleri</i>	Buller's shearwater								1						2			2	16		
<i>Puffinus griseus</i>	sooty shearwater	2	16	1	13	10			44		1	16	52			677	36	38			
<i>Puffinus tenuirostris</i>	short-tailed shearwater																				
<i>Pterodroma cookii</i>	Cook's petrel														1	10					
<i>Oceanodroma</i> spp.	unidentified storm-petrel																				
<i>Oceanodroma furcata</i>	fork-tailed storm-petrel		2		33	3		1													
<i>Oceanodroma leucorhoa</i>	Leach's storm-petrel	112	23	161	41	23	9	1	9		1		2	4							
<i>Oceanodroma homochroa</i>	ashy storm-petrel												1		1	8			2		
<i>Oceanodroma melania</i>	black storm-petrel																				
<i>Halocyptena microsoma</i>	least storm-petrel																				
<i>Oceanites oceanicus</i>	Wilson's storm-petrel																				
<i>Phaethon aethereus</i>	red-billed tropicbird																				
<i>Phaethon rubricauda</i>	red-tailed tropicbird																				
<i>Pelecanus occidentalis</i>	brown pelican													7			5	2	1		
<i>Phalacrocorax auritus</i>	double-crested cormorant												1								
<i>Phalacrocorax penicillatus</i>	Brandt's cormorant													168			107	8			
<i>Phalacrocorax pelagicus</i>	pelagic cormorant												3								
<i>Ardea herodias</i>	great blue heron																				
Suborder Charadrii	unidentified shorebird																2				

Table 4. Raw species counts by survey day, July/August 2008 (con't).

SCIENTIFIC NAME	COMMON NAME	SURVEY DAY																
		24-Jul-08	25-Jul-08	26-Jul-08	27-Jul-08	28-Jul-08	29-Jul-08	30-Jul-08	31-Jul-08	01-Aug-08	02-Aug-08	03-Aug-08	06-Aug-08	07-Aug-08	08-Aug-08	09-Aug-08	13-Aug-08	14-Aug-08
<i>Numenius phaeopus</i>	whimbrel																	
<i>Tringa flavipes</i>	lesser yellowlegs												1					
<i>Tringa incana</i>	wandering tattler																	
<i>Limnodromus</i> spp.	unidentified dowitcher																	
<i>Phalaropus fulicarius</i>	red phalarope		6	20		14	7	2	7	8	4	1	4	7	12			
<i>Phalaropus lobatus</i>	red-necked phalarope								14			16				4	2	1
<i>Stercorarius pomarinus</i>	pomarine jaeger				3	1												
<i>Stercorarius parasiticus</i>	parasitic jaeger					1		1				7		4				12
<i>Stercorarius longicaudus</i>	long-tailed jaeger		3		12	5	7	2	3	3	1	7		13				1
<i>Catharacta maccormicki</i>	south polar skua				2							2	1	2				
<i>Larus occidentalis x glaucescens</i>	western x glaucous-winged gull								1							1		5
<i>Larus</i> spp.	unidentified gull	1														2		
<i>Larus glaucescens</i>	glaucous-winged gull																	
<i>Larus occidentalis</i>	western gull	11							20			8	117			107	68	8
<i>Larus argentatus</i>	herring gull												28			27	1	8
<i>Larus californicus</i>	California gull	1				1			3			5	10			79	5	54
<i>Larus heermanni</i>	Heermann's gull	10	2			9			3									
<i>Xema sabini</i>	Sabine's gull				5								2			13		
<i>Sterna hirundo</i>	common tern																	4
<i>Sterna paradisaea</i>	arctic tern		9	1	10	3	4		2	1				11	10			
<i>Sterna caspia</i>	Caspian tern																	
<i>Thalasseus elegans</i>	elegant tern															4		26
Family Alcidae	unidentified alcid								2		1							
<i>Uria aalge</i>	common murre	94	5		8	2						2	539			319	116	
<i>Cephus columba</i>	pigeon guillemot																	
<i>Synthliboramphus antiquus</i>	ancient murrelet																	
<i>Synthliboramphus hypoleucus</i>	Xantus's murrelet		3											6	2			
<i>Ptychoramphus aleuticus</i>	Cassin's auklet	3	4		7	35			1			1				2	3	9
<i>Cerorhinca monocerata</i>	rhinoceros auklet		13		7				1				8			2	3	1
<i>Fratercula corniculata</i>	horned puffin																	
<i>Fratercula cirrhata</i>	tufted puffin																	
<i>Zenaida macroura</i>	morning dove																	

Table 4. Raw species counts by survey day, July/August 2008 (con't).

SCIENTIFIC NAME	COMMON NAME	SURVEY DAY																
		24-Jul-08	25-Jul-08	26-Jul-08	27-Jul-08	28-Jul-08	29-Jul-08	30-Jul-08	31-Jul-08	01-Aug-08	02-Aug-08	03-Aug-08	06-Aug-08	07-Aug-08	08-Aug-08	09-Aug-08	13-Aug-08	14-Aug-08
Order Passeriformes	passerine																	
<i>Vermivora celata</i>	orange-crowned warbler																	
<i>Dendroica petechia</i>	yellow warbler																	
<i>Molothrus ater</i>	brown-headed cowbird					1												
MARINE MAMMALS																		
<i>Delphinus</i> spp.	common dolphin																	
<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin										4		30					
<i>Lissodelphis borealis</i>	northern right whale dolphin																	
<i>Grampus griseus</i>	Risso's dolphin											6						
<i>Phocoena phocoena</i>	harbor porpoise																3	
<i>Phocoenoides dalli</i>	Dall's porpoise		3			3		3			1	4	2				3	
<i>Balaenoptera acutorostrata</i>	minke whale										1							
<i>Megaptera novaeangliae</i>	hump-backed whale																	
<i>Zalophus californianus</i>	California sea lion											10				60	26	
<i>Eumetopias jubatus</i>	Steller sea lion									1			1			4		
<i>Callorhinus ursinus</i>	northern fur seal		1		2													
<i>Phoca vitulina</i>	harbor seal												1					
TOTAL BY DAY		122	183	46	294	151	43	20	167	24	13	124	998	78	40	1446	276	204

Table 4. Raw species counts by survey day, July/August 2008 (con't).

SCIENTIFIC NAME	COMMON NAME	SURVEY DAY				TOTAL BY SPECIES
		15-Aug-08	16-Aug-08	17-Aug-08	18-Aug-08	
MARINE FISH						
<i>Mola mola</i>	ocean sunfish		6		1	17
MARINE BIRDS						
Class Aves	unidentified bird		7			8
<i>Gavia immer</i>	common loon					6
<i>Aechmophorus occidentalis</i>	western grebe					4
<i>Phoebastria nigripes</i>	black-footed albatross			5	2	215
<i>Diomedea immutabilis</i>	Laysan albatross					1
<i>Fulmarus glacialis</i>	northern fulmar		1			456
<i>Puffinus creatopus</i>	pink-footed shearwater		74		2	527
<i>Puffinus carneipes</i>	flesh-footed shearwater					1
<i>Puffinus bulleri</i>	Buller's shearwater	3	6	17	4	52
<i>Puffinus griseus</i>	sooty shearwater		201		1	3397
<i>Puffinus tenuirostris</i>	short-tailed shearwater					1
<i>Pterodroma cookii</i>	Cook's petrel	12		3	1	27
<i>Oceanodroma</i> spp.	unidentified storm-petrel			4		6
<i>Oceanodroma furcata</i>	fork-tailed storm-petrel					300
<i>Oceanodroma leucorhoa</i>	Leach's storm-petrel	12	147	150		1343
<i>Oceanodroma homochroa</i>	ashy storm-petrel			1		15
<i>Oceanodroma melania</i>	black storm-petrel				1	1
<i>Halocyptena microsoma</i>	least storm-petrel	1		1		2
<i>Oceanites oceanicus</i>	Wilson's storm-petrel	1				1
<i>Phaethon aethereus</i>	red-billed tropicbird				2	2
<i>Phaethon rubricauda</i>	red-tailed tropicbird			1		1
<i>Pelecanus occidentalis</i>	brown pelican		7		1	35
<i>Phalacrocorax auritus</i>	double-crested cormorant					1
<i>Phalacrocorax penicillatus</i>	Brandt's cormorant					284
<i>Phalacrocorax pelagicus</i>	pelagic cormorant					3
<i>Ardea herodias</i>	great blue heron					1
Suborder Charadrii	unidentified shorebird	1	4			14

Table 4. Raw species counts by survey day, July/August 2008 (con't).

SCIENTIFIC NAME	COMMON NAME	SURVEY DAY				TOTAL BY SPECIES
		15-Aug-08	16-Aug-08	17-Aug-08	18-Aug-08	
<i>Numenius phaeopus</i>	whimbrel					1
<i>Tringa flavipes</i>	lesser yellowlegs					1
<i>Tringa incana</i>	wandering tattler					1
<i>Limnodromus</i> spp.	unidentified dowitcher					30
<i>Phalaropus fulicarius</i>	red phalarope	267	1	102	1	476
<i>Phalaropus lobatus</i>	red-necked phalarope		39			272
<i>Stercorarius pomarinus</i>	pomarine jaeger					4
<i>Stercorarius parasiticus</i>	parasitic jaeger	6	1	1		50
<i>Stercorarius longicaudus</i>	long-tailed jaeger	1				63
<i>Catharacta maccormicki</i>	south polar skua					15
<i>Larus occidentalis x glaucescens</i>	western x glaucous-winged gull					277
<i>Larus</i> spp.	unidentified gull					4
<i>Larus glaucescens</i>	glaucous-winged gull					2
<i>Larus occidentalis</i>	western gull		62		24	631
<i>Larus argentatus</i>	herring gull		5			84
<i>Larus californicus</i>	California gull		8		1	224
<i>Larus heermanni</i>	Heermann's gull					26
<i>Xema sabini</i>	Sabine's gull		2			23
<i>Sterna hirundo</i>	common tern					5
<i>Sterna paradisaea</i>	arctic tern	10		2	1	75
<i>Sterna caspia</i>	Caspian tern					82
<i>Thalasseus elegans</i>	elegant tern		16		12	58
Family Alcidae	unidentified alcid					4
<i>Uria aalge</i>	common murre		98			2361
<i>Cephus columba</i>	pigeon guillemot					3
<i>Synthliboramphus antiquus</i>	ancient murrelet					1
<i>Synthliboramphus hypoleucus</i>	Xantus's murrelet	4	3	2	1	23
<i>Ptychoramphus aleuticus</i>	Cassin's auklet	2	3	6		225
<i>Cerorhinca monocerata</i>	rhinoceros auklet		1			180
<i>Fratercula corniculata</i>	horned puffin					1
<i>Fratercula cirrhata</i>	tufted puffin					8
<i>Zenaidura macroura</i>	morning dove		1			1

Table 4. Raw species counts by survey day, July/August 2008 (con't).

SCIENTIFIC NAME	COMMON NAME	SURVEY DAY				TOTAL BY SPECIES
		15-Aug-08	16-Aug-08	17-Aug-08	18-Aug-08	
Order Passeriformes	passerine	6		1		7
<i>Vermivora celata</i>	orange-crowned warbler				1	1
<i>Dendroica petechia</i>	yellow warbler				1	1
<i>Molothrus ater</i>	brown-headed cowbird					1
MARINE MAMMALS						
<i>Delphinus</i> spp.	common dolphin	15		20	56	91
<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin					49
<i>Lissodelphis borealis</i>	northern right whale dolphin					1
<i>Grampus griseus</i>	Risso's dolphin					6
<i>Phocoena phocoena</i>	harbor porpoise					5
<i>Phocoenoides dalli</i>	Dall's porpoise		5			56
<i>Balaenoptera acutorostrata</i>	minke whale					2
<i>Megaptera novaeangliae</i>	hump-backed whale					1
<i>Zalophus californianus</i>	California sea lion		48		4	148
<i>Eumetopias jubatus</i>	Steller sea lion		1			8
<i>Callorhinus ursinus</i>	northern fur seal		4			11
<i>Phoca vitulina</i>	harbor seal					2
TOTAL BY DAY		341	604	313	267	12322

Figure 1. Relative community composition of bird community, April 2008.

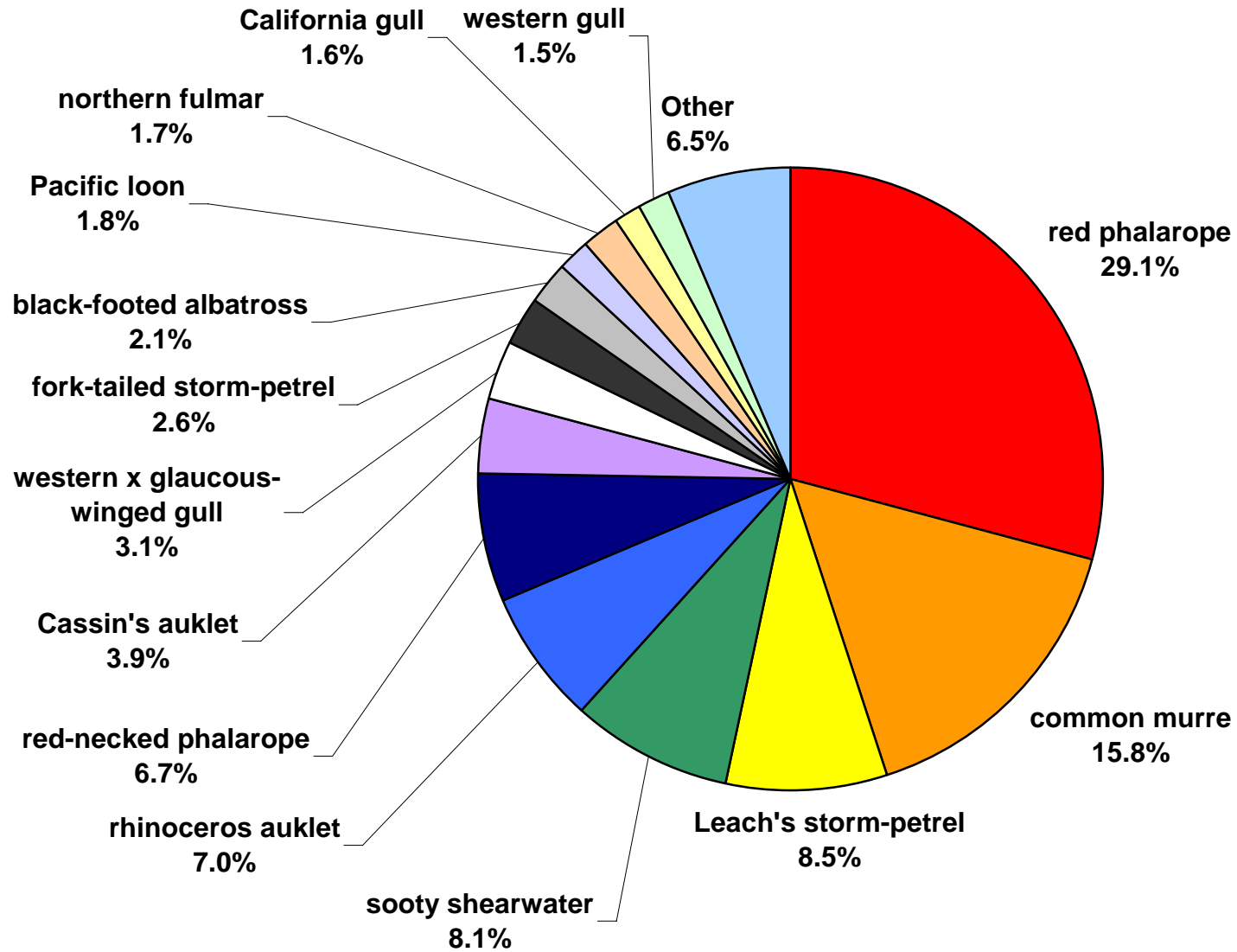


Figure 2. Relative community composition of bird community, July/August 2008.

