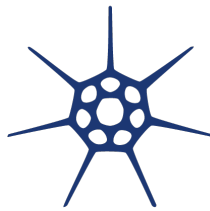


**Seabirds and Marine Mammals on the NMFS
Rockfish Recruitment and Ecosystem Assessment Survey: 2026 Data Report**

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Introduction

Seabird and marine mammal observations are an integral part of the NMFS Rockfish Recruitment and Ecosystem Assessment Survey (RREAS). These data are valuable for several reasons: (1) measurements provide an upper trophic level perspective to complement the oceanographic and mid-trophic level data collected by NMFS, (2) estimates of seabird and marine mammal abundance, diversity and distribution may contribute to various aspects of ecosystem and fisheries management, and (3) by extending our existing time series, measuring annual variation in the top predator community contributes to understanding the effects of climate variability and change on the California Current Ecosystem (CCE). This data report summarizes the at-sea survey observations made during the 2026 cruise and presents basic distribution and abundance estimates for seabirds and mammals.

Methods

Oceanographic conditions. We provide sea surface temperature (SST; C°) and wind averages for the period of 25 April to 8 June 2026 along the West Coast, corresponding with the RREAS survey area. SST data and their anomalies (baseline period 1991–2020) were downloaded from the Optimal Interpolated SST (OISST) dataset (<https://psl.noaa.gov/data/gridded/data.noaa.oisst.v2.highres.html>). Additionally, daily SST and wind (speed and direction) data were downloaded from NOAA/NDBC buoys (<https://www.ndbc.noaa.gov/>).

Seabird observations. Observations of seabirds and marine mammals are made continuously during daylight ship transits between oceanographic and fish sampling stations. The observer, located on the flying bridge approximately 15 meters above sea level, uses hand-held binoculars to assist in the identification and enumeration of birds and mammals. For seabirds, the observer records all individuals seen within a 300-meter strip transect to one side and in front of the vessel while the ship is underway at speeds greater than 5 knots. For mammals, the observer records all individuals out to the horizon while the ship is underway. Observations are entered into a laptop using the dedicated application “Dlog”; the ship’s position is automatically recorded periodically from an external GPS. Each observation includes the species, the number of individuals observed, and their behavior (mostly “flying”, “sitting on the water”, or “feeding” for birds). Observations on the 2026 survey were made by primary observer Brian Hoover with contributions also from Jarrod Santora, Megan Cimino, Ezra Garfield (trainee), Brian Badway (trainee), and Tavi Maes (trainee).

At-sea observation data are post-processed using standardized species codes, validation of positioning data, and binning of observations into along-track sections of 3 km in length. The data are then integrated into a survey database that contains data from 1996 to the present. These data are used to derive summary statistics on density. Species data are presented for 1) the core region surveyed since 2004, 2) the full (core + extended) region within California, and 3) observations made in Oregon (>42°N). We present the Oregon observations separately in this report due to the proximity of industrial hake fishing vessels to the survey vessel, which attracted higher numbers of birds such as albatrosses, fulmars, and shearwaters to that area and elevated the counts of those species.

Calculation of seabird densities. Taxa excluded from this summary were fish, terrestrial birds, and most shorebirds except phalaropes, which are largely pelagic. For seabirds, density is calculated as the total number of individuals observed per species divided by the area (km²) surveyed. For mammals, an “encounter rate” is defined as the total number of individuals observed per species divided by the linear amount of habitat (km) sampled. Density/encounter rate over time is shown for select seabird and mammal species in the core survey area 1996–2026 (Figures 5–8). Seabirds highlighted in this report include: sooty shearwater (*Ardenna griseus*), pink-footed shearwater (*Puffinus creatopus*), northern fulmar (*Fulmarus glacialis*), black-footed albatross (*Phoebastria nigripes*), Cassin’s auklet (*Ptychoramphus aleuticus*), common murre (*Uria aalge*), rhinoceros auklet (*Cerorhinca monocerata*), Brandt’s cormorant (*Phalacrocorax penicillatus*), brown pelican (*Pelecanus occidentalis*), western gull (*Larus occidentalis*), Sabine’s gull (*Xema sabini*), elegant tern (*Thalasseus elegans*), and grouped phalaropes (red phalarope *Phalaropus fulicarius* and red-necked phalarope *P. lobatus*). Marine mammals included are blue whale (*Balaenoptera musculus*), humpback whale (*Megaptera novaeangliae*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), and Risso’s dolphin (*Grampus griseus*).

Results

Oceanographic conditions. The 2026 RREAS survey transited a wide range of water temperatures, with cooler temperatures along the central and northern coast reflective of a typical upwelling signature, and warm in Southern California (Figure 1). During the survey, ocean conditions were cooler than average in the nearshore area of northern California and warmer than normal in Southern California (Figure 1). The cruise experienced a series of upwelling events starting on 28 April with a long relaxation event 22–25 May that allowed steep ocean warming (Figure 2).

Surveying effort. A summary of survey effort is shown in Table 1; transects surveyed are shown in Figure 3. A total of 31 days of survey effort covering 3,825 km (1,147 km²) of ocean habitat is summarized; 15 days were spent covering 1,576 km (473 km²) in the core survey area between Cypress Point and Bodega Bay, and one full day was spent in Oregon (116 km distance and 35 km² area).

Seabirds. Summarized species observations for all species in the core and full survey area, excluding Oregon, are shown in Table 2 (see Appendix 1 for exclusions), while species observations in Oregon are presented in Table 3. Density over time in the core area for the selected seabird species are shown in Figures 4–6. Notable results include that sooty shearwaters were present at approximately 1 standard deviation (s.d.) higher than the long-term average, continuing a trend of high density since 2017, and pink-footed shearwaters were present at the highest density of the time series (Figure 4). Northern fulmar and black-footed albatross both had slightly below but near average densities (Figure 4). Several locally breeding species had very high densities in 2026: brown pelican had the highest density of the time series, continuing a trend of increasing density since 2018, common murre had the second highest density of the time series with a continued trend of increasing density since 2017, and Brandt’s cormorant was at 1 s.d. above the mean, continuing a period of high density since 2019 (Figure 5). On the other hand, Cassin’s auklet was present at approximately 1 s.d. below the mean, and rhinoceros auklet

had slightly below average density (Figure 5). Western gull, Sabine's gull, and grouped phalaropes were all present at higher than average density but within 1 s.d. of the mean (Figure 6). Elegant tern has had an occasional occurrence on this survey and was present this year with density higher than 1 s.d. of the mean (Figure 6).

While sightings of dead seabirds are not consistently tracked across the full time series, dead ($n = 14$) or clearly ill ($n = 1$) birds were seen more frequently than usual and recorded in the data. The majority of these encounters occurred in the Southern California Bight.

Marine mammals. Summarized species observations for all species in the core and full survey area, excluding Oregon, are shown in Table 4. Our focal marine mammal species were abundant in the core area in 2026 (Figure 7). Blue whales, humpback whales, and Pacific white-sided dolphins were observed at the highest density of each of their time series. Risso's dolphins were present with an encounter rate slightly below average and within 1 s.d. above the long-term mean. Four sperm whales (*Physeter macrocephalus*) were sighted, a very unusual observation for this survey.

Figure 1. A) Sea surface temperature (SST; $^{\circ}\text{C}$) B) sea surface temperature anomalies (SSTa; $^{\circ}\text{C}$) averages, and wind averages (speed and direction) represented with arrows. The direction the wind is blowing is shown at NOAA/NDBC buoys (purple dots and orange star). Data were averaged for 25 April to 8 June 2026.

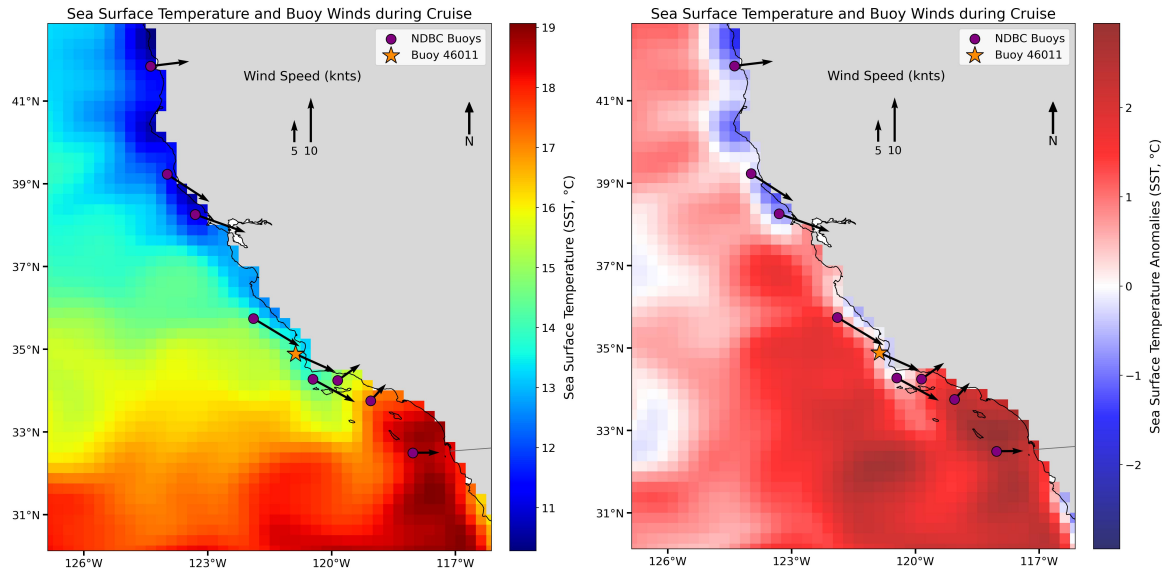


Figure 2. Daily SST ($^{\circ}\text{C}$) and wind averages for the period of 25 April to 8 June 2026 at NOAA/NDBC buoy 46011; location is marked in Figures 1 and 2 with an orange star. Bottom panel: arrow direction indicates the direction the wind is blowing (up = north) and the y-axis indicates wind speed scale in knots. Upwelling-favorable winds are strong winds to the southeast.

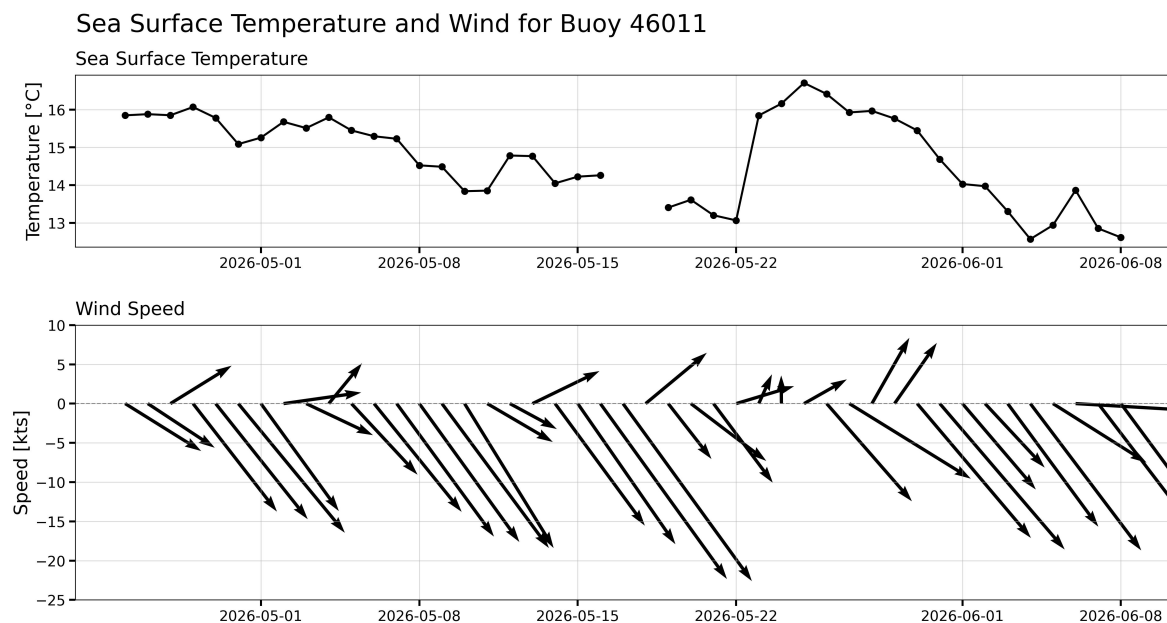


Table 1. Summary of survey effort.

2026	Full Area	Full Area excluding Oregon	Core Area	Oregon
Survey vessel	<i>R/V Reuben Lasker</i>			
Start date	4/25/2026			
End date	6/8/2026			
Number of survey days	31	30	15	2
Distance surveyed (km)	3,825	3,709	1,576	116
Area surveyed (km ²)	1,147	1,113	473	35
Number of bird species	59	58	48	17
Overall bird density (per km ²)	64.358	63.148	90.323	103.187
Total birds observed	73,844	70,266	42,702	3,578
Number of mammal species	23	22	15	5
Overall mammal encounter rate (per 100 km)	169.3	172.6	269.7	61.4
Total mammals observed	6,474	6,403	4,251	71

Figure 3. 2026 survey transects for the full (left) and core (right) regions. Gaps usually reflect nighttime.

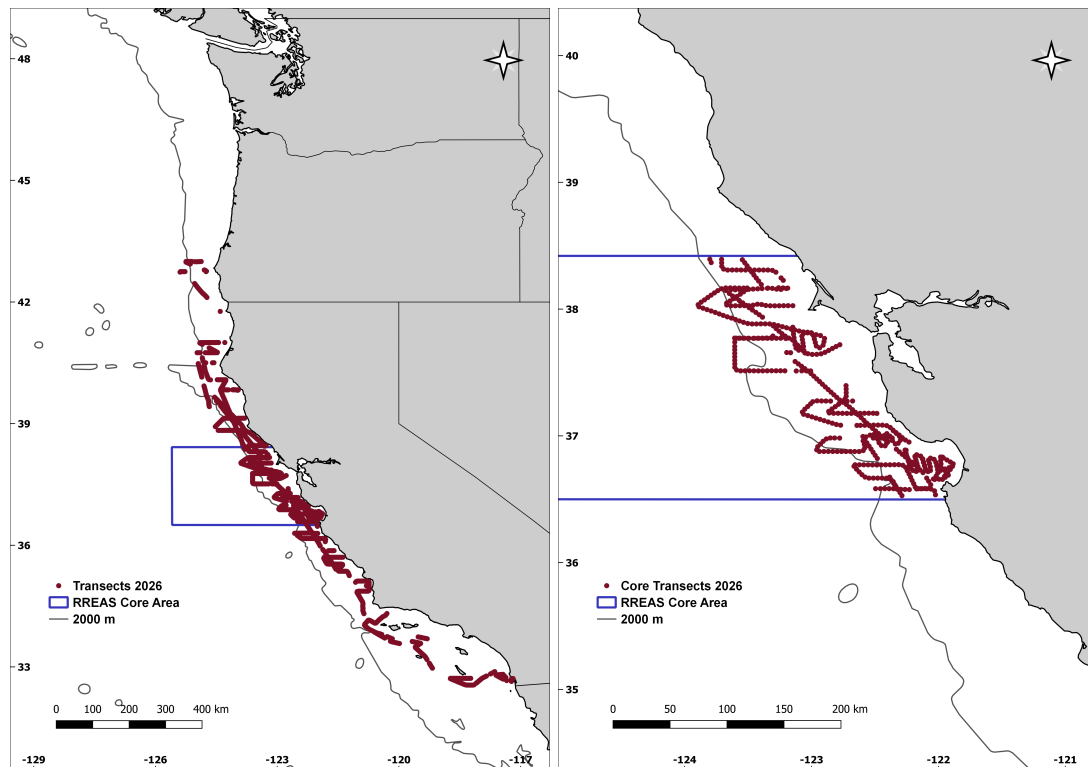


Table 2. Bird survey observations, stratified by area and species. Cell values represent the total number of individuals seen / number of species sightings / average density (birds/km²).

Common Name	Scientific Name	Core Area	Full Area excluding Oregon
American white pelican	<i>Pelecanus erythrorhynchos</i>		
Ancient murrelet	<i>Synthliboramphus antiquus</i>		
Arctic loon	<i>Gavia arctica</i>		
Arctic tern	<i>Sterna paradisaea</i>	4 / 2 / 0.01	10 / 3 / 0.01
Ashy storm-petrel	<i>Oceanodroma homochroa</i>	25 / 20 / 0.05	49 / 23 / 0.04
Black guillemot	<i>Cepphus grylle</i>		
Black storm-petrel	<i>Oceanodroma melania</i>	1 / 1 / 0	13 / 9 / 0.01
Black-footed albatross	<i>Phoebastria nigripes</i>	141 / 133 / 0.3	310 / 285 / 0.28
Black-legged kittiwake	<i>Rissa tridactyla</i>		
Black-vented shearwater	<i>Puffinus opisthomelas</i>		
Blue-footed booby	<i>Sula nebouxii</i>		
Bonaparte's gull	<i>Larus philadelphia</i>	7 / 2 / 0.01	48 / 11 / 0.04
Brandt's cormorant	<i>Phalacrocorax penicillatus</i>	533 / 134 / 1.13	603 / 183 / 0.54
Brant	<i>Branta bernicla</i>	210 / 1 / 0.44	210 / 1 / 0.19
Brown booby	<i>Sula leucogaster</i>	1 / 1 / 0	1 / 1 / 0
Brown pelican	<i>Pelecanus occidentalis</i>	322 / 149 / 0.68	483 / 200 / 0.43
Buller's shearwater	<i>Puffinus bulleri</i>		2 / 2 / 0
California gull	<i>Larus californicus</i>	33 / 18 / 0.07	41 / 23 / 0.04
Caspian tern	<i>Sterna caspia</i>	2 / 2 / 0	5 / 5 / 0
Cassin's auklet	<i>Ptychoramphus aleuticus</i>	95 / 66 / 0.2	98 / 68 / 0.09
Clark's grebe	<i>Aechmophorus clarkii</i>		
Common loon	<i>Gavia immer</i>	2 / 2 / 0	7 / 7 / 0.01
Common murre	<i>Uria aalge</i>	12280 / 2762 / 25.97	14237 / 3522 / 12.79
Common tern	<i>Sterna hirundo</i>		
Cook's petrel	<i>Pterodroma cookii</i>		72 / 61 / 0.06
Craveri's murrelet	<i>Synthliboramphus craveri</i>		2 / 1 / 0
Dark shearwater	(species group)		
Dark-rumped petrel	<i>Pterodroma phaeopygia sandwichensis</i>		
Double-crested cormorant	<i>Phalacrocorax auritus</i>		4 / 2 / 0
Eared grebe	<i>Podiceps nigricollis</i>		
Elegant tern	<i>Sterna elegans</i>	26 / 11 / 0.05	38 / 18 / 0.03
Flesh-footed shearwater	<i>Puffinus carneipes</i>		
Fork-tailed storm-petrel	<i>Oceanodroma furcata</i>		8 / 7 / 0.01
Forster's tern	<i>Sterna forsteri</i>	20 / 2 / 0.04	20 / 2 / 0.02
Franklin's gull	<i>Larus pipixcan</i>		
Glaucous gull	<i>Larus hyperboreus</i>		
Glaucous-winged gull	<i>Larus glaucescens</i>	1 / 1 / 0	2 / 2 / 0
Glaucous-winged / Western hybrid gull			
Guadalupe murrelet	<i>Synthliboramphus hypoleucus</i>		

Hawaiian petrel	<i>Pterodroma sandwichensis</i>		
Heermann's gull	<i>Larus heermanni</i>	7 / 6 / 0.01	12 / 10 / 0.01
Herring gull	<i>Larus argentatus</i>	2 / 2 / 0	3 / 3 / 0
Horned puffin	<i>Fratercula corniculata</i>		
Hybrid gull	(species group)		
Kelp gull	<i>Larus dominicanus</i>		
Laughing gull	<i>Larus atricilla</i>		
Laysan albatross	<i>Phoebastria immutabilis</i>	10 / 10 / 0.02	20 / 20 / 0.02
Leach's storm-petrel	<i>Oceanodroma leucorhoa</i>	12 / 7 / 0.03	21 / 14 / 0.02
Least storm-petrel	<i>Oceanodroma microsoma</i>		
Least tern	<i>Sterna antillarum</i>		
Long-tailed jaeger	<i>Stercorarius longicaudus</i>		
Manx shearwater	<i>Puffinus puffinus</i>		1 / 1 / 0
Marbled murrelet	<i>Brachyramphus marmoratus</i>		
Masked booby	<i>Sula dactylatra</i>	1 / 1 / 0	5 / 5 / 0
Mottled petrel	<i>Pterodroma inexpectata</i>		
Murphy's petrel	<i>Pterodroma ultima</i>	3 / 3 / 0.01	52 / 50 / 0.05
Nazca booby	<i>Sula granti</i>		
Northern fulmar	<i>Fulmarus glacialis</i>	30 / 27 / 0.06	96 / 83 / 0.09
Pacific loon	<i>Gavia pacifica</i>	98 / 57 / 0.21	184 / 95 / 0.17
Parakeet auklet	<i>Aethia psittacula</i>		
Parasitic jaeger	<i>Stercorarius parasiticus</i>	5 / 3 / 0.01	8 / 6 / 0.01
Pelagic cormorant	<i>Phalacrocorax pelagicus</i>		
Pigeon guillemot	<i>Cephus columba</i>	6 / 3 / 0.01	6 / 3 / 0.01
Pink-footed shearwater	<i>Puffinus creatopus</i>	1298 / 418 / 2.75	2701 / 941 / 2.43
Pomarine jaeger	<i>Stercorarius pomarinus</i>	14 / 13 / 0.03	20 / 19 / 0.02
Red phalarope	<i>Phalaropus fulicaria</i>	158 / 15 / 0.33	1474 / 83 / 1.32
Red-billed tropicbird	<i>Phaethon aethereus</i>		1 / 1 / 0
Red-footed booby	<i>Sula sula</i>		
Red-necked grebe	<i>Podiceps grisegena</i>		
Red-necked phalarope	<i>Phalaropus lobatus</i>	2217 / 103 / 4.69	3857 / 354 / 3.47
Red-tailed tropicbird	<i>Pheathon rubricauda</i>		
Red-throated loon	<i>Gavia stellata</i>		
Rhinoceros auklet	<i>Cerorhinca monocerata</i>	63 / 47 / 0.13	85 / 63 / 0.08
Ring-billed gull	<i>Larus delawarensis</i>		
Royal tern	<i>Sterna maxima</i>		3 / 3 / 0
Sabine's gull	<i>Larus sabini</i>	135 / 40 / 0.29	348 / 130 / 0.31
Scripps's murrelet	<i>Synthliboramphus scrippsi</i>	2 / 1 / 0	11 / 6 / 0.01
Short-billed gull	<i>Larus brachyrhynchus</i>		
Short-tailed / Slender-billed shearwater	<i>Puffinus tenuirostris</i>		
Short-tailed albatross	<i>Phoebastria albatrus</i>	1 / 1 / 0	2 / 2 / 0
Sooty shearwater	<i>Puffinus griseus</i>	23801 / 2531 / 50.34	43442 / 4747 / 39.04
South polar skua	<i>Stercorarius maccormicki</i>	1 / 1 / 0	3 / 3 / 0
Surf scoter	<i>Melanitta perspicillata</i>	33 / 8 / 0.07	48 / 12 / 0.04
Thayer's gull	<i>Larus thayeri</i>		
Townsend's storm-petrel	<i>Oceanodroma socorroensis</i>		

Tufted puffin	<i>Fratercula cirrhata</i>	13 / 9 / 0.03	15 / 10 / 0.01
Unidentified albatross	(species group)		
Unidentified auklet	(species group)	1 / 1 / 0	1 / 1 / 0
Unidentified booby	(species group)		
Unidentified cormorant	(species group)		2 / 2 / 0
Unidentified gull	(species group)	63 / 43 / 0.13	131 / 85 / 0.12
Unidentified jaeger	(species group)	1 / 1 / 0	6 / 4 / 0.01
Unidentified large alcid	(species group)		
Unidentified Leach's storm-petrel	(species group)		
Unidentified loon	(species group)	1 / 1 / 0	3 / 2 / 0
Unidentified murre	(species group)		1 / 1 / 0
Unidentified murrelet	(species group)		
Unidentified petrel	(species group)		
Unidentified phalarope	(species group)	12 / 4 / 0.03	59 / 19 / 0.05
Unidentified procellarid	(species group)		
Unidentified shearwater	(species group)	1 / 1 / 0	1 / 1 / 0
Unidentified small alcid	(species group)		
Unidentified storm-petrel	(species group)	3 / 2 / 0.01	4 / 3 / 0
Unidentified tern	(species group)	5 / 2 / 0.01	8 / 5 / 0.01
Wedge-rumped storm-petrel	<i>Oceanodroma tethys</i>		
Wedge-tailed shearwater	<i>Puffinus pacificus</i>		
Western grebe	<i>Aechmophorus occidentalis</i>		
Western gull	<i>Larus occidentalis</i>	1002 / 703 / 2.12	1369 / 1031 / 1.23
Wilson's storm-petrel	<i>Oceanites oceanicus</i>		
Xantus's murrelet	<i>Synthliboramphus hypoleucus</i>		

Table 3. Bird survey observations in Oregon (>42°N). Cell values represent the total number of individuals seen / number of species sightings / average density (birds/km²).

Common Name	Scientific Name	Oregon
Arctic tern	<i>Sterna paradisaea</i>	1 / 1 / 0.03
Black-footed albatross	<i>Phoebastria nigripes</i>	800 / 81 / 23.07
Cassin's auklet	<i>Ptychoramphus aleuticus</i>	2 / 1 / 0.06
Common murre	<i>Uria aalge</i>	52 / 18 / 1.5
Fork-Tailed Storm-petrel	<i>Oceanodroma furcata</i>	151 / 47 / 4.35
Glaucous-winged gull	<i>Larus glaucescens</i>	1 / 1 / 0.03
Glaucous-winged / Western hybrid gull		2 / 1 / 0.06
Laysan albatross	<i>Phoebastria immutabilis</i>	3 / 3 / 0.09
Leach's storm-petrel	<i>Oceanodroma leucorhoa</i>	212 / 40 / 6.11
Northern fulmar	<i>Fulmarus glacialis</i>	307 / 37 / 8.85
Parasitic jaeger	<i>Stercorarius parasiticus</i>	4 / 4 / 0.12
Pink-footed shearwater	<i>Puffinus creatopus</i>	276 / 27 / 7.96
Red phalarope	<i>Phalaropus fulicaria</i>	5 / 2 / 0.14
Red-necked phalarope	<i>Phalaropus lobatus</i>	4 / 1 / 0.12
Short-tailed albatross	<i>Phoebastria albatrus</i>	1 / 1 / 0.03
Sooty shearwater	<i>Puffinus griseus</i>	1678 / 135 / 48.39
Western gull	<i>Larus occidentalis</i>	79 / 19 / 2.28

Figure 4. Log₁₀ density anomalies over time for select seabird species, core survey area, 1996–2026. A) sooty shearwater, B) pink-footed shearwater, C) northern fulmar, and D) black-footed albatross. The dashed lines indicate ± 1 s.d. of the long-term mean, and ‘x’ indicates years when no survey was conducted. A constant of 0.01 was added to each density prior to log₁₀ transformation and the anomaly calculation.

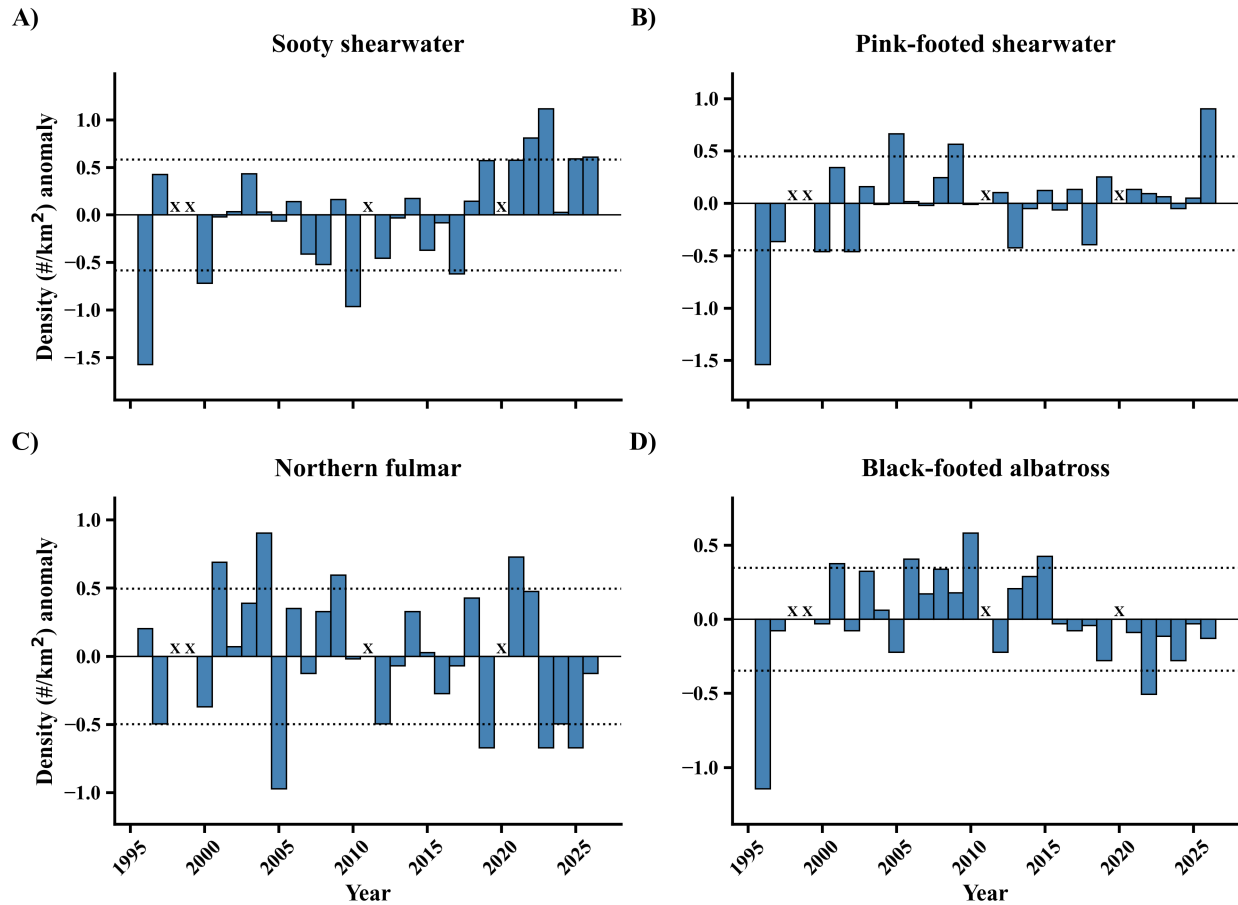


Figure 5. Log₁₀ density anomalies over time for select locally breeding seabird species, core survey area, 1996–2026. A) Cassin’s auklet, B) common murre, C) rhinoceros auklet, D) Brandt’s cormorant, and E) brown pelican. The dashed lines indicate ± 1 s.d. of the long-term mean, and ‘x’ indicates years when no survey was conducted. A constant of 0.01 was added to each density prior to log₁₀ transformation and the anomaly calculation.

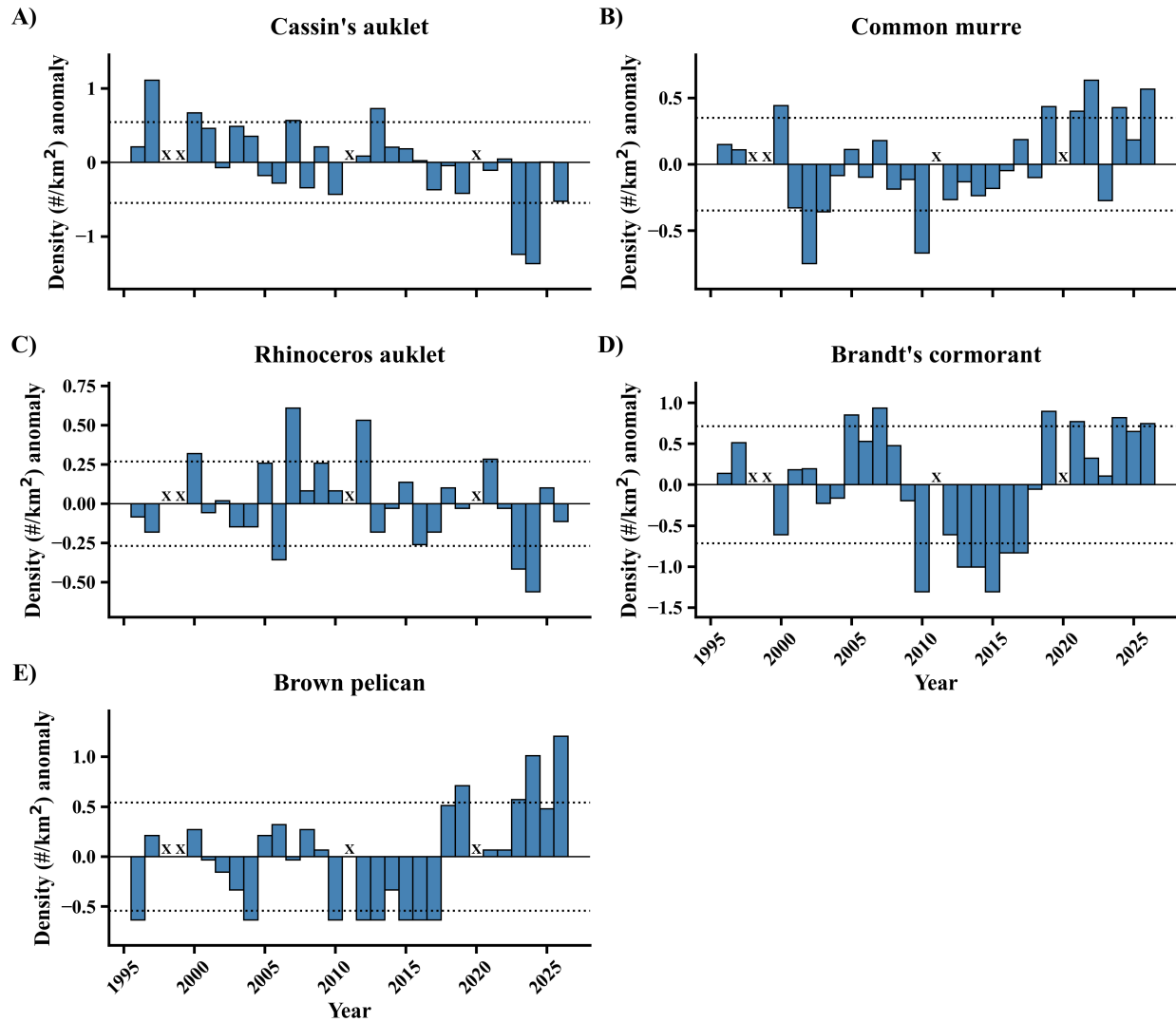


Figure 6. Log₁₀ density anomalies over time for select seabird species, core survey area, 1996–2026. A) western gull, B) Sabine’s gull, C) elegant tern, and D) grouped phalaropes (red and red-necked phalaropes). The dashed lines indicate ± 1 s.d. of the long-term mean, and ‘x’ indicates years when no survey was conducted. A constant of 0.01 was added to each density prior to log₁₀ transformation and the anomaly calculation.

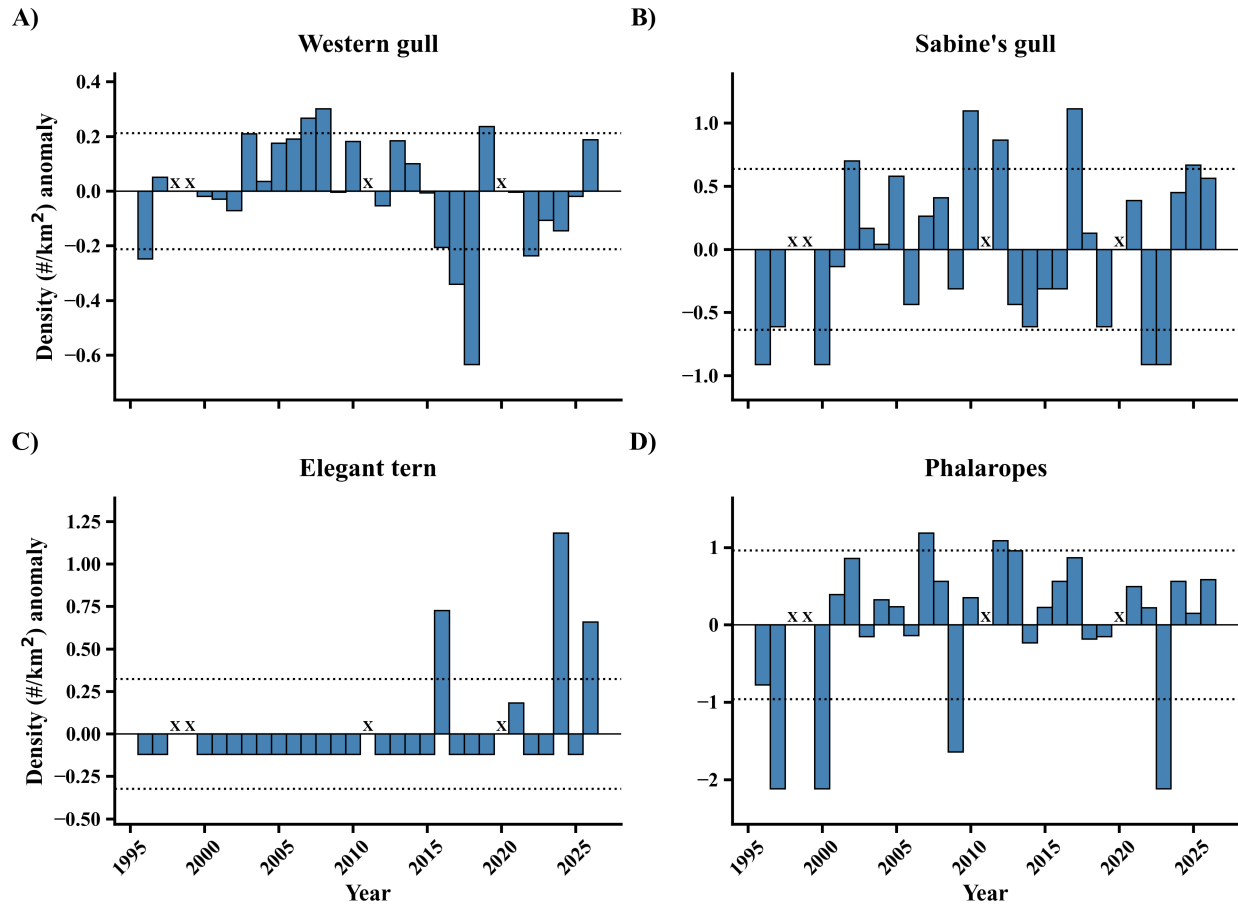
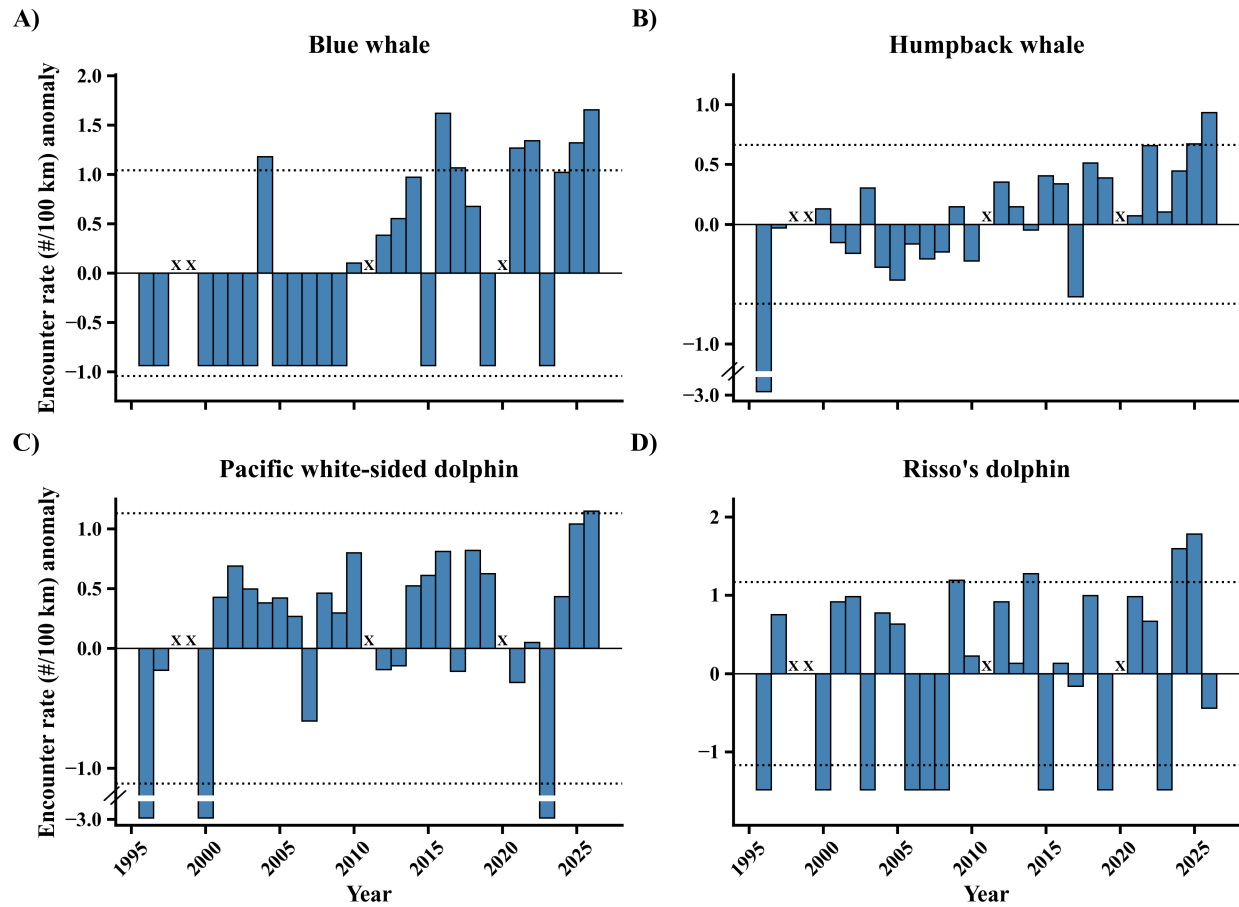


Table 4. Mammal survey observation summary, broken down by survey area and species. Cell values represent the total number of species individuals / number of species sightings / average species encounter rate (individuals per 100 km).

Common Name	Scientific Name	Core Area	Full Area excluding Oregon
Baird's beaked whale	<i>Berardius bairdii</i>		
Blue whale	<i>Balaenoptera musculus</i>	62 / 27 / 3.9	62 / 27 / 1.7
Bottlenose dolphin	<i>Tursiops truncatus</i>		5 / 1 / 0.1
California sea lion	<i>Zalophus californianus</i>	350 / 96 / 22.2	560 / 197 / 15.1
Common dolphin	<i>Delphinus delphis</i>	56 / 3 / 3.6	526 / 8 / 14.2
Cuvier's beaked whale	<i>Ziphius cavirostris</i>		
Dall's porpoise	<i>Phocoenoides dalli</i>	40 / 7 / 2.5	107 / 17 / 2.9
False killer whale	<i>Pseudorca crassidens</i>		
Fin whale	<i>Balaenoptera physalus</i>	38 / 25 / 2.4	55 / 34 / 1.5
Gray whale	<i>Eschrichtius robustus</i>		
Guadalupe fur seal	<i>Arctocephalus townsendi</i>		
Harbor porpoise	<i>Phocoena phocoena</i>		
Harbor seal	<i>Phoca vitulina</i>		1 / 1 / 0
Humpback whale	<i>Megaptera novaeangliae</i>	713 / 409 / 45.2	935 / 567 / 25.2
Killer whale	<i>Orcinus orca</i>	10 / 3 / 0.6	10 / 3 / 0.3
Long-beaked common dolphin	<i>Delphinus capensis</i>	50 / 1 / 3.2	50 / 1 / 1.3
Minke whale	<i>Balaenoptera acutorostrata</i>	3 / 3 / 0.2	4 / 4 / 0.1
Northern elephant seal	<i>Mirounga angustirostris</i>		3 / 3 / 0.1
Northern fur seal	<i>Callorhinus ursinus</i>		26 / 16 / 0.7
Northern right whale dolphin	<i>Lissodelphis borealis</i>	735 / 17 / 46.6	1535 / 18 / 41.4
Pacific white-sided dolphin	<i>Lagenorhynchus obliquidens</i>	1789 / 116 / 113.5	1957 / 134 / 52.8
Pilot whale	<i>Globicephala spp.</i>		
Pygmy sperm whale	<i>Kogia breviceps</i>		
Right whale dolphin	<i>Lissodelphis spp</i>		
Risso's dolphin	<i>Grampus griseus</i>	2 / 1 / 0.1	63 / 7 / 1.7
Sea otter	<i>Enhydra lutris</i>		
Sei whale	<i>Balaenoptera borealis</i>		
Short-beaked common dolphin	<i>Delphinus delphis</i>	258 / 2 / 16.4	318 / 4 / 8.6
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>		
Sperm whale	<i>Physeter macrocephalus</i>		4 / 2 / 0.1
Spinner dolphin	<i>Stenella longirostris</i>		
Steller sea lion	<i>Eumetopias jubatus</i>		
Striped dolphin	<i>Stenella coeruleoalba</i>		
Unidentified Balaenoptera	(species group)		
Unidentified beaked whale	(species group)		
Unidentified Cetacean	(species group)		
Unidentified dolphin	(species group)	4 / 1 / 0.3	4 / 1 / 0.1
Unidentified large whale	(species group)		
Unidentified Pinniped	(species group)		
Unidentified sea lion	(species group)		
Unidentified seal	(species group)		1 / 1 / 0
Unidentified whale	(species group)	141 / 83 / 8.9	174 / 110 / 4.7

Figure 7. Log₁₀ encounter rate anomalies (#/100 km) over time from core area surveys, 1996–2026 for focal species A) blue whale, B) humpback whale, C) Pacific white-sided dolphin, D) and Risso’s dolphin. The dashed lines indicate ± 1 s.d. of the long-term mean, and ‘x’ indicates years when no survey was conducted. A constant of 0.01 was added to each density prior to log₁₀ transformation and the anomaly calculation. Note: marine mammals were observed on the 1996 survey, but these particular species were not seen that year.



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Appendix. List of bird species excluded from this summary. These species may or may not have been observed during the survey.

Common Name	Scientific Name
American coot	<i>Fulica americana</i>
Black oystercatcher	<i>Haematopus bachmani</i>
Black scoter	<i>Melanitta americana</i>
Black skimmer	<i>Rynchops niger</i>
Black tern	<i>Chlidonias niger</i>
Black turnstone	<i>Arenaria melanocephala</i>
Black-throated gray warbler	<i>Setophaga nigrescens</i>
Brewer's sparrow	<i>Spizella breweri</i>
Brown noddy	<i>Anous stolidus</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Bufflehead	<i>Bucephala albeola</i>
Chapman's storm-petrel	<i>Oceanodroma leucorhoa chapmani</i>
Eurasian collared dove	<i>Streptopelia decaocto</i>
European starling	<i>Sturnus vulgaris</i>
Great blue heron	<i>Ardea herodias</i>
Great egret	<i>Ardea alba</i>
Greater scaup	<i>Aythya marila</i>
Green heron	<i>Butorides virescens</i>
Juan Fernandez petrel	<i>Pterodroma externa</i>
Kermadec petrel	<i>Pterodroma neglecta</i>
Least sandpiper	<i>Calidris minutilla</i>
Long-billed curlew	<i>Numenius americanus</i>
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>
Mallard duck	<i>Anas platyrhynchos</i>
Marbled godwit	<i>Limosa fedoa</i>
Mourning dove	<i>Zenaida macroura</i>
Osprey	<i>Pandion haliaetus</i>
Parkinson's petrel	<i>Procellaria parkinsoni</i>
Peregrine falcon	<i>Falco peregrinus</i>
Providence/Solander's petrel	<i>Pterodroma solandri</i>
Red-breasted merganser	<i>Mergus serrator</i>
Ruddy duck	<i>Oxyura jamaicensis</i>
Ruddy turnstone	<i>Arenaria interpres</i>
Sanderling	<i>Calidris alba</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Snow goose	<i>Anser caerulescens</i>
Snowy egret	<i>Egretta thula</i>
Stejneger's petrel	<i>Pterodroma longirostris</i>
Townsend's warbler	<i>Setophaga townsendi</i>
Unidentified bird	(species group)
Unidentified dove	(species group)
Unidentified dowitcher	
Unidentified duck	(species group)
Unidentified goose	(species group)

Unidentified grebe	(species group)
Unidentified hummingbird	(species group)
Unidentified passerine	(species group)
Unidentified raptor	(species group)
Unidentified shorebird	(species group)
Unidentified skua	(species group)
Unidentified tropicbird	(species group)
Wandering tattler	<i>Tringa incana</i>
Waved albatross	<i>Phoebastria irrorata</i>
Western sandpiper	<i>Calidris mauri</i>
Whimbrel	<i>Numenius phaeopus</i>
White-winged scoter	<i>Melanitta deglandi</i>
Willet	<i>Tringa semipalmata</i>
Wilson's warbler	<i>Cardellina pusilla</i>
Yellow-rumped warbler	<i>Setophaga coronata</i>