

# ***Seabirds and Marine Mammals on the NMFS Juvenile Rockfish – Ecosystem Survey, 2013***

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## **Introduction**

Seabird and marine mammals are an integral part of the NMFS Juvenile Rockfish – Ecosystem (JRE) research program, providing data that is valuable on several fronts: 1) measurements provide an upper trophic level perspective to complement the lower- mid-trophic level data collected by NMFS; 2) estimates of seabird and marine mammal abundance, diversity and distribution may contribute to fisheries management; and, 3) by extending our existing time series (now 16 years and counting), measuring annual variation in the seabird community contributes to understanding the effects of climate variability and change on the California Current ecosystem. This data report summarizes the at-sea survey observations made during the 2013 NMFS JRE cruise, and presents basic distribution and abundance estimates for seabirds and mammals. In 2013, a total of 2494 km ( $748 \text{ km}^2$ ) of ocean habitat was surveyed over a period of 22 days.

## **Methods**

At-sea observations are made continuously during daylight ship transits between trawl and hydrographic stations. The observer, located on the bridge approximately 15 meters above sea level, used hand-held binoculars to assist in the identification and enumeration of birds and mammals. The observer records all bird seen within a 300 meter strip transect to one side of the vessel while the ship is underway at > 5 knots. Marine mammals are surveyed out to the horizon. Observations are entered into a portable computer using the dedicated application “Dlog”; the ship’s position is automatically recorded every 10 seconds using an external GPS. Each observation includes the species, the number of individuals observed, and their behavior (mostly flying or sitting for birds). 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 containing data from May 1996 to the present. These data are used to derive the summary statistics reported herein.

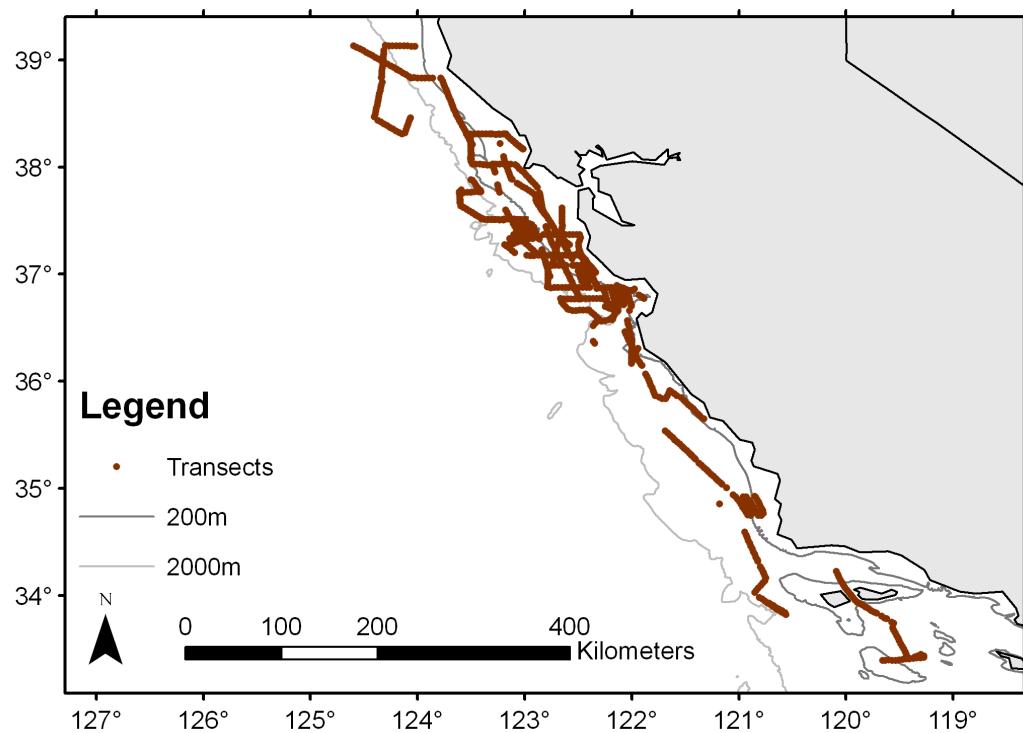
This report summarizes observations for the survey conducted in 2013. Species data are presented for both the core region, and the extended region surveyed since 2004 (see Sakuma et al. 2006); relevant seabird species are listed in Table 2. Taxa excluded from this summary include fish, terrestrial birds, and most shorebirds with the exception of phalaropes which are largely pelagic. Species density is calculated as the total number of individuals observed per species divided by the area ( $\text{km}^2$ ) surveyed. Mammal abundance is estimated as the number of individuals observed by the distance surveyed (100 km). The distribution of seabirds and mammals is illustrated by plotting abundance at each bin’s center position. Abundance is represented by a circle whose diameter is scaled using the Jenks method in ArcGIS version 9.3.

## **Results**

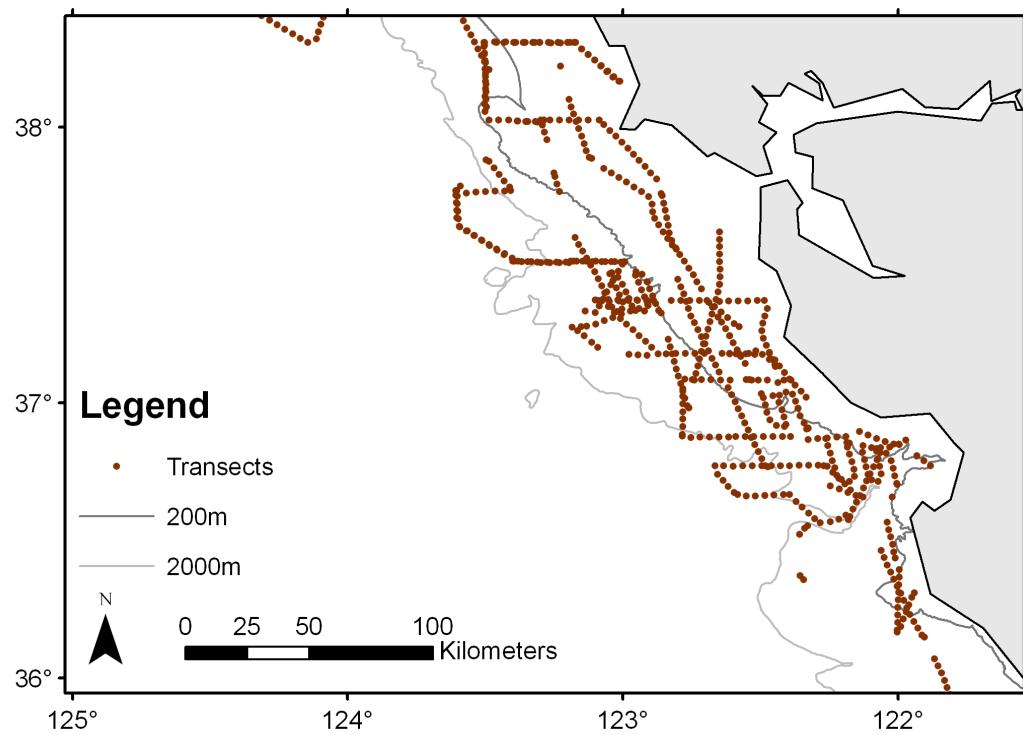
A summary of survey effort is shown in Table 1. The areas surveyed and transects are shown in Figure 1 and Figure 2. A summary of species observations is shown in Table 2 (seabirds) and Table 3 (mammals). Spatial distribution maps for overall seabird density and mammal encounter rate (all species) are shown in Appendix 1. A detailed species list is provided in Appendix 2.

**Table 1. Summary of survey effort, seabird and mammal community statistics.**

| <b>Annual Survey Summary</b>                        | <b>Core region</b> | <b>Extended region</b> | <b>Total</b> |
|---|--------------------|------------------------|--------------|
| Survey Vessel                                       |                    |                        | -            |
| Start Date  | 5/9/2013           | 5/9/2013               | 5/9/2013     |
| End Date  | 6/5/2013           | 6/5/2013               | 6/5/2013     |
| Survey Days   | 20                 | 3                      | 22           |
| Distance Surveyed (km)                              | 2099               | 395                    | 2494         |
| Area Surveyed (birds; km <sup>2</sup> )             | 630                | 118                    | 748          |
| Number of Bird Species Obs.                         | 31                 | 15                     | 35           |
| Overall Bird Density (per km <sup>2</sup> )         | 31.97              | 10.91                  | 28.63        |
| Total Birds Observed                                | 20134              | 1293                   | 21427        |
| Number of Mammal Species                            | 10                 | 9                      | 11           |
| Overall Mammal Encounter Rate (per 100 km surveyed) | 19.7               | 30.6                   | 21.4         |
| Total Mammals Observed                              | 413                | 121                    | 534          |



**Figure 1.** 2013 survey transects for the total region.



**Figure 2.** 2013 survey transects for the core region.

**Table 2. Bird survey observations, stratified by region and species. Cell values represent: the total number of individuals seen / number of species sightings / average density (birds per km<sup>2</sup>).**

| Common Name             | Latin Name                        | Core Region       | Extended Region | Total             |
|-------------------------|-----------------------------------|-------------------|-----------------|-------------------|
| 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>          | 2 / 2 / 0         |                 | 2 / 2 / 0         |
| Ashy Storm-Petrel       | <i>Oceanodroma homochroa</i>      | 9 / 6 / 0.01      | 2 / 2 / 0.02    | 11 / 8 / 0.01     |
| Black Scoter            | <i>Melanitta nigra</i>            |                   |                 |                   |
| Black Storm-Petrel      | <i>Oceanodroma Melania</i>        |                   | 1 / 1 / 0.01    | 1 / 1 / 0         |
| Black-Footed Albatross  | <i>Phoebastria nigripes</i>       | 425 / 310 / 0.67  | 10 / 10 / 0.08  | 435 / 320 / 0.58  |
| Black-Legged Kittiwake  | <i>Rissa tridactyla</i>           |                   |                 |                   |
| Black-Vented Shearwater | <i>Puffinus opisthomelas</i>      |                   |                 |                   |
| Bonaparte's Gull        | <i>Larus philadelphia</i>         | 271 / 5 / 0.43    |                 | 271 / 5 / 0.36    |
| Brandt's Cormorant      | <i>Phalacrocorax penicillatus</i> | 5 / 5 / 0.01      | 537 / 15 / 4.53 | 542 / 20 / 0.72   |
| Brant                   | <i>Branta bernicla</i>            |                   |                 |                   |
| Brown Booby             | <i>Sula leucogaster</i>           |                   |                 |                   |
| Brown Noddy             | <i>Anous stolidus</i>             |                   |                 |                   |
| Brown Pelican           | <i>Pelecanus occidentalis</i>     |                   |                 |                   |
| Buller's Shearwater     | <i>Puffinus bulleri</i>           |                   |                 |                   |
| California Gull         | <i>Larus californicus</i>         | 310 / 226 / 0.49  |                 | 310 / 226 / 0.41  |
| Caspian Tern            | <i>Sterna caspia</i>              | 2 / 2 / 0         |                 | 2 / 2 / 0         |
| Cassin's Auklet         | <i>Ptychoramphus aleuticus</i>    | 2001 / 398 / 3.18 | 94 / 36 / 0.79  | 2095 / 434 / 2.8  |
| Clark's Grebe           | <i>Aechmophorus clarkii</i>       |                   |                 |                   |
| Common Loon             | <i>Gavia immer</i>                |                   |                 |                   |
| Common Murre            | <i>Uria aalge</i>                 | 2561 / 936 / 4.07 | 2 / 2 / 0.02    | 2563 / 938 / 3.42 |
| Common Tern             | <i>Sterna hirundo</i>             | 2 / 1 / 0         |                 | 2 / 1 / 0         |
| Cook's Petrel           | <i>Pterodroma cookii</i>          |                   |                 |                   |
| Craveri's Murrelet      | <i>Synthliboramphus craveri</i>   |                   |                 |                   |

| Common Name              | Latin Name                                 | Core Region | Extended Region | Total     |
|--------------------------|--|-------------|-----------------|-----------|
| Dark Shearwater          | (species group)                            |             |                 |           |
| Dark-Rumped Petrel       | <i>Pterodroma phaeopygia sandwichensis</i> |             |                 |           |
| Double-Crested Cormorant | <i>Phalacrocorax auritus</i>               | 1 / 1 / 0   |                 | 1 / 1 / 0 |
| Eared Grebe              | <i>Podiceps nigricollis</i>                |             |                 |           |
| Elegant Tern             | <i>Sterna elegans</i>                      |             |                 |           |
| Flesh-Footed Shearwater  | <i>Puffinus carneipes</i>                  |             |                 |           |
| Fork-Tailed Storm-Petrel | <i>Oceanodroma furcata</i>                 |             |                 |           |
| Forster's Tern           | <i>Sterna forsteri</i>                     |             |                 |           |
| Franklin's Gull          | <i>Larus pipixcan</i>                      |             |                 |           |
| Glaucous Gull            | <i>Larus hyperboreus</i>                   |             |                 |           |
| Glaucous-Winged Gull     | <i>Larus glaucescens</i>                   | 3 / 3 / 0   |                 | 3 / 3 / 0 |
| Guadalupe Murrelet       | <i>Synthliboramphus hypoleucus</i>         |             |                 |           |
| Hawaiian Petrel          | <i>Pterodroma sandwichensis</i>            | 1 / 1 / 0   |                 | 1 / 1 / 0 |
| Heermann's Gull          | <i>Larus heermanni</i>                     |             |                 |           |
| Herring Gull             | <i>Larus argentatus</i>                    | 3 / 3 / 0   |                 | 3 / 3 / 0 |
| Horned Puffin            | <i>Fratercula corniculata</i>              | 1 / 1 / 0   |                 | 1 / 1 / 0 |
| Hybrid Gull              | (species group)                            |             |                 |           |
| Juan Fernandez Petrel    | <i>Pterodroma externa</i>                  |             |                 |           |
| Kelp Gull                | <i>Larus dominicanus</i>                   |             |                 |           |
| Kermadec Petrel          | <i>Pterodroma neglecta</i>                 |             |                 |           |
| Laughing Gull            | <i>Larus atricilla</i>                     |             |                 |           |
| Laysan Albatross         | <i>Phoebastria immutabilis</i>             |             |                 |           |
| Leach's Storm-Petrel     | <i>Oceanodroma leucorhoa</i>               |             |                 |           |
| Least Storm-Petrel       | <i>Oceanodroma microsoma</i>               |             |                 |           |
| Least Tern               | <i>Sterna antillarum</i>                   |             |                 |           |
| Long-Tailed Jaeger       | <i>Stercorarius longicaudus</i>            |             |                 |           |
| Marbled Murrelet         | <i>Brachyramphus marmoratus</i>            | 2 / 1 / 0   |                 | 2 / 1 / 0 |
| Mew Gull                 | <i>Larus canus</i>                         |             |                 |           |

| Common Name                              | Latin Name                       | Core Region       | Extended Region | Total             |
|--|----------------------------------|-------------------|-----------------|-------------------|
| Mottled Petrel                           | <i>Pterodroma inexpectata</i>    |                   |                 |                   |
| Murphy's Petrel                          | <i>Pterodroma ultima</i>         | 5 / 4 / 0.01      |                 | 5 / 4 / 0.01      |
| Northern Fulmar                          | <i>Fulmarus glacialis</i>        | 40 / 38 / 0.06    | 3 / 3 / 0.03    | 43 / 41 / 0.06    |
| Osprey                                   | <i>Pandion haliaetus</i>         |                   |                 |                   |
| Pacific Loon                             | <i>Gavia pacifica</i>            | 39 / 20 / 0.06    |                 | 39 / 20 / 0.05    |
| Parakeet Auklet                          | <i>Aethia psittacula</i>         |                   |                 |                   |
| Parasitic Jaeger                         | <i>Stercorarius parasiticus</i>  | 4 / 4 / 0.01      |                 | 4 / 4 / 0.01      |
| Parkinson's Petrel                       | <i>Procellaria parkinsoni</i>    |                   |                 |                   |
| Pelagic Cormorant                        | <i>Phalacrocorax pelagicus</i>   | 2 / 2 / 0         |                 | 2 / 2 / 0         |
| Peregrine Falcon                         | <i>Falco peregrinus</i>          |                   |                 |                   |
| Pigeon Guillemot                         | <i>Cephus columba</i>            | 2 / 2 / 0         |                 | 2 / 2 / 0         |
| Pink-Footed Shearwater                   | <i>Puffinus creatopus</i>        | 110 / 77 / 0.17   | 68 / 34 / 0.57  | 178 / 111 / 0.24  |
| Pomarine Jaeger                          | <i>Stercorarius pomarinus</i>    | 1 / 1 / 0         |                 | 1 / 1 / 0         |
| Red Phalarope                            | <i>Phalaropus fulicaria</i>      | 1235 / 135 / 1.96 |                 | 1235 / 135 / 1.65 |
| Red-Billed Tropicbird                    | <i>Phaethon aethereus</i>        |                   | 1 / 1 / 0.01    | 1 / 1 / 0         |
| Red-Footed Booby                         | <i>Sula sula</i>                 |                   |                 |                   |
| Red-Necked Grebe                         | <i>Podiceps grisegena</i>        |                   |                 |                   |
| Red-Necked Phalarope                     | <i>Phalaropus lobatus</i>        | 4625 / 378 / 7.34 |                 | 4625 / 378 / 6.18 |
| Red-Tailed Tropicbird                    | <i>Pheathon rubricauda</i>       |                   |                 |                   |
| Red-Throated Loon                        | <i>Gavia stellata</i>            |                   |                 |                   |
| Rhinoceros Auklet                        | <i>Cerorhinca monocerata</i>     | 63 / 49 / 0.1     | 12 / 8 / 0.1    | 75 / 57 / 0.1     |
| Ring-Billed Gull                         | <i>Larus delawarensis</i>        |                   |                 |                   |
| Royal Tern                               | <i>Sterna maxima</i>             |                   | 1 / 1 / 0.01    | 1 / 1 / 0         |
| Ruddy Turnstone                          | <i>Arenaria interpres</i>        |                   |                 |                   |
| Sabine's Gull                            | <i>Larus sabini</i>              | 14 / 8 / 0.02     |                 | 14 / 8 / 0.02     |
| Scripps's Murrelet                       | <i>Synthliboramphus scrippsi</i> |                   |                 |                   |
| Short-Tailed / Slender-Billed Shearwater | <i>Puffinus tenuirostris</i>     |                   |                 |                   |
| Short-Tailed Albatross                   | <i>Phoebastria albatrus</i>      |                   |                 |                   |

| Common Name               | Latin Name                      | Core Region         | Extended Region  | Total               |
|---------------------------|---------------------------------|---------------------|------------------|---------------------|
| Solander's Petrel         | <i>Pterodroma solandri</i>      |                     |                  |                     |
| Sooty Shearwater          | <i>Puffinus griseus</i>         | 7207 / 1125 / 11.44 | 467 / 159 / 3.94 | 7674 / 1284 / 10.25 |
| South Polar Skua          | <i>Stercorarius maccormicki</i> |                     |                  |                     |
| Stejneger's Petrel        | <i>Pterodroma longirostris</i>  |                     |                  |                     |
| Surf Scoter               | <i>Melanitta perspicillata</i>  |                     |                  |                     |
| Thayer's Gull             | <i>Larus thayeri</i>            |                     |                  |                     |
| Tufted Puffin             | <i>Fratercula cirrhata</i>      | 6 / 5 / 0.01        | 1 / 1 / 0.01     | 7 / 6 / 0.01        |
| Unidentified Albatross    | (species group)                 |                     |                  |                     |
| Unidentified Auklet       | (species group)                 |                     |                  |                     |
| Unidentified Cormorant    | (species group)                 |                     |                  |                     |
| Unidentified Duck         | (species group)                 |                     |                  |                     |
| Unidentified Grebe        | (species group)                 |                     |                  |                     |
| Unidentified Gull         | (species group)                 | 25 / 25 / 0.04      |                  | 25 / 25 / 0.03      |
| Unidentified Jaeger       | (species group)                 |                     |                  |                     |
| Unidentified Large Alcid  | (species group)                 |                     |                  |                     |
| Unidentified Loon         | (species group)                 |                     |                  |                     |
| Unidentified Murre        | (species group)                 |                     |                  |                     |
| Unidentified Petrel       | (species group)                 | 2 / 2 / 0           |                  | 2 / 2 / 0           |
| Unidentified Phalarope    | (species group)                 | 32 / 18 / 0.05      |                  | 32 / 18 / 0.04      |
| Unidentified Procellarid  | (species group)                 |                     |                  |                     |
| Unidentified Shearwater   | (species group)                 |                     |                  |                     |
| Unidentified Skua         | (species group)                 |                     |                  |                     |
| Unidentified Small Alcid  | (species group)                 |                     |                  |                     |
| Unidentified Storm-Petrel | (species group)                 |                     |                  |                     |
| Unidentified Tern         | (species group)                 |                     |                  |                     |
| Unidentified Tropicbird   | (species group)                 |                     |                  |                     |
| Wedge-Rumped Storm-Petrel | <i>Oceanodroma tethys</i>       |                     |                  |                     |
| Wedge-Tailed Shearwater   | <i>Puffinus pacificus</i>       |                     |                  |                     |

| Common Name                   | Latin Name                       | Core Region       | Extended Region | Total             |
|-------------------------------|----------------------------------|-------------------|-----------------|-------------------|
| Western Grebe                 | <i>Aechmophorus occidentalis</i> |                   | 3 / 1 / 0.03    | 3 / 1 / 0         |
| Western Gull                  | <i>Larus occidentalis</i>        | 1123 / 788 / 1.78 | 91 / 81 / 0.77  | 1214 / 869 / 1.62 |
| Wilson's Storm-Petrel         | <i>Oceanites oceanicus</i>       |                   |                 |                   |
| Xantus's / Craveri's Murrelet | (species group)                  |                   |                 |                   |

**Table 3. Mammal survey observation summary, broken down by survey region and by species. Cell values represent: the total number of species individuals / number of species sightings / average species encounter rate (individuals per 100 km).**

| Common Name                | Latin Name                        | Core Region    | Extended Region | Total          |
|----------------------------|-----------------------------------|----------------|-----------------|----------------|
| Baird's Beaked Whale       | <i>Berardius bairdii</i>          |                |                 |                |
| Blue Whale                 | <i>Balaenoptera musculus</i>      | 5 / 2 / 0.2    | 11 / 9 / 2.8    | 16 / 11 / 0.6  |
| Bottlenose Dolphin         | <i>Tursiops truncatus</i>         |                |                 |                |
| California Sea Lion        | <i>Zalophus californianus</i>     | 5 / 5 / 0.2    | 74 / 38 / 18.7  | 79 / 43 / 3.2  |
| Common Dolphin             | <i>Delphinus delphis</i>          |                |                 |                |
| Cuvier's Beaked Whale      | <i>Ziphius cavirostris</i>        |                |                 |                |
| Dall's Porpoise            | <i>Phocoenoides dalli</i>         | 23 / 8 / 1.1   | 1 / 1 / 0.3     | 24 / 9 / 1     |
| False Killer Whale         | <i>Pseudorca crassidens</i>       |                |                 |                |
| Fin Whale                  | <i>Balaenoptera physalus</i>      | 8 / 5 / 0.4    | 1 / 1 / 0.3     | 9 / 6 / 0.4    |
| Gray Whale                 | <i>Eschrichtius robustus</i>      |                |                 |                |
| Green Sea Turtle           | <i>Chelonia mydas</i>             |                |                 |                |
| Guadelupe Fur Seal         | <i>Arctocephalus townsendi</i>    |                |                 |                |
| Harbor Porpoise            | <i>Phocoena phocoena</i>          |                |                 |                |
| Harbor Seal                | <i>Phoca vitulina</i>             |                |                 |                |
| Humpback Whale             | <i>Megaptera novaeangliae</i>     | 138 / 82 / 6.6 | 2 / 1 / 0.5     | 140 / 83 / 5.6 |
| Killer Whale               | <i>Orcinus orca</i>               |                |                 |                |
| Long-beaked Common Dolphin | <i>Delphinus capensis</i>         |                |                 |                |
| Minke Whale                | <i>Balaenoptera acutorostrata</i> | 1 / 1 / 0      |                 | 1 / 1 / 0      |
| Northern Elephant Seal     | <i>Mirounga angustirostris</i>    |                | 1 / 1 / 0.3     | 1 / 1 / 0      |
| Northern Fur Seal          | <i>Callorhinus ursinus</i>        | 8 / 8 / 0.4    |                 | 8 / 8 / 0.3    |

| <b>Common Name</b>           | <b>Latin Name</b>                 | <b>Core Region</b> | <b>Extended Region</b> | <b>Total</b> |
|------------------------------|-----------------------------------|--------------------|------------------------|--------------|
| Northern Right Whale Dolphin | <i>Lissodelphis borealis</i>      |                    |                        |              |
| Pacific White-Sided Dolphin  | <i>Lagenorhynchus obliquidens</i> | 204 / 12 / 9.7     | 21 / 3 / 5.3           | 225 / 15 / 9 |
| Pilot Whale                  | <i>Globicephala spp.</i>          |                    |                        |              |
| Pygmy Sperm Whale            | <i>Kogia breviceps</i>            |                    |                        |              |
| Ridley Sea Turtle            | <i>Lepidochelys olivacea</i>      |                    |                        |              |
| Risso's Dolphin              | <i>Grampus griseus</i>            | 6 / 2 / 0.3        | 5 / 2 / 1.3            | 11 / 4 / 0.4 |
| Sea Otter                    | <i>Enhydra lutris</i>             |                    |                        |              |
| Sei Whale                    | <i>Balaenoptera borealis</i>      |                    |                        |              |
| Short-Beaked Common Dolphin  | <i>Delphinus delphis</i>          |                    |                        |              |
| Short-Finned Pilot Whale     | <i>Globicephala macrorhynchus</i> |                    |                        |              |
| Sperm Whale                  | <i>Physeter macrocephalus</i>     |                    |                        |              |
| Steller Sea Lion             | <i>Eumetopias jubatus</i>         | 1 / 1 / 0          | 1 / 1 / 0.3            | 2 / 2 / 0.1  |
| Striped Dolphin              | <i>Stenella coeruleoalba</i>      |                    |                        |              |
| Unidentified Baleinoptera    |                                   |                    |                        |              |
| Unidentified Beaked Whale    |                                   |                    |                        |              |
| Unidentified Cetacean        |                                   |                    |                        |              |
| Unidentified Dolphin         |                                   | 3 / 2 / 0.1        |                        | 3 / 2 / 0.1  |
| Unidentified Large Whale     |                                   |                    |                        |              |
| Unidentified Pinniped        |                                   |                    | 3 / 3 / 0.8            | 3 / 3 / 0.1  |
| Unidentified Sea Lion        |                                   | 1 / 1 / 0          | 1 / 1 / 0.3            | 2 / 2 / 0.1  |
| Unidentified Seal            |                                   |                    |                        |              |
| Unidentified Whale           |                                   | 10 / 8 / 0.5       |                        | 10 / 8 / 0.4 |

## Appendix 1. Distribution maps

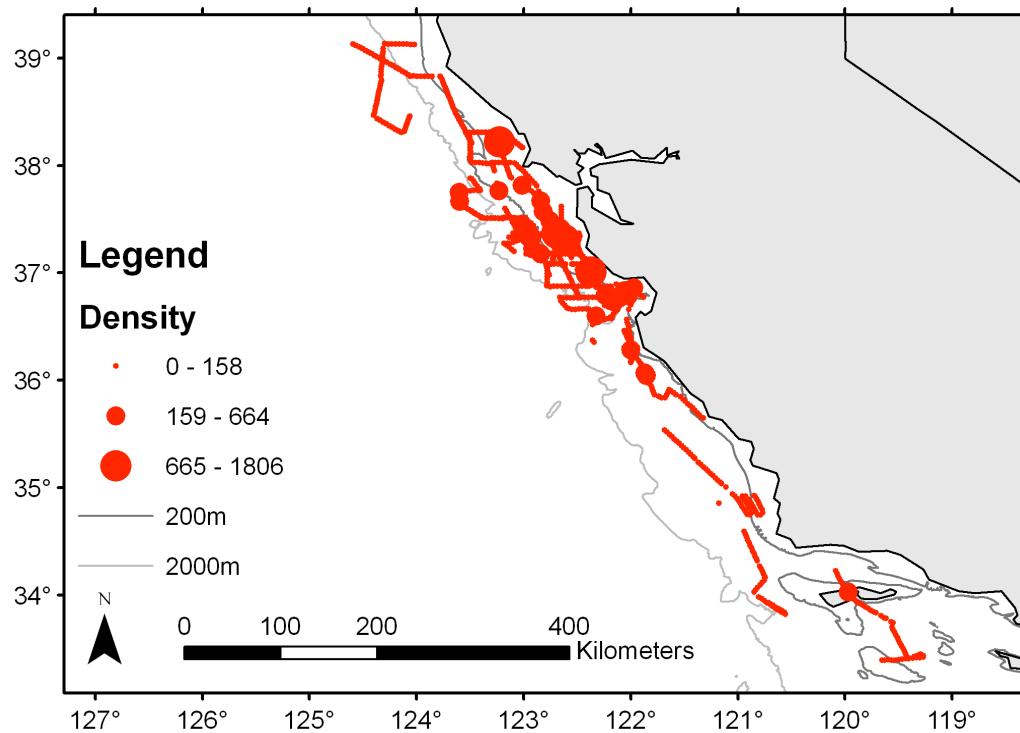


Figure 3. Bird distribution (all species pooled) in the total region.

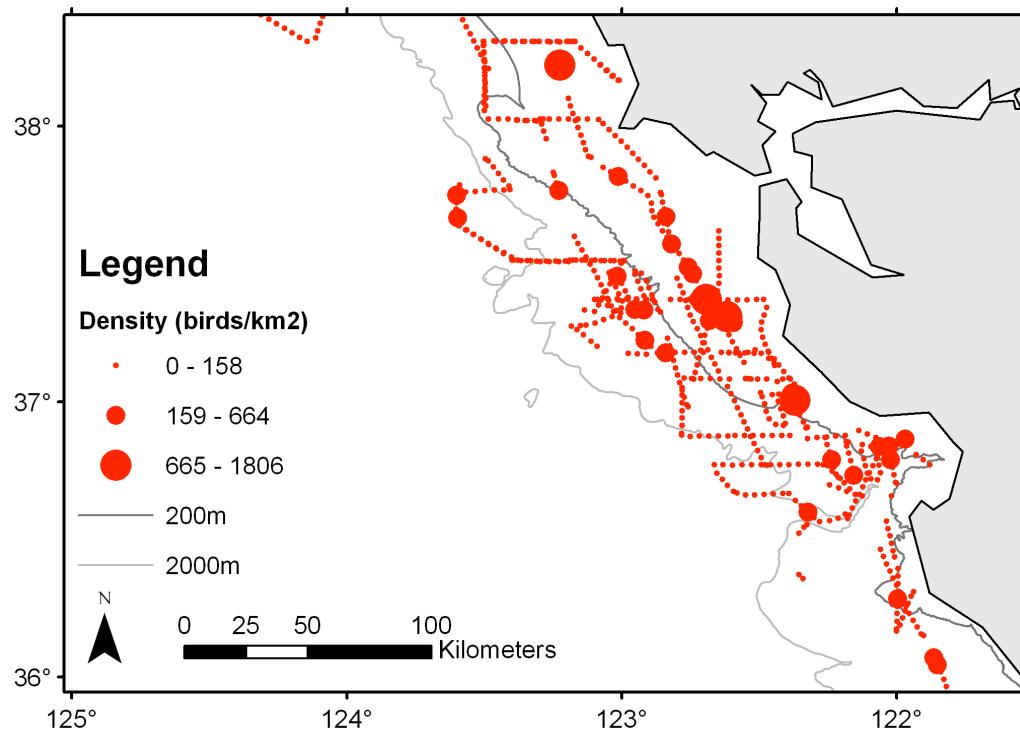
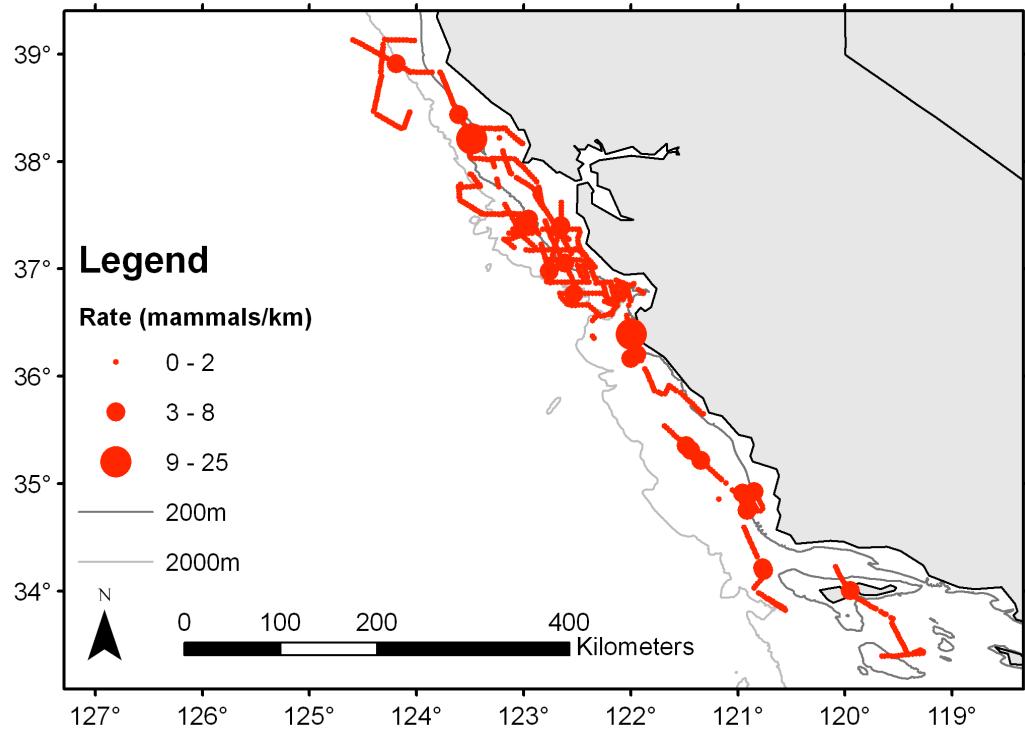
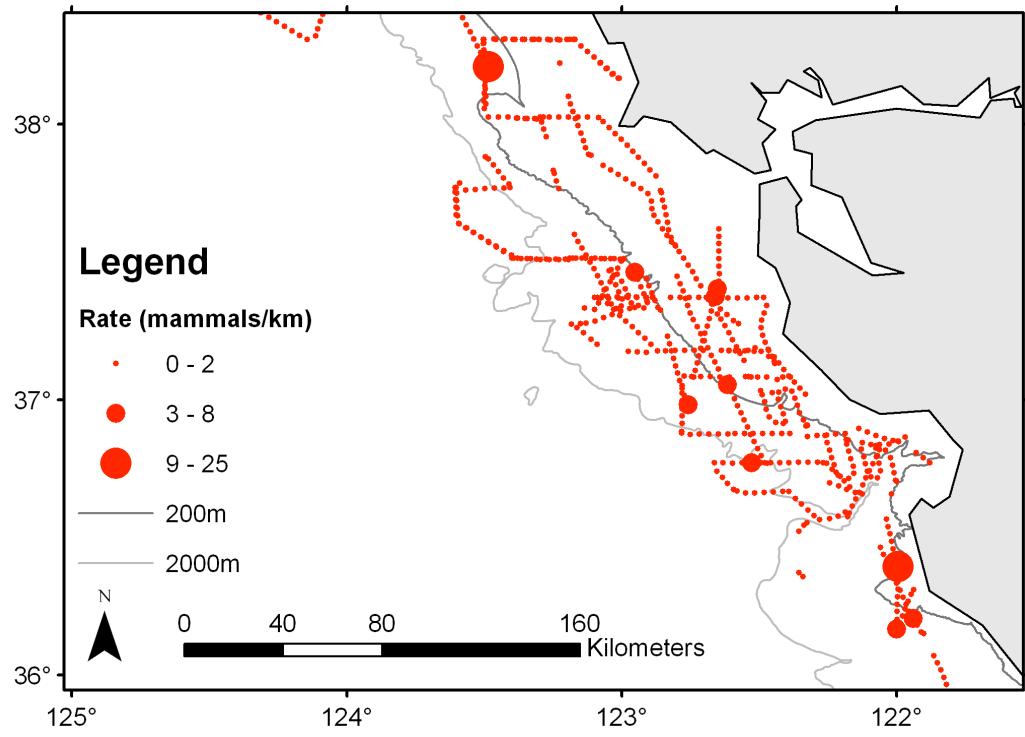


Figure 4. Bird distribution in the core region.



**Figure 5. Mammal distribution in the total region.**



**Figure 6. Mammal distribution in the core region.**

## Appendix 2. Species Lists

### Data selection criteria

Table 4. The following criteria were applied to the survey database to select data for the summary.

|                             |                                     |
|-----------------------------|-------------------------------------|
| Behavior codes included     | All values                          |
| Species categories included | Birds, Mammals, Unidentified        |
| Species categories excluded | Fish, Excluded Species List         |
| Years                       | 2013                                |
| Months                      | All months                          |
| Bin length                  | All bins > 0.1km                    |
| Region                      | JRS core region and extended region |
| Seasons                     | All seasons                         |

### Excluded Species List

Table 5. The following species were excluded from the analysis.

|                          |                                    |
|--------------------------|------------------------------------|
| American Coot            | <i>Fulica americana</i>            |
| Black Oystercatcher      | <i>Haematopus bachmani</i>         |
| Black Skimmer            | <i>Rynchops niger</i>              |
| Black Tern               | <i>Chlidonias niger</i>            |
| Black Turnstone          | <i>Arenaria melanocephala</i>      |
| Brewer's Sparrow         | <i>Spizella breweri</i>            |
| Bufflehead               | <i>Bucephala albeola</i>           |
| European Starling        | <i>Sturnus vulgaris</i>            |
| Great Blue Heron         | <i>Ardea herodias</i>              |
| Great Egret              | <i>Ardea alba</i>                  |
| Green Heron              | <i>Butorides virescens</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>            |
| Red-Breasted Merganser   | <i>Mergus serrator</i>             |
| Ruddy Duck               | <i>Oxyura jamaicensis</i>          |
| Sanderling               | <i>Calidris alba</i>               |
| Snow Goose               | <i>Chen caerulescens</i>           |
| Snowy Egret              | <i>Egretta thula</i>               |
| Unidentified Bird        | (species group)                    |
| Unidentified Dowitcher   | (species group)                    |
| Unidentified Goose       | (species group)                    |
| Unidentified Hummingbird | (species group)                    |
| Unidentified Passerine   | (species group)                    |
| Unidentified Shorebird   | (species group)                    |
| Western Sandpiper        | <i>Calidris mauri</i>              |
| Whimbrel                 | <i>Numenius phaeopus</i>           |
| White-Winged Scoter      | <i>Melanitta fusca</i>             |
| Willet                   | <i>Catoptrophorus semipalmatus</i> |
| Xaveri's Murrelet        | (species group)                    |

|                              |                                   |
|------------------------------|-----------------------------------|
| Yellow-Rumped Warbler        | <i>Dendroica coronata</i>         |
| Baird's Beaked Whale         | <i>Berardius bairdii</i>          |
| Blue Whale                   | <i>Balaenoptera musculus</i>      |
| Bottlenose Dolphin           | <i>Tursiops truncatus</i>         |
| California Sea Lion          | <i>Zalophus californianus</i>     |
| California Sea Lion          | <i>Zalophus californianus</i>     |
| Common Dolphin               | <i>Delphinus delphis</i>          |
| Cuvier's Beaked Whale        | <i>Ziphius cavirostris</i>        |
| Dall's Porpoise              | <i>Phocoenoides dalli</i>         |
| False Killer Whale           | <i>Pseudorca crassidens</i>       |
| Fin Whale                    | <i>Balaenoptera physalus</i>      |
| Gray Whale                   | <i>Eschrichtius robustus</i>      |
| Green Sea Turtle             | <i>Chelonia mydas</i>             |
| Guadelupe Fur Seal           | <i>Arctocephalus townsendi</i>    |
| Harbor Porpoise              | <i>Phocoena phocoena</i>          |
| Harbor Seal                  | <i>Phoca vitulina</i>             |
| Hawksbill Sea Turtle         | <i>Eretmochelys imbricata</i>     |
| Humpback Whale               | <i>Megaptera novaeangliae</i>     |
| Killer Whale                 | <i>Orcinus orca</i>               |
| Leatherback Turtle           | <i>Dermochelys coriacea</i>       |
| Long-beaked Common Dolphin   | <i>Delphinus capensis</i>         |
| Minke Whale                  | <i>Balaenoptera acutorostrata</i> |
| Northern Elephant Seal       | <i>Mirounga angustirostris</i>    |
| Northern Fur Seal            | <i>Callorhinus ursinus</i>        |
| Northern Right Whale Dolphin | <i>Lissodelphis borealis</i>      |
| Pacific White-Sided Dolphin  | <i>Lagenorhynchus obliquidens</i> |
| Pilot Whale                  | <i>Globicephala spp.</i>          |
| Pygmy Sperm Whale            | <i>Kogia breviceps</i>            |
| Ridley Sea Turtle            | <i>Lepidochelys olivacea</i>      |
| Risso's Dolphin              | <i>Grampus griseus</i>            |
| Sea Otter                    | <i>Enhydra lutris</i>             |
| Sei Whale                    | <i>Balaenoptera borealis</i>      |
| Short-Beaked Common Dolphin  | <i>Delphinus delphis</i>          |
| Short-Finned Pilot Whale     | <i>Globicephala macrorhynchus</i> |
| Sperm Whale                  | <i>Physeter macrocephalus</i>     |
| Steller Sea Lion             | <i>Eumetopias jubatus</i>         |
| Striped Dolphin              | <i>Stenella coeruleoalba</i>      |
| Unidentified Baleinoptera    | (species group)                   |
| Unidentified Beaked Whale    | (species group)                   |
| Unidentified Cetacean        | (species group)                   |
| Unidentified Dolphin         | (species group)                   |
| Unidentified Large Whale     | (species group)                   |
| Unidentified Mammal          | (species group)                   |
| Unidentified Pinniped        | (species group)                   |
| Unidentified Sea Lion        | (species group)                   |
| Unidentified Seal            | (species group)                   |
| Unidentified Turtle          | (species group)                   |
| Unidentified Whale           | (species group)                   |
| Basking Shark                | <i>Cetorhinus maximus</i>         |
| Blue Shark                   | <i>Prionace glauca</i>            |
| Hammerhead Shark             | <i>Sphyrna spp.</i>               |

|                    |                          |
|--------------------|--------------------------|
| Mako Shark         | <i>Isurus oxyrinchus</i> |
| Mola Mola          | <i>Mola mola</i>         |
| Unidentified Fish  | (species group)          |
| Unidentified Shark | (species group)          |

### ***Included Species List***

For a list of species included in the analysis, please refer to Table 2 and Table 3.