



## **2014 California Current Cetacean & Ecosystem Assessment Survey (CalCurCEAS): Final Report to Bureau of Ocean Energy Management regarding surveys of Windfloat and Wave Energy Areas**

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### Synopsis

The California Current Cetacean and Ecosystem Assessment Survey (CalCurCEAS; <https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=259&id=19382>) was a multi-disciplinary expedition to estimate the abundance of cetacean species in the California Current and study their ecosystem. The Marine Mammal and Turtle Division (<https://swfsc.noaa.gov/MMTD/>) of NOAA Fisheries, Southwest Fisheries Science Center conducted the survey, aboard the chartered vessel *Ocean Starr*. The survey was supported by NOAA's National Marine Fisheries Service, the U.S. Navy, the Bureau of Ocean Energy Management (BOEM), and NOAA's National Ocean Service. The 120-day survey was divided into 5 legs, approximately 24 days each. Two BOEM study areas (Figure 1), which are being considered for alternative energy development (wind and wave power), were surveyed on Legs 1 and 2.

The Windfloat Area survey took place on 24 August 2014. Sea and weather conditions were typical for coastal Oregon: Beaufort 5 and fog. The fine-scale survey lines were spaced 0.8 nmi apart. The survey began at 09:05:55 local time and was completed at 13:55:55.

The Wave Energy Area surveys took place on 26 and 30 August 2014 (Legs 1 & 2, respectively). Weather conditions during the 26 August survey hampered marine mammal sightings. A second attempt to survey this area on 30 August was successful. Both sets of data were provided to BOEM; this report primarily summarizes data collected on August 30 at the Wave Energy Area. Sea state for the Wave Energy Area survey was Beaufort 4; wind speed was about 12 kts and a 4' swell was present. Foggy conditions were present. The fine-scale survey lines were spaced 0.8 nmi apart. The survey began at 09:38:57 local time and was completed at 13:58:51.

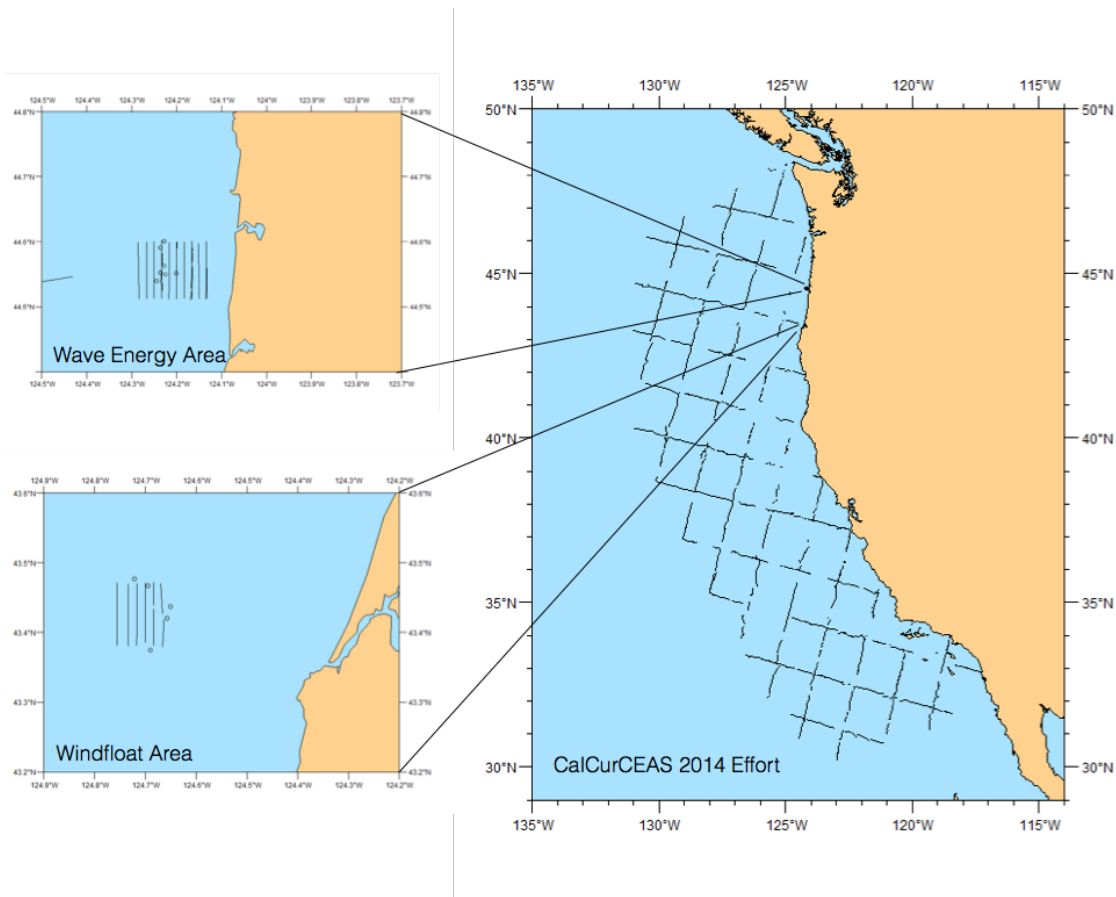


Figure 1. Map of CalCurCEAS total effort (trackline surveyed) with inserts showing Windfloat and Wave Energy Areas surveyed for BOEM. Maps are displayed using decimal degrees.

### Marine Mammal Observations

Line-transect survey methods were used to collect cetacean abundance data (per Barlow and Forney 2007). A daily watch for cetaceans was maintained on the flying bridge by six mammal observers. Each observer worked in 2-hour rotations, manning each of the following three stations on the flying bridge for 40 minutes: a port side 25x150 binocular station, a center-line data recorder position, and a starboard 25x150 binocular station. Marine mammal sightings data were delivered to BOEM in a GIS compatible format.

Low numbers of cetaceans were seen at the Windfloat Area (Table 1). Five cetaceans and five pinnipeds were sighted near the survey area (the Pacific white-sided dolphins listed in Table 1 were seen and heard during transits between the fine-scale survey lines). Please note that the tables in this report contain raw data that are not intended to be a measure of density, abundance, or habitat use.

Table 1. Summary of marine mammals observed in the BOEM Windfloat Area on 24 August, 2014.

Sighting no.	Latitude	Longitude	Local time	Species
180	N43:25.75	W124:40.00	09:24:29	Humpback whale <i>Megaptera novaeangliae</i>
181	N43:22.60	W124:41.53	09:25:29	Pacific white-sided dolphin

Sighting no.	Latitude	Longitude	Local time	Species
				<i>Lagenorhynchus obliquidens</i>
182	N43:27.87	W124:42.02	10:33:18	Humpback whale
183	N43:28.59	W124:43.28	12:22:31	Pacific white-sided dolphin
184	N43:25.42	W124:41.01	13:29:43	Unidentified <i>Balaenoptera</i>
CU1	N43:26.06	W124:40.02	09:22:36	Northern fur seal <i>Callorhinus ursinus</i>
CU2	N43:23.18	W124:39.93	09:42:19	Northern fur seal
MA1	N43:23.99	W124:44.02	11:16:55	Northern elephant seal <i>Mirounga angustirostris</i>
CU3	N43:23.41	W124:44.01	11:20:24	Northern fur seal
CU4	N43:23.10	W124:44.02	11:22:14	Northern fur seal



Blue whale off the coast of Oregon. Photo credit: Paula Olson, NOAA

There were eight cetacean sightings and no pinniped sightings in the Wave Energy Area (Table 2). Please note that the table contains raw data and is not intended to be a measure of density, abundance, or habitat use.

Table 2. Summary of marine mammals observed in the BOEM Wave Energy Area on 30 August, 2014.

Sighting no.	Latitude	Longitude	Local time	Species
199	N44:31.35	W124:10.05	10:12:36	Blue whale <i>Balaenoptera musculus</i>
200	N44:32.11	W124:13.93	12:08:40	Killer whale <i>Orcinus orca</i>
201	N44:32.40	W124:14.97	12:36:08	Harbor porpoise <i>Phocoena phocoena</i>
202	N44:32.76	W124:14.08	13:36:00	Harbor porpoise
203*	N44:32.93	W124:14.09	13:37:05	Harbor porpoise
205	N44:34.87	W124:13.99	13:50:10	Harbor porpoise
206	N44:35.49	W124:14.01	13:54:24	Unidentified large whale
207	N44:35.82	W124:14.01	13:56:37	Harbor porpoise

\* Sighting 203 was the same blue whale as sighting 199.



*Pacific white-sided dolphin - most common cetacean observed in the Windfloat Area on 24 August 2014. Photo credit: Morgane Lauf, NOAA*

### Seabird Observations

Visual surveys of seabirds were conducted from the flying bridge by two seabird observers; each observer worked a 2-hour rotation. Seabird observers used handheld and 25x150 binoculars, and 300 m strip transect methods (Ballance 2007). Seabird sightings data were sent to BOEM in a GIS compatible format.

Thirteen species and 177 birds were recorded in the Windfloat Area (Table 3). Nine species and 218 birds were recorded in the Wave Energy Area during the 26 August survey (Table 4); eight species and 87 individual birds were recorded in this area during the 30 August survey (Table 5).



*Pink-footed Shearwater. Photo credit NOAA.*

*Table 3. Summary of birds observed in the BOEM Windfloat Pacific study grid on 24 August, 2014.*

<b>Common Name</b>	<b>Scientific name</b>	<b>Total individuals</b>
Black-footed Albatross	<i>Phoebastria nigripes</i>	7
Northern Fulmar	<i>Fulmarus glacialis</i>	3
Pink-footed Shearwater	<i>Puffinus creatopus</i>	76
Sooty Shearwater	<i>Puffinus griseus</i>	39
Short-tailed Shearwater	<i>Puffinus tenuirostris</i>	1
Fork-tailed Storm-Petrel	<i>Oceanodroma furcata</i>	10
Red Phalarope	<i>Phalaropus fulicarius</i>	2
Parasitic Jaeger	<i>Stercorarius parasiticus</i>	1
Long-tailed Jaeger	<i>Stercorarius longicaudus</i>	1
Rhinoceros Auklet	<i>Cerorhinca monocerata</i>	2
Western Gull	<i>Larus occidentalis</i>	3
California Gull	<i>Larus californicus</i>	29
Western x Glaucous-winged Gull hybrid	<i>Larus glaucescens/occidentalis</i>	3

Table 4. Summary of birds observed in the BOEM Wave Energy Area study grid on 26 August, 2014.

Common name	Scientific name	Total individuals
Pink-footed Shearwater	<i>Puffinus creatopus</i>	9
Sooty Shearwater	<i>Puffinus griseus</i>	22
Red-necked Phalarope	<i>Phalaropus lobatus</i>	5
Common Murre	<i>Uria aalge</i>	146
Pigeon Guillemot	<i>Cephus columba</i>	1
Cassin's Auklet	<i>Ptychoramphus aleuticus</i>	1
Western Gull	<i>Larus occidentalis</i>	3
California Gull	<i>Larus californicus</i>	30
Glaucous-winged Gull	<i>Larus glaucescens</i>	1



Sooty Shearwater. Photo credit: NOAA.

Table 5. Summary of birds observed in the BOEM Wave Energy Area on 30 August, 2014.

Common Name	Scientific name	Total individuals
Northern Pintail	<i>Anas acuta</i>	27
Rhinoceros Auklet	<i>Cerorhinca monocerata</i>	2
Sooty Shearwater	<i>Puffinus griseus</i>	2
Peregrine Falcon	<i>Falco peregrinus</i>	1
Common Murre	<i>Uria aalge</i>	41
Western Gull	<i>Larus occidentalis</i>	2
California Gull	<i>Larus californicus</i>	12

Cetacean Acoustics

A hydrophone array was towed behind the ship to listen for vocalizations of whales, dolphins and porpoises. In the Windfloat Area, two detections occurred; both acoustic detections were also recorded by the marine mammal visual team. No detections were made in the Wave Energy Area. Acoustic detection data were sent to BOEM in a GIS compatible format.



### Oceanography

Temperature and salinity data were collected continuously throughout the survey area. Expendable bathythermographs were dropped near the edges of the survey to determine the thermocline; bucket samples were collected to confirm temperature values. The raw data were delivered to BOEM in a GIS compatible format; however they are currently undergoing final error checks and if differences are detected, a revised file will be forwarded.

### Active Acoustics

The Simrad EK60 Scientific Echo Sounder operated continuously at 38, 70, 120, and 200 kHz and was interfaced to a data acquisition system to estimate micronekton biomass between 0 and 700 m. The raw data were delivered to BOEM and the recommended processing software is Echoview (<http://www.echoview.com/>).

### Other of Note

During the second survey of the BOEM Wave Energy Area immediately outside of Newport Harbor, a well-known transient killer whale with a distinctively damaged dorsal fin was sighted. This individual (a male with identification number CA217) was first sighted off of Santa Catalina Island on 13 December 1998, and was an adult at that time. He was last sighted with six other whales in Johnstone Strait (British Columbia) on 7 July 2014. He has been seen as far south as Dana Point, though most of his sightings have been in Monterey Bay.



*Killer whale (CA217) photographed near Wave Energy Area.*

### References

- Ballance, L.T. 2007. Understanding seabirds at sea: why and how? *Marine Ornithology* 35:127-135.
- Barlow, J., and K.A. Forney. 2007. Abundance and population density of cetaceans in the California Current ecosystem. *Fishery Bulletin* 105:509-526.