

California Current Cetacean & Ecosystem Survey (CalCurCEAS): End-of-Leg Report: Aug 16-26, 2014

Jay Barlow, Cruise Leader

Synopsis

The California Current Cetacean and Ecosystem Assessment Survey (CalCurCEAS) is a multi-disciplinary expedition to estimate the abundance of cetacean species in the California Current and study their ecosystem. The survey is being conducted by the Southwest Fisheries

Science Center aboard the chartered vessel *R/V Ocean Starr*. Work is being supported by NOAA's National Marine Fisheries Service, the U.S. Navy, and the Bureau of Ocean Energy Management. The 120-day survey is divided into 5 legs of approximately 24 days. This is a report of progress and data collected over the last week and a half.

This report is divided into several sections detailing various aspects of the ongoing survey efforts. We provide some low-resolution graphics for illustrative purposes, but must limit our graphics due to low internet bandwidth.

The first half of Leg 1 took us from San Diego to northern Washington. Since then we have been surveying offshore of Oregon and Washington (Fig.1). Weather has been a bit rough, and was especially challenging in the last week when we had high winds mixed with fog. We persevered and successfully covered most of our

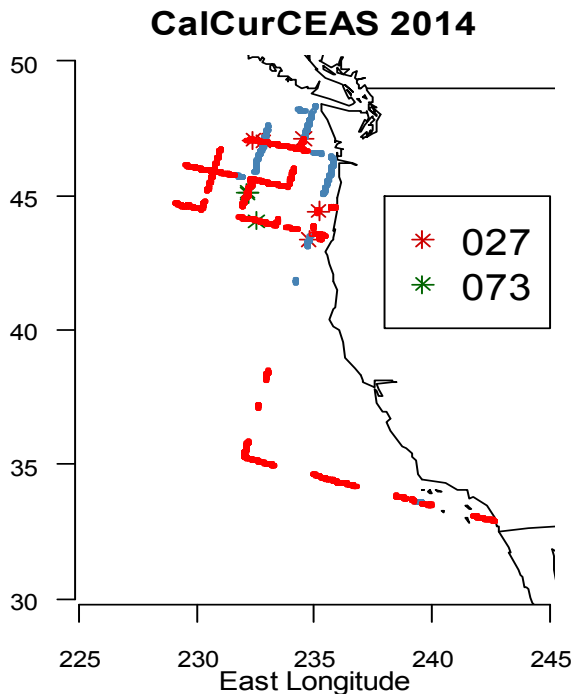


Figure 1. Transect lines completed during Leg 1 in calm seas (blue lines) and rough seas (red lines) and sightings of northern right whale dolphins (code 027) and sei whales (code 073).

planned transect lines and the two BOEM study areas which are being considered for alternative energy development (wind and wave power). The cruise leader on Leg 1, Jay Barlow, is passing over the reins to incoming cruise leader, Eric Archer. Scientists Morgane Lauf, Jeff Moore, Yaiyr Astudillo-Scalia, Eiren Jacobson, and Susannah Calderan are also departing the ship in Newport Oregon.

Marine Mammal Observations (Paula Olson, Juan Carlos Salinas, Adam U, Suzanne Yin, Jeff Moore, Morgane Lauf, Yaiyr Astudillo-Scalia, Bennie Johnson and Jay Barlow)

For the last week and a half, surveys have included waters from the Washington and Oregon coasts out to 300 nmi offshore. The water temperature has varied from a chilly 9°C in coastal waters off Newport to balmy 17°C in offshore areas. In colder waters we have been seeing Dall’s porpoises, northern right whale dolphins, Pacific white-sided dolphins and humpback whales, and in offshore waters we saw mostly sperm whales and beaked whales. In between we found fin whales and a surprising number of sei whales. The sperm whales were all heard by our crack acoustics team who were able to direct the ship towards the whale before it surfaced. All the sperm whales we saw were large, solitary males, but the acoustics team heard one distant group of multiple sperm whales that likely included females and at least one large male. Survey conditions have been challenging, with lots of wind and fog.

We conducted a series of fine-scale survey lines within two sites of special interest to the Bureau of Ocean Energy Management (BOEM). These sites (off Coos Bay, OR and Newport OR) are proposed to be experimental sites for wave and wind energy development. The fine-scale survey lines were spaced only 0.8 nmi apart. Low densities of cetaceans were seen at both sites.

Search Effort by Day

Date	Time Start End	Latitude	Longitude	Nautical Miles Surveyed	Average Beaufort
081614	0637 1915	N45:36.17 N46:00.66	W127:40.66 W125:51.58	98.9 nmi	4.8
081714	0637 1947	N46:42.80 N47:02.06	W125:37.07 W127:52.77	86.6 nmi	4.6
081814	0640 1916	N46:43.01 N46:06.61	W129:00.97 W130:28.83	91.9 nmi	5.1
081914	0646 1950	N44:42.54 N44:46.93	W130:55.95 W129:41.24	57.0 nmi	3.9
082014	0653 2007	N45:11.36 N45:39.70	W129:32.82 W128:01.15	97.2 nmi	3.8
082114	0649 1946	N45:36.19 N44:33.89	W127:41.31 W128:04.53	54.3 nmi	4.0
082214	0648 1820	N44:11.46 N44:07.64	W128:12.48 W126:34.36	72.2 nmi	4.6
082314	1102 1358	N43:49.05 N43:43.54	W126:12.29 W125:43.51	16.5 nmi	6.0
082414	0909 1944	N43:28.20 N43:34.37	W124:40.21 W125:06.89	50.4 nmi	4.4
082514	1037 1530	N44:26.81 N43:46.25	W124:49.77 W125:01.50	12.1 nmi	5.3
082614	1129 1856	N44:30.76 N44:30.72	W124:08.00 W124:09.03	52.0 nmi	3.8

Number of Cetacean Sightings by Species

CODE	SPECIES	TOT#
022	Lagenorhynchus obliquidens	8
027	Lissodelphis borealis	3
044	Phocoenoides dalli	8
046	Physeter macrocephalus	2
049	ziphiid whale	1
061	Ziphius cavirostris	1
063	Berardius bairdii	2
070	Balaenoptera sp.	8
073	Balaenoptera borealis	3
074	Balaenoptera physalus	9
075	Balaenoptera musculus	1
076	Megaptera novaeangliae	10
078	unid. small whale	3
079	unid. large whale	2
096	unid. cetacean	1
	TOTAL	62



Sei whale photo by Paula Olson



Large male sperm whale photo by Morgane Lauf.

Seabird Observations (Michael Force, Dawn Breese)

During the final half of Leg 1, the seabird team logged 2443 birds of 31 species (plus one hybrid and some unidentified ducks) on our 300 metre strip transect. Seventy-two percent of the total consisted of four species common in the California Current at this time of year, reflecting a strong seasonality in seabird occurrence. In decreasing order of abundance these were:

Sooty Shearwater, Pink-footed Shearwater, Leach's Storm-Petrel and Arctic Tern. This is very similar to what we found earlier in the month, with the two shearwaters (non-breeding summer visitors from their Southern Hemisphere nesting grounds) trading top spot. Broad scale patterns of abundance and diversity were also comparable to the first half of Leg 1: high density and abundance near shore, while the opposite was noted off shore. We found an average of 14

species and 347 birds per day near shore, compared with seven species and 46 birds per day offshore. Effort wasn't equal in both areas, however, with an additional two days spent on, or very near, the Continental Shelf, where food resources are much higher. There were many hours of practically nothing at all in the far western reaches of the study area! However, we found several Cook's and Hawaiian Petrels, both considered rare off the west coast, the former particularly so this far north. The biggest surprise out here in The Big Blue was a very lost Pied-billed Grebe, 163 nautical miles west of Cape Foulweather! The other big surprise was an adult female Brown Booby that made a brief cameo appearance, 143 nautical miles west of Point Brown, Washington. This tropical seabird, the bane of flying fish everywhere, is exceedingly rare north of the United States/Mexican border. This bird, and the Elegant Terns seen earlier this month, were both well north of their known ranges—perhaps indicative of El Niño conditions?

We would like to thank Chief Scientist and Leg 1 Cruise Leader, Jay Barlow, for his support this leg, and extend our gratitude to the marine mammal observers for their assistance with the feeding flocks. Special thanks to Cruise Coordinator, Annette Henry for outstanding attention to detail and helping to keep it all together.

The tables (below) summarize what we found during the small-scale surveys on the BOEM proposed experimental sites for alternative energy development off of the Oregon coast.

Summary of birds seen in the BOEM Windfloat Pacific study grid 24 August.

species		total individuals
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

Summary of birds seen in the BOEM P MEC SETS (wave energy) study grid 26 August

Species		total individuals
Pink-footed Shearwater	<i>Puffinus creatopus</i>	9
Sooty Shearwater	<i>Puffinus griseus</i>	22
Red-necked Phalarope	<i>Phalarops fulicaria</i>	5
Common Murre	<i>Uria aalge</i>	146
Pigeon Guillemot	<i>Cepphus 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

Biopsy Sampling (Juan Carlos Salinas & Suzanne Yin)15/08/2014 to 27/08/2014

Species	Common Name	# Weekly Samples	# Weekly Takes	Total Samples	Total Takes
<i>Balaenoptera borealis</i>	Sei whale	1	5	1	5
<i>Balaenoptera physalus</i>	Fin whale	3	5	3	5
<i>Delphinus delphis</i>	Short-beaked common dolphin	0	0	3	3
<i>Globicephala macrorhynchus</i>	Short-finned pilot whale	0	0	1	3
<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin	14	28	18	34
<i>Lissodelphis borealis</i>	Northern right whale dolphin	18	38	23	49
<i>Megaptera novaeangliae</i>	Humpback whale	0	0	1	2
<i>Phocoenoides dalli</i>	Dall's porpoise	1	1	6	7
	Grand Total	37	77	56	108

Cetacean Photographic Sampling (Paula Olson)

16-26 Aug 2014

Entire Leg 1

Species Code	Scientific Name	Common Name	# Sightings	# Photos	# Individual IDs	Total Sightings	Total Photos	Total Individual IDs
13	<i>Stenella coeruleoalba</i>	Striped dolphin				1	73	
17	<i>Delphinus delphis</i>	Short-beaked common dolphin				1	3	
21	<i>Grampus griseus</i>	Risso's dolphin				3	256	
22	<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin	2	11		4	65	
27	<i>Lissodelphis borealis</i>	Northern right whale dolphin	2	433		3	484	
36	<i>Globicephala macrorhynchus</i>	Short-finned pilot whale				1	532	1
40	<i>Phocoena phocoena</i>	Harbor porpoise				1	27	
44	<i>Phocoenoides dalli</i>	Dall's porpoise	1	2		3	8	
46	<i>Physeter macrocephalus</i>	Sperm whale	2	332		2	332	
63	<i>Berardius bairdii</i>	Baird's beaked whale	1	301		2	390	
70	<i>Balaenoptera sp.</i>	Unidentified rorqual	1	15		1	15	
72	<i>Balaenoptera edeni</i>	Bryde's whale				1	19	
73	<i>Balaenoptera borealis</i>	Sei whale	3	767	2	3	767	2
74	<i>Balaenoptera physalus</i>	Fin whale	8	690	7	12	765	7
75	<i>Balaenoptera musculus</i>	Blue whale				5	78	
76	<i>Megaptera novaeangliae</i>	Humpback whale	3	131	1	12	277	2
99	<i>Balaenoptera borealis/edeni</i>	Sei or Bryde's whale				1	1	



Mola mola seen feeding on veleva jellyfish. Photo by Paula Olson.

Oceanography (Annette Henry, Dawn Breese, Yaiyr Astudillo-Scalia, and Bennie Johnson)

The oceanographic team finished up Leg 1 with the coldest water temperatures (9.3° C) encountered to date. At sea, we are collecting underway and station-based physical and biological oceanographic sampling and studies of mid-trophic level organisms (using net sampling and acoustic backscatter methods) to characterize the pelagic ecosystem within the study area. Some of the data collection is automated and just requires monitoring. On the other hand, the bongo net tow is very “hands-on” and has attracted many scientists to come out after dark to find out what types of prey are being collected. Our tows have brought up an assortment of myctophids, herring, krill, various copepods, and lots of salps.

The success of the nighttime operations is due to Scientists that helped with bongo tows are Dawn Breese, Yaiyr Astudillo-Scalia, Bennie Johnson, Juan Carlos Salinas, Morgane Lauf, and Jeff Moore. However the enthusiasm and skill of the crew was unparalleled and we thank Armando Urrutia, Bobby Motherwell, George Rayford, Jr., and Jason Giery.



Figure 2 Yaiyr Astudillo-Scalia examining bongo sample. Photo: Morgane Lauf

Date	XBTs	Bongo Tows
16-26 August	43	5
5-15 August	43	8
Total	86	13



Bongo team is anxiously waiting to see what was collected in the net. Left to right: Bennie Johnson, Jeff Moore, Yaiyr Astudillo-Scalia, Annette Henry, Dawn Breese, and Armando Urrutia. Photo: Morgane Lauf

Acoustics (Emily Griffiths, Susannah Calderan & Eiren Jacobson)

During CalCurCEAS, we are towing a hydrophone array behind the ship to listen for sounds made by whales, dolphins and porpoises that might have been missed by the visual search team. We are also dropping sonobuoys at regular nightly stations to determine the distribution and relative abundance of calling whales. Finally, we are deploying free-floating buoy recorders that will drift and record cetacean sounds and ocean noise for two months.

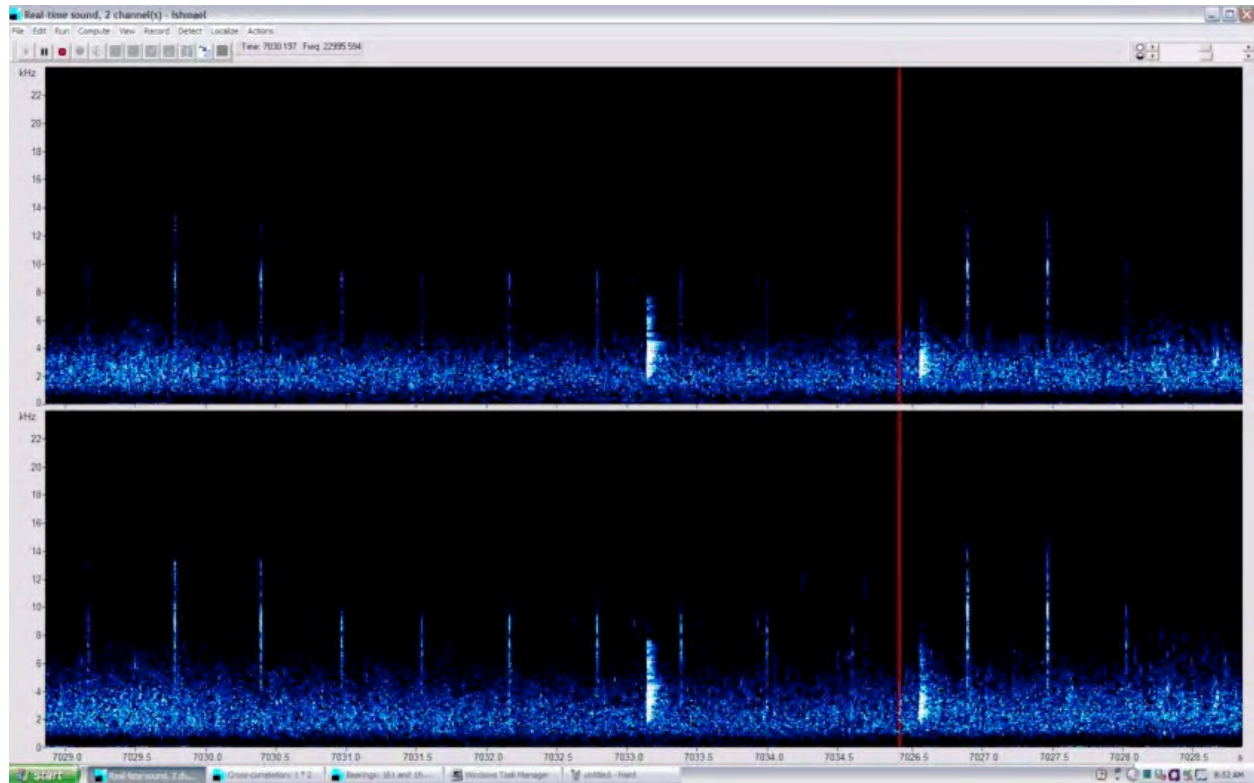
We recorded fewer acoustic detections on the second half of Leg 1 (n=16) than during the first half (n=38). Overall, during Leg 1 we covered huge latitudinal and temperature gradient which allowed us to record a large diversity of cetacean species, like the short-finned pilot whale off the southern Californian coast and northern right whale dolphins off Washington.

All acoustic detections from CalCurCEAS , Leg 1.	
<i>Species</i>	<i>Detection</i>
Short-beaked common dolphin	3
Short-beaked common dolphin/Striped dolphin	1
Risso's dolphin	3
Pacific white-sided dolphin	8
Northern right whale dolphin	2
Northern right whale and Pacific white-sided dolphins	3
Short-finned pilot whale	1
Killer whale	1
Harbor porpoise	1
Dall's porpoise	11
Sperm whale	6
Baird's beaked whale	2
Unidentified dolphin/porpoise	12
TOTAL	54

Disappointingly, we didn't get as many harbor porpoise detections as we had hoped, although we did pretty well with Dall's porpoises. There was one unidentified porpoise peculiarity, because all acoustic signals indicated it was a harbor porpoise. However, the habitat where the detection occurred was highly unlikely for harbor porpoises to be hanging out; the waters were too deep. With the lack of visual identification, due to the intense fog surrounding the Ocean Starr and porpoise's stealth-like abilities, we conservatively kept the detection unidentified.

We had some magnificent sperm whale detections, however. Mostly solitary males, but at just over 5 nautical miles we detected a group which was out of range for the visual team. This group was

producing a variety of sperm whale creeks, clicks, and groans. Also detected were the adorably lovely northern right whale and Pacific white-sided dolphins, which sound a bit like a bee trapped in a glass bottle singing “Zippity-do-da.”



Sperm whale regular clicks (thin faint lines) recorded from the distant group that also included at least one large male making clang sounds (wider bright lines).

In addition to our nightly sonobuoy routine, we launched three opportunistic buoys on fin and sei whales. During all three encounters, the whales continued their low frequency pulse-like calling for hours, allowing us to record a good range of call types. During one nightly sonobuoy deployment, humpbacks littered the waters around our vessel, lunging feeding, some with young by their side, right by our ship! Those sonobuoy recordings are full of the wide breadth of call types humpback whales are legendary for.

Acknowledgments

The CalCurCEAS project is funded by the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service, the Department of Navy’s Pacific Naval Facilities Engineering Command, and the U.S. Department of the Interior, Bureau of Ocean Energy Management, Pacific Region (through Interagency Agreement M14PG00017 with the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center). Sonobuoys were provided by the U.S. Navy. We appreciate the efforts of Sean Hanser and Anne Bull in securing the Navy and BOEM funding that made this project possible. Shoreside support in preparation for this cruise was provided

by Annette Henry, Shannon Rankin, Lisa Ballance, Jeremy Rusin, Libby Williamson, Jessica Redfern, Paul Fiedler, Robert Holland, Al Jackson, Lynn Evans, Gabriela Serra-Valente, Nicky Beaulieu, Nick Keller, Barb Taylor, Karen Martien, Wayne Perryman, Eric Archer, Jennifer Keating, Annette Stern, Terry Henry, Tony Cossio, Roger Hewitt, Jessica Lipsky, Cisco Werner, and all of our families. The crew of the *R/V Ocean Starr* have been extraordinarily helpful and delightful to sail with. We gratefully acknowledge and thank all participants.



The CalCurCEAS Science Team.