

California Current Cetacean & Ecosystem Survey (CalCurCEAS):

Mid-Leg 3 Report: September 25 – October 3, 2014

Lisa T. Ballance, Cruise Leader

Synopsis (Lisa T. Ballance) Leg 3 of the California Current Cetacean and Ecosystem Assessment Survey (CalCurCEAS) began when we sailed from San Francisco on 25 September and passed under the Golden Gate bridge headed west.¹ Our 120-day project 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*, with support by NOAA's National Marine Fisheries and National Ocean Services, the U.S. Navy, and the Bureau of Ocean Energy Management. This 24-day leg has so far taken us to the far west of the study area (lines E through L in the transects planned for Leg 3, shown in the figure), largely outside of the U.S. Exclusive Economic Zone and to the western edges of the influence of the California Current (as evidenced by the close-to-20°C surface water, tropicbirds, and flyingfishes recorded on several days). Though high winds and heavy seas are rarely a surprise out here, we have had to suspend scientific operations due to

weather on only one day so far (with the exception of the acousticians, who are almost always on effort). Details by project follow. Highlights (and some lowlights) include: successful recovery of DASBR-B passive acoustic recording buoy (drifting and collecting data since its deployment on Leg 1), loss of our bongo frame and net, steamed mussels in garlic sauce, two 90-minute counts of sperm whale sightings (is this a highlight? or a lowlight?), Lapland Longspur, snapper etouffee, a sperm whale encounter that brought everyone onto the bow and gave us 4 biopsy

¹ New scientists this leg include Acousticians Amy Van Cise (SIO-MMTD doctorate student) and Michelle Wierathmueller (University of Washington), Ecosystem Samplers Jacob Youssefzadeh (Fisheries Ecology Division, SWFSC) and Morgan Martin (former USD-MMTD master's student), Visiting Scientists Charlotte Boyd (MMTD) and Mridula Srinivasan (NMFS Office of Science & Technology), Mammal Observer Robert Pitman (AERD), and Cruise Leader Lisa Ballance. They join Emily Griffiths (Acoustician), Juan Carlos Salinas, Paula Olson, Suzanne Yin, Adam Ü, and Jim Gilpatrick (Mammal Observers), and Michael Force and Dawn Breese (Seabird Observers), who (with the exception of Gilpatrick) have been aboard since the beginning of the project.

samples (of the sperm whales), seared ahi, assembly and successful deployment of our replacement bongo frame and net, monster cinnamon rolls, monster Short-beaked Common Dolphin schools, monster chocolate chip cookies, initiation and heavy use of our new cetacean species code 199 (fin/sei/Bryde's whale), loss of our port winch, successful deployment of the CTD with the starboard winch instead, stunning cetacean photos, freshly baked blueberry muffins, again sailing aboard a ship near and dear to many of us, and a crew with astonishingly impressive talent, attitude, and support for our research. What an experience – I think I'll stay.

Photo (Adam Ü) – close encounter with sperm whales.



Marine Mammal Observations (Paula Olson, Juan Carlos Salinas, Adam Ü, Suzanne Yin, Jim Gilpatrick, Robert Pitman, Charlotte Boyd, Mridula Srinivasan, and Lisa T. Ballance)

SEARCH EFFORT BY DAY (including last two days of Leg 2)

Date	Start Time	Latitude	Longitude	Total Miles Searched	Average Beaufort
092014	0716	N40:38.36	W125:22.64	37.5 nmi	3.8
	1630	N39:52.04	W124:53.78		
092114	1104	N39:31.49	W125:00.73	75.4 nmi	2.1
	1854	N38:54.06	W124:05.29		
092514	1238	N37:39.98	W122:53.68	32.4 nmi	3.0
	1836	N37:27.36	W123:41.56		
092614	0705	N37:35.92	W124:27.37	53.5 nmi	4.4
	1900	N37:50.71	W125:46.57		
092814	0729	N39:35.60	W128:10.10	66.3 nmi	4.9
	1655	N38:21.90	W128:31.84		
092914	0932	N39:24.62	W128:19.47	52.0 nmi	4.2
	1911	N39:52.73	W128:53.62		
093014	0755	N41:19.95	W129:14.55	57.9 nmi	4.4

	1607	N41:39.98	W130:30.88		
100114	0734	N43:04.65	W130:17.16	74.0 nmi	2.8
	1844	N41:48.73	W130:43.31		
100214	0733	N41:22.84	W129:12.79	77.0 nmi	4.9
	1824	N40:05.45	W129:42.34		
100314	0743	N40:18.38	W130:58.77	52.0 nmi	3.7
	1747	N40:00.03	W129:40.45		

CODE	SPECIES	TOTAL NUMBER SIGHTINGS
013	<i>Stenella coeruleoalba</i>	5
017	<i>Delphinus delphis</i>	36
022	<i>Lagenorhynchus obliquidens</i>	3
044	<i>Phocoenoides dalli</i>	1
046	<i>Physeter macrocephalus</i>	3
049	ziphiid whale	1
061	<i>Ziphius cavirostris</i>	2
063	<i>Berardius bairdii</i>	1
070	<i>Balaenoptera</i> sp.	25
073	<i>Balaenoptera borealis</i>	3
074	<i>Balaenoptera physalus</i>	14
075	<i>Balaenoptera musculus</i>	3
077	unid. dolphin	1
079	unid. large whale	2
099	<i>Balaenoptera borealis/edeni</i>	1
177	unid. small delphinid	5
199	<i>Balaenoptera borealis/physalus/edeni</i>	10
TOTAL		116



Photo (Suzanne Yin) - Robert Pitman searches for sperm whales under the rainbow.

Seabird Observations (Michael Force, Dawn Breese) Seven of the past nine days were spent surveying far off shore at the western edge of the study area. Here, in this relatively nutrient-



poor oceanic environment, avian diversity is low compared to near-shore habitats. We averaged about eight species per day, which is close to our average for the entire cruise when surveying pelagic waters. We found 26 species, our lowest total so far, reflecting both location and decreasing fall migration. Red Phalarope, presumably still migrating south, was the most abundant species. Fifty-two percent of the 943 birds we saw were Red Phalaropes; on some days this percentage was as high as 87%. When combined with Leach's Storm-Petrel, these two species accounted for 72% of what we saw in the strip transect.

Far off shore, when the sea surface temperature reaches 18°C or higher, we can expect to see Red-tailed Tropicbirds. We found 12 (nine in a single day!), higher than expected. But then, what is expected? Also out here in “the middle of nowhere” were five Hawaiian Petrels, ten Cook's Petrels and a single Stejneger's Petrel, the latter northeast of where it should be. Then again, we don't really know for sure since so little is known about seabird distribution in this area. Hatching-year birds lost on their first trip south included a Lapland Longspur (an Arctic songbird) and a Dunlin.



Photos (Michael Force) - A squadron of Red-tailed Tropicbirds; Dunlin resting on the fantail.

Biopsy Sampling (Juan Carlos Salinas, Suzanne Yin, Adam Ü, Robert Pitman)

includes last two days of Leg 2

Species	Common Name	# Samples (9/20-10/3)	# Takes (9/20-10/3)	Total Samples	Total Takes
<i>Balaenoptera borealis</i>	Sei whale	0	0	2	7
<i>Balaenoptera musculus</i>	Blue whale	0	0	1	2
<i>Balaenoptera physalus</i>	Fin whale	1	1	9	29
<i>Bryde's/Sei/Fin whale</i>	Bryde's/Sei/Fin whale	1	2	1	2
<i>Delphinus delphis</i>	Short-beaked common dolphin	33	59	94	172
<i>Globicephala macrorhynchus</i>	Short-finned pilot whale	0	0	2	6
<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin	0	0	30	57
<i>Lissodelphis borealis</i>	Northern right whale dolphin	0	0	23	49
<i>Megaptera novaeangliae</i>	Humpback whale	0	0	1	2
<i>Phocoenoides dalli</i>	Dall's porpoise	0	0	14	19
<i>Physeter macrocephalus</i>	Sperm whale	4	4	4	4
	Grand Total	39	66	181	349

Cetacean Photographic Sampling (Paula Olson, Adam Ü, Jim Gilpatrick, Charlotte Boyd, Mridula Srinivasan)

Photos - Short-beaked Common Dolphin (Mridula Srinivasan), Sperm Whale (Paula Olson), Fin whale (Charlotte Boyd).



Individual ID's	25 Sep-03 Oct 2014	Cruise totals to-date
SF pilot whale		2
Killer whale		1
Sperm whale flukes	3	6
Sei whale		3
Fin whale	4	40
Blue whale	1	11
Humpback flukes		9



Species Code	Scientific Name	Common Name	25 Sep-03 Oct 2014		Cruise totals to-date	
			# Sightings	# Photos	Total Sightings	Total Photos
13	<i>Stenella coeruleoalba</i>	Striped dolphin	1	57	8	164
17	<i>Delphinus delphis</i>	Short-beaked common dolphin	21	708	61	2424
21	<i>Grampus griseus</i>	Risso's dolphin			3	256
22	<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin			9	147
27	<i>Lissodelphis borealis</i>	Northern right whale dolphin			6	599
36	<i>Globicephala macrorhynchus</i>	Short-finned pilot whale			2	1188
37	<i>Orcinus orca</i>	Killer whale			1	248
40	<i>Phocoena phocoena</i>	Harbor porpoise			1	27
44	<i>Phocoenoides dalli</i>	Dall's porpoise			9	57
46	<i>Physeter macrocephalus</i>	Sperm whale	2	1151	5	1546
63	<i>Berardius bairdii</i>	Baird's beaked whale	1	67	3	457
70	<i>Balaenoptera sp.</i>	Unidentified rorqual	2	34	6	182
71	<i>Balaenoptera acutorostrata</i>	Common minke whale			1	2
72	<i>Balaenoptera edeni</i>	Bryde's whale			1	19
73	<i>Balaenoptera borealis</i>	Sei whale	3	167	7	1170
74	<i>Balaenoptera physalus</i>	Fin whale	6	509	53	6284
75	<i>Balaenoptera musculus</i>	Blue whale	1	69	11	1099
76	<i>Megaptera novaeangliae</i>	Humpback whale			16	396
99	<i>Balaenoptera borealis/edeni</i>	Sei or Bryde's whale	1	84	2	85
199	<i>Balaenoptera physalus/borealis/edeni</i>	Fin/Sei/Brydes whale	1	108	1	108

Oceanography (Jacob Youssefzadeh, Morgan Martin, Mridula Srinivasan, Charlotte Boyd, and Dawn Breese) Oceanography operations got underway with a new crew on Leg 3. We continue to monitor the physical and biological properties of the ocean with Jacob Youssefzadeh and Morgan Martin taking care of night ops, with the bongo and vertical tows and the CTD casts.



Mridula Srinivasan and Charlotte Boyd continue our XBT series. We left coastal waters off San Francisco with a water temperature of 18.2 C and have spent much of the leg offshore where temps are up to 20.0 C. The echosounders are gathering acoustic backscatter information which helps characterize the ecosystem in which the dolphins, whales, fishes and plankton live.

Unfortunately on the night of 30 September the video card on the port CTD winch went out, and to add to the heartbreak the starboard winch cable snapped during retrieval of the bongo

net and it was lost. A huge thanks to Amy Hays and her crew at FRD for packing a spare bongo net, and to Jason Benton for re-terminating the cable so we could use the backup net. We are also very appreciative of the night-time assistance of Jeremy Whaley, Ryan Mellinger, Jason Giery and Mo Nartey for making our operations smooth as a Beaufort 0!

Photos: Jacob and Morgan rig our replacement bongo frame and net (Michael Force), Mridula Srinivasan prepares to launch an XBT (Suzanne Yin).

Totals since end of Leg 2 report:

- XBTs 40
- Bongo Net tows 6
- Vertical Net tows 6



Acoustics (Emily Griffiths, Amy VanCise, and Michelle Weirathmueller) The acoustic component of this survey is comprised of three main parts. Chiefly, the bulk of our time is spent monitoring the live feed from the towed hydrophone array 300m behind the *Ocean Starr*. We not only detect vocalizing animals this way, we can localize their whereabouts as we travel down the transect line. Secondly, we are launching nightly sonobuoy stations, as well as opportunistic buoys during daytime sightings of high priority species (e.g., Bryde’s and fin whales). And lastly, we are deploying new autonomous free-floating recording devices, known as DASBRs, to monitor the ocean soundscape at 100 meters depth without constant boat noise interference.

Towed Array Summary Table

Species	Detection Count
Baird's beaked whale	1
Sperm whale	17
Short-beaked common dolphins	25
Striped and Short-beaked common dolphins	2
Unid Dolphin	29

Unid small whale	2
TOTAL	76

Sonobuoy Summary Table

Leg 3	Blue	Fin	Sei	Humpback	Bryde's	Sperm	Killer
definite	3	4	0	2	0	2	0
probable	0	3	1	0	0	0	0
possible	4	2	7	1	4	0	1



A major accomplishment of this leg of CalCurCEAS was the successful retrieval of DASBR-3, one of two free floating recording devices deployed on Leg 1. Each DASBR (Drifting Acoustic Spar Buoy Recorder) has two GPS tracking devices (in case one fails), one that transmits location data once a day, and another that transmits once an hour. We had hourly GPS coordinates for this DASBR. So after a week and a half shy of two months floating around the California Current, speckled with gooseneck barnacles of various sizes, the DASBR was located within minutes of arriving at its last known location.

Unfortunately, it suffered some serious structural damage, and therefore recordings cannot be processed. However, the successful long-term deployment and retrieval of a DASBR unit indicates promising things for the future of acoustic research. Successful shorter-term deployments and retrievals of these units that have collected high quality acoustic data indicate how useful these devices can be, recording dolphins, blue whales, at least two species of beaked whales, among other cetaceans and pinnipeds. Examining the damage on DASBR-3 will inform us on what structural changes need to be made for long-term oceanic deployments.

Nightly sonobuoy monitoring stations have ranged from high to no vocal activity. On this leg we have encountered a few Sei whales, which has allowed for opportunistic sonobuoy stations. Sei

whales have a very poorly understood vocal repertoire. Additionally, many of their calls overlap with Fin whales and Bryde's whales, making identification based on acoustics alone very difficult, if not impossible! However, the more stations we deploy the greater our chances at noticing, recording, and therefore documenting the vocal differences between confusing species.

Photo (Michael Force) – Retrieval of DASBR-B.

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