

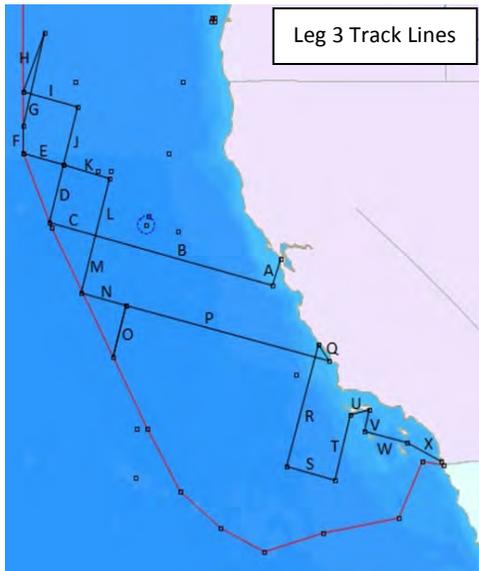
California Current Cetacean & Ecosystem Survey (CalCurCEAS):

End of Leg 3 Report: 4 – 17 October 3, 2014

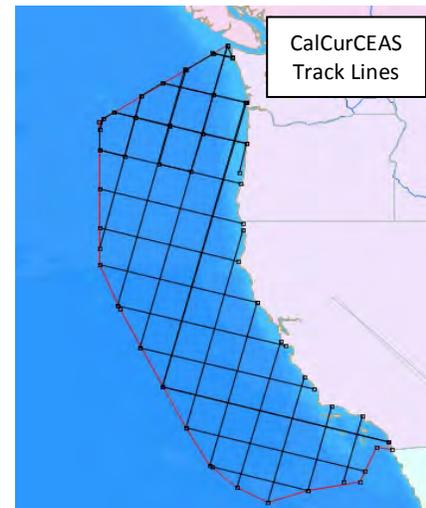
Lisa T. Ballance, Cruise Leader

Synopsis (Lisa T. Ballance)

This report marks the end of Leg 3 of this 5-leg, 120-sea day survey of cetaceans and the ecosystem of the California Current. We have ranged from 43° to 32° N latitude and 131° to 119° W longitude, surveying some 1381 linear nm of trackline from the coast, through the



Southern California Bight and around the Channel Islands, to 300 nautical miles seaward of the nearest land (see Leg 3 Track Lines figure). Our sea surface temperature has fluctuated from 18.4 to an astonishingly high 23.4°C and especially during the last week of this leg in the southern-most regions of our study area, it was apparent that California Current water as we “typically” know it was elsewhere. One clear sign of this was the first record in California waters (of which we are aware) for a typically tropical dolphin, Pygmy Killer Whale



(*Feresa attenuata*, photo). We also spotted several juvenile loggerhead turtles (photo), typically found farther south. A short-finned pilot whale school was followed three hours later by bow-riding Dall’s Porpoise (*Phocoenoides dalli*) – an odd pair indeed as one is typical of warm temperate-to-tropical waters and the other of the temperate to subarctic north Pacific. Lots of lost landbirds made the OCEAN STARR their temporary home as they



Deploying “Ocean Noise Station #5” (photo – Michael Force)

headed to parts unknown. We deployed two DASBR buoys (freely drifting passive acoustic recording devices), a bottom-mounted ocean noise recording device (photo; thanks to the 17th member of our science party who joined the ship in Santa Barbara on the 16th of October), and the RHIB (Rigid Hull Inflatable Boat – ours is the “David Starr Junior”) twice - each time returning with biopsy samples and photos. And to top it all off, Juan Carlos Salinas turned 50! He just gets

better every year.

The reports below provide a synopsis of events and data collected from 4-17 October. These data are brought to us through the most excellent talents of the CalCurCEAS Leg 3 science party (*photo*). In the background are the crew and command of the OCEAN STARR – working around the clock, often unnoticed, but tirelessly providing unending support of all kinds and absolutely critical to



A juvenile loggerhead turtle enjoys the warm waters off southern California (photo Mridula Srinivasan)

our success. Our sincere appreciation goes to Captain Bud Hanson, Chief Mate Clint Peterson, 2nd Mate Jason Giery, Chief Engineer Jerry Taylor, Chief Steward Dale Boyd, Bosun Jason Benton, OS Ryan Millinger, AB Jeremy Whaley, AB Jose Valentin, Galley OS Justice Sagoe, 1st Assistant Engineer Rick Wallace, 2nd Assistant Engineer Don Huffman, and QMED Mo Narthey.



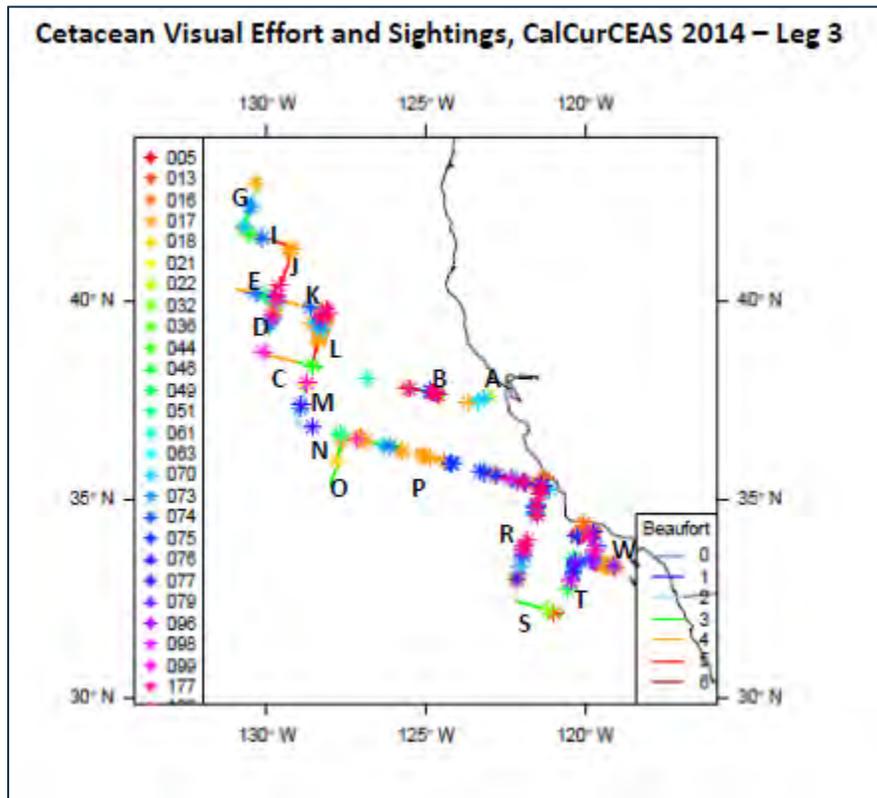
Pygmy killer whale – view from the DAVID STARR JUNIOR (photo Paula Olson)

Our total survey grid (see *CalCurCEAS Track Lines Figure*) is now 60% complete. Leg 4 begins in San Diego on Wednesday, 22 October. Stay tuned.



The scientists of CalCurCEAS 2014, Leg 3 (photo – Captain Hanson)

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

Date	Start Time	Latitude	Longitude	Total Miles Searched	Average Beaufort
100414	0740	N39:52.75	W128:55.29	73.7 nmi	4.7
	1906	N39:09.08	W129:58.02		
100514	0741	N38:48.59	W130:05.04	89.3 nmi	3.5
	1846	N38:19.98	W128:19.18		
100614	0737	N38:00.90	W128:42.09	76.7 nmi	2.1
	1909	N36:49.25	W128:32.75		
100714	0739	N36:41.11	W127:52.15	83.5 nmi	2.9
	1851	N35:20.94	W127:59.80		
100814	0731	N36:32.11	W127:09.40	65.1 nmi	3.4
	1834	N36:13.24	W125:43.91		
100914	0730	N36:07.39	W125:11.81	38.6 nmi	4.0

	1835	N35:52.73	W124:02.13		
101014	0724	N35:43.69	W123:19.83	50.1 nmi	4.8
	1742	N35:28.41	W122:07.18		
101114	0953	N35:25.82	W121:55.16	28.9 nmi	5.6
	1357	N35:17.70	W121:19.84		
101214	0925	N35:23.51	W121:20.61	37.4 nmi	3.8
	1836	N34:31.46	W121:33.02		
101314	0731	N34:00.15	W121:48.70	57.0 nmi	3.8
	1817	N32:50.17	W122:11.21		
101414	0714	N32:26.93	W122:11.49	80.8 nmi	2.9
	1817	N32:15.83	W120:40.05		
101514	0717	N32:39.41	W120:32.49	39.9 nmi	2.8
	1820	N33:33.77	W120:21.08		
101614	0711	N34:26.36	W120:00.39	49.5 nmi	3.4
	1558	N34:14.09	W119:42.16		
101714	1127	N33:27.86	W119:49.01	34.9 nmi	4.3
	1816	N33:16.43	W118:56.31		

<u>CODE</u>	<u>SPECIES</u>	<u>TOTAL NUMBER SIGHTINGS</u>
005	Delphinus sp.	4
013	Stenella coeruleoalba	7
016	Delphinus capensis	8
017	Delphinus delphis	25
018	Tursiops truncatus	2
021	Grampus griseus	4
032	Feresa attenuata	1
036	Globicephala macrorhynchus	2
044	Phocoenoides dalli	1
046	Physeter macrocephalus	4
049	ziphiid whale	3
051	Mesoplodon sp.	1
061	Ziphius cavirostris	2
070	Balaenoptera sp.	10
073	Balaenoptera borealis	1

074	Balaenoptera physalus	15
075	Balaenoptera musculus	7
076	Megaptera novaeangliae	4
077	unid. dolphin	6
079	unid. large whale	2
096	unid. cetacean	2
098	unid. whale	1
099	Balaenoptera borealis/edeni	2
177	unid. small delphinid	4
199		8
	TOTAL	126

Seabird Observations (Michael Force, Dawn Breese)

It was a fabulous two weeks for the seabird team. We saw a record number of species—54—the most ever for CalCurCEAS 2014! Quite remarkable really, considering our previous high was 44 back in mid-August. Finding an explanation for this high diversity isn't easy, but the simple answer is extensive coverage of a variety of habitats: from pelagic waters to the neritic waters of the Santa Barbara Channel. Far offshore we found seabirds typical of sub-tropical waters such as

Stejneger's and Hawaiian Petrels and Red-tailed Tropicbirds; closer to the coast were Black-vented and Pink-footed Shearwaters, Red-billed Tropicbird, Brown Pelican and Common Tern.

Abundance was also high, finding 1859 birds, 64% of these being Black-vented Shearwater, Leach's Storm-Petrel and Red Phalarope.

Once again, Leach's Storm-Petrel and Red Phalarope were the commonest birds offshore; on some days 97% of what we saw was Leach's Storm-Petrel.



A Red-billed Tropicbird shows off its stunning looks (photo – Michael Force)

Black-vented Shearwater, although abundant, wasn't widespread. Almost all of them were seen on a single day during our transects in the Santa Barbara Channel, where it is the commonest bird at this time of year in mixed species feeding flocks over Common Dolphins. The feeding flocks tell the story. In seven feeding flocks we counted that day, 80% of the 2105 seabirds were

Black-vented Shearwaters. Elimination of terrestrial predators from their breeding colonies on islands off central Baja California has had positive results on this species' nesting success.

With so many species it's hard to parse out the highlights, of which there are many. A single Laysan Albatross was only the fourth for the cruise, while an immature Black-legged Kittiwake, a cruise first, was extremely early. On previous California Current surveys, finding just one Brown Booby was a "stop the presses" event. Nowadays, as this species continues its march north, finding five is hardly noteworthy, especially during this fall's widespread invasion of the west coast. Several lost land birds found their way to the decks of the R/V *Ocean Starr* including Yellow-rumped and Yellow Warblers, Black Phoebe, Mourning Dove, and Brown-headed Cowbird.

We would like to extend our gratitude to our Leg 3 Cruise Leader, Lisa Ballance, for her enthusiastic support of the seabird component of CalCurCEAS, and to our fellow scientists and shipmates for helping to make this such an enjoyable and successful Leg 3. We would also like to thank all those who helped rescue Leach's Storm-Petrels that had been stranded on deck during the night.

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



Scientists aboard the DAVID STARR JUNIOR collect biopsy samples and photographs from *Globicephala macrorhynchus* (photo - Adam Ü)

Species	Common Name	# Samples (10/4-10/17)	# Takes (10/4-10/17)	Total Samples	Total Takes
<i>Balaenoptera borealis</i>	Sei whale	0	0	2	7
<i>Balaenoptera musculus</i>	Blue whale	1	1	2	3
<i>Balaenoptera physalus</i>	Fin whale	3	8	11	36
<i>Bryde's/Sei/Fin whale</i>	Bryde's/Sei/Fin whale	1	2	1	2
<i>Delphinus capensis</i>	Long-beaked common dolphin	7	9	7	9
<i>Delphinus delphis</i>	Short-beaked common dolphin	39	69	100	182

<i>Feresa attenuata</i>	Pygmy killer whale	2	4	2	4
<i>Globicephala macrorhynchus</i>	Short-finned pilot whale	5	9	7	15
<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	2	2	16	21
<i>Physeter macrocephalus</i>	Sperm whale	4	4	4	4
<i>Stenella coeruleoalba</i>	Striped dolphin	6	7	6	7
	Grand Total	70	116	212	399

Tissue culture sub-sampling during Leg III (Sep. 25-Oct. 18) of CalCEAS 2014

Species	Common Name
<i>Balaenoptera physalus</i>	Fin whale
<i>Feresa attenuate</i>	Pygmy killer whale
<i>Stenella coeruleoalba</i>	Striped dolphin
<i>Phocoenoides dalli</i>	Dall's porpoise

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

Species Code	Scientific Name	Common Name	04-17 Oct 2014		Cruise totals to-date	
			# Sightings	# Photos	Total Sightings	Total Photos
13	<i>Stenella coeruleoalba</i>	Striped dolphin	2	352	10	517
16	<i>Delphinus capensis</i>	LB common dolphin	6	184	6	184
17	<i>Delphinus delphis</i>	SB common dolphin	19	597	81	3162
18	<i>Tursiops truncatus</i>	Bottlenose dolphin	2	154	2	154
21	<i>Grampus griseus</i>	Risso's dolphin	2	136	5	392
22	<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin			9	131
27	<i>Lissodelphis borealis</i>	Northern right whale dolphin			6	576

32	<i>Feresa attenuata</i>	Pygmy killer whale	1	283	1	283
36	<i>Globicephala macrorhynchus</i>	Short-finned pilot whale	1	673	3	1861
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	1	4	10	121
46	<i>Physeter macrocephalus</i>	Sperm whale	1	33	6	1695
49	<i>Ziphiid whale</i>	Unidentified beaked whale	1	49	1	49
63	<i>Berardius bairdii</i>	Baird's beaked whale			4	620
70	<i>Balaenoptera sp.</i>	Unidentified rorqual	1	4	7	186
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	1	195	8	1365
74	<i>Balaenoptera physalus</i>	Fin whale	11	1893	63	8121
75	<i>Balaenoptera musculus</i>	Blue whale	6	740	17	1851
76	<i>Megaptera novaeangliae</i>	Humpback whale			16	396
99	<i>Balaenoptera borealis/edeni</i>	Sei/Bryde's whale	2	64	4	179
199	<i>Balaenoptera physalus/borealis/edeni</i>	Fin/Sei/Brydes whale	2	67	3	175



A blue whale takes one more breath before a dive (photo – Paula Olson)

Individual ID's	04-17 Oct 2014	Cruise totals to-date
SF pilot whale	5	7
Killer whale		1
Sperm whale		6
Sei whale		6
Fin whale	9	49
Blue whale	3	14
Humpback		9



A short-beaked common dolphin gets to know a striped dolphin! (photo – Charlotte Boyd)

Oceanography (Jacob Youssefzadeh, Morgan Martin, Mridula Srinivasan, Charlotte Boyd, and Dawn Breese)

Our oceanography operations continued smoothly through the last night of Leg 3. Jacob and Morgan took care of night ops, with successful bongo and vertical tows and CTD casts. The backup bongo net worked like a champ! Mridula and Charlotte continued our XBT drops. Water temperatures ranged from 16.0 C to a high of 22.0 C, with the warmest water around the Channel Islands. The echosounders continued their seemingly magic pinging.

We are very appreciative of all the help Jeremy, Ryan, Jason and Mo gave endlessly so that our operations were a great success.

Totals since mid-Leg 3 report:

- XBTs = 54
- Bongo Net tows = 11
- Vert Net tows = 11
- CTD casts = 11

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 hydrophone array, which was towed 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 Sei 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.

We had our most productive leg to date, with a total of 194 detections. That is almost as much as the two previous legs combined. Species with the most detections were sperm whales, short-beaked common dolphins, and the elusive unidentified dolphin groups never seen by the visual team. Long-beaked common and Risso’s dolphins, which had been sparse or absent on the previous two legs, were detected several times.

Towed Array Summary Table for the second half of Leg 3.

Species	Detection Count
Sperm Whale	13
Short-beaked common dolphins	17
Long-beaked common dolphins	4
Common dolphin sp.	3
Striped and Short-beaked common dolphins	3
Striped dolphins	2
Risso's dolphins	4
Bottlenose dolphins	1
Risso's, short-, and long-beaked common dolphins	1
Pacific white-sided dolphin	1
Unid Dolphin	64
Pygmy killer whales	1
Cuvier's beaked whale	1
Pilot whales and Bottlenose dolphins	1
Unid small whale	2
TOTAL	118

Sonobuoy Summary Table for all of Leg 3.

Leg 3	Blue	Fin	Sei	Humpback	Bryde's	Sperm	Killer
definite	13	10	0	3	0	2	0
probable	1	9	4	0	0	1	0
possible	4	3	16	2	4	0	1

DASBRs and Don-a-buoys



Photograph by Michelle Weirathmueller

We successfully deployed two types of retrievable passive acoustic monitoring devices on Leg 3: two DASBRs and a Don-a-buoy. The DASBR (Drifting Acoustic Spar Buoy Recorder) deployments occurred during midday on October 12th and just at sunrise on the 13th. These devices will remain in the California Current until mid-December, when they will be picked up on a later leg of CalCurCEAS, or an independent retrieval team from the SWFSC La Jolla Laboratory. Adjustments have been made to these units to help prevent the same equipment malfunction that the previously retrieved unit (mentioned in the last report) suffered. Currently, we have three DASBRs floating off our coast, one deployed on the first leg, and these two. The data they return to us can help us better

understand not only marine mammal acoustics, but also the overall acoustic soundscape across the region.



Photograph by Michelle Weirathmueller

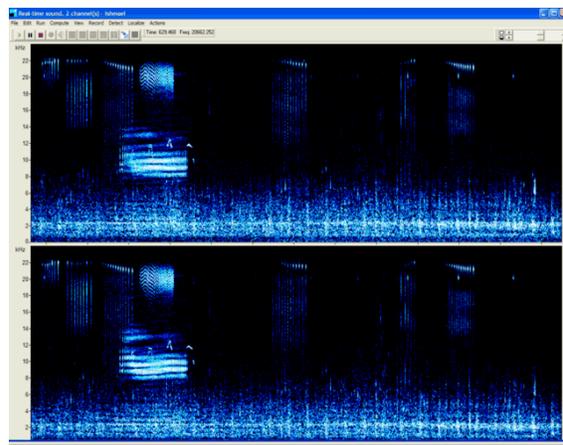


Photograph by Emily T. Goffiba

A don-a-buoy is a modified sonobuoy with rechargeable batteries, allowing it to be used for multiple deployments. They are affectionately referred to as 'don-a-buoys' as they were rebuilt by Don Ljungblad. During one of our nightly sonobuoy stations with calmer seas, we tethered a don-a-buoy to the stern of the vessel by a 100m line. Like our sonobuoys, the Difar hydrophone was at a depth of 90 feet transmitting acoustic data back to the ship via a predetermined radio channel. In this, the don-a-buoy was the first successful reusable sonobuoy prototype deployed during a SWFSC research cruise.

Risso's Dolphin (*Grampus griseus*)

We had five Risso's dolphin detections on this leg, confirmed by the visual team. Risso's produce readily identifiable vocalizations, full of burst pulses, lower frequency tonal whistles, and higher frequency modulated whistles. Though we always had visual confirmation, the acoustics team quickly learned to spot Risso's vocalizations.



Acknowledgments

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The crew of the *R/V Ocean Starr* have been extraordinarily helpful and delightful to sail with. We gratefully acknowledge their critical support.

Shore-side 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.