Ecosystem Survey of *Delphinus* Species

13 September 2009

NOAA FISHERIES SERVICE

Southwest Fisheries Science Center

Protected Resources Division

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Weekly Report No. 1: 07-12 September 2009

Susan Chivers, Cruise Leader

On Labor Day we sailed from San Francisco, California to begin our study of common dolphins (*Delphinus* sp.). This study will focus on the two species of common dolphin found off the coast of California: the long-beaked common dolphin and the short-beaked common dolphin. Our primary objectives are to estimate abundance, reproductive rates and contaminant concentrations, and to characterize the habitat of these species. The study area is largely defined by the distribution of long-beaked common dolphins, which are a coastal species that ranges from about Monterey Bay, California south to about Cabo San Lucas at the tip of Baja, Mexico. The data collected to estimate abundance will use standard design and analytical techniques, including surveying pre-determined tracks within the study area and estimating group size for all cetaceans encountered. Skin and blubber samples collected from individual dolphins will be used to estimate pregnancy rates (by measuring hormone concentrations) and contaminant (e.g. DDT and PCBs) loadings for each species. The habitat will be characterized using standard sampling methods to measure physical and biological oceanographic parameters.

Both common dolphin species are important members of the California Current ecosystem. However, our knowledge of them is limited, and a large and growing coastal population impacts the Southern California Bight (SCB) creating potential threats to these populations. For example, these species are impacted by commercial and recreational fisheries, and likely respond to changes in habitat quality caused by pollution and climate change. We are particularly interested in collecting data to understand better these species, their abundance, distribution, biology, and habitat preferences in the SCB in order to evaluate the impacts of anthropogenic activities on their populations and to monitor the influence of habitat changes on them in the future.

ADDITIONAL PRD INFORMATION:
http://swfsc.noaa.gov/prd.aspx

ADDITIONAL CRUISE INFORMATION:
http://swfsc.noaa.gov/prd-delphinus.aspx

Long-beaked Common Dolphins

Long-beaked common dolphins were officially recognized as a species distinct from short-beaked common dolphins in 1994. The two species are morphologically and genetically distinct, and they occupy different habitats. The long-beaked common dolphin has a coastal distribution that extends from about Monterey Bay, California south to Cabo San Lucas on the Baja peninsula of Mexico in the eastern North Pacific Ocean. The short-beaked common dolphin is a pelagic dolphin and occupies tropical and temperate waters of the North Pacific Ocean.

A population of long-beaked common dolphin also inhabits coastal waters off South Africa. The scientific name for these species is *Delphinus capensis*. Recent genetic evidence indicates that the population off South Africa and that in the eastern North Pacific are distantly related. The evidence suggests they are so different as to be different species. The type specimen for the species is from South Africa, and so if the eastern North Pacific population is recognized as a separate species, it will be given a new name.

We are aboard NOAA Ship *McArthur II* for this survey. The *McArthur II*'s home port is Seattle, Washington, and so for the crew, this project started the week before our Labor Day departure, because they sailed south to meet us in San Francisco. The oceanographers for our project sailed with the crew from Seattle to San Francisco to set up and test new equipment. All went well.

During our first week at sea, we collected data on cetaceans, sea birds and oceanography in the northern part of the study area. We collected numerous skin and blubber samples from common dolphins and encountered many blue and fin whales along the way. See below for individual project summaries for more information about our first week at sea.

Short-beaked common dolphins riding the bow of NOAA Ship *McArthur II*.

Photography Report – James Cotton, Suzanne Yin, Sophie Webb & Nick Kellar

As we conduct hormone analysis of biopsy samples for reproductive information it is important to know if our biopsy samples are representative of our study population. To investigate this, we are measuring the lengths of bowriders from vertical photography at the bow of the *McArthur II*. From a known bow height with a fixed lens we can estimate the total length of each dolphin that rides the bow. These measurements will be compared against those derived from aerial photography of dolphin groups sans the research vessel. This week we've obtained 7539 vertical bow images from 12 common dolphin schools (8 short and 4 long-beaked).

Pacific white-sided dolphins.

Seabird Report – Michael Force & Sophie Webb

Species typical of the neritic waters of the California Current in fall were strongly represented this week, particularly in flocks over Long-beaked Common Dolphins. Pink-footed Shearwater in particular dominated these flocks, outnumbering Sooty Shearwater by at least three to one. Buller's Shearwater was locally common and tended to avoid the large aggregations of Pink-foots and Sooties. The north edge of Santa Lucia Bank, about 29 nautical miles southwest of Point Buchon was, for some reason unknown to us at this time, a hot spot for storm-petrels. Mixed in with the 1500 Ashy Storm-Petrels was a remarkable 80 Wilson's Storm-Petrels, an exceptionally high number for this locally rare species from the Antarctic and sub-Antarctic. Also here were plenty of Black and Least Storm-Petrels. On Tuesday, about 56 nautical miles west of Cape San Martin, we saw our only Cook's Petrels of the week, perhaps stragglers left over from their remarkable near-shore summer incursion to coastal areas. Fall migration is a perilous undertaking, especially for hatching year birds making their first trip south. Lost and off course, these birds frequently find their way to the McArthur II. This week there were several Brown-headed Cowbirds, single Yellow-headed Blackbird, Lapland Longspur, Mourning Dove, American Kestrel and Semipalmated Plover, and a couple of Marbled Godwits. Including these, we found a total of 39 species this week, with a daily average of 20, fairly typical for coastal areas.

Oceanography Report – Candice Hall, Justin Garver, Siri Hakala & Corey Sheredy

Oceanographically, we are having a terrifically productive time out here, as we track the ecosystem that the *Delphinus* spp. reside in. We start our day with a CTD cast (conductivity, temperature and depth recorder, with additional oxygen, salinity and sound velocity measurements) before sunrise, followed by six Underway CTD (UCTD) drops, in conjunction with surface chlorophyll *a* and phaeophytin levels. Expendable Bathythermograph's (XBT's) are used when deploying our UCTD system would be risky (i.e. shallow depth, kelp infested waters or high seas). On four of these seven daily stations we collect water to test for the presence of harmful algal blooms (HAB). We continually record the surface temperature (weekly average = 15 °C) and conductivity (weekly average = 33.42 psu) using a thermosalinograph (TSG). Additionally, we constantly record all that we can acoustically 'see' below the ship, using an acoustic backscatter system. The partial pressure of carbon dioxide in the water and atmosphere interface is also continually monitored. Meteorological data (wind speed and direction, barometric pressure, air temperature and humidity) are routinely gathered by the ship, mainly for NOAA weather prediction models, but are also provided to us as current shipboard clients.

During evening mid-trophic stations, we jig for squid and deploy plankton nets. During jigging, we are targeting Dosidicus gigas (Humboldt Squid), as it is thought that the larger specimens (>40cm) are competing for the same food source as the *Delphinus* spp, while the small to medium size squid are potentially

dolphin prey themselves. Despite our valiant efforts, thus far, the squid have evaded our jigs. We are hopeful however, that our luck will soon turn as we make our way further south.

This year we are deploying the Oblique Bongo Net and the Isaacs-Kidd Midwater Trawl (IKMT). The bongo net captures quantitative samples of macrozooplankton, while the IKMT targets an array of fishes, squid and shrimp that inhabit the midwater zone. The data will enable us to assess the potential food available to the *Delphinus* spp., as well as confirm the targets the acoustic backscatter data is recording.

Today alone, we sampled near a majestically large school of dolphins and our next scheduled station occupied the area where a pod of transient killer whales enjoyed a meal, surrounded by a profusion of humpbacks. In all, we couldn't ask for more targeted oceanographic sampling than this and are confident our results will greatly enhance what is known of the *Delphinus* spp. habitat.

Outreach and Education Report – Siri Hakala

We're off and running for the intensified Outreach Efforts for the *Delphinus* Survey! There are eight classrooms following our progress from Ramona to Solana Beach to Chula Vista, California. During 'Week 1' we covered Survey Goals and preparations to sail. This coming week the concentration will be on a virtual ship tour and then heading into oceanography. Internet connectivity has caused some difficulties in posting fully edited videos, but I've been able to post short ten-fifteen second clips of the ship leaving port and dolphins swimming off the bow.

Short-beaked common dolphins. Photo credit: Sophie Webb.

Line transect Survey Report: Juan Carlos Salinas, Jim Cotton, Rich Pagen, Richard Rowlett, Ernesto Vázquez & Suzanne Yin

Our tracklines took us on and off the shelf along the central California coast. These tracklines are quite close together compared to the Southwest Fisheries Science Center's tracklines for the regular west coast survey (i.e., ~14 nm versus ~50 nm). The variability in species diversity and density along the way has been interesting as we cross on- and off- the shelf. Of particular note was the high density of fin whales around the Santa Lucia Bank.

Summary of Marine Mammal Effort

Date	Time	Position		On Effort Survey Miles (nm)	Average Beaufort
090709	1333	N37:36.10	W122:43.54	11.6	5.0
	1723	N36:57.62	W122:41.27		
090809	0701	N35:56.19	W122:38.47	99.0	3.9
	1900	N36:21.91	W122:06.80		
090909	0651	N36:20.35	W122:08.22	35.4	1.1
	1617	N35:38.88	W122:22.58		
091009	0700	N35:34.15	W122:13.97	10.0	4.0
	1730	N35:33.14	W121:57.23		
091109	1106	N34:55.50	W121:34.08	34.8	3.3
	1725	N35:28.30	W121:09.60		
091209	0659	N34:50.41	W121:29.72	34.2	2.9
	1703	N34:53.21	W120:52.42		

Summary of Marine Mammal Sightings

Species	Number of groups
Delphinus capensis	4
Delphinus delphis	13
Grampus griseus	3
Lagenorhynchus obliquidens	6
Lissodelphis borealis	2
Phocoena phocoena	3
Phocoenoides dalli	4
Berardius bairdii	3
Balaenoptera sp.	6
Balaenoptera acutorostrata	1
Balaenoptera physalus	12
Balaenoptera musculus	4
Megaptera novaeangliae	17
Unid. dolphin	2
Unid. large whale	7
Unid. small delphinid	1
Total	**88**

Biopsy Samples Collected – Juan Carlos Salinas, Ernesto Vázquez, Rich Pagen & Robert Pitman

Species	Common Name	Weekly No. of Samples	Weekly No of Takes	Total No. of Samples	Total No. of Takes
Balaenoptera physalus	Fin whale	1	1	1	1
Delphinus capensis	Long-beaked common dolphin	65	109	65	109
Delphinus delphis	Short-beaked common dolphin	53	115	53	115
Lagenorhynchus obliquidens	Pacific white-sided dolphin	4	10	4	10
Lissodelphis borealis	Northern right whale dolphin	1	1	1	1

Oceanography Samples Collected and Stations Completed – Candice Hall, Justin Garver, Siri Hakala & Corey Sheredy

Date	CTD	Surface Chlorophyll	HAB	UCTD (XBT)	Squid Stations	Bongo Tow	IKMT
09/07/09*	0	0	0	0	1	1	1
09/08/09*	1	7	4	3 (+ 4)	1	1	1
09/09/09	1	6	4	5	1	1	0
09/10/09	1	6	4	5 (+ 1)	1	1	0
09/11/09	1	6	4	6	1	1	1
09/12/09*	1	6	4	6	1	1	1
Total	**5**	**31**	**20**	**25 (+ 5)**	**6**	**6**	**4**

* Winch issues associated with IKMT stations

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HTTP://SWFSC.NOAA.GOV/PRD.ASPX

ADDITIONAL CRUISE INFORMATION CAN BE FOUND AT:
HTTP://SWFSC.NOAA.GOV/PRD-DELPHINUS.ASPX