STAR 2006: NOAA Ship *McArthur II*
Weekly Science Report

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Science Summary: 09 - 15 November, 2006

Today, we completed our first full week at sea on Leg 4. Our first goal for the week was to work together with the aerial photography team to collect data for calibrating observer estimates of school size. School size estimates are one of the critical data elements for making abundance estimates for the animals in our study area. In the past, this work has been done using a helicopter flown off the R/V *David Starr Jordan* (DSJ), but this year we are trying a new approach using a fixed-wing aircraft. So this means rather than the observers switching ships mid-cruise to collect the necessary calibration data, the plane works with both ships for 10 days each and the observers stay on their respective ships for the entire cruise. Those of you who have read the DSJ's most recent weekly reports likely noted that they reported excellent weather (many Beaufort 0 days) and a tremendously successful calibration experiment. As I am sure you can imagine, whether you are a field biologist or not, being successful means you have good weather and animals at the same time. Needless to say, this is not always an easy task, and we have certainly had our challenges. First our sailing time was delayed by a snafu with customs, and then tropical storm Rosa forced us south from Manzanillo, Mexico in search of good weather. And as if one storm wasn't enough, Hurricane Sergio arrived on the scene to influence our weather at the end of the week. But it's okay. We can take it and still be successful.

Even with the challenges we experienced, our success this week demonstrates that this method of calibrating school size estimates works well. The plane crew photographed and the observers counted 10 calibration schools, and we still have four more days to work with the plane to increase our sample size. The schools we worked ranged in size from a few dozen to a few hundred, which will give us a good regression for calibrating school size estimates. The species photographed included our primary target species (pantropical spotted dolphin (*Stenella attenuata)* and eastern spinner dolphin (*Stenella longirostris))* as well as bottlenose dolphin (*Tursiops truncatus)* and pygmy killer whale (*Feresa attenuata)*.

Spending this much time in a relatively small area has been particularly interesting, because we have been able to observe the patchiness of this environment on a different scale than we are used to when we are doing regular line transect surveys. The selection of the area for doing the calibration work was based on past sighting records that indicated a high density of dolphins 70-120 nm from shore. But we found schools of small delphinids, especially *Stenella* spp., concentrated between about 55 and 70 nm offshore. When we were >70 nm from shore, we saw a completely different group of species, including several beaked whale species (*Ziphius cavirostris* and *Mesoplodon* sp.), dwarf sperm whale (*Kogia sima)* and sperm whale (*Physeter macrocephalus).*

During these 10 days of intensive sampling, we had also hoped to do some intensive biopsy sampling for estimating dolphin pregnancy rates, but so far we have had few opportunities to collect samples. The schools of animals we have encountered are not interested in riding the bow and so are not available to us for sampling.

Our second goal for the week was to get our CTD (Conductivity, Temperature, Depth sensor) working again. The CTD is an integral part of our oceanographic data collection, and we needed a new 'fish,' which is the main sensor unit, to put the system back together. The Pacific Marine Center sent a 'fish' to the ship's agent, who then arranged for it to be transported to Acapulco where we were to pick it up. Tuesday we dipped into the harbor at Acapulco to pick it up and all went smoothly. We extend our thanks to all of you shore-side (Kaye, Jim, Michael, Annette, Vasile and others whose names I do not know) who worked to get us the part and to the folks on board (Jim, Lacey and Mindy) who worked to put the unit together. Thank you. Wednesday night was our first CTD cast of the leg.

Sightings and Effort Summary for Marine Mammals

DATE	Start Stop Time	Position	Total Distance	Average Beaufort
110906	1408	N18:59.20 W104:24.61	25.6 nmi	2.5
	1809	N18:40.13 W103:58.92		
111006	0659	N17:49.50 W102:42.21	72.5 nmi	3.5
	1739	N17:03.55 W102:38.77		
111106	0646	N16:09.47 W101:10.03	57.5 nmi	1.0
	1802	N15:12.84 W101:00.01		
111206	0637	N15:54.21 W100:20.76	62.0 nmi	2.2
	1800	N16:01.43 W099:59.03		
111306	0647	N16:18.35 W101:16.75	66.5 nmi	3.3
	1754	N15:59.51 W100:26.76		
111406	0652	N16:28.98 W099:53.70	40.9 nmi	2.9
	1726	N16:01.33 W099:53.04		
111506	0640	N16:02.37 W099:53.35	56.5 nmi	3.2
	1759	N15:43.26 W099:11.40		

CODE	SPECIES	TOT#
001	Mesoplodon peruvianus	1
002	Stenella attenuata (offshore)	15
006	Stenella attenuata graffmani	1
010	Stenella longirostris orientalis	10
015	Steno bredanensis	4
018	Tursiops truncatus	4
032	Feresa attenuata	2
037	Orcinus orca	1
046	Physeter macrocephalus	1
048	Kogia sima	2
049	ziphiid whale	6
051	Mesoplodon sp.	7

CODE	SPECIES	TOT#
061	Ziphius cavirostris	1
077	unid. dolphin	2
078	unid. small whale	1
090	Stenella attenuata (unid. subsp.)	5
177	unid. small delphinid	4
277	unid. medium delphinid	1
	TOTAL	68

Special report: Aerial photography (Wayne Perryman)

The aerial team continues to work with the *McArthur II* collecting school size calibration data. School size data on 10 schools are in the can, and if we can get a break in the weather we have a good shot at getting at least 15 schools. While we have been working down here, we have also had the opportunity to photograph several groups of beaked whales (*Ziphius cavirostris* and *Mesoplodon* sp.) and an occasional school of common dolphins (*Delphinus delphis*) inshore.

Biopsies (Suzanne Yin and Erin LaBrecque)

Species	Common Name	Weekly		Total	
		Samples	Takes	Samples	Takes
Balaenoptera edeni	Bryde's whale			1	1
Balaenoptera musculus	Blue whale			9	10
Delphinus delphis	Short-beaked common dolphin			2	3
G. macrorhyncus	Short-finned pilot whale			18	21
Pseudorca crassidens	False killer whale			3	5
Stenella attenuata	Pantropical spotted dolphin	6	15	7	16
S. attenuata graffmani	Coastal spotted dolphin	1	2	1	2
S. attenuata subsp.	Unidentified spotted dolphin subspecies	1	1	1	1
Tursiops truncatus	Bottlenose dolphin	1	1	23	46
Total		9	19	66	106

Photo-id Report (Isabel Beasley and Jim Cotton)

Species Code	Species	This week	Total
002	*Stenella attenuata* (offshore)	4	8
003	*Stenella longirostris* (unid. subsp.)		1
006	*Stenella attenuata graffmani*	1	1
010	*Stenella longirostris orientalis*	1	2
011	*Stenella longirostris* (whitebelly)		6
090	*Stenella attenuata (unid. subsp.)*	1	1
101	*Stenella longirostris* (southwestern)		4
013	*Stenella coeruleoalba*		13
015	*Steno bredanensis*		1

Species Code	Species	This week	Total
017	*Delphinus delphis*		12
018	*Tursiops truncatus*	2	15
021	*Grampus griseus*		1
026	*Lagenodelphis hosei*		2
031	*Peponocephala electra*		1
032	*Feresa attenuate*	1	1
033	*Pseudorca crassidens*		6*
036	*Globicephala macrorhynchus*		29*
037	*Orcinus orca*		4*
046	*Physeter macrocephalus*		4
072	*Balaenoptera edeni*		9*
075	*Balaenoptera musculus*		17*
076	*Megaptera novaeangliae*		1
TOTAL		**10**	**139**

* Individual whales photographed

Seabird and Marine Debris (Michael Force and Sophie Webb)

We spent most of this week working around the vitally important marine mammal calibration effort, and when we weren't doing that, we were counting plastic bottles and coconuts. The amount of marine debris littering the ocean out here off Acapulco makes Times Square after a night of New Year's Eve revelry appear absolutely spotless. At times, there is simply so much as to be essentially uncountable. It is both staggering and depressing.

It was fairly quiet for birds seen during our strip transect survey effort; most of what we saw being in flocks over spotted and spinner dolphins and/or fish, such as tuna. Considering the apparent paucity of birds, one begins to puzzle over how we managed to come up with 31 species this week. It certainly wasn't due to the diversity in the feeding flocks, these being primarily Brown Boobies, Black Terns and a scattering of jaegers. More likely it was singles passing by, never to been seen again. Species such as Audubon's (Galapagos) Shearwater, Savannah Sparrow, Markham's Storm-Petrel, White Tern, South Polar Skua, Cinnamon Teal, Peregrine Falcon, and many others. Our daily average (12 species) remains surprisingly consistent and comparable to almost every other week of the cruise, but with quite a different (*i.e.* more coastal) species mix. One example was our first Sabine's Gulls since leaving San Diego in late July.

Oceanographic Operations (Melinda Kelley)

DateRange	Day	CTD	SeaCat	XBT	Bongo	Manta
	Thursday*	0	1	0	1	1
Leg 4	Friday	0	2	1	1	1
	Saturday	0	2	1	1	1
11/09	Sunday	0	2	1	1	1
to	Monday	0	2	1	1	1

DateRange	Day	CTD	SeaCat	XBT	Bongo	Manta
11/15	Tuesday	0	2	1	1	1
	Wednesday**	0	1	2	0	0

***Depart Manzanillo – evening ops only**
**** Tows cancelled due to weather**

We departed Manzanillo a day late and happy to have parts for a new CTD system on board. Thank you to the many individuals that helped to get this oceanographer back on her feet! The CTD package has been put together and one last stop was made in Acapulco bay on Tuesday where we picked up the final piece of the puzzle. The ship received a new SBE 9*plus* (a.k.a. the fish) to replace the damaged one we had on board. This part of the CTD houses the acquisition electronics and pressure sensor. It also provides the connection for the SBE3 temperature sensor and the SBE 4 conductivity sensor. Without this component we would not have an operational CTD; we are glad that it caught up with us in Acapulco. Thanks again to those involved in making this happen. A few kinks are being worked out with regard to the CTD wire termination and we expect to be conducting casts as early as tomorrow morning (November 17th).

This was the last week for the SeaCat to splash around in the water. The last cast was conducted on Wednesday. In the future, conducting a few CTD casts with the SeaCat attached to the frame will help to observe differences between the SBE 911*plus* system and the SBE 19 SeaCat.

Oceanographic variables have been consistent throughout the week. The average thermocline depth was 35-40 m. Profiles looked very similar from cast to cast. The average sea surface temperature has also been somewhat consistent, averaging 29-30 degrees C. There was not a wide range in sea surface temperature but changes did occur quick and frequently. Sea surface salinity averaged 32-33 PSU (practical salinity units), moving back and forth quite frequently but not as quickly as the temperature values.

Inconsistency did show its face during evening net tow operations. Samples sizes have been unpredictable, anywhere from 3 gallons of jellies to just a few spoons full of yummy plankton. Dave Bratten of the Tuna Commission (La Jolla office) is assisting with net tows for this final leg. So far Dave has been wowed with cod ends full of jellies and a crazed oceanographer with stinging hands. Thanks to Dave for his patience and willingness to help, your assistance is appreciated and invaluable.

Squeakly Report (Shannon Rankin and Liz Zele)

This week has definitely been a change for acoustics, with mixed reviews. During calibrations, our mornings alternate between shifts on the flying bridge and computer work in the lounge. Given the opportunity, we avoid the dry lab like the plague (in fact, after a typical shift in that room we exhibit symptoms similar to the plague). During lunch we work extra shifts on the flying bridge, and then have a short breather for RnR (or, more computer work). The array typically goes out sometime after 2pm. Despite the half days of array work, we still managed to obtain 26 detections, of which 19 were not

sighted. Diversity was low, with recordings of spotted dolphins, bottlenose dolphins, and a single sperm whale.

Big Thanks go to Sofie Van Parijs and Liz Zele for their long hours performing species ID on whistles using ROCCA. Our goal is to have acoustic species ID for non-sighted detections within the visual range, so that we can have a full season's dataset with which to begin the statistical nightmare that will allow acoustics to become fully incorporated into these line-transect cetacean surveys (Note to Jay: with Julie gone, you are in trouble!).

Notes from our visiting scientist

Dave Bratten writes: I have enjoyed the first week of Leg 4 and I'm impressed with the efficiency and professionalism of the entire scientific team, especially the marine mammal and seabird observers. I also learned (but will I remember?) how to play cribbage, thanks to Yin and Mike. Hopefully by Monday we'll have met our calibration school quota (go Wayne and Susan!) and the Chargers will have another win.