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

Susan Chivers, Cruise Leader
7 December 2006

Science Summary: 30 November – 7 December, 2006

Today is the last day of Leg 4 and the last day of the STAR project. Today, we arrive back in San Diego after four months at sea.

Our last week at sea was spent near the western edge of our core study area. Marine mammal and seabird densities were low, but we did see several schools of spotted, spinner, striped and common dolphin. As we headed north, we recorded a steady decline in sea surface temperature. We went from 28° C to 26° C on Saturday, to 22° C on Sunday, to 21° C on Monday and to 18° C on Tuesday. The decrease in water temperature was directly correlated with an increase in the number of people wearing jackets and long pants, and by Tuesday nearly everyone was wearing a jacket and long pants. It's a sudden transition from the tropical waters to the more temperate waters off Baja California.

This week we also had a couple of sperm whale sightings, and from one of them we were able to collect a skin sample for genetic work in addition to acoustic recordings and photographs. The skin sample was frozen for our genetic stock structure project after a small piece was cut off and put in tissue culture media for our collaborative project with the San Diego Zoological Society. During our last whale sighting of the trip, we also sampled a humpback whale for our stock structure work and the Zoo project.

When we add our survey effort and data collected on this leg to that collected during the prior three legs, it is an amazing collection of data. We were 'on-effort' for nearly 10,000 nm and our survey tracks took us from San Diego, CA to Honolulu, HI then on to Manta, Ecuador and back to San Diego, CA. We recorded 576 cetacean sightings of 29 species, 350 sea bird flocks associated with fish and/or dolphin together with data for 90 seabird species. Acoustic recordings were made from 44 sonobouys (baleen whale recordings) and over 750 cetacean groups representing 14 species. We also collected biopsy samples from 79 individual animals representing 12 cetacean species, dipped flying fish from 119 dip-net stations, oceanographic data from 170 CTD stations, 405 XBTs and 94 manta and bongo net tows. And last, but by no means least, we collected data for 16 calibration schools

With this final weekly report, I would like to extend my thanks to all of the officers and crew on the *McArthur II*. I truly appreciate the effort each and every one of you made to make this cruise go smoothly and the project a success. And, of course, a big thank you to members of the scientific party whose hard work, dedication and passion for their work make this project an exceptional example of a large-scale ecosystem study.

From San Diego, the *McArthur II* officers and crew will complete the final leg of their field season and transit north to their home port in Seattle, WA. Many on board will be leaving the ship in San Diego for a variety of destinations, including new jobs and new field projects, while others will be traveling home to be with family and new grandchildren. Here's wishing all of you the very best wherever you go and much happiness in 2007.

Sightings and Effort Summary for Marine Mammals

DATE	Start Stop Time	Position	Total Distance	Average Beaufort
113006		No Effort		6+
120106	0701	N16:18.02 W116:58.91	85.6 nmi	4.5
	1812	N16:41.99 W118:24.83		
120206	0714	N17:57.71 W118:45.10	89.6 nmi	4.2
	1800	N19:28.63 W119:00.70		
120306	0729	N20:38.61 W119:11.76	88.7 nmi	4.8
	1800	N22:19.95 W119:28.67		
120406	0727	N23:19.98 W119:38.27	99.5 nmi	4.5
	1759	N25:00.01 W119:55.16		
120506	0634	N26:43.04 W119:19.60	60.9 nmi	2.3
	1651	N27:55.84 W118:53.90		
120606	0638	N30:03.23 W118:08.54	44.3 nmi	3.4
	1400	N30:52.09 W117:41.41		

CODE	SPECIES	TOT#
002	Stenella attenuata (offshore)	1
013	Stenella coeruleoalba	4
017	Delphinus delphis	5
046	Physeter macrocephalus	2
076	Megaptera novaeangliae	1
101	Stenella longirostris (southwestern)	1
177	unid. small delphinid	6
	TOTAL	20

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. macrorhynchus	Short-finned pilot whale			18	21
Megaptera novaeangliae	Humpback whale	1	1	1	1

Species	Common Name	Weekly		Total	
		Samples	Takes	Samples	Takes
Physeter macrocephalus	Sperm whale	1	1	1	1
Pseudorca crassidens	False killer whale			3	5
Stenella attenuata	Pantropical spotted dolphin			8	17
S. attenuata graffmani	Coastal spotted dolphin			1	2
S. attenuata subsp.	Unidentified spotted dolphin subspecies			8	12
S. longirostris orientalis	Eastern spinner dolphin			3	5
*Tursiops truncatu*s	Bottlenose dolphin			24	47
Total				79	125

Photo-id Report (Isabel Beasley and Jim Cotton)

Another quiet week for photography on the Mac II. However, in the last few hours of the cruise we had a close encounter (via the small boat) with two rather evasive humpback whales, with good identification photographs obtained of one individual.

Since this is our last report for the cruise, the photography team would like to thank all the scientific observers and visiting scientists that helped take cetacean images for the database – everyone's assistance is greatly appreciated!

Species Code	Species	This week	Total
002	*Stenella attenuata* (offshore)		17
003	*Stenella longirostris* (unid. subsp.)		3
006	*Stenella attenuata graffmani*		1
010	*Stenella longirostris orientalis*		9
011	*Stenella longirostris* (whitebelly)		6
088	*Stenella longirostris centroamericana*		3
103	*Stenella l. centroamericana/orientalis*		1
090	*Stenella attenuata (unid. subsp.)*		2
101	*Stenella longirostris* (southwestern)	1	5
013	*Stenella coeruleoalba*	3	16
015	*Steno bredanensis*		2
017	*Delphinus delphis*		17
018	*Tursiops truncatus*		16
021	*Grampus griseus*		1
026	*Lagenodelphis hosei*		2
031	*Peponocephala electra*		1
032	*Feresa attenuate*		2
033	*Pseudorca crassidens*		6*
036	*Globicephala macrorhynchus*		31*
037	*Orcinus orca*		4*
046	*Physeter macrocephalus*	1	5
072	*Balaenoptera edeni*		10*
075	*Balaenoptera musculus*		17*
076	*Megaptera novaeangliae*	1	2
TOTAL		**6**	**179**

* Individual whales photographed

Seabird and Marine Debris (Michael Force and Sophie Webb)

Like a marathon runner hitting the wall, we scraped, groveled and crawled our way to the finish line. It wasn't easy finding a bird during the final five days of the last week of STAR 2006. We began the week in tropical waters with Wedge-tailed Shearwaters, boobies, flyingfish and Sooty Terns, and finished up in the relatively cold and empty waters of the southern portion of the California Current. Here, finding a bird, any bird, was a highlight and elicited ululation of surprise from anyone lucky enough to see one.

As we steamed northward into increasingly colder water, an immature Brown Booby stayed with us for four days, joined later by a second immature Brown Booby and an adult Red-footed Booby. Fifteen minutes after the flying fish disappeared, so did they, never to be seen again—they're not that stupid! They were our last tropical seabirds. The big highlight among the 22 species seen this week was a Mottled Petrel, somewhat farther east than expected, a Cook's Petrel, and a Buller's Shearwater.

We have spent 115 days at sea, and, perhaps not surprisingly, are dragging our tail feathers a wee bit as we approach home. But with it, a satisfaction of a job well done, collecting an impressive amount of seabird distribution, behavioural, and abundance data. Our seabird data, combined with that from the physical and biological oceanography, will contribute to a better understanding of the avian ecology of this dynamic and vast ecosystem. We would like to thank the hard working officers and crew of the McArthur II for their enthusiastic support of the project and heartfelt thanks to our Cruise Leaders. Hugs and kisses and a HUGE thank you to our Survey Coordinator extraordinaire, Annette Henry, slaving away back at the lab, holding it all together. Not only is she a managerial magician juggling numerous bureaucratic balls, she attends to important details—the intangibles so important to morale out here during these extended deployments—sending out to the ship Thanksgiving and Halloween treats; taped NHL and NFL games arriving unexpectedly at port calls; birthday presents; holiday decorations. You name it. Thanks Annette. You rock!

Oceanographic Operations (Melinda Kelley)

Date Range	Day	CTD	XBT	Bongo	Manta
Leg 4	Thursday	2	3	1	1
	Friday	2	3	1	1
	Saturday	2	3	1	1
11/30	Sunday	2	3	1	1
To	Monday*	2	3	1	1
11/06	Tuesday	0	5	0	0
	Wednesday	0	4	0	0
	Totals	10	24	5	5

***end of CTD and net tow operations**
Oceanography Report
Melinda Kelley

This final week was spent wrapping up oceanographic operations for STAR 2006. The final CTD cast was deployed on Monday evening along with the last bongo and manta tow. XBT casts continued through the day on Tuesday and Wednesday showing us the drastic changes in sea surface temperature; we started the week at 26 degrees Celsius and ended today at 18.6 degrees Celsius.
It is very exciting to report that there weren't any oceanographic tragedies this week. Nothing broken, nothing lost. All right, we lost the end caps of Niskin bottle #11, but other than that operations ended on a great page.
I would like to once again thank all of the *McArthur II* crew for the help they provided during the past several months, your skills, patience and help are always greatly appreciated! I would also like to thank all the cruise leaders (Jessica, Lisa, Jay, Susan) and visiting scientists (Cindy, Maria, Ignacio, Danna, Kruger, Dave) for their help with afternoon XBT casts and chlorophyll sampling, the break was priceless. The final thanks goes to Senior Survey Technician, Lacey O'Neal, your experience, patience, and knowledge is much appreciated, thank you!

Squeakly Report (Shannon Rankin and Liz Zele)

This week marked the slowest week for acoustics in months! It is hard for us to believe, but we even had two days with only two detections! Despite this, our weekly numbers are still rather high, with a total of 82 acoustic detections, including 7 minke whales. Of the fifteen sighted detections, recordings were made of striped, spotted, and spinner dolphins, common dolphins, and sperm whales. We even ended the week (and cruise) with recordings of a humpback whale on the sonobuoy! Whew! Not including 44 sonobuoy recordings of baleen whales, we were just shy of the 800 mark for acoustic detections for the cruise. That would be a total of four weary ears on two acousticians!

Notes from visiting scientists

Sofie Van Parjis writes: Huge thanks to Shannon and Liz for teaching me so much about the acoustic set up & data collection!