STAR 2006: NOAA Ship *David Starr Jordan*
Weekly Science Report

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Science Summary: 28 September – 4 October 2006

Welcome to Leg 4. We are now half-way through our 120 days at sea and all but two of those chronicled in this week's report were spent in Puerto Quetzal, Guatemala. As is always the case, most of the scientists get a well-deserved break, and most of the crew and officers get only a few hours to a day, if lucky (work on a ship never stops – even when the science rests). Our core scientific contingent remains unchanged but I am newly arrived at the ship, having just sailed for 30 days on our sister ship for the project, the *McArthur II*. The first few days of a project can be a little rough around the edges as everyone becomes familiar with their responsibilities and each other, but walking into this particular group on this particular ship at this particular time is like watching a well-oiled and complex machine. Everyone knows exactly what to do, how to do it, when, and where. I need mostly just stay out of the way and enjoy.

This leg we are privileged to have an esteemed visiting scientist with us – *the* Carl Safina, who needs no introduction to marine fans. Having recently published his third book on marine conservation issues (he has written about marine turtles, albatrosses, coral reef fishes, bluefin tuna, and salmon), he is out here to see the quintessential eastern tropical Pacific, and it is no accident that he is on this particular leg, for we will spend our time in the "core area" where the phenomenon that makes this region so famous is well-developed.

That phenomenon is the multi-species feeding assemblage comprised of spotted and spinner dolphins, yellowfin tuna (which can reach dolphin-sized proportions), and seabird flocks which often contain many species and many individuals. The component species of this assemblage are, for the most part, found throughout the tropical oceans of the world but for reasons that are still not entirely understood, nowhere do they come together as regularly or as pervasively as they do here.

Leaving Guatemala, we headed almost due south and directly offshore, watching the water turn from green to blue in a few hours time as we left the continental shelf (very narrow here – and along most of the Central American coast) and entered true oceanic habitat. On day 2, we neared 10 degrees north where the thermocline is shallow and strong – prime habitat for our phenomenon. And just as expected, there it was. A "chicken ranch" visible on the horizon (imagine the pandemonium created by a flock of hundreds of chickens suddenly flushed into the air) gradually turned (as we neared) into a flock of swirling seabirds with rooster-tail rips below them on the surface of the water made by rocketing tunas pursuing prey. At several miles distant, dolphins were visible leaping out of the water, eastern spinners clearly distinguishable by their forward-canted dorsal fins, looking for all the world as if they were put on backwards (spotted dolphins have "normal" dorsal fins). At half a mile distant, the school exploded out of the water in a white froth, with dolphins running away from the ship in tight formation just ahead of the bow. At this close distance, we could hear the honks and squawks of the Nazca Boobies in the flock as they fought for the precious airspace over the dolphins and tuna – where their favorite dish of flyingfish was flushing in dense sheets. No matter how often I sail out here, I will never tire of this amazing sight.

Sightings and Effort Summary for Marine Mammals

Date	Start/ Stop Time	Position	Total nmi	Average Beaufort
092806	---	In Port	---	---
	---	" "		
092906	---	" "	---	---
	---	" "		
093006	---	" "	---	---
	---	" "		
100106	---	" "	---	---
	---	" "		
100206	---	" "	---	---
	---	" "		
100306	1149	N13:54.07 W090:45.96	16.4	2.4
	1742	N13:24.88 W091:05.47		
100406	0620	N12:24.34 W091:31.37	64.1	3.8
	1749	N11:07.44 W092:03.44		

Code	Species	Number of Sightings
002	*Stenella attenuata* (offshore)	1
006	*Stenella attenuata graffmani*	2
010	*Stenella longirostris orientalis*	1
017	*Delphinus delphis*	2
018	*Tursiops truncatus*	9
072	*Balaenoptera edeni*	1
077	Unid. Dolphin	3
079	Unid. Large Whale	1
Total		20

Photography (Cornelia Oedekoven and Laura Morse)

Once again, digital cameras proved their value in the field. What was left as a Bryde's/Sei type whale after finishing the sighting was later identified as a Bryde's whale as its ancillary ridges became apparent on the whale's rostrum during evening image viewing.

Species Code	Species	This week	Total
002	*Stenella attenuata* (offshore)		10
003	*Stenella longirostris* (unid.)		6
006	*Stenella attenuata graffmani*	1	11
010	*Stenella longirostris orientalis*	1	4
002/010	*St. l. orientalis/a* (offshore)		2
013	*Stenella coeruleoalba*		11
015	*Steno bredanensis*		8
017	*Delphinus delphis*	1	30
018	*Tursiops truncatus*		32
021	*Grampus griseus*		7
032	*Feresa attenuata*		1
036	*Globicephala macrorhynchus*		11
037	*Orcinus orca*		4*
046	*Physeter macrocephalus*		20*
049	Ziphiid whale		1
063	*Berardius bairdii*		3
072	*Balaenoptera edeni*	1	2
074	*Balaenoptera physalus*		2*
075	*Balaenoptera musculus*		18*
076	*Megaptera novaeangliae*		6*
090	*Stenella attenuata* (unid.)		1
099	*Balaenoptera borealis/edeni*		6

* Individual whales photographed

Biopsy (Juan Carlos Salinas Vargas and Ernesto Isaac Vázquez Morquecho)

Species	Common Name	# Weekly samples	# Weekly Takes	Total Samples	Total Takes
Balaenoptera edeni	Byrde's whale	0	0	3	3
Balaenoptera musculus	Blue whale	0	0	9	17
Delphinus delphis	Short-beaked common dolphin	1	1	19	40
Globicephala macrorhynchus	Short-finned pilot whale	0	0	61	135
Megaptera novaeangliae	Humpback whale	0	0	2	5
Orcinus orca	Killer whale	0	0	1	7
Physeter macrocephalus	Sperm whale	0	0	8	8
Stenella attenuata	Pantropical spotted dolphin	0	0	12	23
Stenella attenuata graffmani	Coastal spotted dolphin	6	11	27	42
Stenella coeruleoalba	Striped dolphin	0	0	2	8
Stenella longirostris orientalis	Eastern spinner dolphin	0	0	6	20
Stenella longirostris subsp.	unidentified spinner dolphin	0	0	25	42
Steno bredanensis	Rough-toothed dolphin	0	0	7	18
Tursiops truncatus	Bottlenose dolphin	3	7	45	75
		10	19	227	443

Seabirds and Marine Debris (Rich Pagen and Chris Cutler)

After an inport consisting of (among other things of course) glimpsing birds in three countries and two continents, we completed two days of survey this week on our way offshore, watching the towering volcanoes of Guatemala shrink to mere molehills. An evening of brilliant lightning in the direction of the coast on our first night out was a reminder that terra firma still had her far-reaching arms tangled up in this patch of the ocean realm, and the birds we encountered on Day 1 further supported that tenet. A small legion of Audubon's Shearwaters guided us to deeper waters, like ambassadors providing us safe passage to the pelagic realm. Black Terns were the heart of feeding flocks in these waters, an existence that is a far cry from their life nesting on the fringes of inland marshes in North America.

Day 2 found us further offshore, where Tahiti Petrels dominated the scene, covering huge expanses of featureless sea in the hopes of encountering something to scavenge upon. We also encountered several bird flocks associated with tuna/dolphin aggregations. The players in this area were Nazca and Red-footed Boobies, Arctic Terns, Wedge-tailed and Pink-footed Shearwaters.

Wayward birds with a predilection for more terrestrial haunts continue to visit our mobile way-station, with Yellow & Prothonotary Warblers, Cattle Egret, Semipalmated Plover, and a tripartite flock of swallows, (Bank, Barn & Cliff), among them. The most intriguing of these waifs, of late, was a Belted Kingfisher hotly pursued and harried by a Parasitic Jaeger on the edge of a classically busy and speciose ETP feeding flock. Of all the non-seabird species we've seen out here, it is perhaps the Belted Kingfisher, a plunge-diving piscivore principally found in freshwater habitats, which might have a decent chance for survival in this marine environment. There are plenty of small fish to eat, and, with the arrival of large amounts of natural woody and anthropogenic debris in certain areas where eddies occur, no shortage of perches to rest upon.

Turtle Operations (Lindsey Peavey, *et al.*)

We left Guatemala much like we approached it: knee deep in turtles on the back deck. We set sail at 1100 hours and the small boat was in by noon. Carl Safina was able to rodeo his first sea turtle (ever, if you can believe that!) within the first few hours of his STAR 2006 cruise experience. From noon to sunset we processed 10 olive ridleys, all adults, and all healthy. The next day was more of the same, with just one juvenile in the mix. Over two days of effort during our shortened week, we saw a ratio of 9 males to 6 females with the sexable adults; not bad. Because we are surveying offshore and in pelagic regions, we are able to sample numerous adult male sea turtles, an important section of sea turtle populations that swim under (literally) most land-based sea turtle projects' capacities. We have unique opportunities working aboard this well-equipped NOAA Research Vessel, and ecological investigations are plenteous when it comes to turtles. At least once a week a new unanswered question surfaces, and everyday we see something new and exciting to feed eager inquiring minds.

At the inport we lost a couple of die-hard turtlers when Anna and Mateo had to say good-bye. Luckily our visiting doctor, Ernie Sullivent, is anxious to get his hands dirty and legs scarred in the name of turtle research. We are happy to have Carl sailing as well; you can never be in the company of too many turtle lovers. Welcome aboard!

Species	**Common name**	**Number sampled**	
		Weekly	**Total**
Caretta caretta	Loggerhead	0	8
Eretmochelys imbricata	Hawksbill	0	1
Lepidochelys olivacea	Olive ridley	16	141
Total		16	150

Fish Sampled for Diet and Isotope Analysis

Species	Samples	
	Weekly	Total
Yellowfin tuna	1	22
Skipjack*	2	13
Wahoo		3
Mahi mahi		11

*includes black skipjack

Oceanographic Operations (Candy Hall)

Date	CTD	XBT	Bongo tow	Manta tow
28 Sept	*	*	*	*
29 Sept	*	*	*	*
30 Sept	*	*	*	*
1 Oct	*	*	*	*
2 Oct	*	*	*	*
3 Oct	1	1	1	1
4 Oct	2	3	1	1
Total	3	4	2	2

* In port.