

ORCAWALE 2008: Weekly Report

Report Dates: 05-18 October 2008 Chief Scientist: Jay Barlow Leg 4 Cruise Leader: Karin Forney

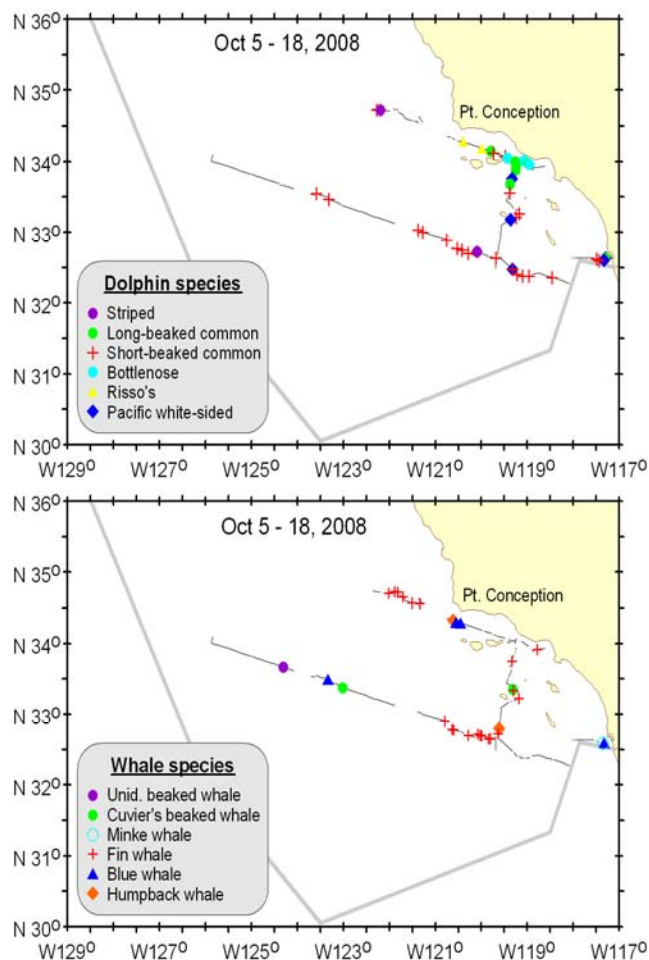
Weekly Science Summary Karin Forney

Well, *weekly* report is a bit of a stretch for this one -- we will actually report on ORCAWALE activities spanning both of the last two weeks (Oct 5-18). This includes the last 4 sea-days of Leg 3, a well-deserved rest for scientists and crew in San Diego from Oct 9-14, and the first four days of Leg 4. Weather has been very favorable, and marine mammal operations have been going smoothly.

The final Leg 3 transect took the *McArthur II* through the Santa Barbara Channel, an area with diverse and abundant cetaceans. Here our team encountered the first Risso's dolphins (*Grampus griseus*) of the cruise. The absence of this species so far has been notable; generally Risso's dolphins can be seen in a wide range of nearshore and offshore habitats all up and down the coast. They tend to be rare in offshore waters, but are common in the Southern California Bight and along the central California coast. In some years, their distribution extends well into Oregon and Washington - but apparently not this year. I wonder where they all are.

Upon arrival in San Diego, the team bid farewell to Shannon Lyday, Jim Carretta, Aly Fleming, and Carl Mayhugh. Jim and I reviewed operations and he happily 'passed the baton' of cruise-leading responsibilities to me. After a few days rest, we sailed again on October 15th, welcoming our new team members: oceanography technician Justin Garver and visiting scientists Elizabeth Becker and Jason Blackburn.

Our first transect heading offshore yielded many schools of short-beaked common dolphins, and abundant fin whales. Yin obtained our 20th fin whale biopsy - nice job! Now that we are near the offshore edge of the study area, our next



mission will be to head north to try to fill a rather large hole in our coverage off Point Arena. Normally, we would like to avoid heading north this time of year because early winter storms can bring fierce winds and huge swells. But a transect hole of this size could lead to biased abundance estimates for many species, so we will do our best to cover the area adequately. Wish us luck, and I'll let you know next week how things go . . .

Marine Mammal Effort Summary.

Date	Time start Time end	Start Location End location	Distance surveyed (nm)	Average Beaufort
100508	0731 1812	N34:21.42 W120:44.61 N33:57.80 W118:58.13	68.0	3.8
100608	0705 1831	N34:04.19 W119:14.29 N33:53.49 W118:53.31	25.2	2.0
100708	0710 1825	N33:41.57 W119:22.02 N32:28.27 W119:41.15	75.3	3.0
100808	0704 1620	N32:38.08 W119:42.35 N32:16.00 W118:04.25	74.5	2.7
100908		In port, San Diego		
101008		In port, San Diego		
101108		In port, San Diego		
101208		In port, San Diego		
101308		In port, San Diego		
101408		In port, San Diego		
101508	1129 1629	N32:37.72 W117:18.01 N32:37.97 W118:01.82	25.3	2.2
101608	0704 1821	N32:38.74 W119:45.55 N33:00.14 W121:23.93	67.2	2.0
101708	0721 1830	N33:07.42 W121:52.68 N33:32.52 W123:41.81	91.5	2.7
101808	0733 1818	N33:36.69 W124:04.48 N34:05.95 W125:50.18	88.5	4.3

Marine Mammal Sighting Summary.

Code	Species	Total sightings
005	<i>Delphinus</i> sp.	9
013	<i>Stenella coeruleoalba</i>	1
016	<i>Delphinus capensis</i>	7
017	<i>Delphinus delphis</i>	24
018	<i>Tursiops truncatus</i>	3
021	<i>Grampus griseus</i>	2
022	<i>Lagenorhynchus obliquidens</i>	5
049	Ziphiid whale	1
061	<i>Ziphius cavirostris</i>	2
070	<i>Balaenoptera</i> sp.	12
071	<i>Balaenoptera acutorostrata</i>	1
074	<i>Balaenoptera physalus</i>	14
075	<i>Balaenoptera musculus</i>	4
076	<i>Megaptera novaeangliae</i>	3
177	Unid. small delphinid	9
CU	<i>Callorhinus ursinus</i>	22
MA	<i>Mirounga angustirostris</i>	10
UA	Unid. fur seal	1
ZC	<i>Zalophus californianus</i>	1
Total		131

Cetacean Biopsy Report

Suzanne Yin, Allan Ligon, and Rich Pagen

Cetacean Biopsy Report for 10/5/2008 to 10/18/2998

Species	Common name	No. weekly samples	No. weekly takes	Total samples	Total takes
<i>Balaenoptera physalus</i>	Fin whale	3	4	20	30
<i>Berardius bairdii</i>	Baird's beaked whale	0	0	1	1
<i>Delphinus capensis</i>	Long-beaked common dolphin	7	12	7	12
<i>Delphinus delphis</i>	Short-beaked common dolphin	7	14	84	210
<i>Delphinus</i> sp.	Unidentified common dolphin	3	4	3	4
<i>Globicephala macrorhynchus</i>	Short-finned pilot whale	0	0	4	5
<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin	0	0	25	49
<i>Lissodelphis borealis</i>	Northern right whale dolphin	0	0	10	23
<i>Orcinus orca</i>	Killer whale	0	0	2	9
Grand Total		20	34	156	343

Photo Report

Jim Cotton and Chris Cutler

The cetacean mug-shot collection added 72 new suspects this week, including two novel species for the image archives, bottlenose dolphins (*Tursiops truncatus*) and long-beaked common dolphins (*Delphinus capensis*). Both dolphin types were encountered nearshore, the former being widely known through “Flipper” fame

while the latter was only described as a distinct species in 1994. Long-beaked common dolphins have the distinction of sometimes occurring in the same geographical areas as ("sympatric" with) their shorter-beaked brethren, *Delphinus delphis* (see photos)



Photography summary table.

Common Name	Weekly Totals		Cruise Totals	
	Sightings Photographed	Individual IDs	Sightings Photographed	Individual IDs
Pacific white-sided dolphin	3	8	13	60
Northern right whale dolphin	0	0	8	6
Short-beaked common dolphin	14	26	37	140
Long-beaked common dolphin	6	23	6	23
Bottlenose dolphin	1	1	1	1
Striped dolphin	0	0	3	0
Dall's porpoise	0	0	1	0
Sperm whale	0	0	1	2
Baird's beaked whale	0	0	3	12
Sei whale	0	0	3	9
Fin whale	4	12	37	77
Blue whale	2	2	15	20
Humpback whale	0	0	12	16
Killer whale	0	0	3	37
Cuvier's beaked whale	0	0	1	1
Short-finned pilot whale	0	0	1	39
Total	30	72	154	452

Seabirds***Michael Force and Sophie Webb***

Forty-two species seen this week smashed our previous weekly high by eight species. This reflects the amount of time spent in neritic waters and results in a correspondingly diverse assemblage of gulls, terns, cormorants, and other coastal seabirds. In fact, almost 50% of the species seen were Charadriiformes (gulls, jaegers, terns, alcids, and shorebirds). Add to this of course ubiquitous displaced migrants. Hardly a day passed without finding a lost landbird hopping around on deck or a little brown job making a tantalizing trajectory just outside identifiable range. Misplaced misfits this week include Morning Dove, an immature Western Meadowlark, Yellow-rumped Warbler (3), Savannah Sparrow (2), Brown-headed Cowbird (2) and a Bank Swallow. A Yellow-rumped Warbler that narrowly escaped becoming lunch for a Long-tailed Jaeger provided some insight to the eventual fate of many landbirds lost at sea.

Impressive were several huge flocks of Black-

vented Shearwaters associating with large, tight groups of long-beaked common dolphins in the Santa Barbara Channel. A flurry of wings and flashing white underparts would obscure the sea surface, with up to 2500 birds jockeying for feeding position, pattering across the water and making sudden short dives or head dips to snatch up small fish. This compact shearwater, at one time considered to have been a subspecies of the Manx Shearwater, is a Mexican breeding endemic seabird, nesting in sandy burrows or in crevices on islets off the west coast of central Baja California. Located off Punta Eugenia, Isla Natividad supports an estimated 76,000 breeding pairs, about 95% of the entire world population. The population on this island has made an impressive recovery thanks to the eradication in 1997 and 1998 of introduced goats and sheep and in 2002, feral cats. Upon the culmination of breeding, the birds wander north in the fall to coastal waters off southern California.

The birders (and Leach's Storm-Petrels!) want to thank the efforts of the *McArthur II* Deck Department, particularly Kevin Lackey, for

making the coffer dams bird-friendly with a cover of protective netting.



Mixed seabird feeding flock. Photo: Sophie Webb

Acoustics Squeakly Report ***Tina Yack and Elizabeth Becker***

After a long in-port in San Diego (and a restock of espresso beans), we are back at sea for Leg 4 of the ORCAWALE survey. Acoustics says goodbye to Aly (thanks for all of your help!) and welcomes a new scientist, Elizabeth Becker. This week we traveled to the western edge of the study area on a ~300 nm trackline, gathering many acoustic encounters along the way (see figure below). This has resulted in approximately 54 hr of acoustic recording effort and 37 hr of monitoring effort. During this time, there were 64 acoustic encounters, approximately 38% of which matched visual sightings. The highlights of this week's acoustic encounters include: a joint visual/acoustic beaked whale (Cuvier's), three fin whale, two sperm whale, eleven short-beaked common dolphin, one long-beaked common dolphin, and two mixed dolphin schools. Instead of highlighting an acoustic encounter this week, I

thought I would share a different component of our work. After all, we don't spend the entire day listening to the music of the ship and sea noise, only most of it... For many reasons, it is important for us to know the depth that the array reaches during the course of a typical day. As such, once per cruise we attach a dive watch to the array to log its depth for an entire day. Speed and array depth have an inverse relationship, meaning that as speed decreases, array depth increases. The average array depth range is between 7 and 24 m, depending on ship speed. At maximum survey speed (10 kts) array depth is approximately 7 m, at half speed (5 kts) array depth is 11m, and at slow speed (3 kts) array depth is approximately 16m. This information allows us to understand better the position of the array in the water column, which in turn allows us to determine the optimal speed for acoustic passes given behavior of the species we are recording. Additionally, it allows for more accurate sound speed calculations.

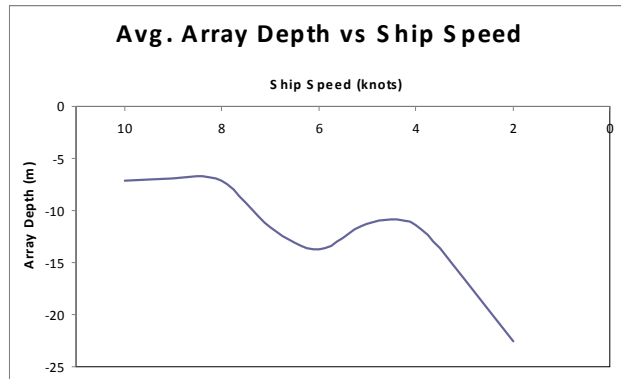


Figure 1. Graph illustrating average depth (meters) at given ship speeds (knots).

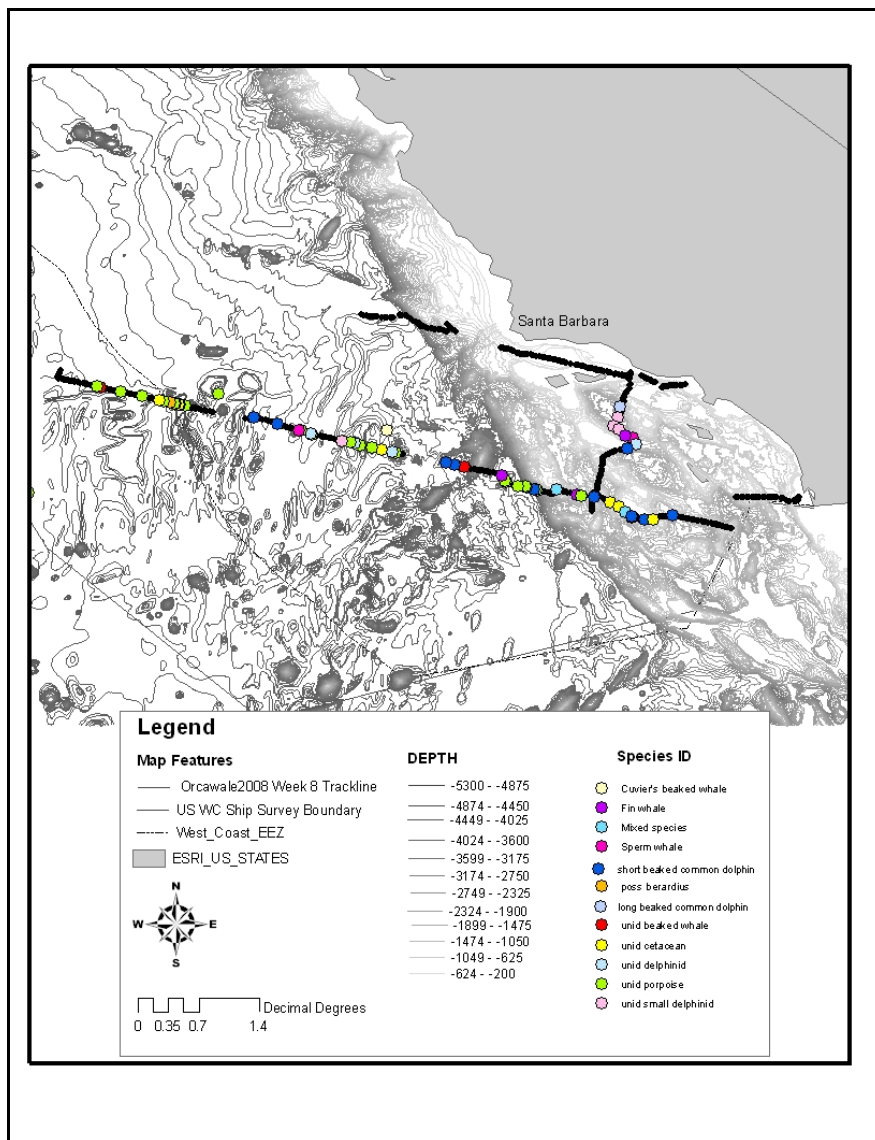


Figure 2ORCAWALE 2008: Week 10 Acoustic Encounters.

Table 1. Acoustic Encounters

Species ID	No of Acoustic Encounters
Short-beaked common dolphin	11
Long-beaked common dolphin	1
Fin whale	3
Sperm whale	2
Mixed delphinid	2
Unid. beaked whale	2
Unid. cetacean	9
Unid. delphinid	6
Unid. porpoise	22
Unid. small delphinid	4
Cuvier's beaked whale	1
Possible Baird's beaked whale	1
Total	64

Table 2. Rainbow Click Recording Effort (sample rate: 480 kHz: hydrophones 4 and 5),

Date	Average Beaufort	Average Visibility Range (nm)	Recording Start	Recording End	Recording Time	Monitoring Effort	Acoustic Encounters
10/05/2008	OFF	OFF	OFF	OFF	OFF	OFF	OFF
10/06/2008	OFF	OFF	OFF	OFF	OFF	OFF	OFF
10/07/2008	2.9	5.9	7:30	18:30	11:00	8:00	8
10/08/2008	2.7	6.4	7:25	18:30	11:05	5:00	9
10/09/2008	OFF	OFF	OFF	OFF	OFF	OFF	OFF
10/10/2008	OFF	OFF	OFF	OFF	OFF	OFF	OFF
10/11/2008	OFF	OFF	OFF	OFF	OFF	OFF	OFF
10/12/2008	OFF	OFF	OFF	OFF	OFF	OFF	OFF
10/13/2008	OFF	OFF	OFF	OFF	OFF	OFF	OFF
10/14/2008	OFF	OFF	OFF	OFF	OFF	OFF	OFF
10/15/2008	OFF	OFF	OFF	OFF	OFF	OFF	OFF
10/16/2008	2.0	4.6	6:58	18:23	11:25	8:25	18
10/17/2008	2.7	5.5	7:14	18:32	11:18	9:00	16
10/18/2008	4.2	5.9	9:30	18:20	8:50	6:15	13
Total					53:38:00	36:40:00	64

Oceanography *Ryan Driscoll and Justin Garver*

The Oceanography Team ended Leg 3 smoothly and even managed an XBTpalooza before our long in port. The palooza consisted of 7 XBTs launched while heading out from San Nicholas Island giving us a detailed description of the water column. Oceanography said farewell to the excellent help of Shannon Lyday and Jim

Carretta during the in port by conducting a comparison of specific gravities found in San Diego. Leg 4 welcomes Justin Garver to Team Oco; he has had an excellent start helping to fill the hole left the by our Survey Tech Lillian. We began this leg with our second ARGO deployment (see photo), which has already

“called home” on its 5-year journey. Having turned north, we will head back through ground

previously covered, so stay tuned next week to see what has changed out here.

Oceanography, by the numbers.

Day	CTD	XBT	Surface chlorophylls	Bongo tows	HAB	ARGO Float
10/5/2008	1	4	4	1	31	0
10/6/2008		2	1		6	0
10/7/2008	1	7	3	1	25	0
10/8/2008	1	3	3	1	25	0
10/9/2008 - 10/14/2008	In port - San Diego					
10/16/2008	2	4	4	1	25	0
10/17/2008	1	4	4	1	29	0
10/18/2008	1	4	4	1	2	1
Grand Total	61	242	228	5	1438	1



Midwater Trawling Weekly Report
IKMT Leader: Andrey Suntsov; Assistants: Carl Mayhugh and Jason Blackburn

On October 9 we successfully finished Leg 3 with a total of 46 midwater tows, which yielded over 8000 specimens of mostly mesopelagic fishes (two epipelagic Pacific sauries caught as a bycatch). Our midwater fish collection for this time period is composed of 55-56 species from 20 families. Lanternfishes (family Myctophidae) were the most species rich group with 12-13 species, followed by hatchetfishes (Sternoptychidae) – 7-8 species, deep-sea smelts (Bathylagidae), bigscales (Melamphaeidae), scaleless dragonfishes (Melanostomiidae), bristlemouths (Gonostomatidae) with 3-4 species, and remaining families represented by 1-2 species. Numerically, just two deep-sea groups – lanternfishes (Myctophidae) and bristlemouths (Gonostomatidae, *Cyclothone* spp.) – formed over 90% of all fish specimens collected. During final days of the Leg 3, we kept getting additional interesting examples of deep-sea ichthyofauna. Thus, our deeper tows produced two large specimens of magnificent, bronze-colored blackbelly dragonfish *Stomias atriventer*, with peculiar hexagonal scales, similar to that found in viperfishes. Unlike viperfish, it sports a chin barbell with bioluminescent lure at the tip, holding it horizontally in front of the mouth. Another interesting catch was a pelagic juvenile of a spotted cuskeel – *Chilara taylori* (fam. Ophiidiidae), from a group of primarily benthic fishes, which can stand on its tail and bury themselves into sediment tail first, when in danger.

Leg 4 of ORCAWALE started with an exciting capture of deep-sea anglerfish – a unique pelagic group best known for the evolution of sexual parasitism – a remarkable mode of reproduction in which dwarf males become permanently attached to much larger females (in some extreme cases a female can exceed the male by 60 times in length and about half a million times in weight!). The common name, anglerfishes, refers to their luring apparatus constructed out of anterior-most dorsal spine (ilicium), bearing

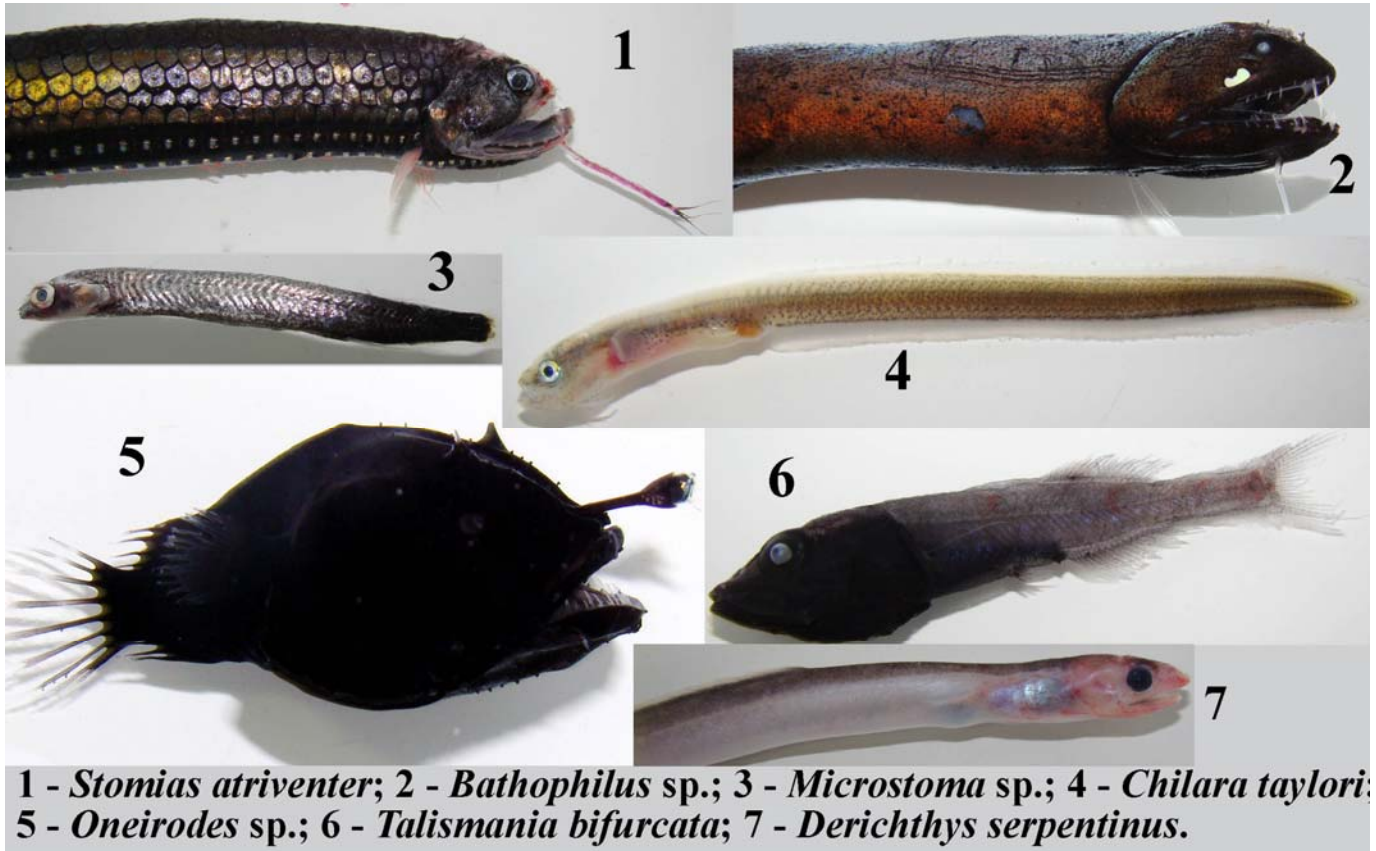
terminal bait or esca (bioluminescent in deep-sea anglers). We collected a rather small (20 mm) female specimen of *Oneirodes* sp. (Fam. Oneirodidae), commonly known as dreamers – the most species rich and least known family of anglerfishes, containing over 40% of approximately 160 currently known species. Our completely black specimen was in perfect condition and swam vigorously from time to time, holding luring apparatus in front of its enormous mouth. Deep-sea anglerfishes are mostly found below 500m, i.e., beyond the reach of our regular deep trawls – so this was our lucky day!

Despite popular beliefs, not all male deep-sea anglerfishes are sexually parasitic on females (only 5 out of 11 families and 23 out of 160 species display this unique mode of life), including our specimen. Male anglerfishes, which lack luring apparatus, are usually equipped with large eyes and huge nostrils, hypothetically for targeting in on pheromones emitted by females – both features not inconsistent with extremely dispersed deep-sea populations, where chances of male-female encounter are always slim. Despite the apparent biological advantage of a female carrying a permanently attached male (and using it when needed for reproduction), sexual parasitism has not evolved in other deep-sea groups. At the same time, it emerged independently at least three (possibly more!) times among different anglerfish lineages. However, despite the clear value for passing their genes to the next generation, when they establish a permanent bond with a female, male anglerfishes enjoy a certain freedom of choice and can be either obligatory parasitic, facultative parasitic or simply have temporary non-parasitic attachment to females. Apparently, there is some resistance and desire to be free, despite the apparent biological advantage of being reduced to a small appendage on the body of a female!

In addition to a female dreamer, our collection has increased by a juvenile threadfin slickhead *Talismania bifurcata* and a longneck eel *Derichthys serpentinus*. The former species belongs to a group closely related to tubesholders (Platytroctidae), mentioned in earlier reports, and its common name 'slickhead' refers to lack of head scales in adults. Longneck eels are truly oceanic fishes, distributed in meso-

bathypelagic zones of the temperate regions of the World Ocean, their common name referring to a narrow constriction in the neck area.

Last but not least, I would like to express my sincere thanks to former midwater trawl assistant Carl Mayhugh for his impeccable work during our nightly operations and to welcome the new man on board - Jason Blackburn.



Preliminary list of fishes collected with 6 ft IKMT during 3rd leg of ORCAWALE (46 tows, total numbers/frequency of occurrence)

Nemichthyidae

Avocettina infans 1/1
Nemichthys scolopaceus 3/3

Bathylagidae

Leuroglossus stilbius 34/6
Lipolagus okhotensis 87/32
Pseudobathylagus milleri 4/3

Microstomatidae

Microstoma sp. 2/2

Opisthoproctidae

Bathylchnops exilis 1/1

Platytroctidae

Sagamichthys abei 2/2

Gonostomatidae

Cyclothone signata 2519/23
Cyclothone pseudopallida 459/20
Cyclothone sp. 27/5
Diplophos taenia 2/2

Phosichthyidae

Ichthyococcus irregularis 1/1
Vinciguerria lucetia 7/5

Sternoptychidae

Argyropelecus sladeni 38/6
A. affinis 62/15
A. hemigymnus 55/15
Argyropelecus sp. 1/1
Danaphos oculatus 135/20
Valenciennellus tripunctulatus 1/1
Sternoptyx spp. 2/2

Chauliodontidae

Chauliodus macouni 39/11

Stomiidae

Stomias atriventer 18/9

Melanostomiidae

Bathophilus sp. 2/2
Flagellostomias bourrei 1/1
Photonectes sp. 1/1
Tactostoma macropus 35/17

Idiacanthidae

Idiacanthus antrostomus 26/16

Malacosteidae

Aristostomias scintillans 4/2

Scopelarchidae

Benthalbella dentata 1/1

Notosudidae

Scopelosaurus harryi 3/3

Paralepididae

Lestidiops sp. 6/6

Myctophidae

Bolinichthys sp. 1/1
Ceratoscopelus townsendi 86/19
Diaphus theta 607/46
Diogenichthys atlanticus 24/11
Lampanyctus regalis 14/7
Lampanyctus ritteri 154/27
Lampanyctus spp. 70/25
Myctophum nitidulum 1/1
Protomyctophum thompsoni 95/17
Stenobranchius leucopsarus 2837/45
Symbolophorus californensis 22/13
Tarletonbeania crenularis 61/20
Triphoturus mexicanus 349/9
unidentified 76/25

Melamphaeidae

Poromitra sp. 2/2
Scopeloberyx sp. 4/3
unidentified 62/20

Ophidiidae

Chilara taylori 1/1

Percichthyidae

Howella sp. 6/4