

## Okeanos Explorer ROV Dive Summary

Dive Information	
General Location	
General Area Descriptor	Kingman Reef and Palmyra Atoll Unit of the Pacific Remote Island Marine National Monument
Site Name	Kingman Reef Cone
Science Team Leads	Scott France/ Del Bohnenstiehl
Expedition Coordinator	Kasey Cantwell
ROV Dive Supervisor	Bobby Mohr
Mapping Lead	Mike White
ROV Dive Name	
Cruise	EX1705
Leg	-
Dive Number	DIVE 11
Equipment Deployed	
ROV	Deep Discoverer
Camera Platform	Seirios



	Kelley		
	Del Bohnenstiehl	North Carolina State University	drbohnen@ncsu.edu
	Dhugal Lindsay	JAMSTEC	dhugal@jamstec.go.jp
	Heidi Hirsh	NOAA NMFS PIRO Marine National Monuments Program	heidi.hirsh@noaa.gov
	Inner Space Center ISC	Inner Space Center	innerspacecenter@googlegroups.com
	Jaymes Awbrey	University of Louisiana, Lafayette	jawbrey@louisiana.edu
	Jenn Casselle	Univ California Santa Barbara	Univ California Santa Barbara
	Ken Sulak	USGS emeritus	ksulak@usgs.gov
	Kevin Jerram	University of New Hampshire	kjerram@ccom.unh.edu
	Les Watling	University of Hawaii at Manoa	watling@hawaii.edu
	Neah Baechler	Contractor	Neah.baechler@gmail.com
	Nicole Morgan	Florida State University	nmorgan@fsu.edu
	Scott France	University of Louisiana at Lafayette	france@louisiana.edu
	Sonia Rowley	University of Hawai'i at Manoa	srowley@hawaii.edu
	Timothy Shank	Woods Hole Oceanographic Institution	tshank@whoi.edu
Purpose of the Dive	<p>This dive will investigate the distribution and abundance of benthic fauna, map substrate composition in order to evaluate the relationship between faunal communities and substrate type, collect rock and crust samples to determine their geological and geochemical properties.</p>		
Dive Summary	<p>The ROV dive began at the base of one of several small cones on the flat-topped platform extending to the east-southeast of Kingman Reef. The dive extended between a depth of 1029 and 990 m. The ROV encountered a flat pavement of Mn-crust rock with a very thin dusting of light-colored sediment, suggesting strong currents moving across this shallow platform. Near the base of the cone, larger blocks of rocks were encountered with thicker deposits of sediments pooling their lee side. Although the rocks were Mn-crust, the overall character of the rock outcrops suggests that this platform is covered with submerge carbonate reef material. One rock sample was collected (D2_DIVE11_SPEC01GEO).</p> <p>Despite the flat relief (and low [O<sub>2</sub>] ≈1.7 mg/L), there were a high number of small yellow acanthogorgiid fans, which, along with the lack of sediment</p>		



accumulation, suggested relatively high flow through the space between the bases of the cone features. Several urchins (*Plesiodiadema*, *Histocidaris*), a pagurid crab carrying an epizoanthid, a rock pen, (?*Calibelemnon*) and others were seen on the flat seafloor. The flatness was interrupted by an occasional rock outcrop, and these were sparsely populated by: a *Zoroaster* seastar draped over the top of a rock, an unusual observation for this taxon; large sessile barnacle; several small anemones; stoloniferous octocoral; a mini-forest patch of colonial hydroids.

As we reached the base of the cone slope the relief changed with many displaced rocks, boulders and sediment patches between them; the number and diversity of corals increased dramatically. These included more of the yellow acanthogorgiid fans, the primnoid *Narella*, and a large planar isidid (*Jasonisis*), measuring  $\approx 1 \times 1.2$  m, with anemones, brittle stars, crinoids, and benthic ctenophores in its branches. At the massive base of the colony colonial hydroids grew from exposed skeleton and two gastropods were seen possibly grazing the hydroids. As we moved upslope we began to see yellow plexaurid fans (?*Paramuricea*), which could be distinguished from the yellow acanthogorgiids by the large asteroschematid ophiuroids in the branches of the plexaurids. The acanthogorgiids often had a couple of much smaller ophiuroids. Paragorgiids also started appearing (without zoanths). We imaged two large primnoid fans (*Calyptrophora*?) that each had a basketstar (Gorgonocephalidae) on them; one of the colonies was being preyed upon by a *Histocidaris* urchin, and the other had some zoanthid overgrowth. Other corals observed: *Parantipathes* (with 2 chirostylid squat lobsters), rock pen (*Calibelemnon*?), *Metallogorgia*, isidid whip, chrysogorgiid. We encountered another *Jasonisis* fan, this one mostly stripped of tissue and being preyed upon by a *Hippasteria* seastar and an echinothurid urchin. An interesting observation of the isidid skeleton where the echinothurid was, was that each of the exposed nodes of the isidid had clumps of hydroids growing on them, but not on the internode. Do the hydroid larvae settle preferentially on the proteinaceous nodes, or does the echinothurid preferentially graze the internodes? A large *Hydrodendron* colony (or multiple) was seen growing under a rock overhang and a homolid crab was seen carrying an anemone.

While imaging some of these colonies we were approached by a large smalltooth sand tiger shark (*Odontaspis*); a *Candidella* whip and another basketstar (on an acanthogorgiid colony) could be seen as the shark swam by. A kink was noted in the ROV tether at this point (unclear if it was caused by following the shark), which required about an hour of ops attention. New observations included colonies of *Trissopathes* and *Victorgorgia*, and hexactinellid sponges Farreidae and a dead euplectellid (*Regadrella* like), but after 40 more minutes it was decided to recover the ROV to attend to the tether kink.

The most frequently observed fish were the halosaurs (*Aldrovandia* cf *phalacra*), many of them hanging vertically in the water column. Other fish seen more than once included oreos (*Oreosomatidae*, *Neocyttus acanthorhynchus*), cutthroat eels (*Synaphobranchus affinis* and *Synaphobranchus* sp) and rattails (*Macrouridae*). Two macrourid morphotypes were noted. The first was a small, elongate rattail with a very tall first dorsal fin sporting a black spot (tentatively *Nezumia* sp. or *Ventrifossa*) The second was shorter and deeper-bodied with a

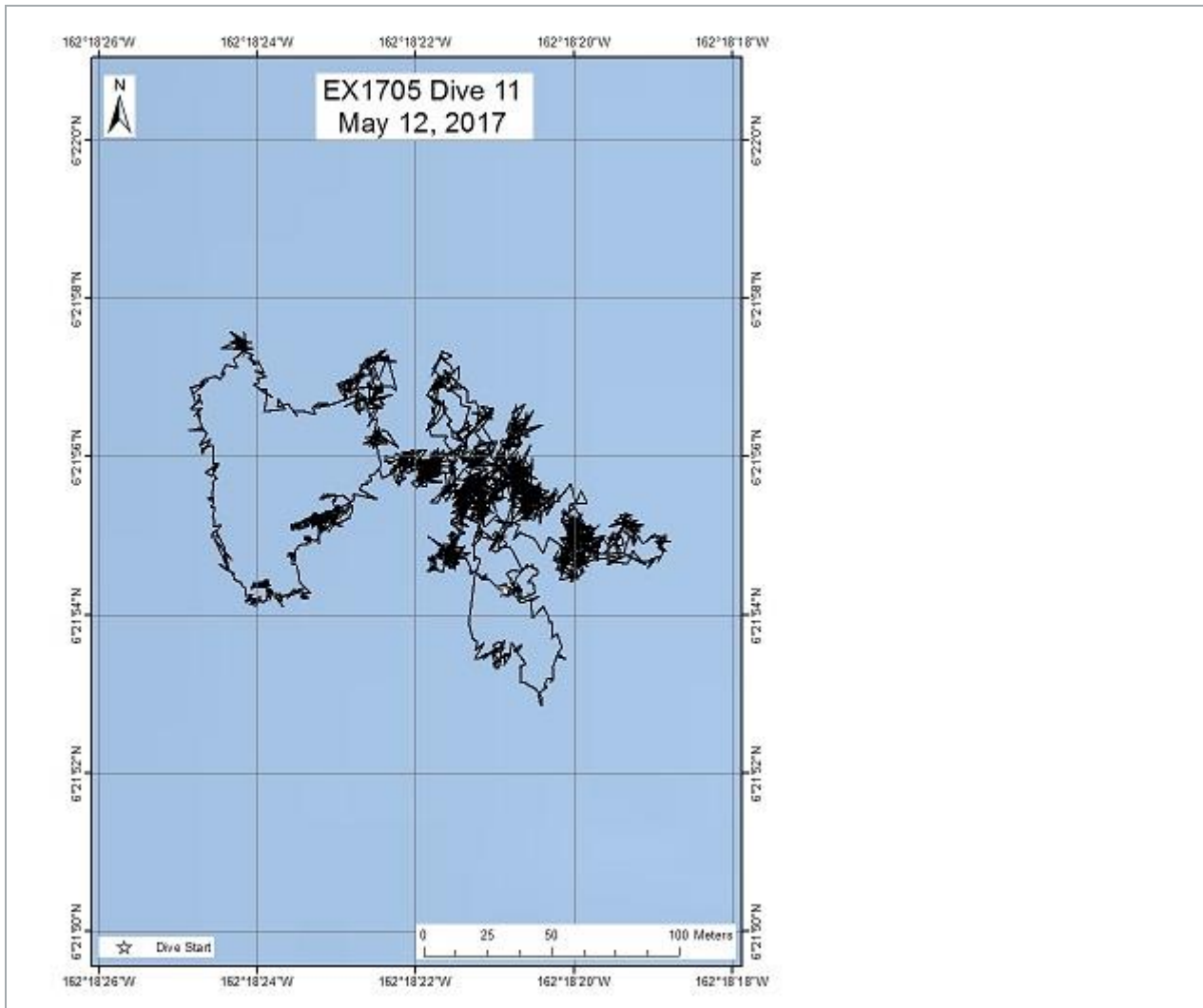
large eye, round snout, and a dished head (possibly *Nezumia* sp or *Kuronezumia* sp). Also in the family Macrouridae, we observed two individuals in the subfamily Bathygadinae (*Gadomus*).

We were surprised by a very large oilfish (Gempylidae, *Ruvettus pretiosus*), a major predator. We found only a single individual cusk eel (*Lamprogrammus*) and a large silvery Nettastomatidae (duckbill eel), possibly *Venefica*. Two sharks were observed: a small, black deepwater dogfish (Etmopteridae) with a bright eye (perhaps *Centroscyllium nigrum*), and a small tooth sand tiger shark (*Odontaspis ferox*). The latter was a male with a damaged mouth. The left corner of his mouth had severe scarring and it looked like he had been hooked by a fishing line and then released. He was very curious about the ROV and approached very closely.

There was much lower abundance of animals in the water column at Kingman Cone compared with yesterday's dive at South Palmyra Slope, which surprised us. We did still see a good diversity of animals on our ascent, including several *Ocyropsis maculate* (a lobate ctenophore), larvaceans, chaetognaths, siphonophores, a snipe eel, and its prey, sergestid shrimps. There was also a layer of salps around 50-100 m, though they were not as densely distributed as at the Palmyra site.

Map of ROV Dive Site





Representative Photos of the Dive



Mn-crusted pavement with light dusting of sediment



Hydroids growing solely on exposed proteinaceous nodes of the isidid skeleton



Blocks of Mn-crusting submerged reef carbonate

Large planar bamboo coral (*Jasonia*), measuring  $\approx 1 \times 1.2$  m



Outcrops on otherwise flat seafloor

Smalltooth sand tiger shark; note the basketstar on the acanthogorgiid colony in the foreground

### Samples Collected

#### Sample

Sample ID	EX1705_20170512T225041_D2_DIVE11_S PEC01GEO
Date (UTC)	20170512
Time (UTC)	225041
Depth (m)	1023.12
Temperature (°C)	4.5
Field ID(s)	Mn crusted rock



Commensal ID and Field Identification	EX1705_20170512T225041_D2_DIVE11_SPEC01GEO_A01 Coral
	EX1705_20170512T225041_D2_DIVE11_SPEC01GEO_A02 Xenophyophore (labeled as foram)
	EX1705_20170512T225041_D2_DIVE11_SPEC01GEO_A03 Sipunculid
	EX1705_20170512T225041_D2_DIVE11_SPEC01GEO_A04 Sponge
	EX1705_20170512T225041_D2_DIVE11_SPEC01GEO_A05 Coral

**Please direct inquiries to:**

NOAA Office of Ocean Exploration & Research  
1315 East-West Highway (SSMC3 10th Floor)  
Silver Spring, MD 20910  
(301) 734-1014

