Web Update
Day 1: 02/25/2008

NOAA's Center for Coastal Monitoring and Assessment (CCMA) will be conducting the fifth year of an ongoing scientific research mission onboard the NOAA Ship NANCY FOSTER funded by NOAA's Coral Reef Conservation Program and CCMA. The cruise will start on February 25, 2008 and end on March 8, 2008.

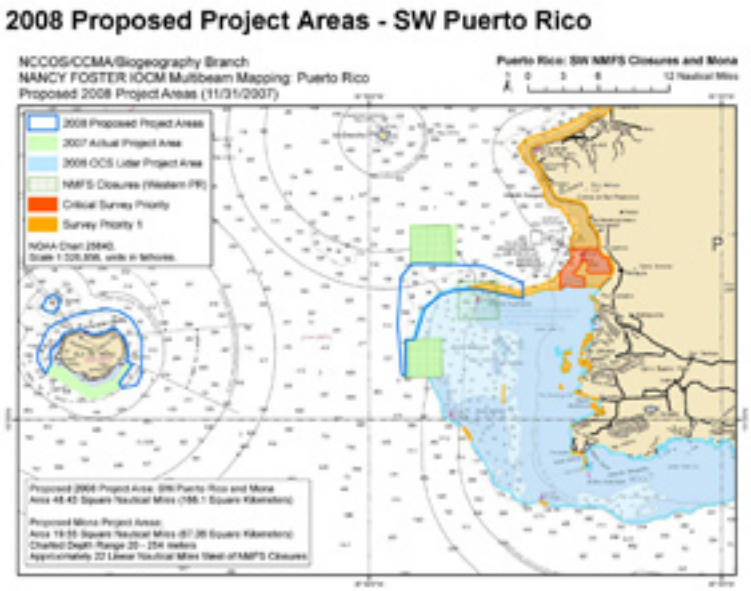
The purpose of the cruise will be to explore and characterize seafloor habitats in high priority conservation areas off the west coast of Puerto Rico.

Project Details
The primary objective of the research mission is to collect and integrate data obtained from a multibeam acoustic sonar system, fish acoustic system and data obtained from underwater imagery systems, to create the first comprehensive map of coral ecosystems. Other project objectives are to image and document the spatial distribution, abundance and condition of fish, coral reefs and fishery resources. The mission's intended outcome is to support more effective marine conservation and monitoring efforts.

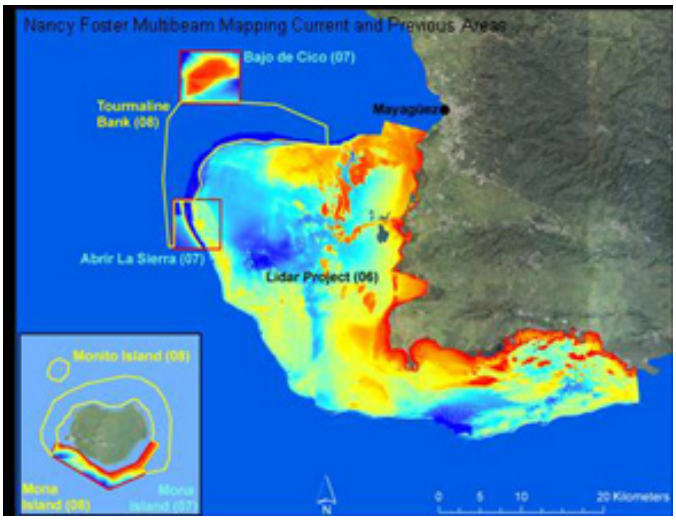
Data generated during this mission will support natural resource management in federal and state waters of Puerto Rico, as well as help NOAA continue to meet its commitment to the U.S. Coral Reef Task Force to map moderate depth (20-1000m) coral reef ecosystems. Data will be used to support management and understanding of fishery closure areas (e.g., Bajo de Cico, Tourmaline Bank, Abrir la Sierra), and important fish spawning aggregation sites.

Profiles at Sea: Mark Monaco

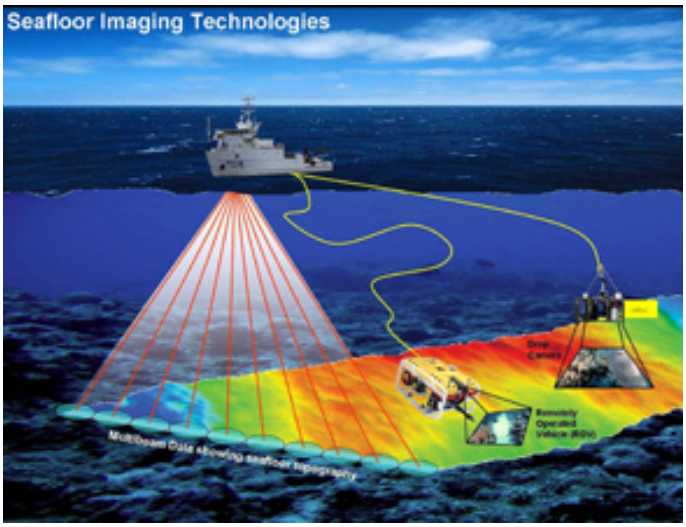
Mark Monaco is a marine biologist and Biogeography Branch Chief



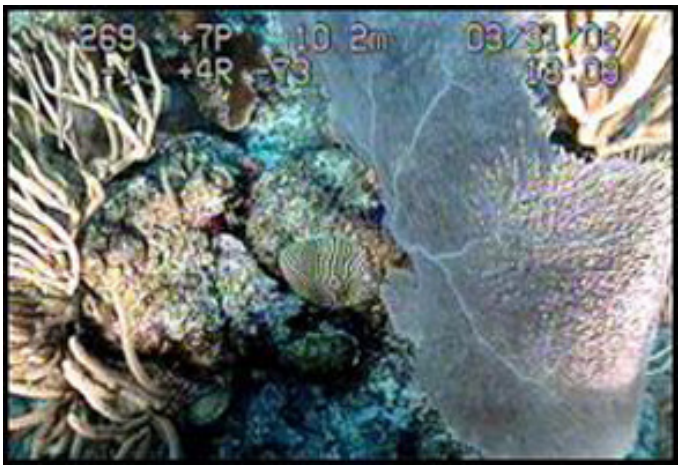
2008 Proposed Project Areas in SW Puerto Rico



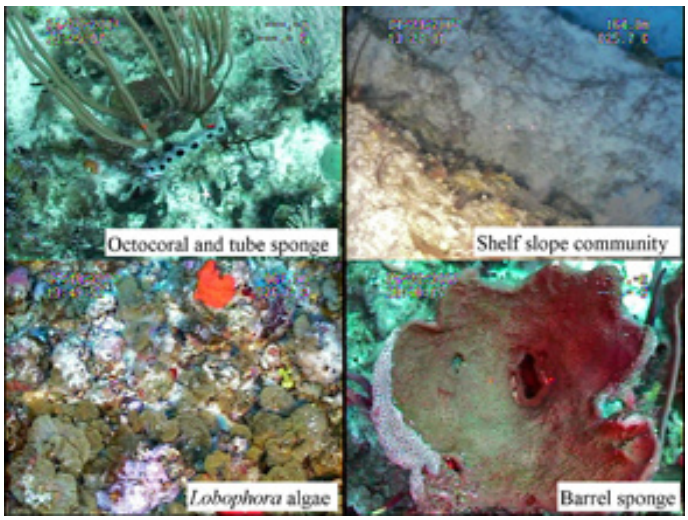
Nancy Foster Multibeam Current and Previous Areas



A diagram of Multibeam data collection and ground truthing



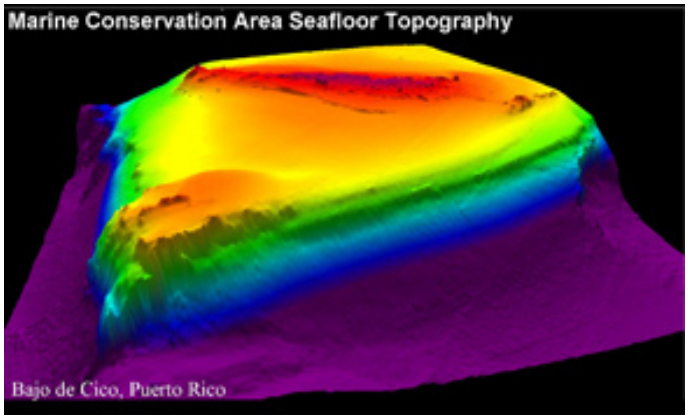
Example of ROV underwater imagery collected in SW Puerto Rico



Cover types in southwest Puerto Rico

Geologic History of Puerto Rico

Puerto Rico is primarily composed of volcanic and plutonic rock from the Cretaceous (145 million to 65 million years ago) and Eocene (65.5 million to 23 million years ago) periods. Some of the island's oldest rock formations date back to the Jurassic period and are located in the southwest part of the island. Because Puerto Rico sits at the boundary of the Caribbean and North American plates, the island is under tectonic stress. As a result, Puerto Rico is known to experience occasional earthquakes. Another unique geologic feature is the Puerto Rican Trench. Located approximately 75 miles north of the island, it is the largest and deepest trench in the Atlantic. At its deepest point, the trench extends some 8,380 m (27,493 feet).



Bathymetric image of the marine conservation area at Bajo de Cico, Puerto Cico

Marine Life

Puerto Rican waters are home to coral reef ecosystems teaming with life, including deep many coral species, sponges, invertebrates, fish and sea turtles. Many areas off the coast of Puerto Rico have been identified as important spawning areas for a number of the region's fish, including grouper and red hind.

Tourmaline Bank, Abrir la Sierra and Bajo de Cico: Fishery Closures

Tourmaline Bank, Abrir la Sierra and Bajo de Cico are located off the coast of southwest Puerto Rico near Mayagüez.

As a result of concerns over declines in some reef fish species, in 1996, the Caribbean Fishery Management Council, in cooperation with the DNER and local commercial fishermen, took steps to protect deep reefs that are known spawning aggregation sites for red hind, Epiniphelus guttatus in Tourmaline Bank, Abrir la Sierra and Bajo de Cico. Spawning aggregation sites (SPAGS) occur when a large number of fish gather at a particular area to spawn. Because large numbers of fish often migrate to these spawning areas year after year, SPAGS often come under intense fishing pressures. Prolonged exploitation of these SPAGS may result in their disappearance. As a result, regional fish populations may decline with time. Now the areas are closed to fishers from December 1 through the last day of February. Since 2005 the use of fishing pots, traps, bottom, gillnets and trammel nets is prohibited year-round.

For more information on area closures in the USVI and Puerto Rico, visit
http://www.caribbeanfmc.com/REGULATIONS%20PR-USVI/PR%20area%20closures.htm

For more information on Spawning Aggregation Sites, visit
http://www.nmfs.noaa.gov/habitat/ead/spawnaggs.htm

Isla Mona: The Galapagos of the Caribbean

First discovered in 1493 by Christopher Columbus, Isla Mona is located 47 miles southwest of Mayaguez in the Mona Passage, a strait between the Dominican Republic and Puerto Rico. Isla Mona is rich in history and is home to a vast array of terrestrial and marine life, earning it the nickname "The Galapagos of the Caribbean".

Named for a Taino Chief, Isla Mona was home to bands of pirates, including the infamous Captain Kidd in 1699. The last permanent inhabitants were Civilian Conservation Corps members, sent to plant trees in a post-Depression era program to create jobs. Other activities have included guano mining, military air bombing practices, agricultures, commercial and recreational fishing, and feral animal hunting.

The waters off Mona feature numerous species of fish, three species of endangered sea turtles and coral reefs. At 157,575 hectares the Mona Island Nature Reserve, is the largest Marine Protected Area (MPA) in Puerto Rico. Its boundaries extend to nine nautical miles from the coast and encompass coral reef fish communities, the insular shelf of Mona and Monito, and deep water fish habitats, forming an essential area of genetic connectivity between Puerto Rico and Hispaniola. Other wildlife includes countless sea birds and giant iguana (including the Mona Iguana, which can grow to more than four feet in length). The Puerto Rico Department of Natural and Environmental Resources (DNER) manages this uninhabited, rugged island which is home to stunning coral reefs, mangrove forests, breathtaking cliffs and about 200 limestone caves, some large enough to hold a small cruise ship.

For more information, visit
http://welcome.topuertorico.org/city/mona.shtml

For research reports on its unique fish assemblages, see
http://ccri.uprm.edu/researcher/Scharer/

Fun & Games

* Crossword puzzle
* Word Search (easy)
* Word Search (difficult)

Web Update
Day 2: 02/26/2008

NOAA Ship Nancy Foster: A Floating Laboratory

The R/V Nancy Foster didn't start out as a hi-tech laboratory built for the sea. The ship was originally built by the U.S. Navy as a torpedo test craft in 1987. Then in 2001 the Navy passed ownership to NOAA who soon outfitted the vessel for to conduct coastal research along the Atlantic and Gulf coasts, as well as in the Caribbean. The vessel is named after Dr. Nancy Foster, a former director of the National Ocean Service. Its home port is sunny Charleston, South Carolina.

The R/V Nancy Foster comes in at 187 ft long and provides scientist with 1,600 sq ft of work space. The ship can reach a cruising speed of 10.5 knots and has. Up to 35 people can be houses in the ship's 37 buncks. There are also emergency medical facilities stocked with first aid equipment and staffed with trained personnel.

The equipment on deck is capable of moving mountains of scientific gear. The ship is equipped with four cranes: 1) the main deck crane with a boom length of 40 ft and capable of lifting 10,000 lbs at maximum capacity; 2)the Aft 01 deck crane, on Deck 1, has a maximum length of 35 ft and a lifting capacity of just over 2,300 lbs; 3) the A-Frame, located on the stern, clears 12.3 ft over the stern, has a width of 14 ft and has a maximum load of 25,000 lbs; and 4) the J-Frame extends 6 ft over the side of the ship and can lift some 5,000 lbs. The vessel also has two winches: 1) the oceanographic winch with a maximum pull of 6,000 lbs; and 2) the EM Winch with a 10,000 meter cable. Together these cranes and winches allow scientist to lower and retrieve heavy instrumentation like Conductivity, Temperature, Depth sensors, remotely operated vehicles and drop cameras.

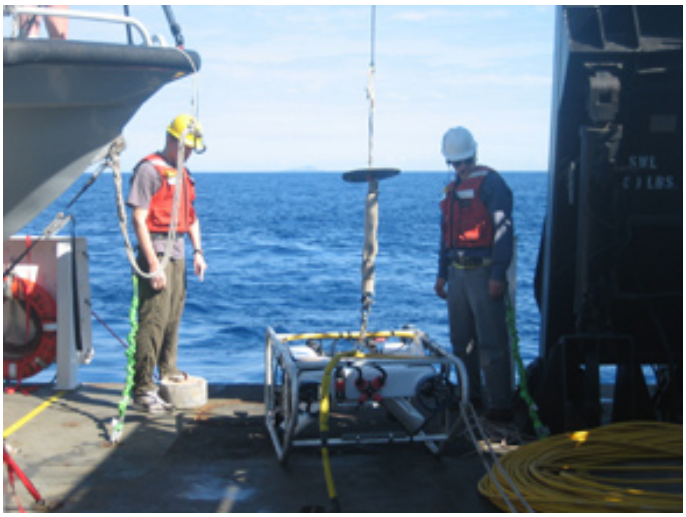
Inside there are two scientific laboratories– the Dry Oceanographic Lab and the Wet Oceanographic Lab. The Dry Lab houses a number of different machines including an Acoustic Doppler Current Profiler that uses the Doppler Effect to measure speed and current, a multibeam transducer to collect survey data and CTD instrumenta

Profiles at Sea: Commanding Office CDR Ralph Rogers

Commanding Office CDR Ralph Rogers

The front end of the ROV. On the left is the strobe. The video camera is located in the center of the frame and the still camera is positioned to the left. There are two headlights to illuminate the seafloor

Members of the science team begin preparing for the launch



Charles Menza and Glenn Taylor attaching the ROV to the winch

tion for water sampling. The Wet Lab contains an uncontaminated seawater system and machines to measure sea surface temperature, as well as software for navigation line plans.

The entire operation is powered by 1250 hp engine. A pair of Z-Drives turns the propeller and enables 360° steering. The vessel is staffed with highly trained engineers and crew responsible for engine maintenance. Navigation takes place four decks above the engine room in the bridge. There the commanding officer and other crew members track the position of other vessels, steer the ship and oversee all ongoing operations.

For more information on the R/V Nancy Foster, visit: http://www.moc.noaa.gov/nf/

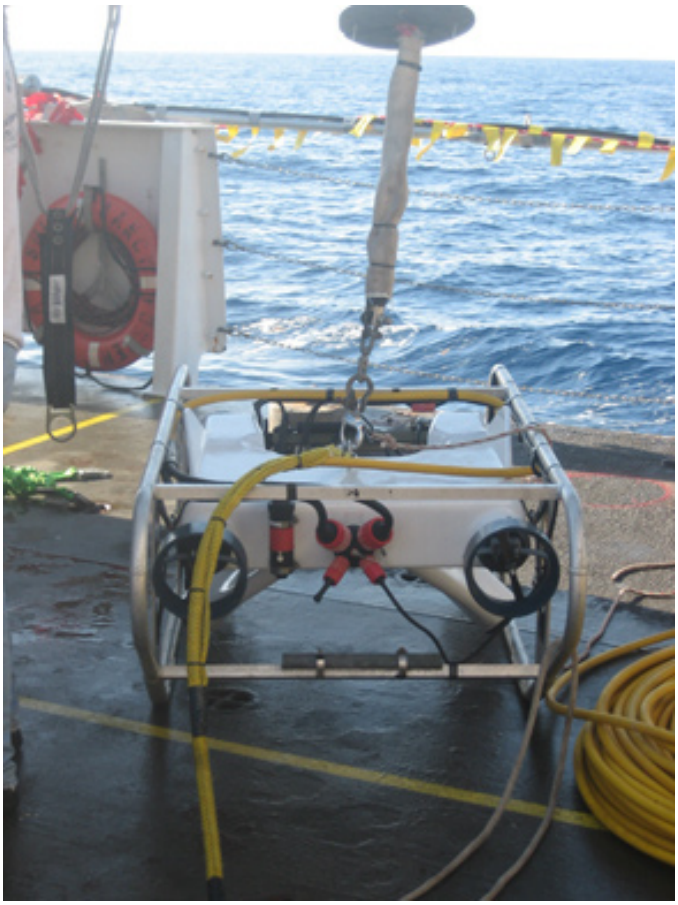
The control and monitoring station of the ship

Remotely Operated Vehicle (ROV) Launch
Earlier scientists and crew launched the ROV to collect video images of the seafloor. Its name says it all; a ROV is a remotely operated device that houses a video camera, a still camera and a strobe. Once the ROV is deployed, video images that allow the operator to see what the ROV is seeing are transmitted to a console. A ledger on the console displays the depth, time and direction on the screen. From there, the operator uses a joy stick to navigate along the seafloor. As the ROV makes its way, still pictures of the underlying habitat are captured approximately every minute. This allows scientist to later produce a quantities analysis of cover type.

Tim Battista and Lance Horn setting up the ROV console

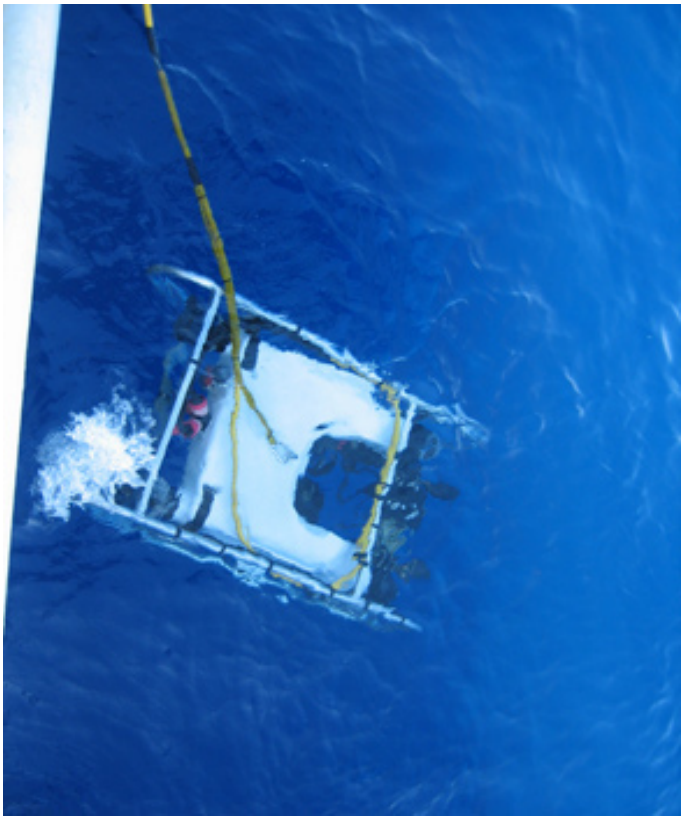
Bridge crew members (from left to right) Marc Weekley, Dave Brown and Dan Simon

Charles Menza and Laura Kracker testing the echo-sounder



The Remotely Operated Vehicle being prepped for launch

The captain's chair



ROV at the surface, shortly after being lowered

The main switchboard controls all power on the ship

Web Update
Day 3: 02/27/2008

Media Day

Biogeography Branch scientists and research partners invited national and local media, area fishermen, as well as scientists from the Department of Natural and Environmental Resources of Puerto Rico, the Caribbean Coral Reef Institute and other organizations to join them for the day to learn how seafloor characterization data is collected. More than 20 people participated.

Attendees were taken to the R/V Nancy Foster where they were greeted by Principle Investigator Tim Battista and Biogeography Branch Chief Mark Monaco. Following quick introductions and a safety briefing, the day got off to a start with an overview of acoustic seafloor mapping and multibeam operations.

After lunch, the group moved outside to the main deck and watched Remotely Operated Vehicle (ROV) operators Glenn Taylor and Lance Horn deploy the device. Once back in the wet lab, everyone gathered around the console to watch real-time footage of the ROV drifting over the seafloor. At one point a large barracuda came into view. There were also barrel sponges, brain coral, sea fans, a ray and numerous fish. As the ROV came upon the more structurally complex areas, more organisms came into view.

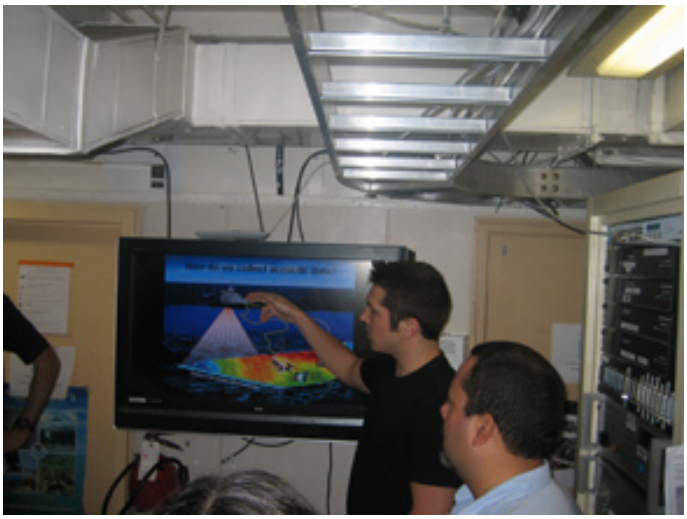
Following the ROV demonstration Laura Kracker, a geographer with NOAA Center for Coastal Environmental Health and Biomolecular Research, explained how underwater acoustic surveys are used to collect information on the distribution of fish over time and space.

With the science demonstrations done for the day, it was time for a tour of the R/V Nancy Foster. The 20-minute tour included a walk through of the bridge, bunks, mess hall, science/computer laboratories and entertainments spaces on the ship. With that Media Day concluded and participants were launched back to shore.

Profiles at Sea: Marc Kagan

Mark Kagan, video director and producer for NOAA

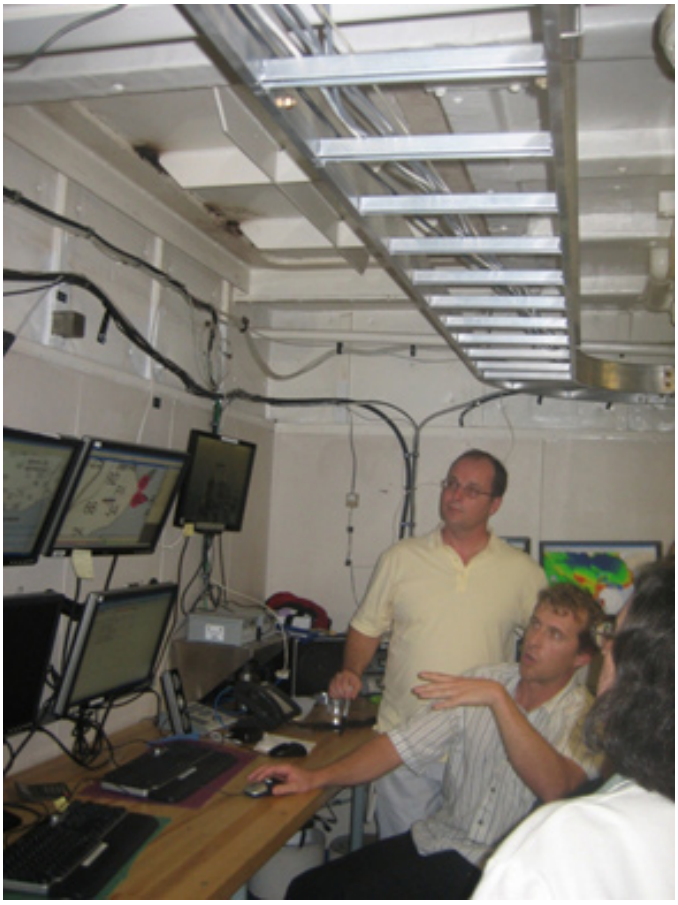
Glenn Taylor (UNCW/NURC) explains ROV operations to provide seafloor imagery to groundtruth acoustic data collected.



Bryan Costa of NOAA's Biogeography Program explains multibeam collection for seafloor mapping.

Mark Monaco (NOAA's Biogeography Program, Branch Chief) explains Biogeography Program's integrated seafloor mapping and biological monitoring approach to visiting scientists, media, resource managers and Puerto Rican fisherman.

Glenn Taylor (UNCW/NURC) explains ROV operations to provide seafloor imagery to groundtruth acoustic data collected.



Mike Stetcher (Solmar Hydro) and Ed Owens (NOAA's Atlantic Hydrographic Division explain multibeam collection for seafloor mapping onboard the NOAA ship NANCY FOSTER.

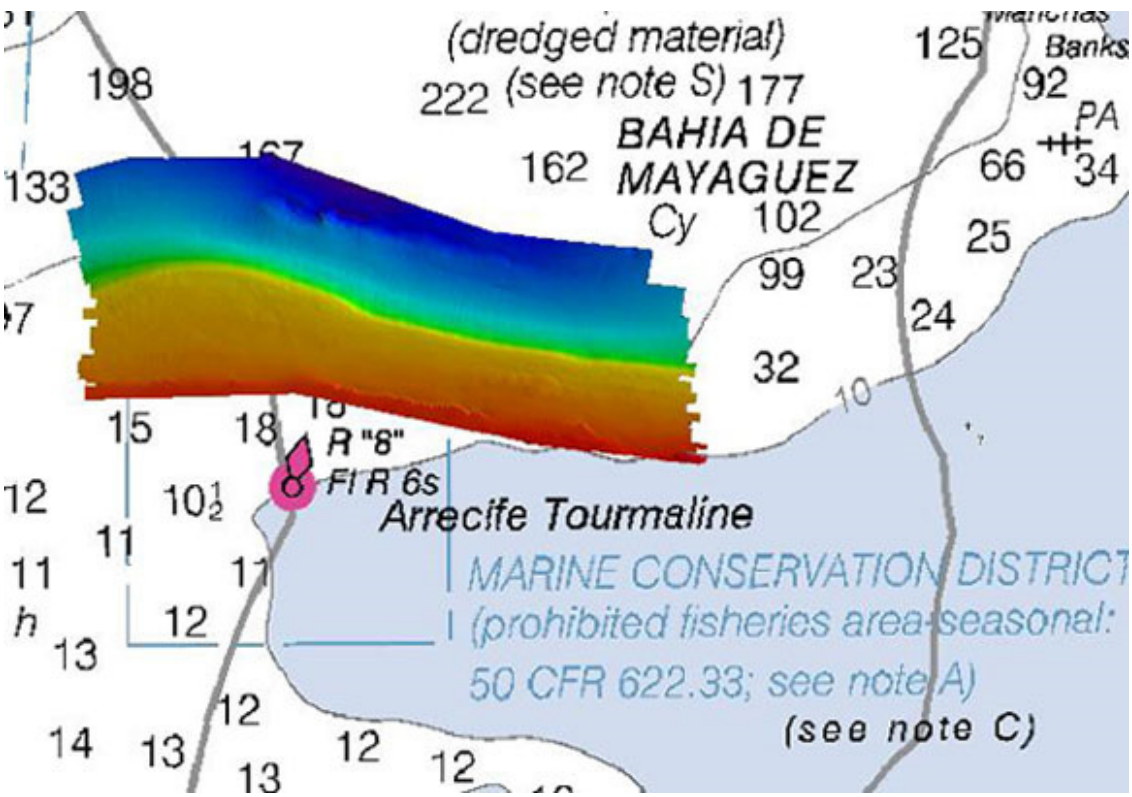
Web Update
Day 4: 02/28/2008

Research Resumes

After an exciting media day, scientists resumed collecting data for the mission. The first priority was to conduct comprehensive seafloor mapping of the area surrounding Tourmaline Bank conservation area. The Bank is located near the city of Mayaguez and along the western insular shelf of Puerto Rico. Acoustic multibeam data was collected from 17 meters (red color shading) to 325 meters (blue color shading) water depth. This complements the shallow water bathymetric LiDAR data NOAA collected in 2006 covering the shallow water extent of the conservation area (0 to 30 meters). We now have collected complete high resolution bathymetry for the entire Tourmaline Bank conservation area (delineated by the blue box on the underlying NOAA nautical chart).

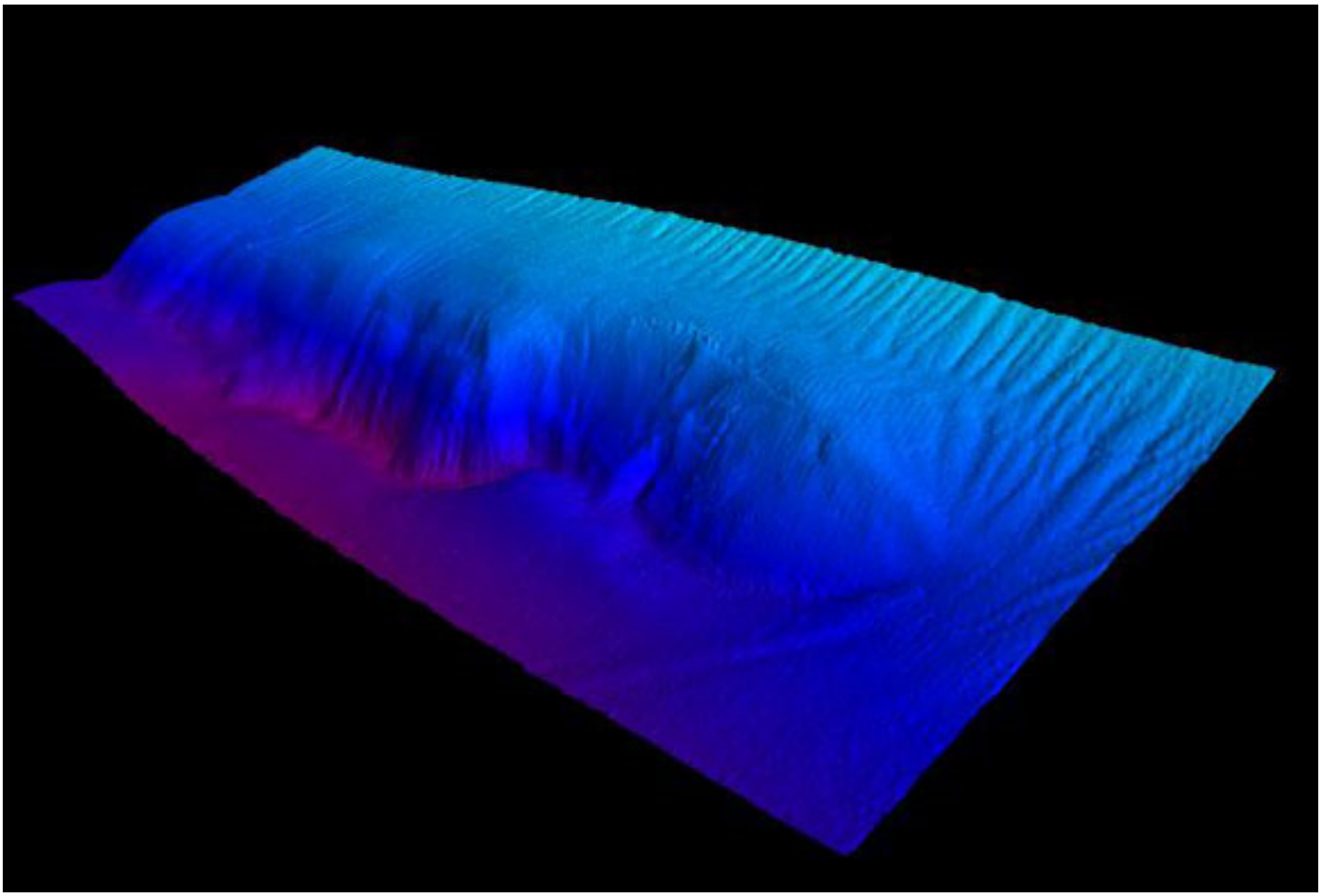
Profiles at Sea: Tim Battista

Tim Battista is a Biological Oceanographer and Chief Scientist for the Puerto Rico seafloor mapping mission.



Seafloor topography mapped for Tourmaline Bank conservation area and beyond

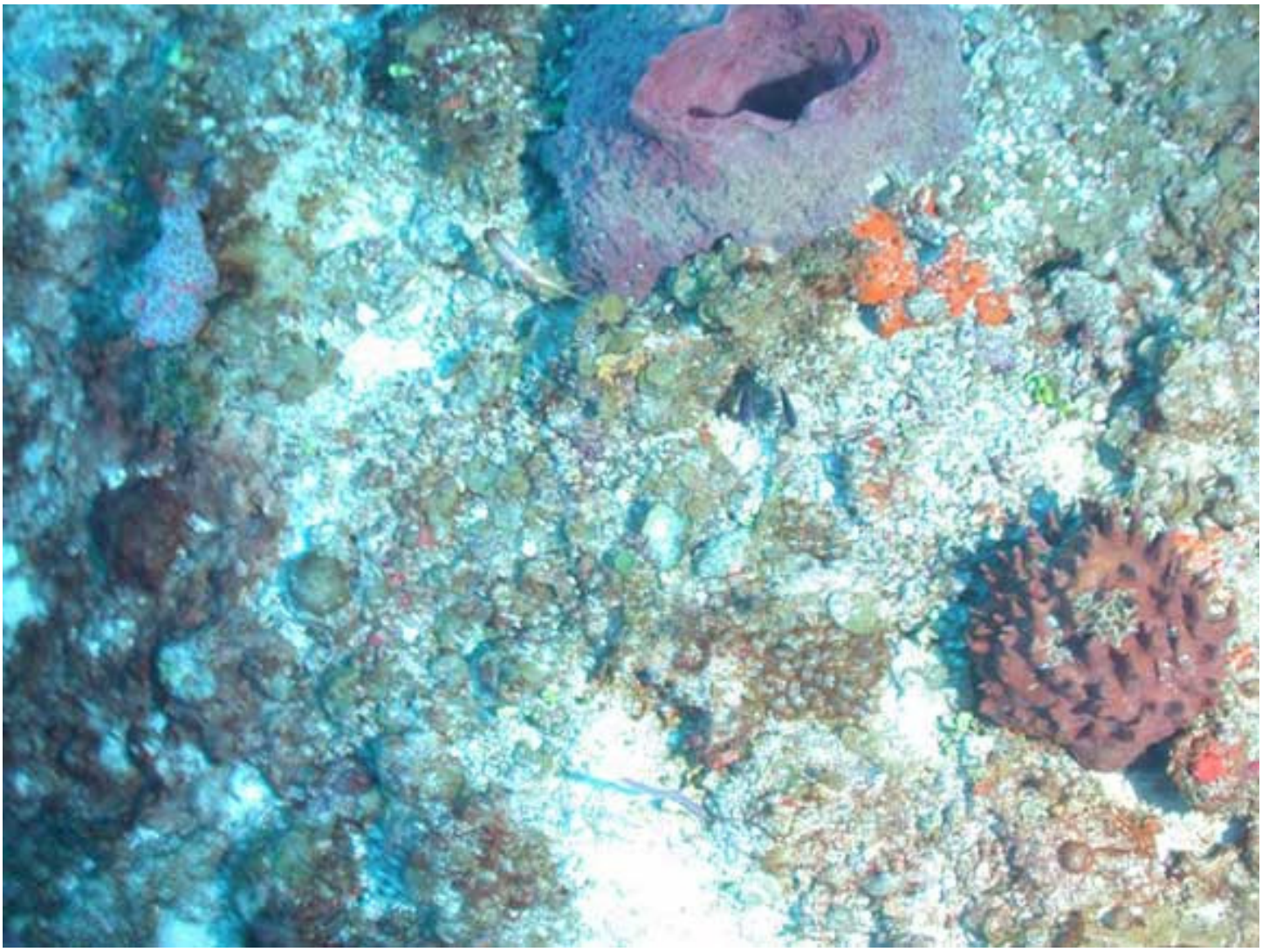
The multibeam survey revealed a very interesting topographic feature just beyond the shelf edge (green color shading) and just north of the conservation area boundaries. The documented terrain indicates a steep slope adjacent to a distinct series of parallel rills running north south. A number of seafloor protrusions are evident along the top edge of the feature. The biological importance of this feature for fish aggregations has yet to be determined.



3-d depiction of interesting Tourmaline Bank seafloor feature

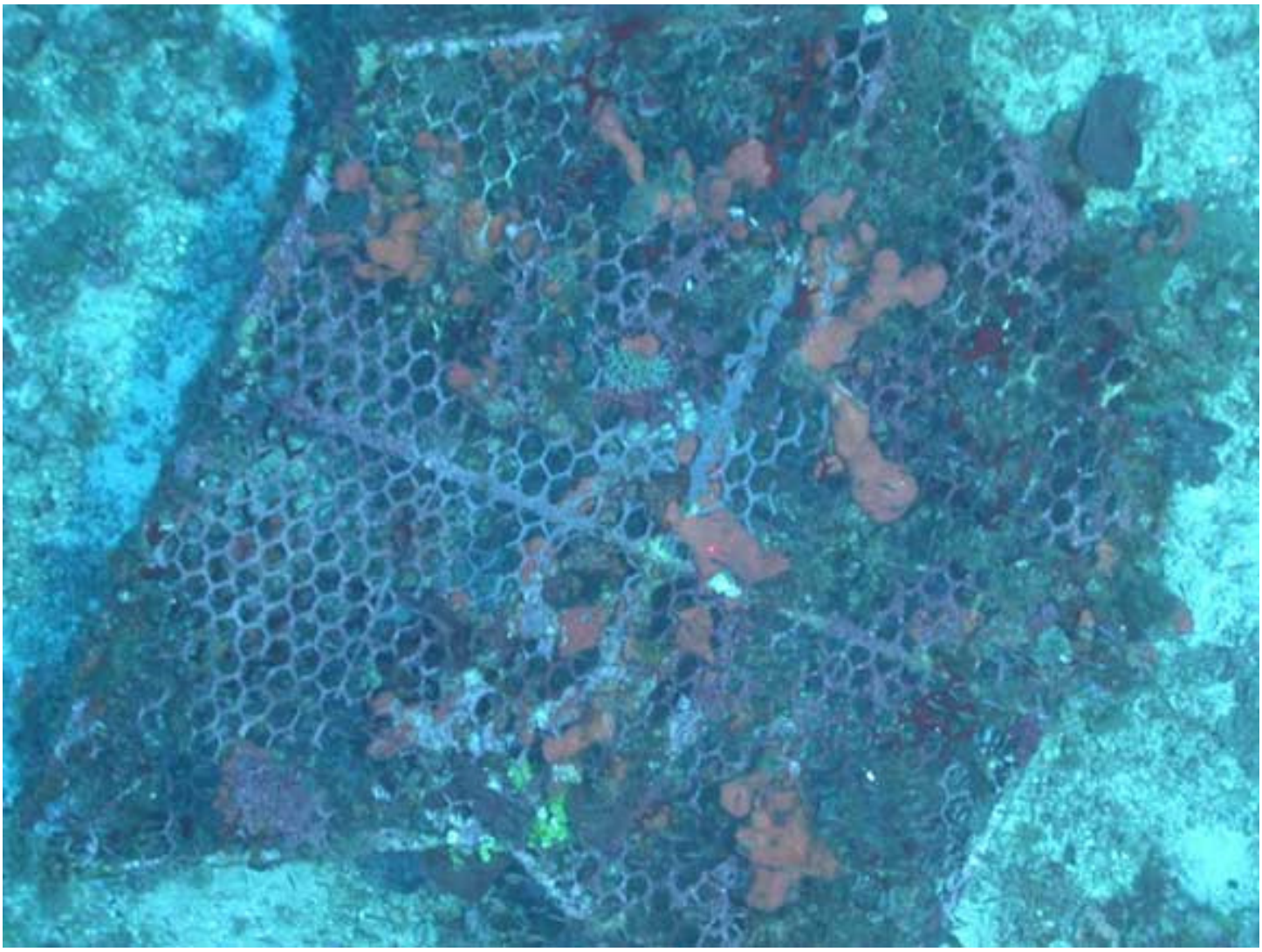
Additionally, the remotely operated vehicle (ROV) spent the day collecting images of the seafloor on Tourmaline Bank. The images revealed a plethora of benthic habitats inhabited by corals, fish, sponges, and algae.

Many of the habitats traversed by the ROV were at moderate depths (20-40m). Although many coral species were seen, algae and sponges were the most dominant bottom cover types. Algae, which were generally short and bushy, waved back and forth with underwater currents. Barrel sponges protruded amongst the algae, offering fish shelter from the strong currents and potential predators, like the macabre barracuda encountered throughout the day.



Seafloor habitat imagery Tourmaline Bank

Several Red Hind, a species which is frequently fished off the shores Puerto Rico, were observed hiding among sponges. This species is protected on Tourmaline Reef, because it is known to aggregate and spawn here. During routine transects of the seafloor, the ROV observed several old fish traps. These traps were covered by sponges and their doors were open. Many old traps are known as ghost traps, because they continue to kill fish long after they have been forgotten or lost. Thankfully all of the traps we found were broken and incapable of capturing fish.



Ghost fish trap Tourmaline Bank

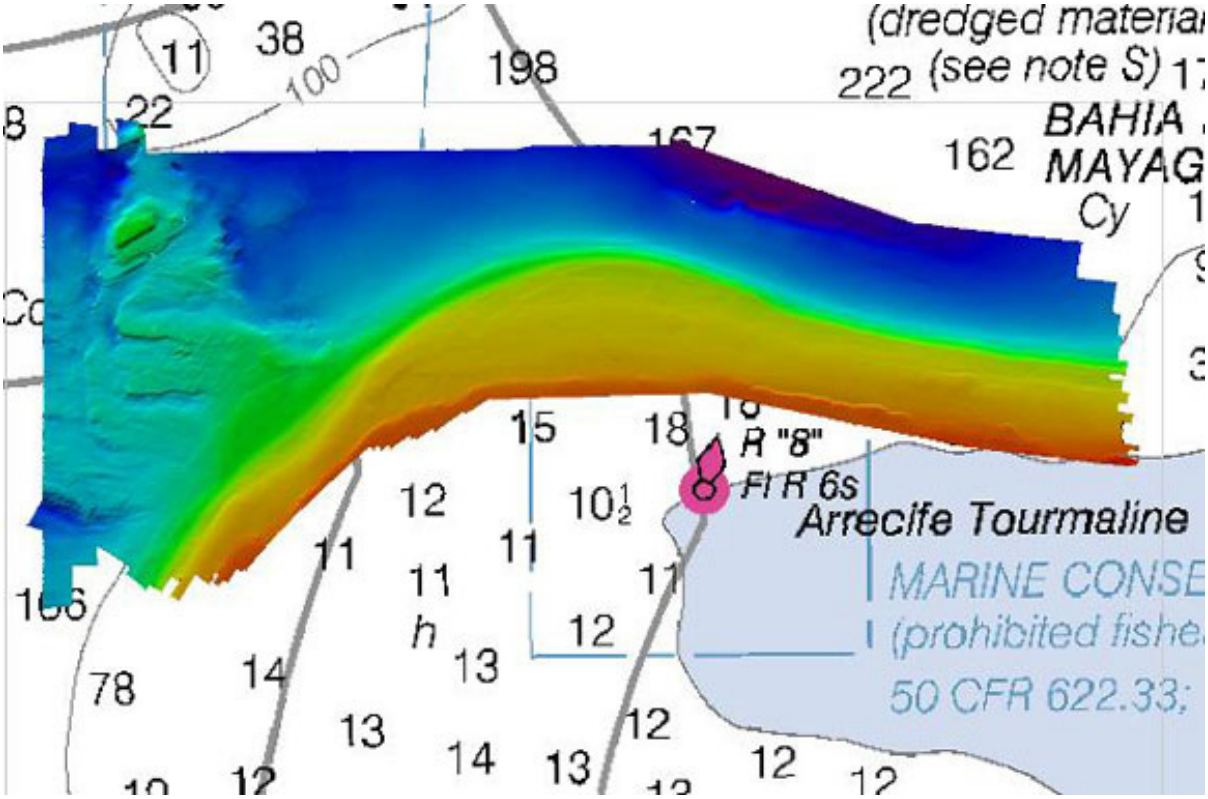
Web Update
Day 5: 02/29/2008

Tourmaline Bank Complete

The crack multibeam teams worked throughout the night to accomplish significant coverage, closing out the Tourmaline Bank “proper”. Data collected to date encompasses 88 square kilometers of bank shelf and beyond. The data provides high resolution seafloor topography to connect the Tourmaline Bank conservation area and Bajo de Cico conservation area, completed in 2006.

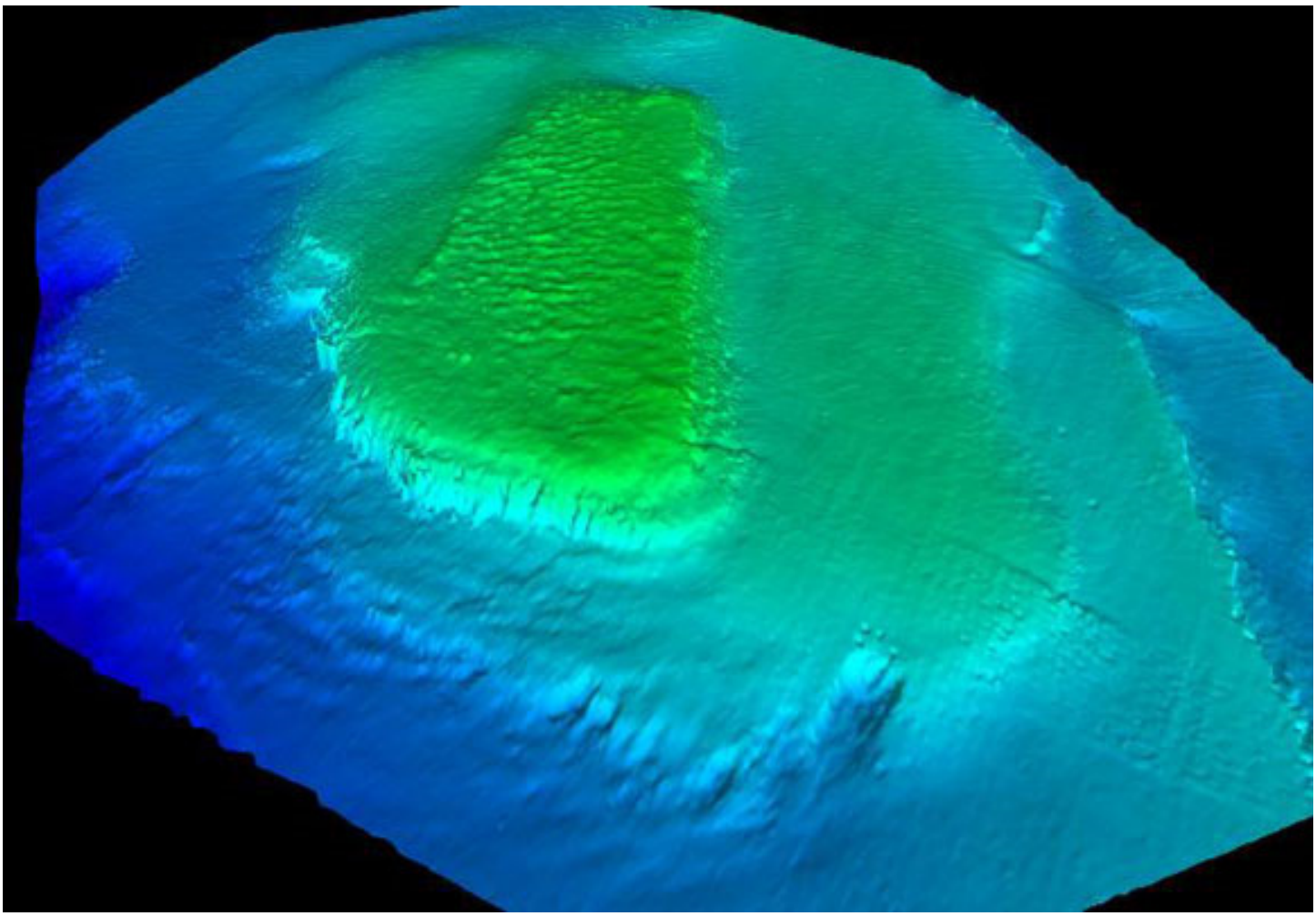
Profiles at Sea: Charlie Menza

Charlie Menza: Marine Scientist, Biogeography Branch



Multibeam coverage completed for Tourmaline Bank

Survey operations revealed an interesting seafloor feature located due south of Bajo de Cico. The semi-rectangular plateau was revealed for the first time in high detail resolution with distinct ledges visible on multiple sides. The depth rises up to 300 feet.



Unnamed plateau due south of Bajo de Cico

The ROV operators finished collecting groundtruth data for the shallowest portions of Tourmaline Bank. Along several ROV transects macroalgae was the predominant cover. Occasionally, patches of coral and sponges were observed. These patches generally had a high diversity of invertebrates and fishes in an area the size of a car tire. Patches with holes for fish to hide in were especially diverse.

Tourmaline Bank sea life

In addition to sponges and coral patches, several sand tilefish mounds were found among vast expanses of sand and fleshy macroalgae. The mounds were composed of algal nodules (rhodoliths) and other gravel-sized hard material accumulated by the sand tilefishes. To get images of the mounds, the ROV had to hover directly above its target in sometimes screaming currents. Of course, the sand tilefish did not remain near their homes. They could be seen lurking in the periphery of view, keeping a watchful eye on the ROV.

Organisms such as coral and sponges, which required a hard substrate for attachment to the seafloor, take advantage of the sand tilefish's work. They attach to the accumulated material. By doing this, they enhance the mound's stability and provide habitat for other organisms.

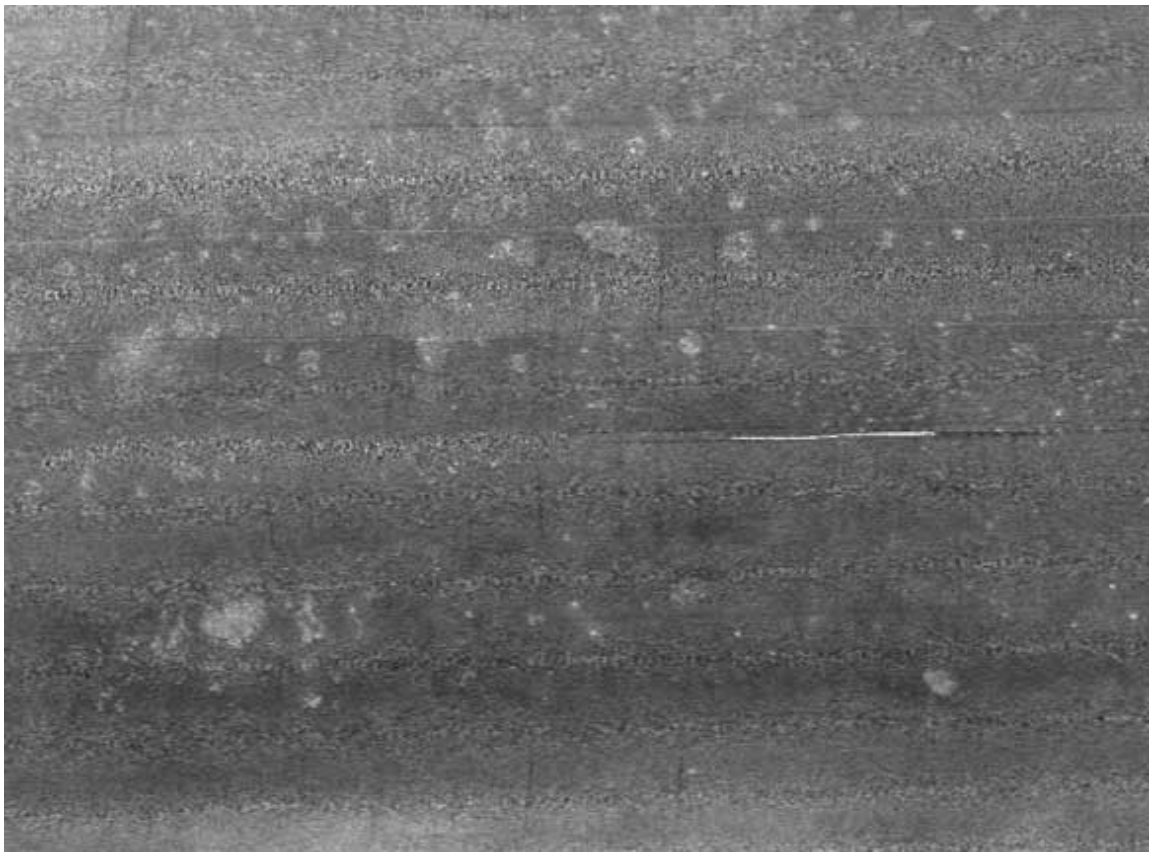
Tourmaline Bank mound feature

Web Update
Day 6: 03/01/2008

Advanced processing of the multibeam backscatter intensity using UNH/JHCOM Geocoder software easily reveals distinct biological seafloor features. The groundtruthing scientists were inquisitive about what these could be. Using the underwater Remotely Operated Vehicle (ROV), the scientists were able to precisely locate and image these anomalies located on Tourmaline Bank.

Profiles at Sea: Mike Stetcher

Mike Stetcher: Lead Hydrographer, Solmar Hydro

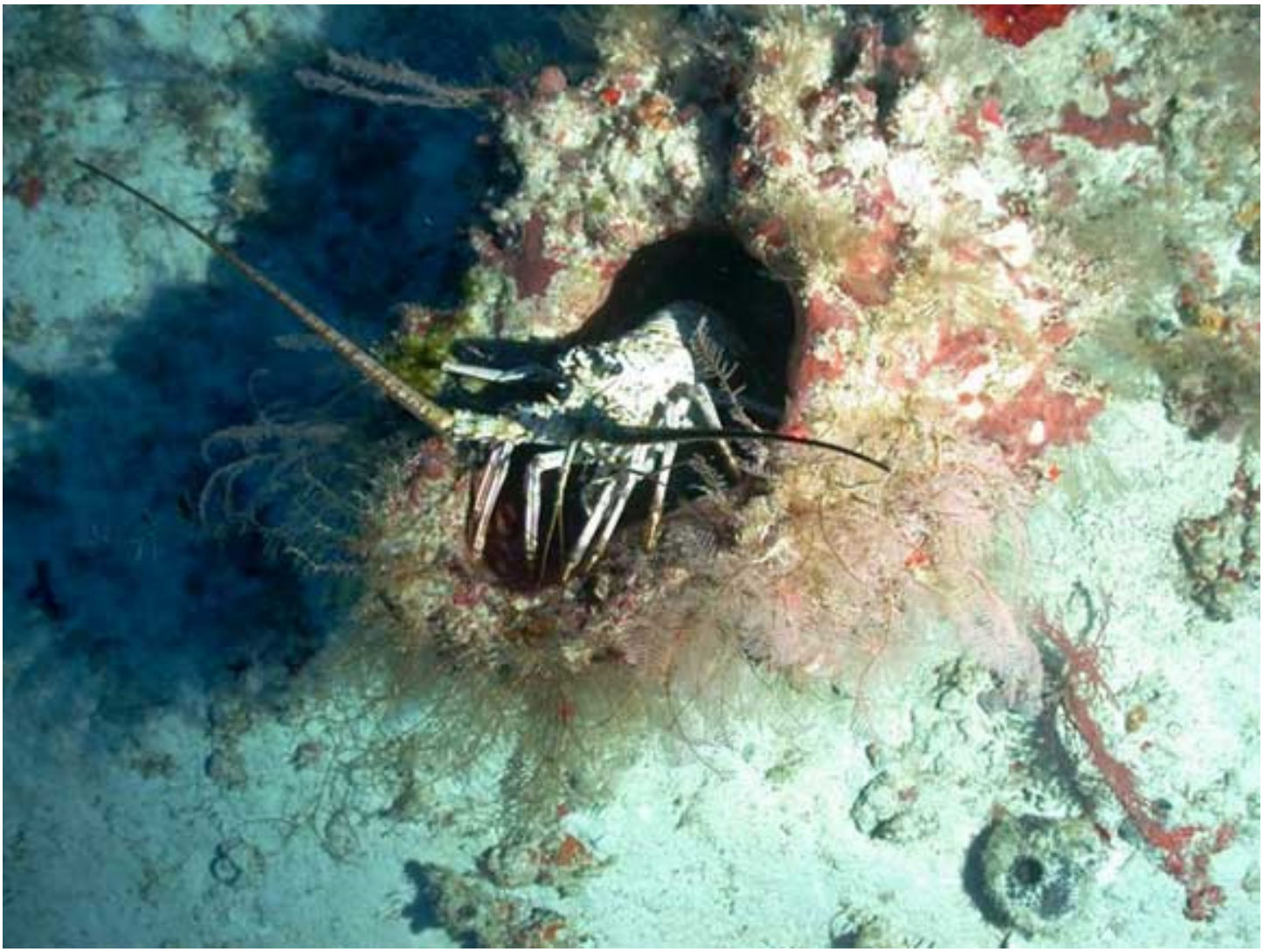


Multibeam backscatter intensity data collected for Tourmaline Bank

Patches of hardbottom structure among sand or mud bottoms are clearly seen in the backscatter data as conspicuous white patches within a black matrix. These patches are important to map because they are used by many fish species, some of which are part of the Puerto Rican fishery. We found grouper and snapper commonly associated with small hardbottom patches, even though patches may be surrounded several hundred meters of sand on all sides.

Tourmaline Bank barrel sponge and associated fish

In one instance we found a very curious lobster within a large sponge looking up at us. The lobster was unafraid. As we passed overhead with the ROV and snapped a few pictures, the lobster approached us and wiggled its antennae inquisitively. It was an enormous lobster and to see it pose as it did was remarkable.



Tourmaline Bank barrel sponge and spiny lobster

Web Update
Day 7: 03/02/2008

The Day of Reckoning

The ROV underwent hours of surgery to attempt to resuscitate it from its incapacitated state. Multiple points of failure required ROV "Master and Commander" Lance Horn of UNCW/NURC to wield the blunt scalpel. With great remorse, Lance removed 100ft of bad cable reducing the overall cable length to 600ft. Would the invasive removal be successful? The scientists waited with baited breath, while resuming the multibeam activities in the interim.

Profiles at Sea: Laura Kracker

Laura Kracker is a geographer with NOAA's Center for Coastal Environmental Health and Biomolecular Research in Charleston, SC

The ROV umbilical gets a trim.

Lance Horn and Glenn Taylor re-terminate the ROV cable so as to reconnect cable wires used to control the vehicle after severing. This requires many hours or meticulous work. They instilled confidence to the scientists that the vehicle would be back in operation shortly.

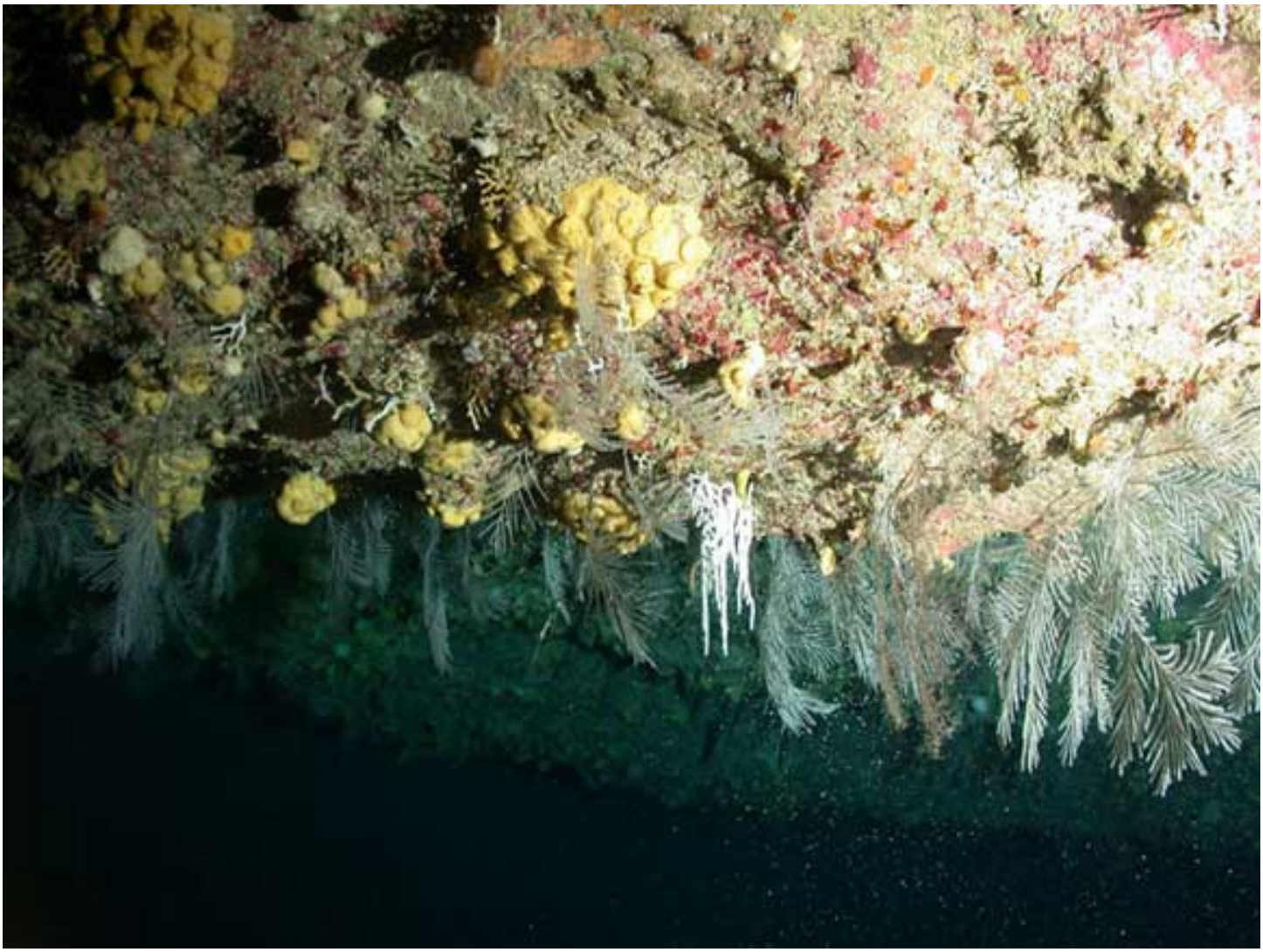
“The Terminators” repair the ROV.

By 4:00 pm, the vehicle was ready for redeployment. There was only time for one final ROV dive at Tourmaline Bank. The scientists chose “Little Bajo” the unofficial name of the feature depicted on Day 5 of the web posts. Their high expectations were quickly realized. The plateau offered a spectacular montage of diverse seafloor habitats with a plenitude of colors and creatures. The elusive Slit shell mollusk, several large yellowfin grouper, arrow head crabs, jacks, snapper, and a plethora of additional deep fish.

Pictures of the seafloor showed a diverse assemblage of seafloor organisms, including sponges which looked like upward pointing tuba horns and red bushy gorgonians. The scientists were most amazed by the abundance of biota covering the seafloor. It appeared as though every possible parcel of real estate was inhabited by some type of sponge or coral. This was especially awe inspiring since the shallowest part of “Little Bajo” is below 400 ft, where a negligible amount of sunlight can reach. Most of the organisms must have fed on the plankton in the water.

“Little Bajo” ledge

“Little Bajo” possessed several escarpments, which rose from depths below the maximum depth of the ROV (>600ft) to the plateau at 400 ft. These escarpments were covered by organisms which did not require light, such as sponges and coral. White gorgonians lined the top of “Little Bajo” like a crown. They extended their long appendages into the surrounding water in attempt to capture as much plankton as possible.



Little Bajo” sealife cornucopia

Web Update
Day 8: 03/03/2008

Mona Island dazzling diversity

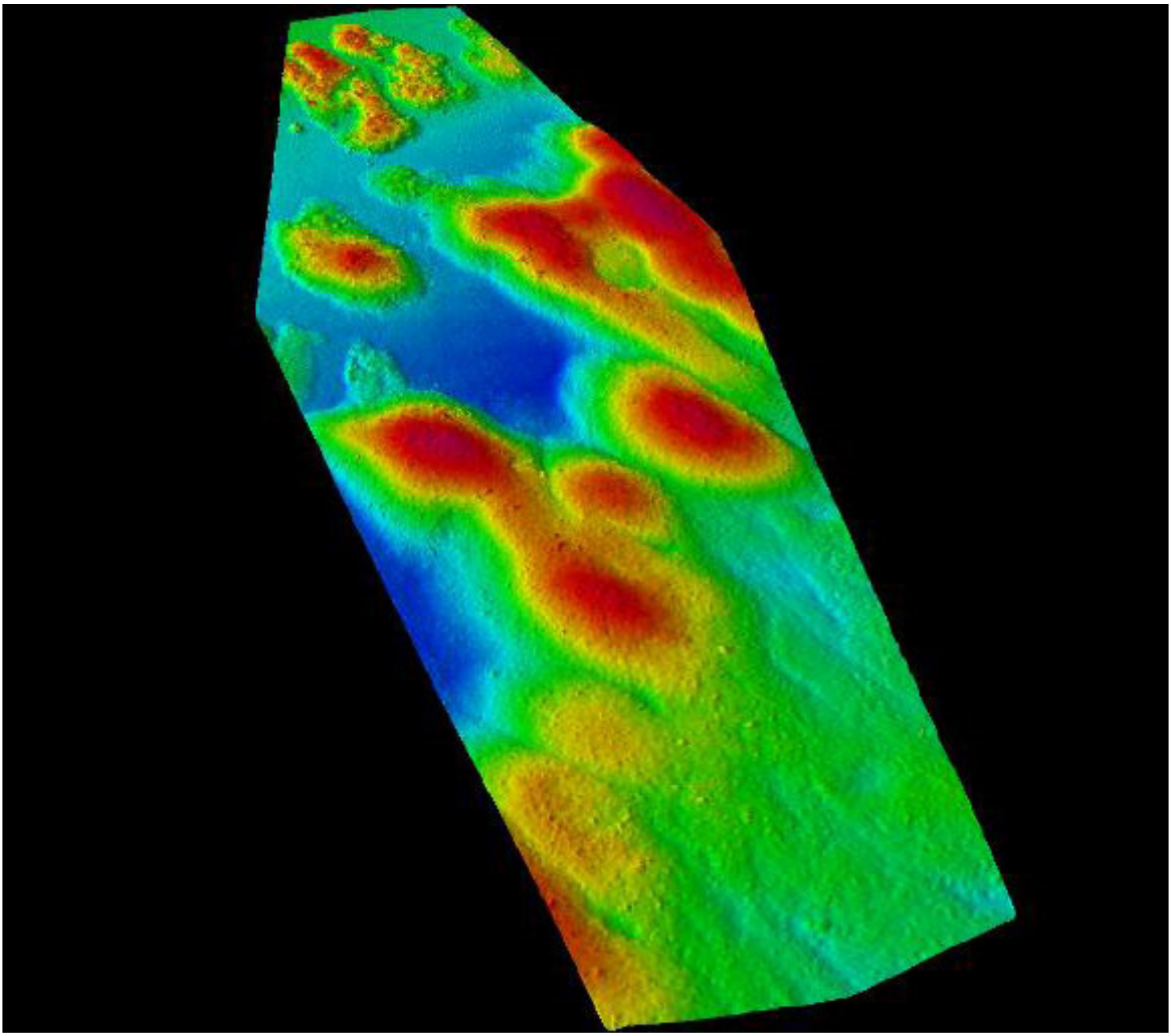
The NOAA ship NANCY FOSTER transited two hours west to begin exploration of the mid-water of Mona Island. Much of the south shore had been mapped in 2006, but the remaining circumference offered intriguing unknowns to be ascertained. Towering cliffs fortified the perimeter, interspersed with mysterious caves, lending convincing credibility to notorious tales of Captain Kidd's foray to the island in the late 1600's during the "privateering" era and as popular rum smuggling hideout during Prohibition.

Profiles at Sea: Bryan Costa

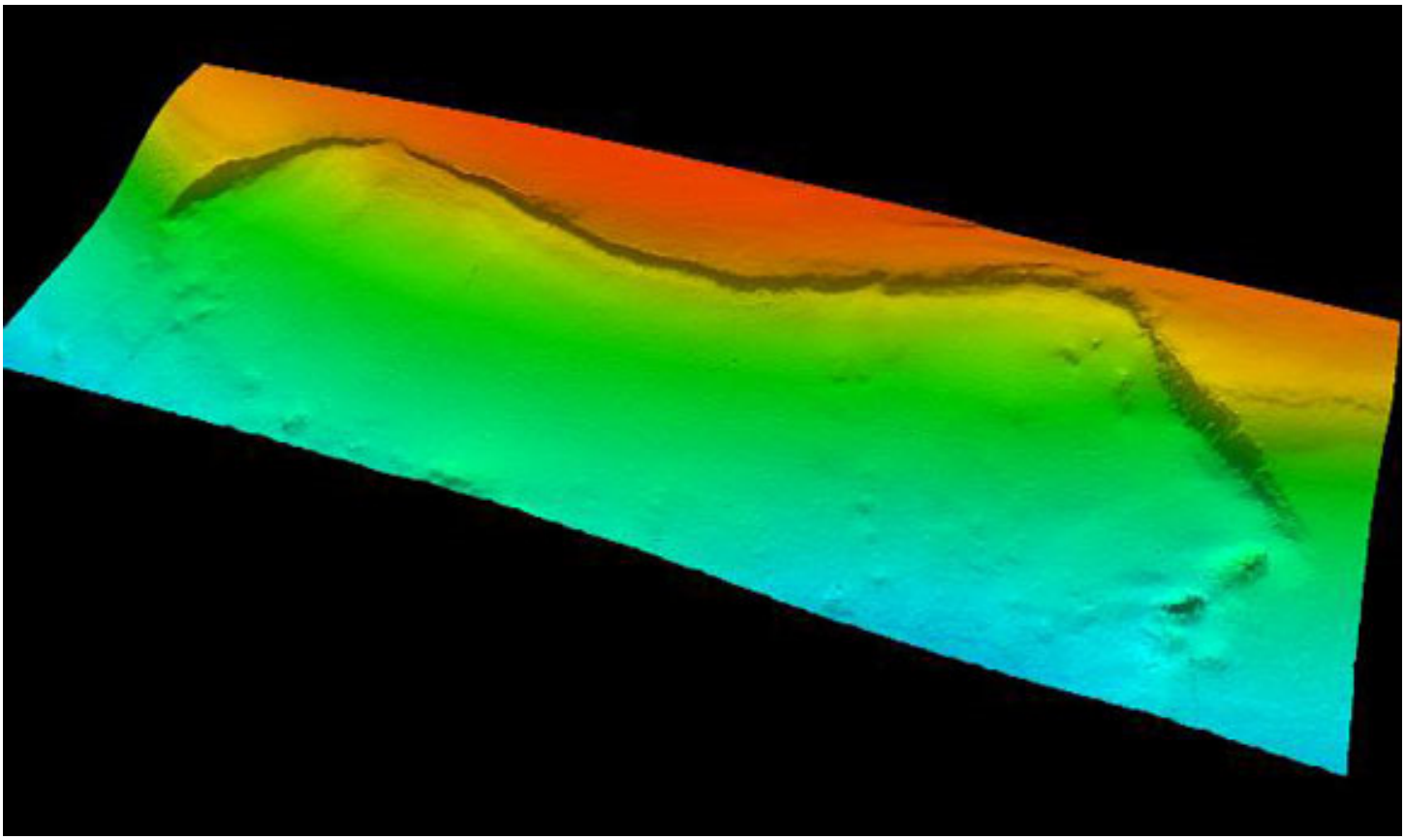
Bryan Costa is a Geospatial Scientist for the Biogeography Branch

Mona Island cliff caves

Equally as alluring as the terrestrial topography, the seafloor offered the full spectrum of variable conditions - steep wall dives, deep giant rock outcropping, flat plains, and texturous nearshore. The western shore was the focus of today's activities. Choosing ground truthing sites for using the ROV was challenging in so much as trying to narrow the multitude of possibilities to a manageable few. A few examples of those mapped by the multibeam that were chosen for further exploration.

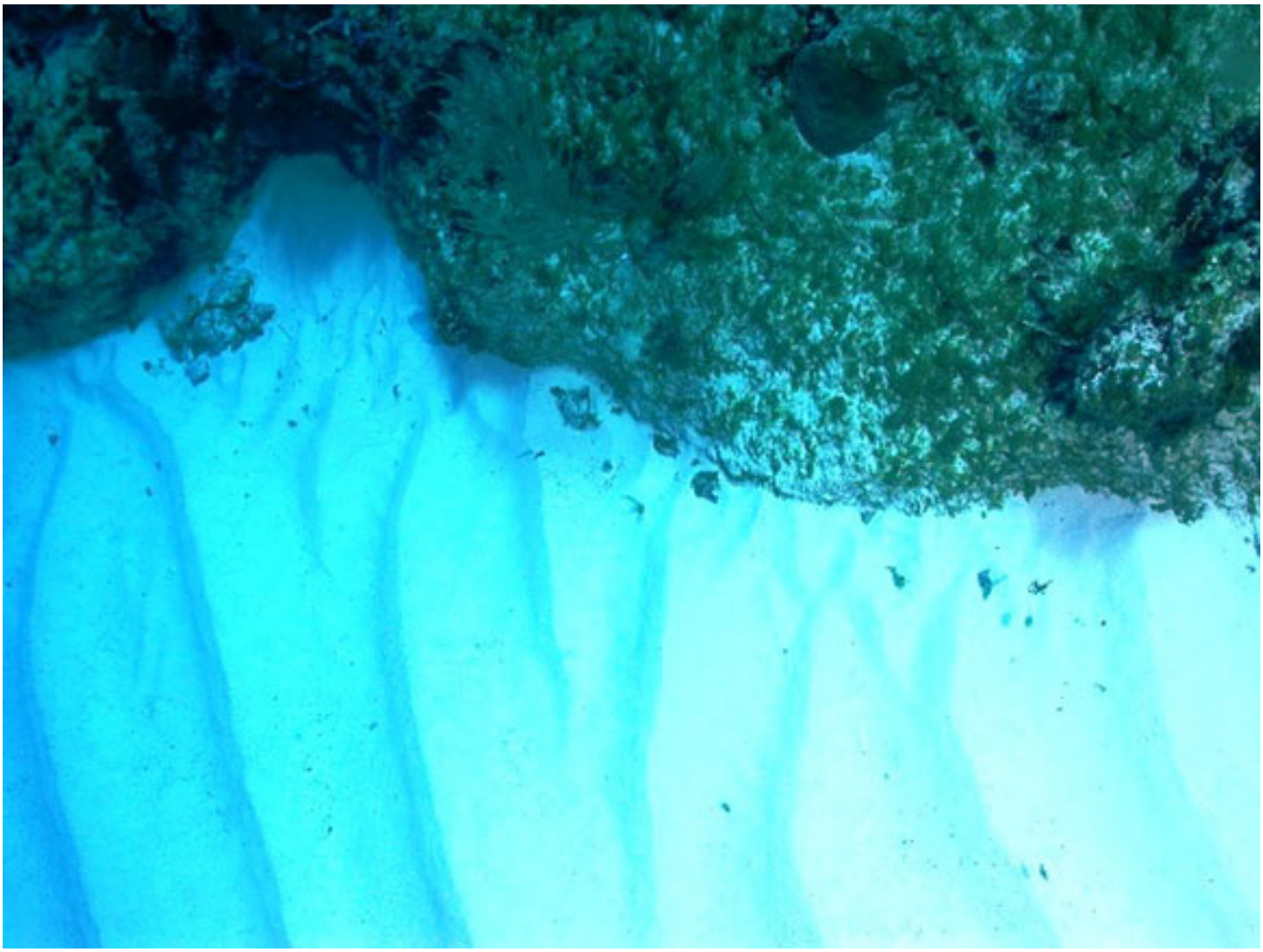


Patch reef mosaic



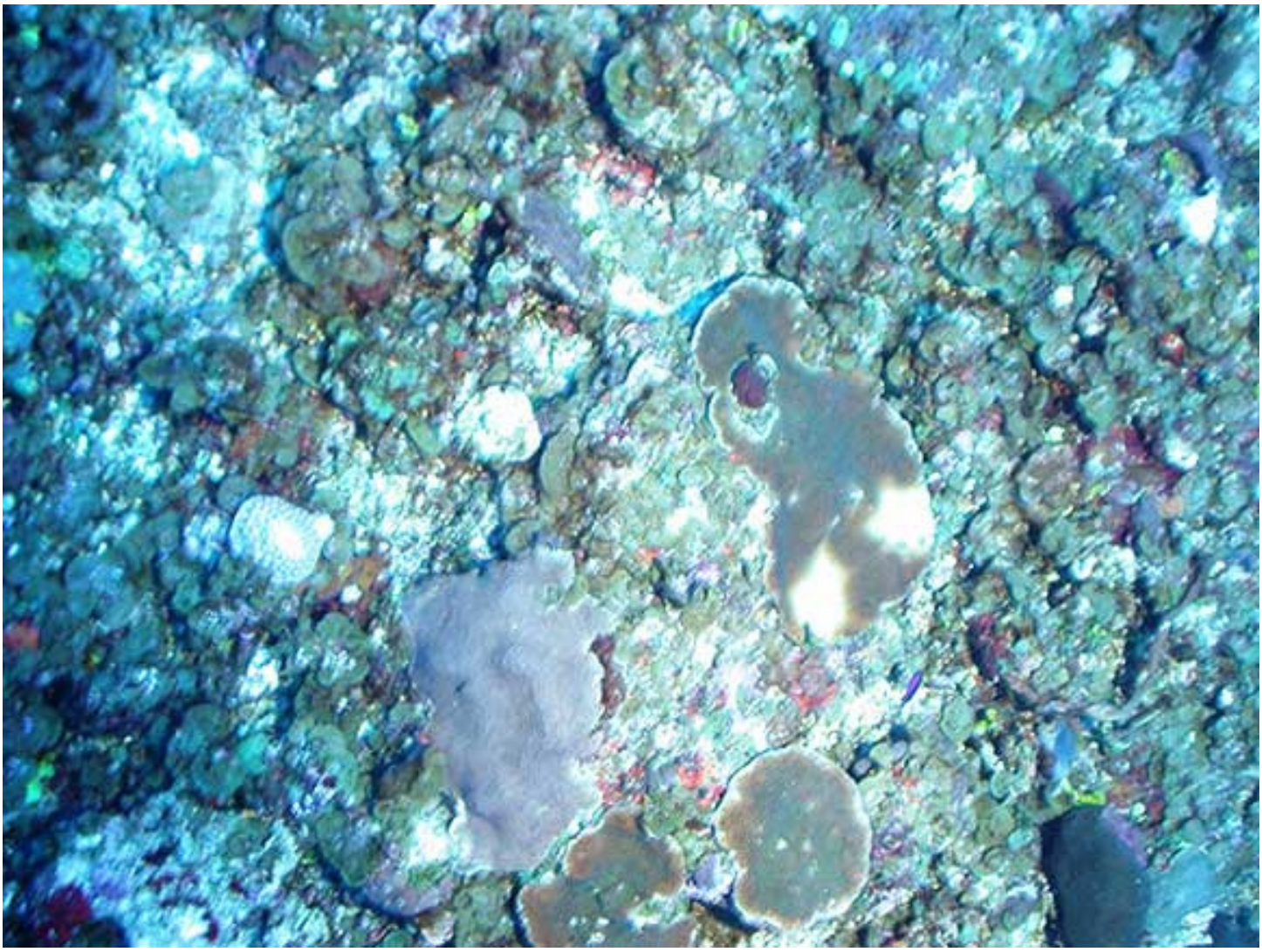
Mona Island seafloor ledges

The pictures of the seafloor we collect fall into two broad categories, those which are systematic and those which are targeted. Systematic pictures are used to provide an unbiased estimate of measured items such as biological or substrate cover. We take systematic pictures every minute no matter where we are along the transect. This ensures the camera man isn't taking pictures of the best or the worst areas consistently. Targeted pictures are used by the map maker to identify key areas in the map. For instance, we target the transition zone among habitats so that the map maker knows the precise location of where habitats changes occur.



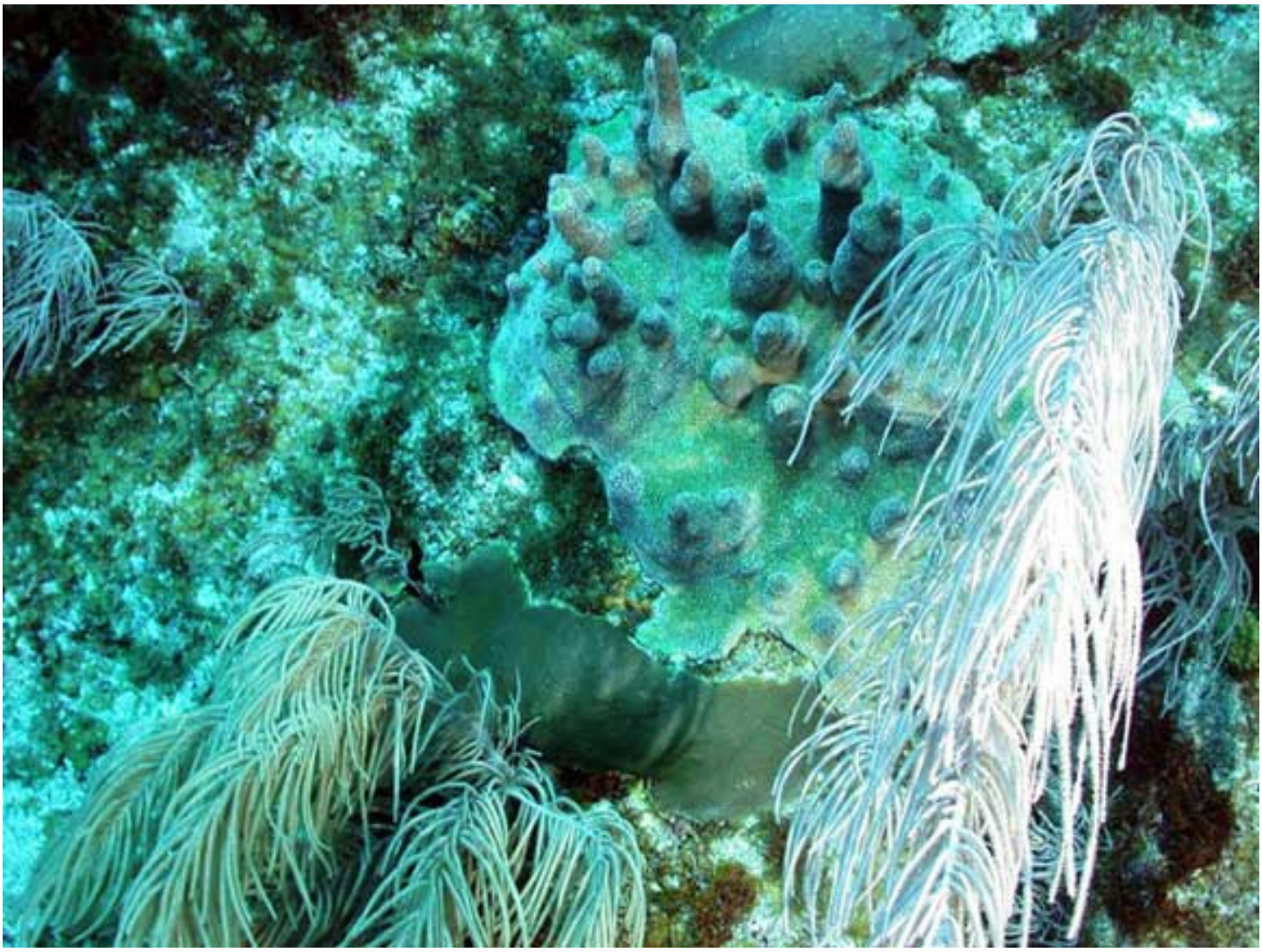
Stark seafloor habitat transitions

So far we have been impressed with the amount of coral and coral health we have observed at Tourmaline Bank and Abrir la Sierra Bank and surrounding Mona Island. Whenever coral disease is observed we take a photo. These photos can then be sent to coral specialists so that they can identify the coral, sometimes the disease and if needed compile data from several studies to determine ecological patterns.



Mona Island diseased coral

Occasionally, we come across something that we have never seen before. One of our photos showed numerous protuberances, some 10 cm tall, emerging from a plate coral. The coral seems more of another world than ours. The protuberances have not been seen in any other pictures we have taken.



Pillar coral

Web Update
Day 9: 03/04/2008

A taste of terra firma

Scientist, crew and officers mounted a foray to the beach head for a few hours of reprieve from the mapping efforts. While a core crew remained onboard to continue ROV operations, the remainder willingly chose to hit the beach for snorkeling, chance encounters with the endemic Mona iguana, and excessive UV exposure.

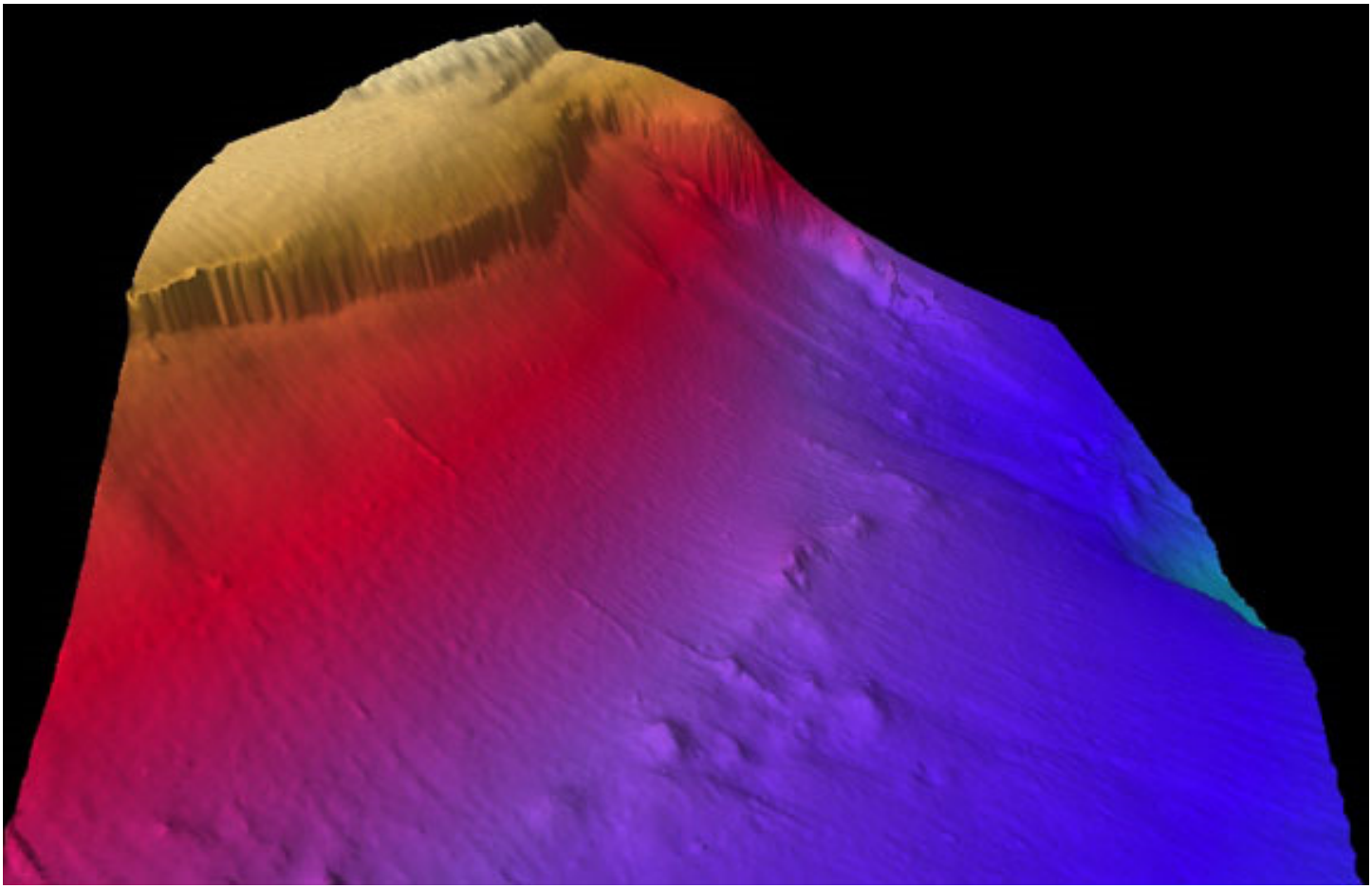
Profiles at Sea: Ed Owens

Ed Owens: Hydrographer, NOAA Atlantic Hydrographic Branch

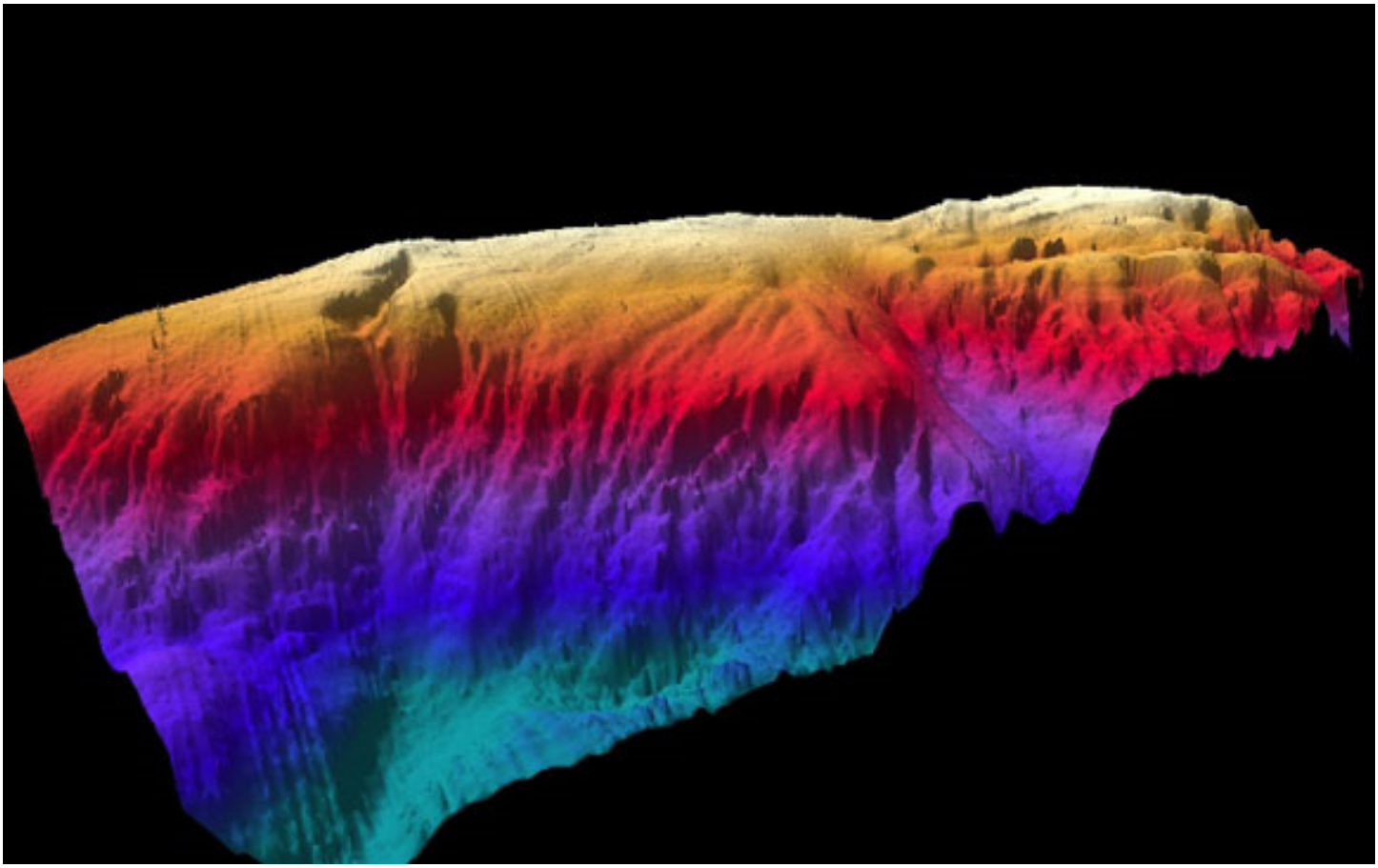
Scientist foray to the beach

Multibeam operations continued to battle increasing long period ocean swell out of the north. The recently procured multibeam room chairs with wheels prove to be projectiles in constant motion. Maybe not the best choice for a ship. Despite the conditions, we continue to make steady progress on our objective to map from 10 to 100 fathoms. As always the shallows prove to be the challenge. The multibeam swath is directly proportional to water depth. (swath width equals three times water depth). Thus a narrow swath in the shallow, compounded by steep water depth drop off on the north side means the ship has to operate very close to shore. The ship cautiously and prudently conducts these inner most survey tracks during daylight. At times, the cliffs are but a stones throw from the deck.

The following figures reveal some interesting topography from the days activity.

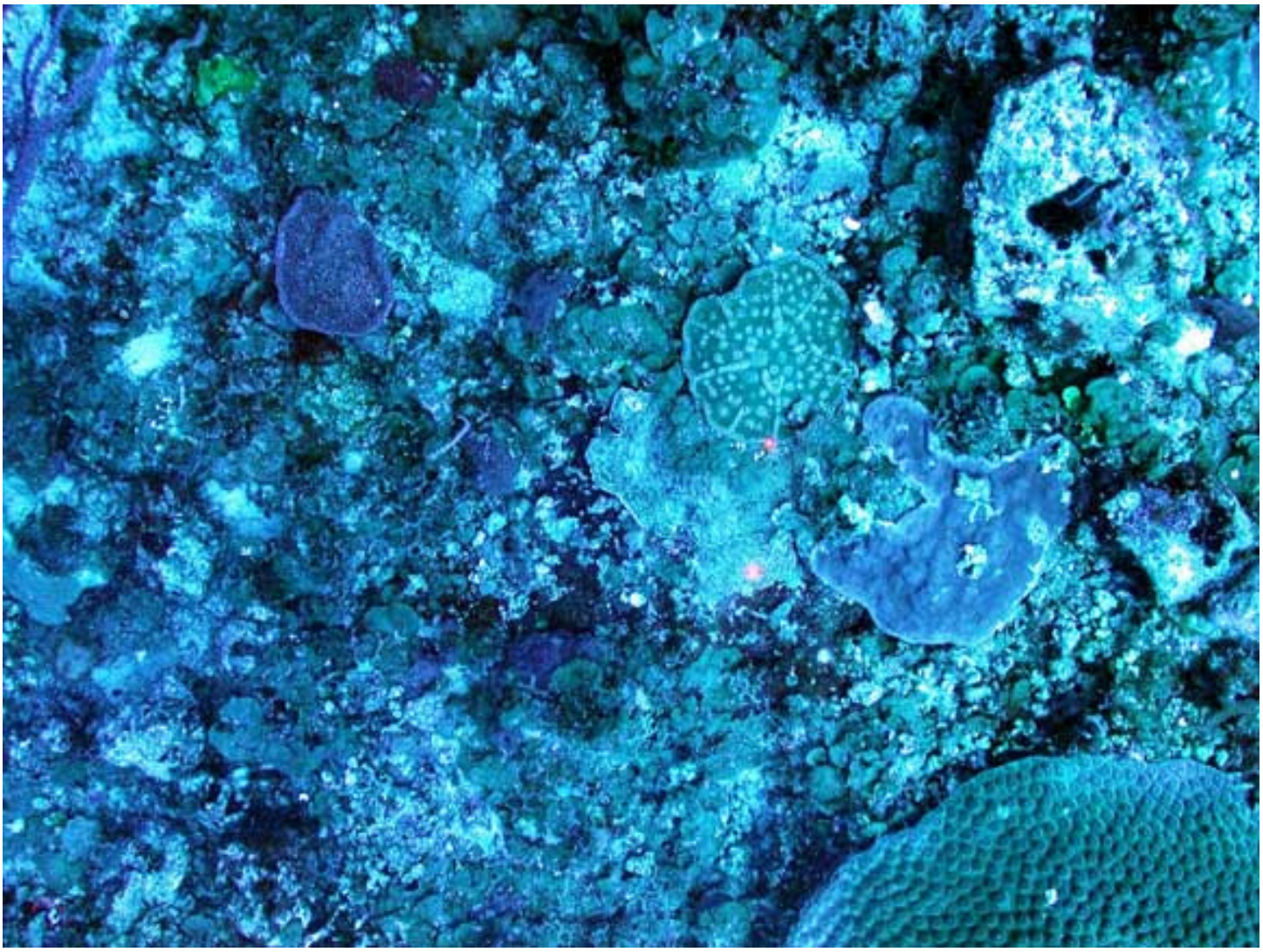


Mona Island topography east side (1)



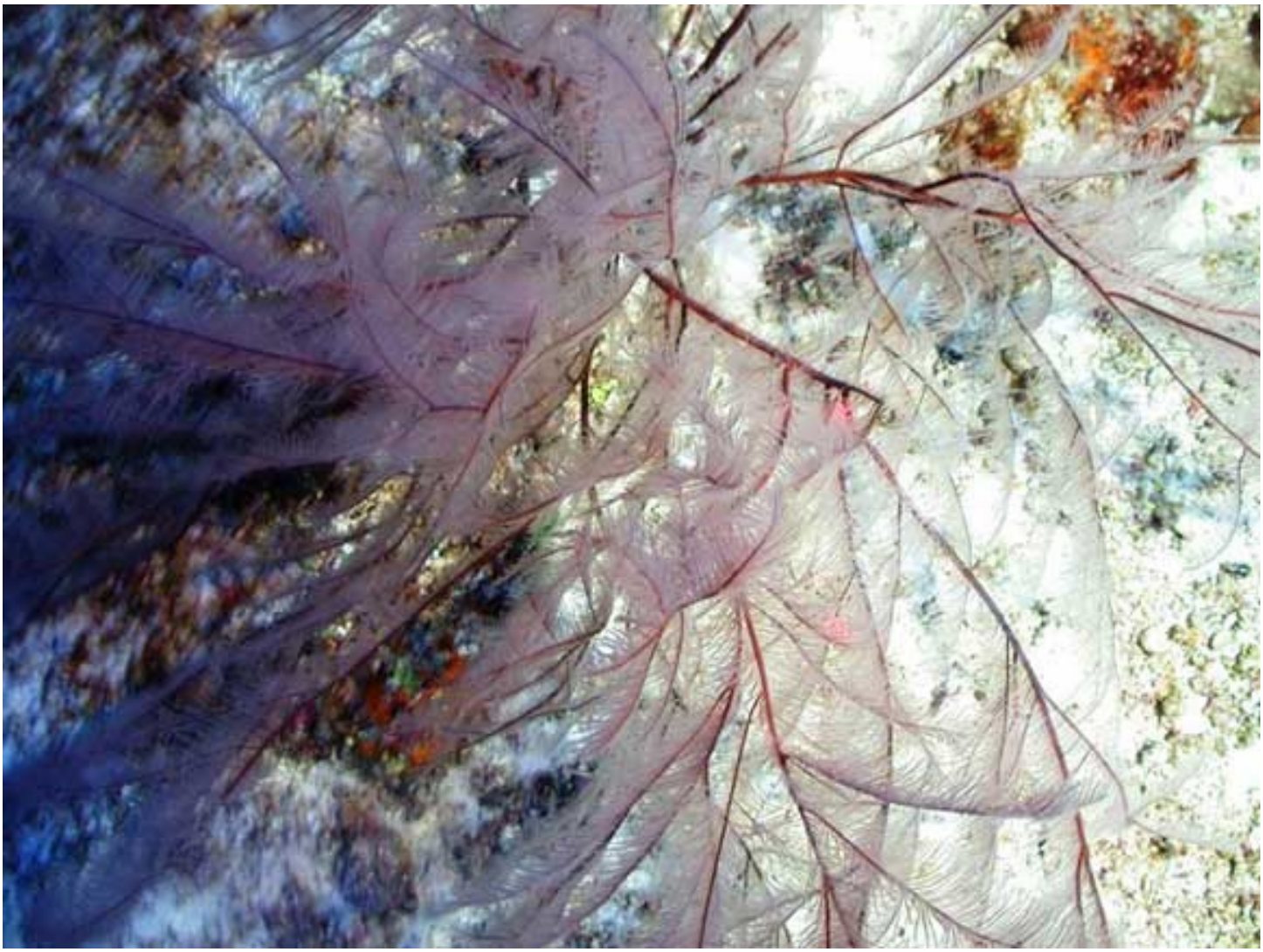
Mona Island topography east side (2)

Stony corals, the corals most people think of when they think of reefs, are in the order Scleractinia. We have seen an amazing assortment of stony corals throughout our mission. For, instance in the following picture we saw at least four different stony corals in an area the size of a kitchen table (1 square meter). The same area is also full of algae and sponges. In fact, almost no space is left uncolonized.



Stony coral ensemble

Some of deep seafloor surrounding Mona Island and Tourmaline Bank are steep slopes and escarpments. The steep gradients offer abundant habitat for black corals, a type of coral in the order Antipatharia. Unlike most stony corals which make coral reefs, black corals do not posses symbiotic zooxanthellae and thus are not light dependent. We have seen many black corals among dark recesses, escarpments and in deep seafloor habitats. In these areas, organisms which require light would perish. Black corals have many different shapes, sizes and colors. For instance, we see some black corals in the shape of coiled wires and others which look like gorgonians or a big bush.



Black coral

Web Update
Day 10: 03/05/2008

A day of unusual finds

A couple of weeks ago, red hind, a species of grouper, were aggregated off western Puerto Rico. The species aggregates in particular areas every year to spawn. Fishermen take advantage of these aggregations to catch fish with a minimum of effort. During ROV ops numerous red hind were observed. Generally they retreated behind tall sponges, within holes of a patch reef or in small recesses of pavement as we approached.

Profiles at Sea: Lance Horn

Lance Horn: UNCW/NURC ROV Operator and Operations Director

Red hind

Most of us were perplexed by a dark black object with what looked like numerous tentacles waving in the surge, but Lance Horn, the ROV operator, quickly spoke up “that’s a sea hair”. We looked up what a sea hare was and found out some interesting facts. Sea hares are large sea slugs. They are also herbivores and are commonly seen near their food – algae. So its no surprise we saw the sea hare in a rather large field of macroalgae covered rhodoliths.

Hairy Sea Hare

Along the seafloor slopes descending from the shores of Mona Island we have observed a change in coral structure with depth. Among the shallowest habitats we have investigated, brightly colored stony corals and gorgonians have made up the majority of coral. These corals such as Diploria sp. and Siderastrea siderea generally are bulbous and have a lot of three-dimensional structure. At deeper depths the coral changes into plate corals such as Agaricia lamarcki and Montastraea cavernosa. These species form thin plates on top of the substrate, generally rhodoliths, to maximize the surface area available for sunlight.

Plate coral - genus Agaricia

As we zoomed above the seafloor in the ROV taking pictures every so often we saw an interesting tan colored sponge and took a picture of it. Later that night while going through the photos and we noticed the tan sponge wasn't a sponge at all, it was a compound tunicate. An interesting fact is that tunicates are chordates, so they are more closely related to humans than sponges, corals, sea stars, or other invertebrates.

Speckled Compound tunicate

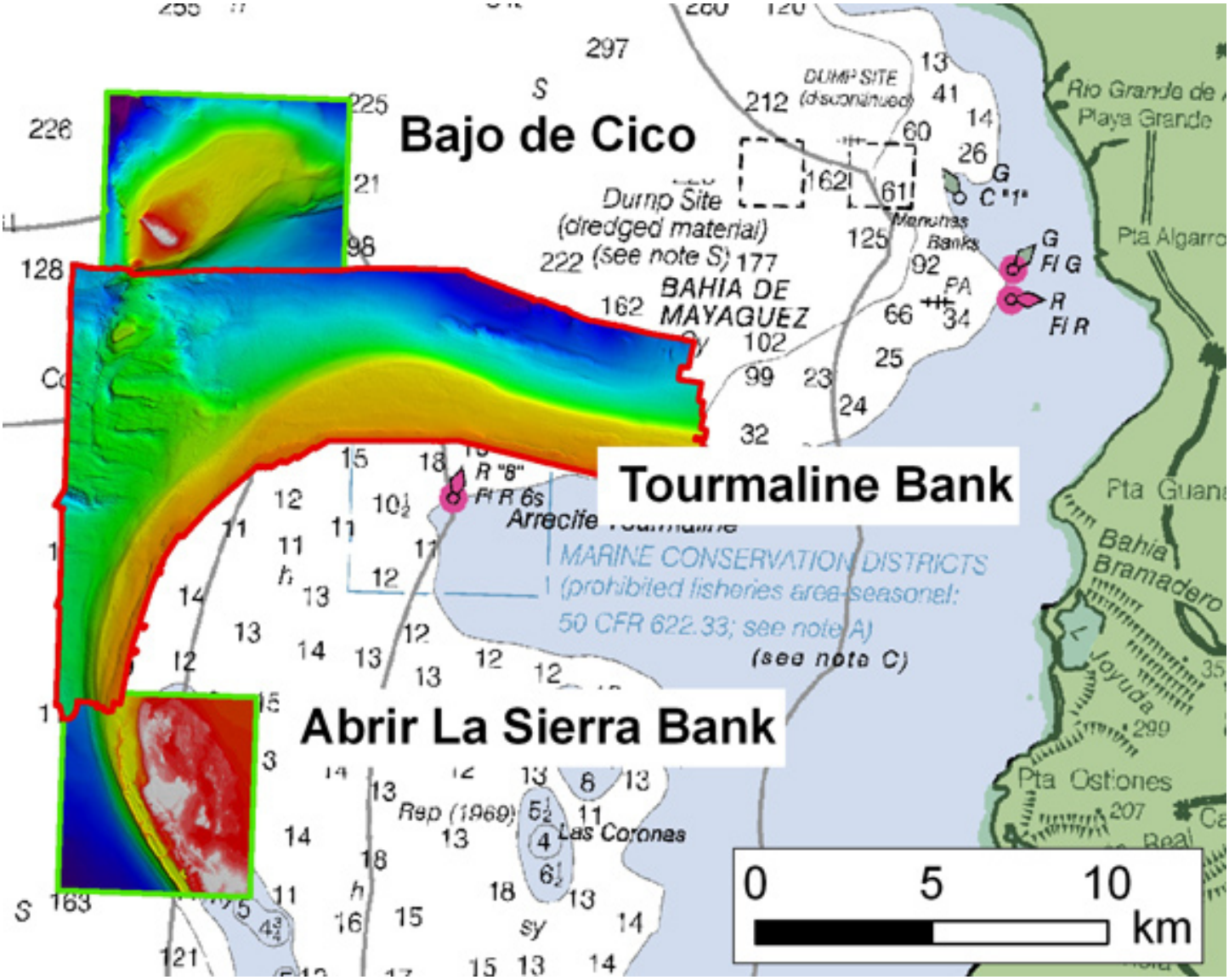
Web Update
Day 11: 03/06/2008

Heading home

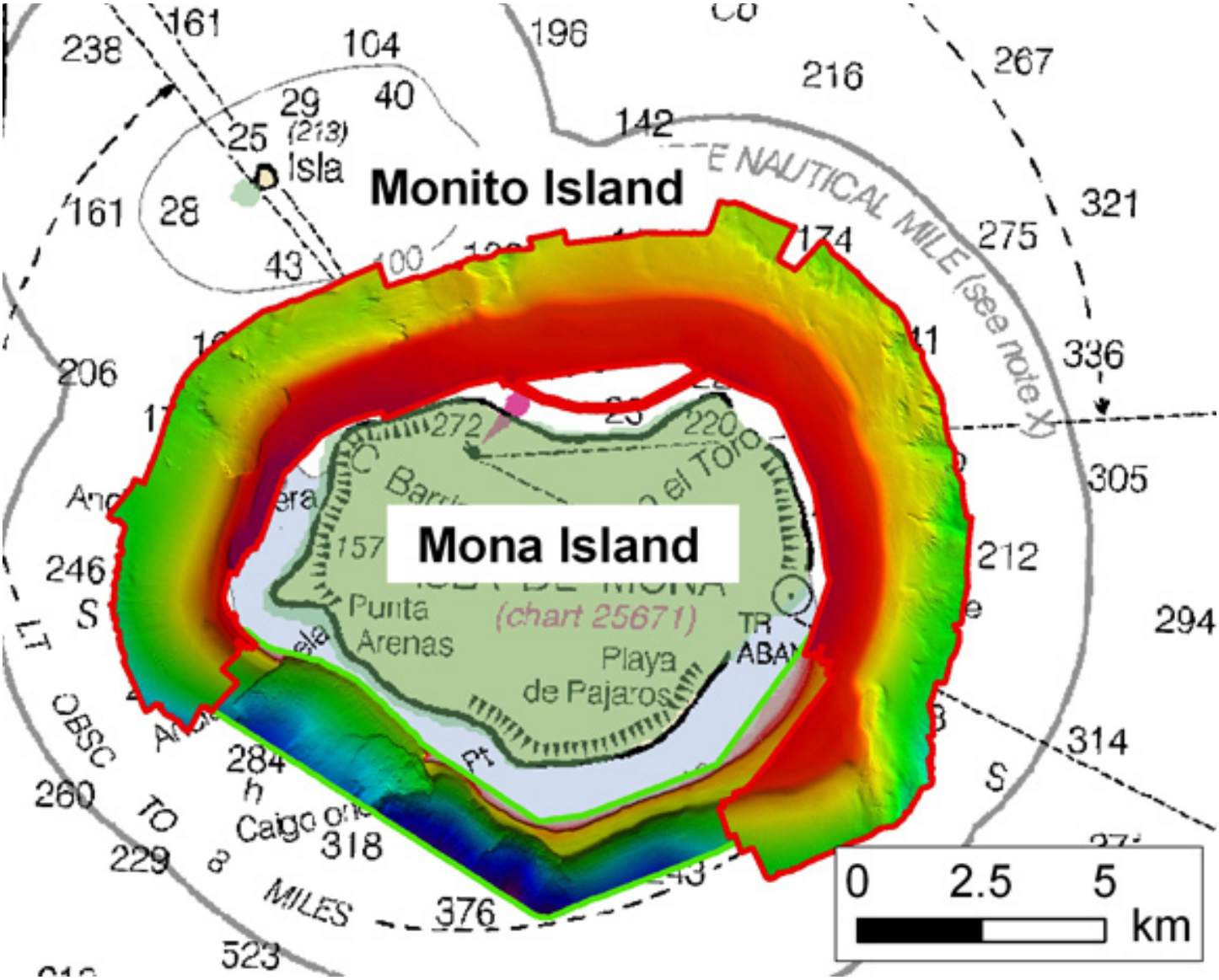
With the weather turning sour, winds gusting to 30 knots, and sea state making for an uncomfortable ride, the coral mapping team were relieved to finally reach the end of the mission. All were satisfied with the achieved accomplishment, although slightly disappointed there wasn't sufficient time to complete Monito Island.

Puerto Rico seafloor mapping scientific researchers onboard the NOAA ship NANCY FOSTER February 25-March 8, 2008. Right to left (Tim Battista, Lance Horn, Charlie Menza, Glenn Taylor, Ed Owens, Bryan Costa, Zach Hecht-Leavitt, Mike Stetcher (not shown).

In summary, the team completed 190 km2 of high resolution seafloor mapping of the Mona Island (81km2) and Tourmaline Bank (109 km2) conservation areas. Surveyed depths ranged from 15-375 m at Tourmaline Bank to 13-673 around Mona Island. The mapping effort around Tourmaline complements and provides the missing topographic connectivity with the seafloor mapping we completed last year of Bajo de Cico and Abrir la Sierra conservation areas, as well as the shallow water bathymetric LiDAR survey of the Cabo Rojo bank shelf (http://ccma.nos.noaa.gov/products/biogeography/lidar_pr/welcome.html).



Multibeam survey for Tourmaline Bank completed in 2008 (red outline) and 2007 (green outline).



Multibeam survey completed for Mona Island in 2008 (red outline) and 2007 (green outline).

In addition to the multibeam survey, the team conducted 28 ROV dive missions to characterize the range, diversity, and condition of coral reef ecosystems and the associated marine life. Approximately 60 hours of video imagery will be analyzed by scientists in the coming months and be made available for viewing at our "Benthic Habitat Viewer" website (http://www8.nos.noaa.gov/bhv/bhvMapBrowser.aspx). Finding from previous years research cruise can be viewed at this location by "clicking" on the study area of interest.