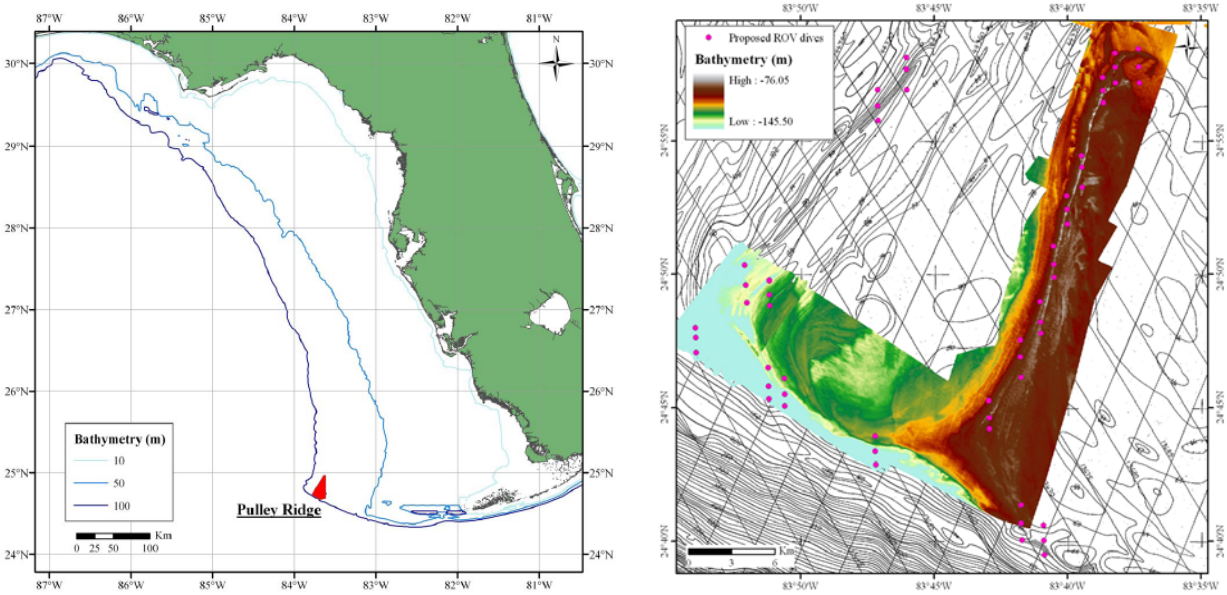
NOAA Teacher at Sea
Robert Lovely
Onboard NOAA Ship GORDON GUNTER
March 31 – April 12, 2008

NOAA Teacher at Sea: Robert Lovely
NOAA Ship: GORDON GUNTER
Mission: Document Fish/Coral Associations at Pulley Ridge and along the West Florida Shelf
Date: April 2, 2008
Geographical area of cruise: Gulf of Mexico

NOAA ship GORDON GUNTER at the dock in its home port of Pascagoula, MS.

Weather Data from the Bridge
Visibility: 10-12 miles
Wind Direction: East (080)
Wind Speed: 10 knots
Sea Wave Height: 1-2 foot
Swell Wave Height: 1-2 foot
Seawater Temperature: 23.93 C.
Present Weather Conditions: Partly cloudy

Science and Technology Log
After spinning around in circles in the harbor area so that a specialist could synchronize all the compasses onboard the ship, we left the Port of Pascagoula at about 10 a.m. on Monday, March 31. We would have two full days and nights of transit to our first station at Pulley Ridge, which



Pulley Ridge dive sites. The red dots indicate start and stop points for individual dive transects. Map by Marta Ribera.

lies about 54 nautical miles west of the Dry Tortugas (see map above). The weather was cold, cloudy, and windy on the first day, and the waves ranged from four to six feet high. This set the stage for a very rocky first day at sea. On day two, however, the seas flattened out, and the weather was beautiful, with a clear blue sky and only light winds. I could see for miles in every direction, but there was no land in sight.

ROV team Lance Horn (left) and Glenn Taylor prepare the ROV for deployment.

One of the main objectives of our mission is to identify the extent of live stony corals (order: scleractinia) on Pulley Ridge. This approximately 20-mile long three-mile wide undersea ridge has been designated as a habitat area of particular concern, and consequently carries certain fishing restrictions. Trawling gear, in particular, may not be used. Moreover, fishers are not allowed to drop anchor, use long lines, bottom traps and other equipment that is apt to kill or damage the coral. Because the corals serve as prime breeding habitat for many commercially-important species of fish, it is in the long-term interest of the commercial fisheries to protect areas such as Pulley Ridge.

Apart from its importance as fish habitat, though, Pulley Ridge also is unique because it contains the deepest known photosynthetic coral reefs on the U.S. continental shelf. Scleractinian corals, such as *Agaricia* spp., thrive along with sponges and common species of reef algae in water some 250-feet deep.

The ROV is lowered into the water.

Chief scientist Andrew David feeds out the ROV's umbilical during deployment.

Because the Pulley Ridge reefs lie well below the safe-diving limit of 130 feet, the most practical and efficient way to explore these unique habitats is by means of a remotely-operated vehicle (ROV) equipped with digital still and video cameras. When deployed, the ROV is tethered to the ship by means of a long umbilical and driven by an operator in the control room. The umbilical delivers electric power and control signals to the ROV. From the control room the ROV pilot watches a video monitor and steers the unit much like one would play a video game. Video of the sea bottom is recorded continuously, while high

resolution digital still frames are recorded at specific time intervals, such as every two minutes. The scientific field party on this mission consists of six individuals, two of whom are dedicated to the operation and maintenance of the ROV. The rest are biologists. The ship itself carries a crew of 18.

Long before we left port, Andrew David, the chief scientist, developed a cruise plan, which called for the ROV to make dives along specific transects. We reached our station for the first transect at about 7:30 this morning. After considerable setup, the ROV was deployed and lowered down to the bottom, about 300 feet below the surface. ROV pilot Lance Horn drove the unit about a meter or two above the bottom, recording video continuously and taking digital still images at two-minute intervals. Biologist Stacey Harter added narration to the video by identifying the different fishes and bottom conditions she saw on the monitors.

The ship's dry lab serves as a control room for the ROV. From left to right: Marta Ribera (GIS specialist), ROV pilot Lance Horn, and Stacey Harter (fish biologist).

Everything ran quite smoothly for the first half of the transect. But then the video light flooded and popped a breaker, causing the ROV to lose power. The unit had to be brought back onboard the ship for repairs. That was it for the day. "The deep sea bottom is such an extreme environment," said Andrew David, "that equipment break-downs like today's are practically a routine part of doing science at sea."

Personal Log

While watching today's operations, I couldn't help but think how easy I have it when I take a class of students out onto Wisconsin lakes to do basic limnology. We work from a small, easy-to-maneuver pontoon boat. None of our equipment is too heavy for a student to lift over the side and drop in. Our depths rarely exceed 20 meters. Finally, we collect a considerable amount of data in just a three-hour lab period.