NOAA Teacher at Sea
Mark Silverman
Onboard NASA Ship LIBERTY STAR
June 7 – 14, 2006

NOAA Teacher at Sea: Mark Silverman
NASA Ship: M/V FREEDOM STAR
Mission: South Atlantic MPA's: Pre-closure evaluation of habitat and fish assemblages in five proposed no fishing zones
Day 5: Sunday, June 11, 2006

Teacher at Sea, Mark Silverman, takes still digital photos during an ROV dive aboard the NASA ship FREEDOM STAR. The ROV navigator, Kevin Joy, and pilot, Craig Bussel are seen in the background.

Weather Data from Bridge
Visibility: Good, a little hazy on the horizon
Wind direction: SW
Average wind speed: 12 knots
Harbor wave height: SW, 2-4'
Air temperature: 76 ^{o}F
Cloud cover: 10%
Barometric pressure: 1013 mb

Science and Technology Log
This morning dawned with Tropical Storm Alberto expected to come off the north Florida or south Georgia coast sometime late afternoon on Tuesday, June 13. Winds for tomorrow are forecast at 20-25 knots and seas are forecast at 5-7 feet. In these conditions it is not possible to work safely. Capt. Exell and Andy David, the Principle Investigator, made the decision to go in early, upon completion of today's work. We are scheduled into Port Canaveral by noon tomorrow, so this will be the last science log. I will do one more personal log tomorrow.

This morning dawned with fine weather and no sign of the expected storm. Three ROV dives were planned in the Options off southern Georgia. At 0800 a general CTD was deployed to support the ROV. It was decided not to deploy the 4-camera array today because strong currents would interfere.

Before presenting a record of the dives, I will discuss a little about the importance of communication and coordination between the bridge and the ROV team. Although the ROV is piloted by Craig Bussel, it is essential that the ship is moved in the direction that the ROV needs to go. The ROV remains tethered to the ship throughout all dives. Craig explained that the technology is not yet in place for an autonomous ROV. The tether provides electrical power to the ROV and returns data, information on position, and video and still photographs to the ROV lab on the ship. The ROV team remains in constant contact with the bridge using two-way radios. Craig or Kevin, the navigator, may radio: "move us 50 meters, bearing 273^{o}" and the ship can use dynamic positioning technology to make precise movements. Dynamic positioning is accomplished using the main props, bow and stern thrusters, GPS, and computers in conjunction with human pilots. Current

and wind play a large role in how well the positioning system functions. The cooperative efforts of the bridge crew, the ROV team, along with external conditions are crucial to the success of the dive.

One of my jobs on this cruise was to take still photos during the ROV dives. The still photos are shot straight down to study bottom and habitat composition. One photo per minute is shot and additional photos may be taken of interesting objects.

ROV dive 1 was the deepest dive of the cruise at 345 feet (104 m). The current was very strong for blue water (1.7 to 3 knots). This caused some difficulty with positioning the ship as explained above. The bottom was soft, silty ooze. Much less ambient light was present than in the previous dives. The fish seen included flounders, lizardfish, and scorpionfish. Where scattered rocks occurred snowy grouper were also seen. One large jack appeared briefly. Invertebrates included sea pens, crinoids (sea lilies), pencil urchins, starfish, and abundant portunid crabs.

ROV dive 2 transected a mud/silt bottom between significant rock formations and ledges at about 245 feet. Once again it was difficult to position the ship due to the combination of current and wind. Visibility was poor; however, many grouper were seen. Seen for the first time on this cruise were Warsaw grouper and red snapper near the larger rocks. Snowy grouper and scamp were also seen, in addition to the usual big eyes, tattlers, etc.

After ROV dive 2, two fish traps were deployed containing cut up Atlantic mackerel (tinker mackerel) as bait. The traps were recovered after ROV dive 3. The first trap came up empty. The second trap was deployed in the rocky area found on ROV dive 2. It produced 37 red porgies of various sizes, which were measured and released.

In what quickly became a “tradition,” the members of the science team and crew gather in the galley to attentively watch an ROV dive on the big screen TV. Cheers and jeers would echo as a big grouper or snapper appeared or was lost from view. Clockwise from left in front view, Andy David (PI), Steve Matthews(Fisheries Specialist), Tim Freeley (Chief Engineer), Darin Schuster(Winch operator), and Wayne Stewart (Crane operator).

ROV dive 3 was the final dive for the cruise. The bottom was a silt and compacted sand mixture with algal patches. Visibility was poor. Fish seen included amberjack, big eyes, bank sea bass, tattlers (*Serranus phoebe*), red porgies, and juvenile beeliners (also known as vermillion snapper, which are of a different genus than all other snappers). One large rock with caves had a wrasse bass, yellow tail reef fish, and a large school of unidentified fish, possibly grunts. Several white colonial tunicates were seen. Interestingly, they are

of a type that is being investigated for possible medical applications (new drugs). Many terrestrial sources have been tried and produced many drugs. The ocean has many new possibilities waiting to be discovered. Other invertebrates included hermit crabs in long shells, chalice sponges, gastropod egg cases, and starfish.

It is unfortunate that the cruise had to be cut short, but a wealth of important data was collected during the 5 days we worked. Work ended around 1700, 195 miles from home, and FREEDOM STAR transited to her homeport, Port Canaveral, overnight.

Personal Log

I woke early in order to finish up yesterday's log. The conversation at breakfast centered on the impending storm and Andy announced that we would head in tonight. I have had such a wonderful experience that I can't help but be a little bit disappointed. However, I am just grateful to have had the opportunity to experience the world of a marine biologist and all the wonderful adventures of the last five days. Living and working aboard a research vessel with marine biologists fulfilled a life long dream for me.

An Atlantic Spotted Dolphin frolics in the wave of the FREEDOM STAR, much to everyone's delight. The pod had about eight members.

I worked on my log until the first ROV run was under way and then assisted with the camera and recovery of the vehicle. Throughout the day I worked in various capacities, experiencing one more time life at sea.

A "biting shark" is brought up to the gunwale in order to be released.

Several exciting moments occurred. The first was when I spotted a large school of spotted Atlantic dolphins from the "Lido" deck. After announcing their presence I bolted down the stairs to get my camera. I shot lots of pictures in order to try and get a good one. I have included one of the better ones in this log. The crew fished on and off all day and several dolphin were caught and also a shark! I asked Andy what type of shark it was and he replied, "A biting shark." Finally, I got up my nerve to try and toss the high-flyer float again on the last fish trap

deployment (remember I dented the radar array, and nearly my head, on my last attempt). I had been studying the technique all day and my toss was perfect! Later Cody Gordon, Ordinary Seaman, took me up to the flying bridge and gave me a great tour. It was thrilling to be up so high up on the ship underway as the wind whipped by at about 40 knots. Cody was familiar with all the equipment topside and explained to me the function of each, such as antennae for GPS, radios, radar, etc. and signal lights, search lights and more. As always the food and camaraderie was excellent, another great day at sea! As my Newfoundland friends would say, "I'm beat to a snot!" and ready for a good night's sleep.

Ordinary Seaman, Cody Gordon, braces against the wind as he gives me a tour of the flying bridge. Clouds from Tropical Storm Alberto loom in the background.

Hasta mañana,
Mark

Question of the Day

Answer to yesterday's question:
Yesterdays question about the distribution of fisheries resources has no clear-cut answer and is highly debatable. Much of the fisheries research at NOAA, such as this mission will help answer the question. The current trend is a 50-50 split between commercial and recreational users while maintaining a sustainable fishery for the future.

Today's question:
Do you think you would like life at sea or the career of a marine biologist? If so how would you prepare?

Addendum 1: Glossary of Terms

Ambar: Zodiac-like partially inflatable outboard boats carried aboard the ship and deployed by cranes. FREEDOM STAR normally carries two.
Tropical storm: A cyclonic storm with winds of at least 40 mph.
Autonomous: Something that operates on its own, with no connection to a source or other support system.
Ambient: The natural surroundings.
Colonial: Organisms that live in close association to one another, but are not completely interdependent on one another.
"Lido" deck: A colloquialism (slang) used by the crew for the O-1 deck. The ship has five decks from below sea level up: the lower deck (below the water line), the main deck (at or just above the water line), the O-1 deck (forecastle – pronounced fo'cle deck), the bridge deck and the flying bridge.
PI: Principal Investigator.

Addendum 2: Interview with Mike Nicholas and Allan Gravina

Mike and Allan enthusiastically agreed to do an interview. I approached them on day 4 while they were on they're morning bridge watch. Seamen on the FREEDOM STAR and her sister ship LIBERTY STAR work 2 four hour watches per day or as they say, "4 on, 8 off." Mike and Allan were assigned 8 AM to noon and 8 PM to midnight during this cruise. I found them to be very proud of they're work, particularly as it involved the space shuttle missions, with a good sense of humor and a very positive attitude. They were eager to talk and my notes filled 3 and ½ pages. The interview is paraphrased. I did not have a tape recorder to get accurate quotes and used notes. Any inaccuracies are the fault of the interviewer and not the subjects.

From left, Allan Gravina, Able Bodied Seaman, and Mike Nicholas, 2nd Mate, on the bridge during the 0800-1200 bridge watch. Their duties while on watch include monitoring the ships position in relation to other vessels, land, and obstacles, piloting the vessel and monitoring the ships systems and communications. They're ability to pilot the ship was crucial to the success of the ROV dives. When not on watch they frequently lend a hand on deck. Off duty both of them enjoy fishing or a good game of Spades.

Q: Describe your job and life at sea.
Mike: Mostly I'm just Navigational Officer. Each day as we go from place to place, I make sure we get there without hazards.
Allan: …and charts and communications.
Allan: I assist the watch; stand the look out for watch on duty is my main job. Also, my job includes anything else that needs to be done on deck. Retrieving boosters we work on deck. Any time personnel needs to be moved we'll drive the Ambars.
Q: How did you come to work on FREEDOM STAR?
Mike: I actually started on LIBERTY STAR [sister ship to FREEDOM STAR] eighteen and one half years ago.
Q: How old are you now?
Mike: I'm 38.
Allan: I'm 32.
Mike: I started entry level as an ordinary seaman and came up through the ranks. I came on FREEDOM STAR as a promotion 11 years ago and I was transferred over to FREEDOM then.
Q: Do you like working at sea?
Mike: Yeah, I enjoy it. I like the idea that everyday is different. You don't know what you'll get everyday. Not to mention, the challenges of what we have to do.
Q: Is it fun?
Mike: Absolutely…a good time! We usually retrieve the space shuttle solid rocket boosters. This is not our normal mission.

Allan: That'd be our number 1 job, that and the external [fuel] tank.
Q: What's it like working a shuttle mission?
Allan: Pretty exciting actually, a good feeling! We know we are one of 24 people in the world that do what we do, no other country, no other boat, no other place. It's also challenging, because we must go regardless of weather, up to 30-foot seas. They've only held the boat back once or twice in the 25 year program history.
Q: Do you see the launches?
Allan: About 1 minute after lift off it will fly over us. [They are roughly 120 mi out to see in the recovery zone]
Q: How far to splash down of the boosters are you?
Allan: 5-10 miles. You can see them come down, the whole bit.
Q: Is there any danger of them hitting you?
Mike: No, they know exactly where they are going to land.
Allan, grinning: If you think about it, those things are 130 feet long and 12 feet in diameter coming through the air. They're pretty big!