



**NOAA Teacher at Sea
Lynette Swiger
Onboard NASA Ship LIBERTY STAR
July 16 – 23, 2008**

NOAA Teacher at Sea: Lynette Swiger

NASA Ship LIBERTY STAR

Geographical Area: South Atlantic Ocean off the coast of Florida

Date: Tuesday, July 22, 2008

Weather Data from the Bridge

Air temperature: 84 degrees

Water temperature: 80 degrees

Barometer: 29.95

Wind: SW at 6.5 knots

Waves: South at 3 feet

Visibility: 3 miles

Science and Technology Log

Unless something unexpected happens, this will be my last journal entry. Our last day of operations is tomorrow morning, we have only one camera trap drop, and we will be doing basically the same activities that I've covered in previous journals. I will finish this science and technology section of my log with some general ideas and items that I've found of interest and that may not be known widely known. So here goes.....

- The ROV is on the mending list, but isn't yet fully recovered. It is able to dive and use the underwater video

camera but the digital still camera is not responding to commands. However, it makes us all a little happier to see the little guy up and running. **Post journal entry: The ROV's cable again became caught on the ship's propeller. The cable was hopelessly twisted*



A small boat on the LIBERTY STAR had to be deployed to untwist the ROV cord from the ship's propeller.

and had to be manually removed from the prop. The ROV is finished for this cruise and we are doing only video camera array recordings.

- Scientific projects almost always encounter glitches, but part of the process is learning to work around the glitch or to have a backup plan in place.
- A project is not a failure simply because its results don't support hypotheses. In fact, most statistical tests are designed to reject the hypothesis.
- Replication of data over time is essential to authenticity of results.
- We have observed no tilefish on any days of diving, although their habitat is muddy bottoms and we have focused on reef areas which grouper prefer.
- Fish are not necessarily found everywhere in the ocean. Instead, life seems to teem around outcroppings, ledges, and drop-offs that can provide hiding places. These appear haphazardly and we must search with the ROV for these places in order to find a congregation of fish.
- We have not seen a shark or octopus on this cruise though both inhabit these waters. We saw one or two piles of shells that could signal an octopus in the area because an octopus will eat shellfish and drop the shells in a pile near its hiding place.
- Some species, such as grouper, shy away from the camera and scuttle to their hidey-holes while others, such as the short bigeye seem to pose for the camera. They are reminiscent of people in that way.
- The ROV is a technological wonder. It can travel faster, farther, and deeper than a diver and does not need to decompress. Though expensive, loss of an ROV is much better than loss of human life.
- Good food in abundant amounts goes a long way toward keeping people happy.

Animals Seen

In two dives covered this morning we saw about thirty lionfish. As I mentioned in previous journaling, lionfish are now a concern in the Atlantic Ocean. In the grouper/snapper complex, with which the lionfish competes, we saw porgy, soapfish, hogfish, white grunt, triggerfish, rock hind, graysby, and scamp. Outside the economically important fish groups we saw five types of angelfish, three types



Lynn (right) poses with some fellow crewmembers

of butterflyfish, cubbyu, sunshine fish, pearly razorfish, and short and regular big-eye. Two interesting finds were a chain moray eel and several sea stars. That's not the full extent of the list, but it's a good beginning!

Vocabulary

octopus, octopi, inhabit, replicate, authenticity,

Career Connection

For anyone interested in a career aboard a ship, I would like to introduce Dave. He is a staff person on this particular cruise because he is filling in for someone who is absent. He has actually served as captain of this ship in the past and now has an office job on land where one of his tasks is trying to envision new programs for the future.

Dave knew that he wanted to work aboard a ship so he attended a maritime college in Massachusetts and received a Bachelor of Science degree in marine transportation. He also sat for and passed an examination for a U.S. Coast Guard license, and he received a naval reserve commission as an officer. People with these licenses can work on all types and sizes of ships from tugboats to cargo vessels to large cruise ships. They also have the wonderful opportunity to travel around the world as part of their job.

Dave has worked in the oil fields on offshore supply boats. He's worked in the Gulf of Mexico, off the New England coast and off Canada and California. In order to maintain his sailing skills and earn extra money, he currently works on a casino ship that sails out of Port Canaveral.

There is one federal maritime college at King's Point in New York. There are also five state maritime colleges in Maine, Massachusetts, New York, Texas, and California. Degrees other than maritime transportation at maritime colleges include marine engineering, environmental protection, and oceanography. A person graduating from a maritime college doesn't have to work on a ship. There are many options besides the water with maritime law being one possibility.

Question of the Day

The areas we are monitoring are scheduled to become MPAs in 2008. However, we will also collect data from **outside** the scheduled MPAs.

- What can we learn by comparing the two types of areas?
- Why would scientists study an MPA before **and** after closing?

Educational Link

In talking with Andy I have learned that scientists don't necessarily accept the results of one project but wait to see if those results will be replicated over time. This is possibly something that I need to carry into the classroom – assign the same project to several groups and then allow students to compare and contrast the results to come up with a final theory.

Personal Log

I am sailing aboard the Liberty Star and I would like to spend some time today telling about her job. The Liberty Star has a twin sister named the Freedom Star. They dock at the Cape Canaveral Air Force Station in Cape Canaveral, Florida, belong to NASA, and actually tow the solid rocket

boosters that detach from the space shuttle after blast-off. Each solid rocket booster can be used ten times, so it saves money to rescue and reuse them rather than let them sink into the ocean.

Each time there is a scheduled blast-off, the Liberty Star and her crew leave 24 hours ahead of time and wait in the Atlantic Ocean three or four miles away from the scheduled drop zone. Two minutes after blast-off the shuttle drops the two solid rocket boosters. Each booster's descent is slowed by three main parachutes. Each one is over 150 feet in diameter, and they are released when the nose cone pops open. After the rocket boosters enter the ocean, the Liberty Star goes into action.

When it hits the water at sixty miles per hour, the rocket booster begins to fill with water. It bobs upright in the ocean with only 20 ft of its top protruding above the water and 100 ft descending below. Divers from the ship go into the ocean, seal the bottom of the booster and begin to fill it with air. As the air goes in, the water comes out and the booster slowly begins to rise from the



A picture of the LIBERTY STAR with the space shuttle rocket boosters on her starboard side

water until it is standing far above the waves. Eventually its size causes the booster to gently topple onto its side and float in the ocean. The parachutes are reeled in on special reels, and the booster begins its journey home by being towed behind the ship. The nose cone is secured on a special platform on the deck of the ship. As the Liberty Star

nears land, the booster is secured alongside the right

side of the ship and brought to the dock. The Freedom Star always carried her booster on the left side of the ship, and the Liberty Star carries hers on the right.

Before blast-off, the rocket boosters are packed with solid rocket fuel in Utah, shipped to Florida in pieces, and assembled at Cape Canaveral. The huge external fuel tank is made in Shreveport, Louisiana. To transport it to Cape Canaveral the Liberty Star again saves the day. The external fuel tank is placed on a long cart and wheeled into an equally long covered barge. It is the ocean and space equivalent of a covered wagon, and it is the Liberty Star's job to tow this mammoth barge to Cape Canaveral. The size difference between the Liberty Star and the barge is similar to

the difference between a matchbox car and the real thing, but the Liberty and her crew are up to the task. After blast-off most of the external fuel burns up on its re-entry above the Indian Ocean and does not have to be recovered.

I am so excited and honored to have been chosen as a NOAA Teacher at Sea, and having the opportunity to work on this special ship with her great crew has been my extra good fortune.

Lynn