



**NOAA Teacher at Sea
Jill Carpenter
Onboard NOAA Ship DELAWARE II
September 5 – 15, 2006**

NOAA Teacher at Sea: Jill Carpenter
Onboard NOAA Ship DELAWARE II
Mission: Herring Hydroacoustic Survey
Day 8: Tuesday, September 12, 2006

Weather Data from Bridge

Visibility: 10 nautical miles
Wind direction: 60 degrees
Wind speed: 17 knots
Sea wave height: 5 feet
Swell wave height: ~
Seawater temperature: 17.3°C
Sea level pressure: 1029.1 mb
Cloud cover: PC (partly cloudy)

Science and Technology Log:

On Sunday, the DELAWARE II steamed out of the Great Harbor. Our first stop was Cape Cod Bay, and then we continued to the Gulf on Maine. It's great to be at sea!

My first night on the night shift felt very productive to me. I worked with fisheries biologists Dr. Jech and Karen to rig up the monofilament (fishing line) so we could attach the copper spheres beneath the hull in order to complete calibrations of the acoustic system. As explained in an earlier log, calibrations are required for each survey to ensure data quality and to verify that the equipment is working properly. We were mostly successful, but a few events slowed our progress, such as having to reposition the ship because of fixed gear (lobster traps) in the water near us. Once we located the copper spheres in each of the remote-controlled downriggers in order to move the copper sphere in all directions within the beam. After we worked out all the bugs during the first calibration, the system worked smoothly for the two remaining frequency calibrations. When we finished, we disassembled the downriggers and put away the gear.



TAS Jill Carpenter with a lumpfish caught with a mid-water trawl on the NOAA ship DELAWARE II.

We finished our first shift by deploying a Conductivity-Temperature-Depth (CTD) sensor and keeping track of it in the Event Log book and computer program. A CTD is an instrument that is equipped with devices which measure the salinity and temperature of the water and the depth of the instrument. Connected to a cable and winch system, it is lowered into the water within meters of the ocean floor, all the while taking measurements and sending data to computers on deck. A profile of salinity and temperature is taken at the end of each transect, or path, that the ship makes and also before a trawl is completed.

Deploying a CTD is a joint effort on the part of the officers on the bridge, the fishermen and the scientists. Communication takes place via walkie-talkies to synchronize the deployment time. While the officers on the bridge maintain the location of the ship and watch out for traffic, the fishermen are deploying the CTD instrument and the scientists are logging the event, recording information such as time of deployment and the latitude and longitude of the deployment.

My second night on the night shift was also very eventful. We had begun a series of transects, which basically means that the ship zigzags back and forth across the ocean in order to take CTD measurements and locate large schools of fish for the purpose of trawling, or catching fish for biological sampling.

Twice during the night, in the middle of parallel transects, we completed trawls. The High Speed Midwater Rope Trawl (HSMRT) is a funnel-shaped net attached to wires, also known as trawl warps, which are spooled onto winches located on the aft deck of the ship. The HSMRT is used to collect biological samples. The decision on where to trawl rests with the scientists as they interpret acoustic data, so if the acoustic system shows that there is a large collection of objects (hopefully fish) below the surface, a trawl may be completed. Trawling is also a group effort between the officers, the fishermen, and the scientists. The net is set out and retrieved by the fishermen who control the depth of the net and monitor its performance. The officers on the bridge work with the fishermen during the trawl to ensure its success.

The catch from the trawls is sorted by species. Then the individual species are weighed and measured. The catch from our first trawl included redbfish, Atlantic herring, lumpfish, and northern shrimp. We then took a subsample of redbfish which means that we took a portion of the total catch and measured each individual length. Because herring is the primary focus of this survey,



TAS Jill Carpenter with two redbfish caught with a mid-water trawl on board the NOAA ship DELAWARE II.

additional information was also gathered on this species including sex, maturity stage, and stomach contents, and then a subsample was frozen for age analysis back at the lab. The Fisheries Scientific Computer System (FSCS) system was used for entry of the biological data. This is done by using a stylus to press the buttons on the computer screen to enter the catch information. The scales used for weighing the fish and the measuring boards automatically send their information into the computer system. The data is saved and later will be analyzed by the National Marine Fisheries Service.

Personal Log:

I apologize for not writing in a few days. As I predicted, the shift work is taking a bit of a toll on me, and I haven't been sleeping well during the day due to slight seasickness. It is such a strange feeling to be lying in bed and rocking back and forth. Sometimes the boat pitched so much that my stomach got butterflies, just like when you ride a roller coaster and go down a steep hill. I had to keep getting up and sitting on one of the decks so I could see the horizon and get some fresh air. Our stateroom has no windows, so there is no way of telling what the conditions are outside. I had to laugh at myself when I went up to the bridge, expecting to see a ferocious storm and high sea swells, only to find blue skies and slightly choppy waters. A combination of Dramamine, ginger root tablets, and Saltine crackers also helped to calm my stomach.

This past night of sleeping (rather, day of sleeping) went much better. I seemed to be used to the motion of the ship, and I fell asleep right away. It helped to wedge myself in between the wall and my bag to keep from rocking back and forth so much. I feel rested and much more confident to handle the seas. It was forecasted that Hurricane Florence would make our ride a bit rough, though she is passing several hundred miles from our location and seas have been much calmer than expected, which is fine with me! Even so, I can now see why we had to spend time tying down equipment so it wouldn't slide or roll. When the ship was docked, it was hard to imagine it moving so much to necessitate



TAS Jill Carpenter with a basket of redfish caught with a mid-water trawl for the Atlantic Herring Hydroacoustic Survey aboard the DELAWARE II.

securing items so well, but the need was evident to me after this shift. Several times during the night, the ship rolled side to side so much that even heavy items fell over and off tables. The chairs we were sitting in kept sliding back and forth, and we had to hang on to the tables to keep from moving around! It was wild. I loved it! I tried to get a picture, but I had to hang on instead!

I was proud of myself when we completed our trawls and I had to handle the fish. It was rather disturbing to see the eyes and stomachs of the fish bulge out because of the change in pressure. We had to

be careful when picking up the redfish because of the prickly spines sticking out of their fins. I was a little apprehensive to feel the fish through my gloves, and I was very grossed out at the thought of picking up a slimy, dead fish, but I tried to put that aside so that I could be of some help, at least. The biologists I was working with jumped right in and weren't squeamish at all. After all, this is part of their job and the focus of their research. I tried to be brave and handle the fish confidently and without shrieking just as they did, but I still looked a bit wimpy. The important thing, though, is that I tried something new and walked away with an invaluable learning experience. Cutting apart a herring to examine its insides was a little over my limit, but I tried it anyway and now I am glad that I did. I figured that it's not every day that I have the chance to dissect a fish in the name of research.



Removing otoliths (ear bones) from a redfish. Otoliths are used by scientists to age a fish.

I spoke with Mrs. Nelson the other day, and she said I have a bright group of fifth graders awaiting my return. I can't wait to show all of you my pictures and share this incredible learning experience with you.

Question of the Day:

When weighing fish on board the ship, it is necessary to "tare" the scale. This means that if a fish is being weighed in a bucket, we must first put the empty bucket on the scale, and then we need to reset the scale so it measures to zero kilograms. After that, we place the fish in the bucket and put it back on the scale.

Why do you think it is important for scientists to tare a scale when weighing objects that are in containers?