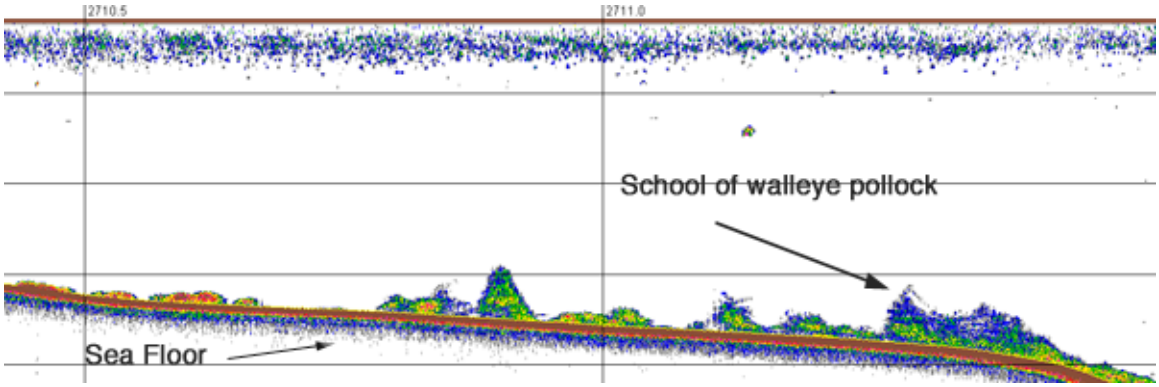
NOAA Teacher at Sea
Kathryn Lanouette
Onboard NOAA Ship *Oscar Dyson*
July 21 – August 7, 2009

NOAA Teacher at Sea: Kathryn Lanouette
NOAA Ship *Oscar Dyson*
Mission: Summer Pollock Survey
Date: Saturday, August 1, 2009

Weather Data from the Ship's Bridge
Visibility: 10+ nautical miles
Wind direction: variable
Wind speed: less than 5 knots, light
Sea wave height: 0 feet
Air temperature: 7.9˚C
Seawater temperature: 8.6˚C
Sea level pressure: 30.1 inches Hg
Cloud cover: 7/8, stratus

Science and Technology Log
In addition to the Aleutian wing trawl (which I explained in Day 5 NOAA ship log) and Methot (which I explained in Day 8 NOAA ship log), scientists also use a net called an 83-112 for **bottom trawls**. The 83-112 net is strong enough to drag along the sea floor, enabling it to catch a lot of the animals that live in, on, or near the sea floor. This afternoon, we conducted the first bottom trawl of our cruise. Bottom trawls are usually conducted in two situations: if the walleye pollock are too close to the sea floor to use an Aleutian wing trawl or if the scientists want to sample a small amount of fish (because the 83-112's net opening is smaller than the Aleutian wing trawl's net). From the looks of the sonar-generated images, it appeared that most of the walleye pollock were swimming very close to the bottom so the scientists decided it would be best to use the 83-112 net.



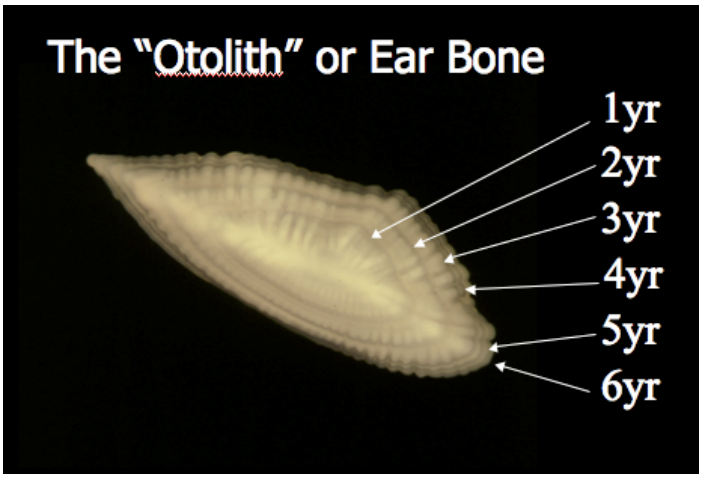
This sonar-generated image shows walleye pollock close to the sea floor. The red line at the bottom of the image is the sea floor. The blue specks at the top of the image are jellyfish floating close to the water's surface.

Once the fish were spotted, we changed our course to get ready to trawl. Usually the trawl is made into the wind for stability and net control. Once the ship reached trawling speed, the lead fisherman was given the "OK" to **shoot the doors**. Slowly, the net was lowered to 186 meters below the surface, the sea depth where we happened to be. The water temperature down there was about 1˚C (compared to 7˚C on the sea's surface). I had heard from a previous Teacher At Sea that bottom trawls brought up a wide variety of animal species (compared to the relatively homogenous catches in mid-water trawls). And sure enough, when the net was brought up, I couldn't believe my eyes!

Here I am holding one of the skates that was caught in the bottom trawl

All told, we sorted through over 7,000 animals, a total of 36 different species represented in the total **catch**. It took 4 of us over 4 hours to sort, measure, and weigh all these animals. There were over 350 walleye pollock in this catch as well as skates, octopi, crabs, snails, arrowtooth flounder, sea anemones, star fish, and dozens of other animals. Some of them were even walking themselves down the **table**.

During this catch, I also learned how to take the ear bones, or otoliths, out of a walleye pollock. Why ear bones you might ask? Using the ear bones from a walleye pollock, scientists are able to determine the exact age of the fish. Misha Stepanenko, one of the two Russian scientists on board the *Oscar Dyson*, showed me how to cut partially through the fish's skull and take out two large ear bones.



A diagram of an otolith, or ear bone, of a fish. You can see that it's a lot like looking at tree rings!

Once they were taken out, I put them in a solution to preserve them. Back in NOAA's Seattle lab, the ear bones are stained, enabling scientists to count the different layers in each ear bone. For every year that the fish lives, a new layer of bone grows, similar to how trees add a layer for each year that they live. By learning the exact age of a fish, scientists are able to track age groups (called "cohorts"), allowing more precise modeling of the walleye pollock population life cycle.

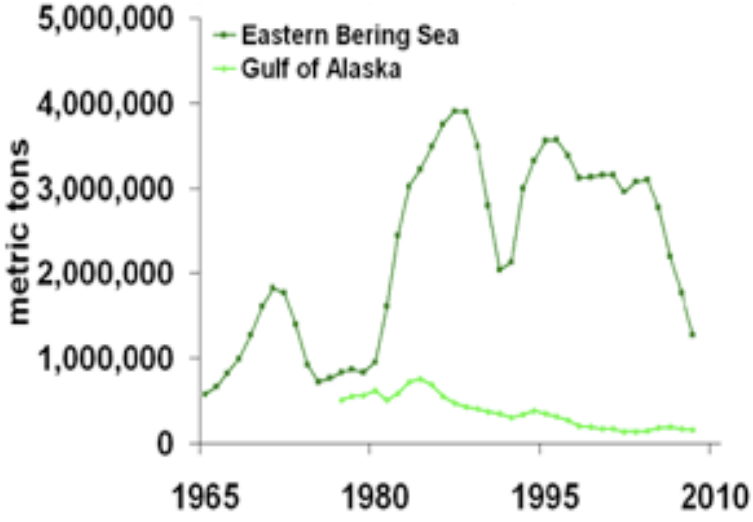
Personal Log
So far this trip, we have sailed within 15 miles of Cape Navarin (Russia) on at least two different occasions but fog and clouds prevented any glimpse of land both times. It was a frustrating feeling knowing that land was so close, yet impossible to see. After 12 days of looking at nothing but water and sky, seeing land would have been a welcome treat.

Despite not seeing land, I still felt like I was in Russia just from listening to different fishing **vessels** communicate with one another. On our first night in Russian waters, we sailed through a heavy fog, with 7 or 8 different boats fishing nearby. I was impressed with how Ensign Faith Opatrny, the Officer on Deck at the time, communicated with various vessels, using collision regulations ("the rules of the road") to navigate safely.

On a culinary note, I got my first chance to eat some of a catch. After most trawls, we discard remaining inedible specimens overboard. After our bottom trawl however, one of the scientists filleted some of the cod. The next day, the stewards cooked it up for lunch. It tasted great and it felt good to be eating some of the fish that we sampled.

As the cruise starts to wind down, I also want to express my gratitude to all the NOAA scientists and *Oscar Dyson* crew. Everyone in the science group took time to explain their research, teach me scientific techniques, and answer my many questions. On numerous occasions, the deck crew explained the mechanics of fishing nets as well as the fishing process. The engineering crew gave me a tour of the engine rooms, describing how four diesel engines power the entire boat. The survey techs explained how different equipment is operated as well as the information it relays back to the scientists. The NOAA Corps officers showed me how to read weather maps, take coordinates, and explained ship navigation. The ship's stewards described the art and science behind feeding 33 people at sea. And the USFWS bird observers patiently showed me how to identify numerous bird species. From each of them, I learned a tremendous amount about fisheries science, fishing, boats, sailing, birding, and life in the Bering Sea. Thank you!

Answer to July 28 (Tuesday) Log: How has the walleye pollock biomass changed over time?
In the past few years, the walleye pollock biomass has decreased (according to the acoustic-trawl survey, the survey that I joined.) It should be noted that there is a second complementary walleye pollock survey, the eastern Bering Sea bottom trawl survey. This survey studies walleye pollock living close to the sea floor. As walleye pollock age, they tend to live closer to the sea floor, thus the bottom trawl survey sometimes shows different biomass trends than the



A graph showing the adult walleye pollock biomass estimates from 1965 to 2008.

acoustic-trawl survey. Both surveys are used together to manage the walleye pollock stock.

Animals Seen
Auklet
Arrowtooth flounder
Basket star
Bering skate
Cod
Hermit crab
Fin whale
Fur seal
Octopus
Sculpin
Sea mouse
Sea slug
Shortfin eelpout
Snow crab
Squid
Tanner crab

An up-close look at one of the squid's tentacles

New Vocabulary
Bottom trawl - fishing conducted on and near the bottom of the sea floor
Catch – fish brought up in a net
Shoot the doors – a fishing expression that means to lower the 2 metal panels that hold open the fishing nets in the water
Stewards – the name for cooks on a ship
Table – nickname for the conveyor belt where the fish are sorted for sampling
Vessels – another word for ships