



**NOAA Teacher at Sea**  
**Megan Woodward**  
**Onboard NOAA Ship *Oscar Dyson***  
**July 1 – 18, 2009**

**NOAA Teacher at Sea: Megan Woodward**

NOAA Ship *Oscar Dyson*

Mission: Bering Sea Acoustic Trawl

Geographical Area: Bering Sea

Date: Thursday, July 16, 2009

**Weather and Location**

Position: N 58 13.617; W 171 25.832

Air Temp: 7.2 (deg C)

Water Temp: 6.54 (deg C)

Wind Speed: 15 knots

Weather: Overcast

**Science and Technology Log**

One of the most interesting things I've learned while participating in the pollock survey is the importance of **otoliths**. Otoliths are small bony structures situated in the head of all bony fish, and are often referred to as "ear stones." For each haul we brought on board, 50 otoliths were taken from large fish (3+ years) and/or 5 from small fish (younger than 3 years old). The otolith holds the key to accurately calculating the age of a fish (scales and vertebrates can also be used, but are not as reliable). The average age of fish from the samples collected in the survey helps scientists estimate the strength of a year-class and size of the **stock** in the future.



**All bony fish have otoliths (ear bones) that can be used for calculating the age of the fish.**



**Back in the lab, otolith samples are carefully catalogued.**

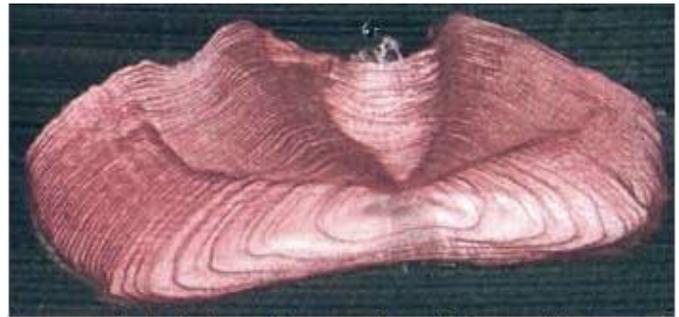
The first step in taking an otolith is pictured above. An incision is made on the back of the pollock's head, and an otolith is removed using tweezers. Once the otolith is removed, it is rinsed with water and placed in a glass vial containing a small amount of 50% ethanol solution for preservation purposes.

The otoliths are taken back to NOAA's aging lab where ages are determined by reading rings similar to those on a tree trunk. A crosscut is made through each otolith revealing a pattern of rings. Scientists then count the rings to determine the age of the fish. Lightly burning or staining the otoliths makes the rings more visible.

Below are pictures from the Centre for Environment, Fisheries & Aquaculture Science website.



North Sea cod otolith - section viewed by reflected light - Age 5



Stained sole otolith - approximately 37 years old



Plaice otolith - 4 years old

New material is deposited on the surface of the otolith creating the rings as the fish grows. The translucent/light zones indicate the main growth that takes place in the summer months. The opaque/darker rings appear during the winter months when growth is slower. Because of the slower growth rate, new material is deposited on top of the old layers resulting in the dark ring. Each pair of light and dark zones marks one year.

In fish younger than one year of age, rings can be identified for each day of life!

### Personal Log

I was surprised to discover otoliths have been used for aging fish since the early 1900's. While working in the fish lab I observed the scientist removing otoliths, however I did not remove any myself. The cracking sound heard when cutting the head open was like fingernails on a

chalkboard to me. I spent most of my time in sorting and measuring fish, as well as assisting with the stomach collection project.

For the next two days we will be heading back to Dutch Harbor, and the likelihood of trawling for more fish is minimal. Our remaining work assignment is to give the fish lab a thorough cleaning. Everything in the lab is waterproof, so we'll put on our Grunden's (orange rubber coveralls) and boots and spray down the entire space.

Working and living at sea for nearly 3 weeks has been an eye opening experience. My time aboard the Oscar Dyson has flown by. I have learned so much about fisheries research and life at sea. Dry land, however, will be warmly welcomed when we get back to Dutch Harbor. Would I do it again? Absolutely.

### **Animal Sightings**

The whales have an incredible way of showing up when I don't have my camera. Yesterday I spotted two orcas, but did not get a photograph. The seabirds continue to circle. I like the murre most. They look like small, flying penguins.

### **New Vocabulary**

Otoliths- Small bony structures situated in the head of all bony fish. Often referred to as "ear stones."

Stock- Refers to the number of fish available, supply.

\*\*\* Much of the information used for this log entry was found on the Centre for Environment, Fisheries & Aquaculture Science (Cefas) web site.  
<http://www.cefas.co.uk/data/fisheries-information/ageing-fish-.aspx>