

# Age and Growth

By: Samantha Delaney (Mentor: Dr. Earl Meredith NMFS Cooperative Research)

AFS Hutton Scholar

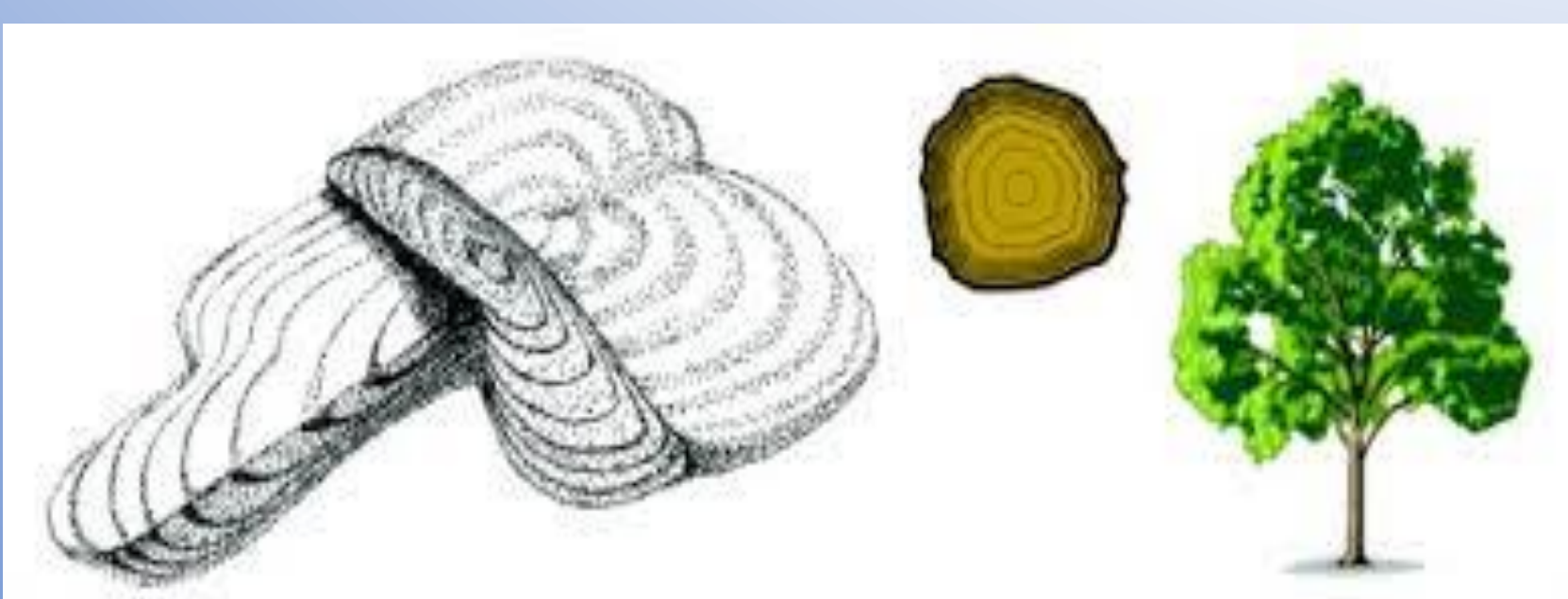
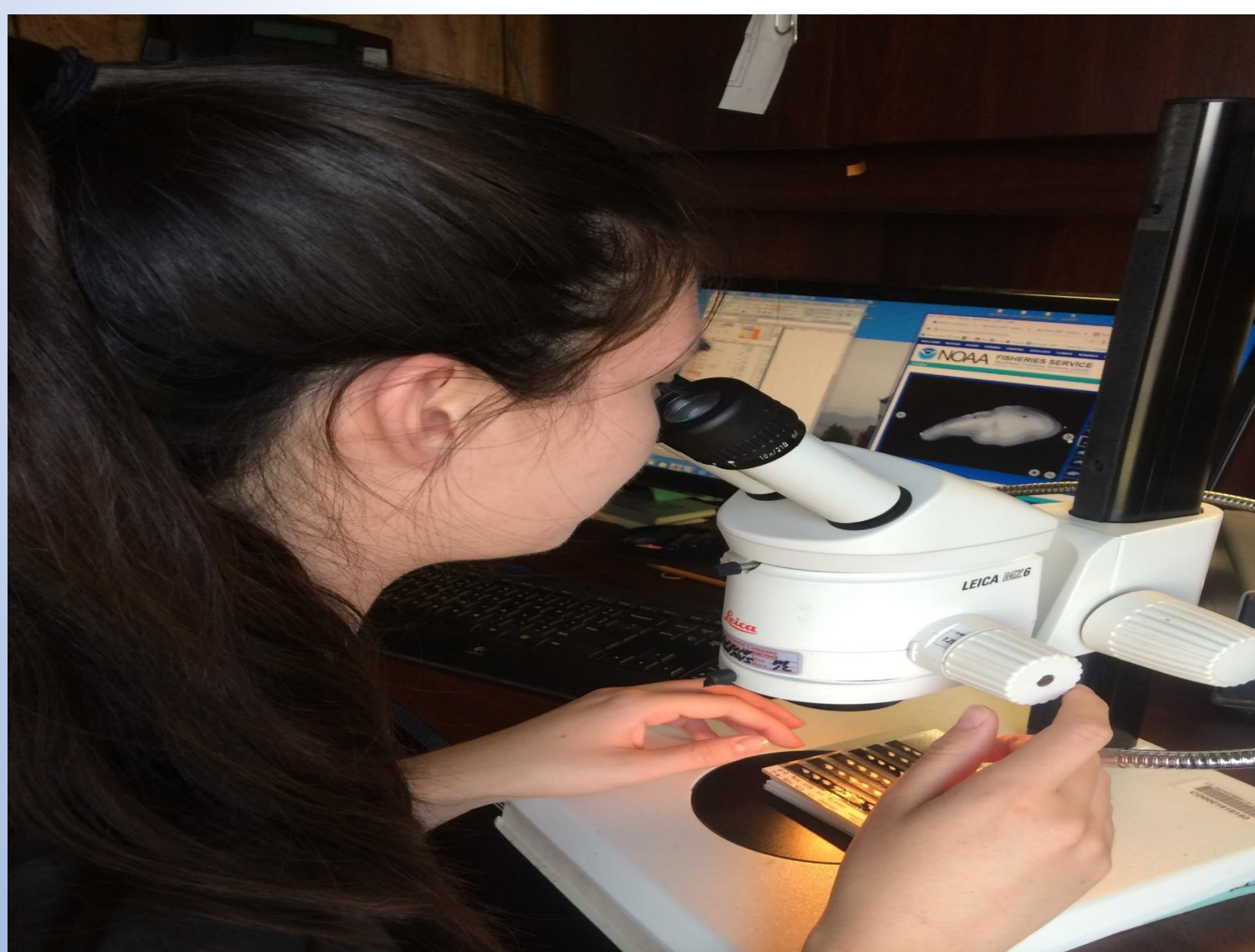
Northeast Fisheries Science Center/ Greater Atlantic Region

August 2015

The age and growth of fishes are important because it provides an integrated assessment of environmental and endogenous conditions affecting fish. Although there are several methods for aging fish, the most common method is examining the hard parts of the fish. The hard parts of the fish that are used include scales, otoliths, fin spines, fin rays, cleithra, vertebrae, opercular bones, and dentary bones. For my age and growth lab, I examined fish otoliths, hard, calcium carbonate structures located directly next to the brain of bony fishes.

Otoliths can be obtained by making cuts to the top of the fish's head or by going through the gills of the fish. For commercial fisheries, port samplers go to fish auctions and take otoliths from the different kinds of fish available. Since these fish are going to be sold, most samplers collect otoliths by making incisions through the gills because this does not damage the fish as severely as making incisions through the head of the fish. Otoliths are normally collected from a sample of at least one hundred fish. Once otoliths are collected they are put in small coin envelopes that are marked with the type of fish, boat that caught the fish, sex, and length in centimeters. Once the otoliths have dried for a few days, they are shipped to labs to be examined.

**Fun Fact: Sexual maturity varies greatly in fish. Some fish like lake sturgeon can take up 25 years to mature while it only take some fish a few months to reach their adult size.**



Once the otoliths arrive at the lab, their nuclei are labeled with a pencil and they are lined up on a tray. After the tray is completely full, an epoxy gel is poured over the tray of otoliths. Once the gel dries, the otoliths can then be cut. They are cut into thin slices that are then attached to a microscope slide. After this step, the otoliths can now be observed under a microscope for counting annuli.

Otoliths continue to build up a calcium coating as the fish continues to age. Annuli show the increments of growth which changes speed with the seasons. Otoliths have alternating hyaline and opaque bands. Hyaline bands represent periods of active growth and opaque bands represent periods of slow growth. Fast growth tends to occur in the spring and summer while slow growth tends to occur in the fall and winter. One hyaline and adjacent opaque band compose one year of growth. The age of the fish is determined by counting the opaque bands under a microscope. All fish are given the birthday of January 1 to approximate the age of the fish. Aging fish is very similar to aging trees; Trees also have rings that indicate approximately one year of growth.

Why do we age fish? With all the data collected from aging fish, we can see trends over time. It takes years of data to see these trends. Regulations can then be made that tell fisherman of what size fish they can catch. Ideally, we want fishermen to catch fish that have reached sexual maturity and have spawned at least once if not multiple times to replace the fish population that is being caught.