

SUSTAINABLE U.S. SEAFOOD: WHAT'S SCIENCE GOT TO DO WITH IT?

Join NOAA Fisheries Service in this five-part series to learn about the science behind responsibly managed U.S. fisheries.

Age matters!

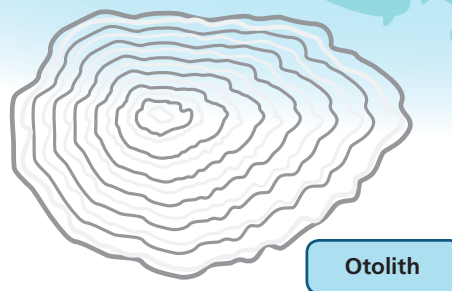
Yesterday we learned one method of how scientists estimate population size. Today let's find out what may influence the size of a fish population. One obvious way is if a fisherman harvests too many fish. But in the U.S., fishery managers create catch limits that tell fishermen how many fish they can harvest in a year or in a season. Do you think how old a fish gets is important?

Fishery scientists have learned that knowing a fish population's age structure means knowing how old the fish can get, how many individuals in the population are at each age and how old a fish is when it first spawns. Scientists have learned that some fish grow fast and live less than 10 years, and other fish grow slow and live to be over 100 years old. This means that some species may become mature enough to spawn at a young age, such as less than 6 years old. Other species may not spawn until they are over 20 years old.

Why is this important to sustainable seafood? Age is important to know because a sustainably harvested population means not harvesting fish when they are too young or too old. Both would decrease the size of future populations.

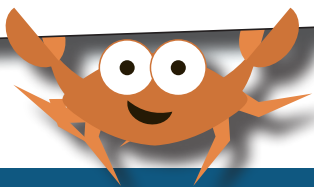
How do scientists age fish?

They use otoliths! Similar to trees, otoliths have rings that can be counted. What are otoliths? Otoliths are hard, calcified structures located in the ear of a fish. Their function is to help the fish detect sounds, and provide a sense of balance as the fish swims. Otoliths are good for aging because a new layer is added to it almost every year throughout the life of a fish. Unlike tree rings, otolith rings are generally more faint and irregular to see, making them harder to count.



Otolith

Data collection: Scientists collect otoliths and other biological data from many species of fish and from both sexes during research surveys in the cold waters off Alaska. Otoliths are preserved in small jars filled with ethyl alcohol.



Let's do science!

Let's help the scientists interpret the age structure of fish harvested by three different boats.

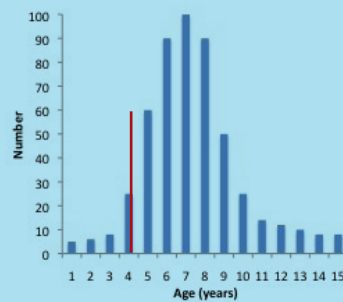
Look at the three graphs below. The graphs show the age structure of fish caught by three different boats.

All three boats were fishing for pollock in the Bering Sea. Scientists want to know which of these boats has the most sustainable harvest strategy.

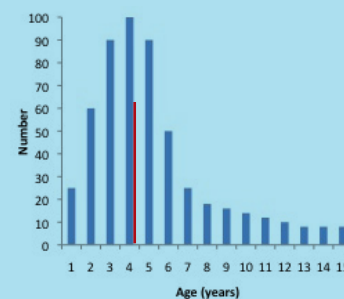
Scientists have two pieces of information for pollock: their maximum age is about 17 years old and they are reproductively mature or begin spawning at age 4 (line on graph).

Armed with this information, look at the graphs and answer the following questions:

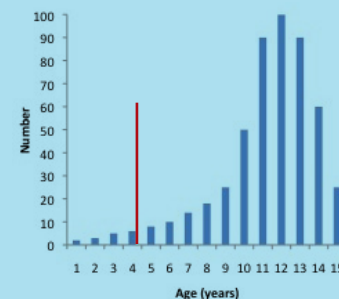
- Which boat is catching mainly older fish?
- What happens if the boat continues to fish out the older fish of a population?
- Which boat is catching mainly younger fish?
- What happens if the boat continues to fish out the younger fish of a population?
- Which boat is harvesting middle aged fish? Do you think this is more sustainable? Why?



Boat 1



Boat 2



Boat 3

Explanation:

Boat 1 is catching fish that are middle-aged, Boat 2 is catching fish that are too young, and Boat 3 is catching fish that are too old.

ACTIVITIES

- Learn how to read an otolith: <http://www.afsc.noaa.gov/refm/age/interactive.htm>
- Plot age data from Alaska: http://www.afsc.noaa.gov/refm/age/dynamic_maps/agemap.html
- For more information email: afsc.outreach@noaa.gov



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