# How Old Is That Fish?

WALLEYE/ Eric Engbretson/USFWS

***By Jeff Lee Hansbarger***

How old is that walleye? How long do bass live? Why would anyone want to know this and how does one determine the age of fish? As my fellow DNR fisheries biologist Mark Scott once wrote, "Fish don't come with a birth certificate!" For an angler, it is interesting to know just how old the fish you caught might be, or how long it may live. For me, an assistant district fisheries biologist, and other biologists within the DNR, this knowledge will enable us to better manage the sport fisheries of the state. Derived age and growth data used in conjunction with length and harvest data from creel surveys help us estimate mortality and survival, and to follow changes in fish populations. By determining these parameters we are able to better manage the state's sport fisheries for today's anglers and for future generations.

Scientists can use many methods and different parts of a fish to accurately estimate age depending on the species, the need and other factors. In the past, scales were used frequently. But scales can be re-absorbed by fish during times of stress and can also contain inaccurate checks or marks that could confuse a reader assigning age estimates. Spines, fin rays and even vertebrae offer alternative structures to assign age estimates to fish through various procedures.

The preferred method of aging fish currently is the use of otoliths (small calcified earstones) found within the fish's inner ear. *Oto* means bone, and *lith* means to scribe, so as its root words point out, otolith means a bone or calcified structure containing marks or information. As with scales, these structures are removed from fish


Mark A. King/ Virginia Commonwealth University

*Transverse section of a smallmouth bass otolith. One year's growth equals a light band (summer growth) and dark band (winter mark or annuli) together.*

and taken back to a lab and processed according to our division protocols. But, unlike scales, once material is deposited in an otolith, it is never reabsorbed during the fish's life and continues to grow as the fish grows. Otoliths therefore represent the most accurate structure available to fisheries managers for assigning age estimates to fishes.

Back in the lab, we clean the sampled otoliths, section them, polish the new exposed face and view them under a microscope to assign age estimates to individual fishes. What we view under the scope is approximately the same as tree growth rings. They are interpreted the same way a forester assigns ages to trees. Within a sectioned otolith, the record of a year's growth is made up of both a translucent (or clear) zone and a narrower opaque (or darker) band. The dark band is called the annulus and, in our region of the country, is formed by the fish during slow growth periods during cold weather. Due to fish being cold-blooded, growth is highly correlated with temperature.

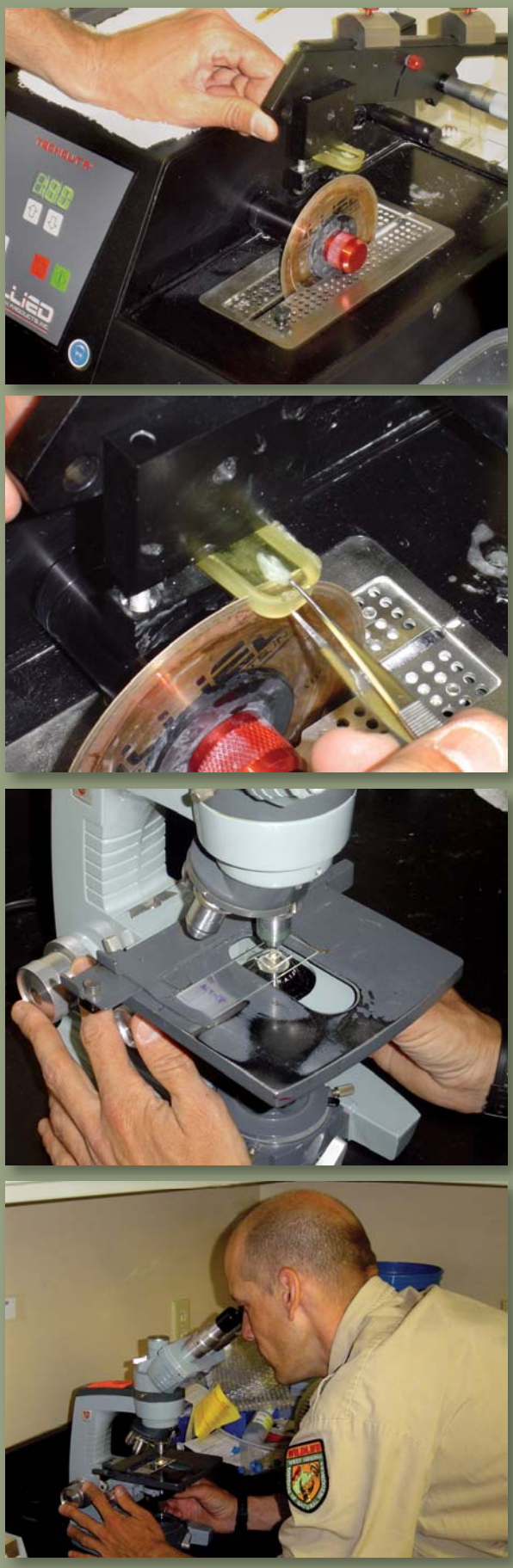
To accurately assign age estimates we must also establish that the annular "marks" are in fact marks occurring on a yearly basis -- this is termed validation. Once validated, confirmed annular rings in each otolith can be added and each fish assigned an age estimate. In the course of a year, hundreds or even thousands of otoliths will be viewed and read by DNR Wildlife Resources Section staff to enable us to understand the characteristics of a given fishery in a particular body of water. The next step is to analyze this derived information and to incorporate it into current fisheries management for a specific fish species and/or for a specific body of water.

Accurate age and growth information is vital for successful fisheries management. Together with other DNR staff, we use age and growth data to determine how long fish live, their maximum length and weight, and other information. We also construct tables and keys that relate average size and population levels for all ages of various species.

Another piece of information derived from age and growth data is the age at which fish first spawn. Many times we establish regulations to allow the females in a given population the opportunity to spawn at least once or twice before being recruited into a legal fishery. Without age and growth data and associated information, biologists would have no idea what this size or age would be! For example, we have proposed to set a 24" size restriction on walleye in Moncove and Charles Fork lakes in 2008. Female walleye spawn at 4 to 5 years of age, which equals roughly 24 inches in West Virginia reservoirs.

The aim of this regulation would be to create a quality walleye fishery, and ultimately to provide a source of walleye broodstock for our hatchery system. So, the next time you read the state fisheries regulations and wonder about their content, realize that much work went into them to establish what limits and regulations are correct for that species and body of water.

*Jeff Hansbarger is assistant district fisheries biologist stationed at McClintic WMA.*



*From top, otoliths are imbedded in a plastic resin and sectioned using a low speed saw. Sections are then mounted on microscope slides and viewed under a microscope for age estimation.*