

You Can Judge a Fish by Its Cover

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YOU CAN JUDGE A FISH BY ITS COVER

By WILLIAM T. BRYSON and
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Photographs by Bryson

EVER catch a prize fish and ask: How old is it? How fast did it grow? Or perhaps a Commission employee has asked to measure your fish and remove a few scales. What could be learned from a tiny scale? Amazingly enough, a single scale can reveal a surprisingly large amount about a fish.

First of all, a scale will reveal the age of a fish, and probably the length at any year of the fish's life. For fish such as salmon that spend part of their lives in fresh water and part in the ocean, the scale will tell how many years the fish spent in fresh water, how many in the ocean, and even when it returned to fresh water to spawn.

How does a scientist determine all these things? Un-

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Maximum Age of Fish

SPECIES	AREA	MAXIMUM AGE
Largemouth Bass	North	14-16
	Central, South	9-12
Smallmouth Bass	North	14-16
	Central, South	9-12
Walleye	North	15-16
	South	10-12
Crappie		4-7
Bluegill		5-8
White Bass		2-5
Brook Trout		19

Length (Inches) of Fish at Various Ages

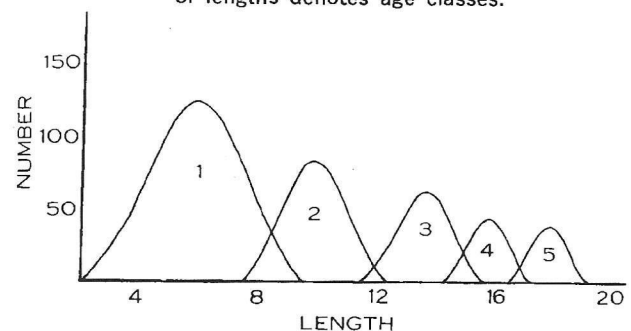
SPECIES	AGE						
	1	2	3	4	5	6	7
Largemouth Bass	2-8	4-12	5-15	7-19	10-21	11-24	12-25
Smallmouth Bass	2-7	5-11	7-14	9-16	11-19	13-21	
Walleye	4-10	9-16	11-20	13-23	15-26	16-28	
Black Crappie	2-5	4-11	6-12	8-13	9-13	11-14	12-15
Bluegill	1-6	3-7	4-8	5-9	5-9	5-9	6-9
White Bass	3-12	6-15	10-17	11-18	15-19	17-19	
Rainbow Trout	2-10	5-16	7-20	9-23	10-28		
Brook Trout	3-7	5-9	5-12	6-14	6-16		
Landlocked Striped Bass	4-9	9-16	14-20	17-23	20-27	24-31	27-35
Channel Catfish	2-6	4-11	6-16	7-18	9-21	10-21	11-24



Commission photo by Kesteloo

like mammals which stop most growth after reaching maturity, fish continue to grow throughout their life. However, being cold-blooded, and having the same temperature as the water, fish become less active in winter when water is colder. As a fish grows, its scales also grow by laying down bony ridges called *circuli*. During periods of slow growth, such as winter, the ridges crowd together. With the onset of rapid growth in spring they are formed farther apart. The boundary area between the close- and wide-spaced ridges is the year mark, or *annulus*. By counting these year marks, the age of the fish is determined.

Typical length-frequency distribution, showing how grouping of lengths denotes age classes.

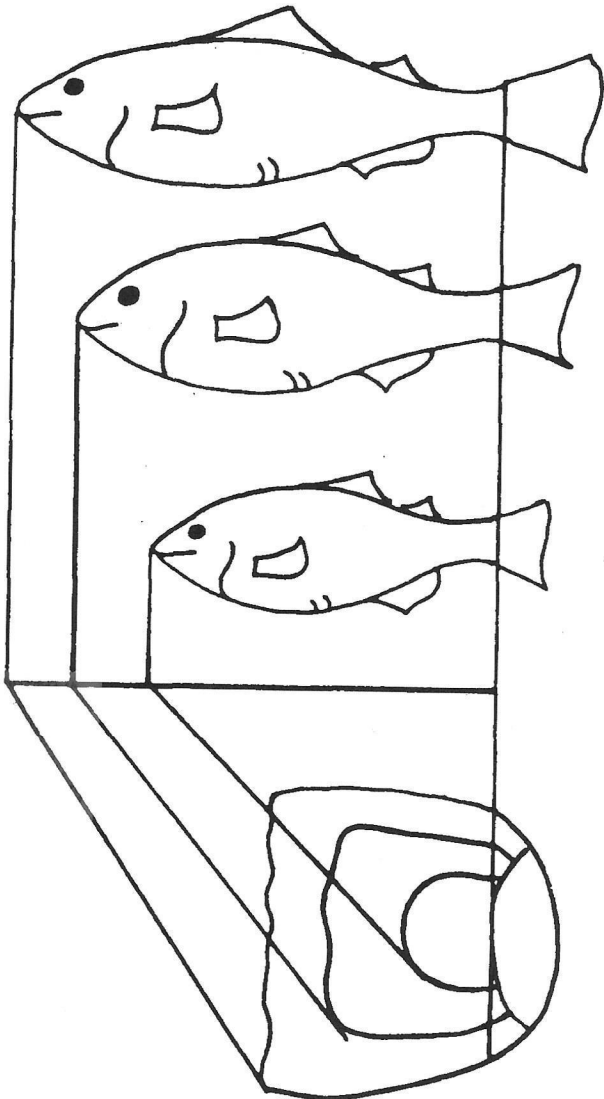


If for some reason the use of scales is not possible, other bony structures, such as otoliths (ear bones), vertebrae, or catfish spines may be used. These structures, like scales, show rings caused by varying growth rate.

Another common method of aging is the length-frequency technique. When a large number of fish are measured, their lengths tend to clump together around certain points. Each of these groups is usually a year class of fish. All three to four inch fish may be yearlings, those five to six inches, two year olds and so on.

Factors affecting the growth of fish are numerous. Changing temperatures vary the length of the growing season, with fish in the South having a longer growing season than those in the North. Food supply is also important. Closely related to this is population density, which increases competition for available food. Various chemical components of the water alter growth rates.

The growth of the scale is proportionate to the growth of the fish, which allows the length at any age to be calculated.



These may be chemicals which directly affect the fish or those chemicals which influence the basic productivity of the water and thus affect the food supply of the fish. The genetic composition of the fish, which produces separate *strains* of the same species, affects growth. The Florida largemouth bass grows faster than other southern largemouths, not only because of the longer growing season, but also because it is a separate strain.

Just how much will a fish grow each year? There are wide variations within a single species. One interesting point concerning growth is that slower-growing individuals tend to live longer than those having rapid growth. Fish having ideal growing conditions grow quickly, but do not live as long as smaller, slower-growing fish of the same species. So your lunker may be a fast-growing youngster rather than an old "mossback." Although fish grow throughout their lives, their growth rate slows in later years.

What is the maximum age for a fish? Fish in captivity will survive longer than wild fish because of better living conditions. Fish that live longest are the sluggish, shallow-water dwellers which can adapt to extreme changes in water conditions, such as carp and sturgeon. The oldest wild fish on record, a sturgeon, was 152 years old, but this age is questionable. In aquaria, sturgeon have reached the age of 69 and carp the age of 38. At the other extreme, a species of goby lives only one year. And then there is the tale of the "Emperor's Pike." Said to have been caught in a lake in Württemberg in the year 1497, the fish had a copper ring around the gill area saying that Emperor Frederick II put the fish in the lake in 1230—267 years before its capture! Adding to the story, this pike was supposedly 19 feet long and weighed 550 pounds. Unfortunately, or perhaps fortunately for the storyteller, today's aging methods weren't available to verify this "overgrown" fish story.

Enlarged photograph of a scale from an eight-inch bluegill showing annuli and circuli.

