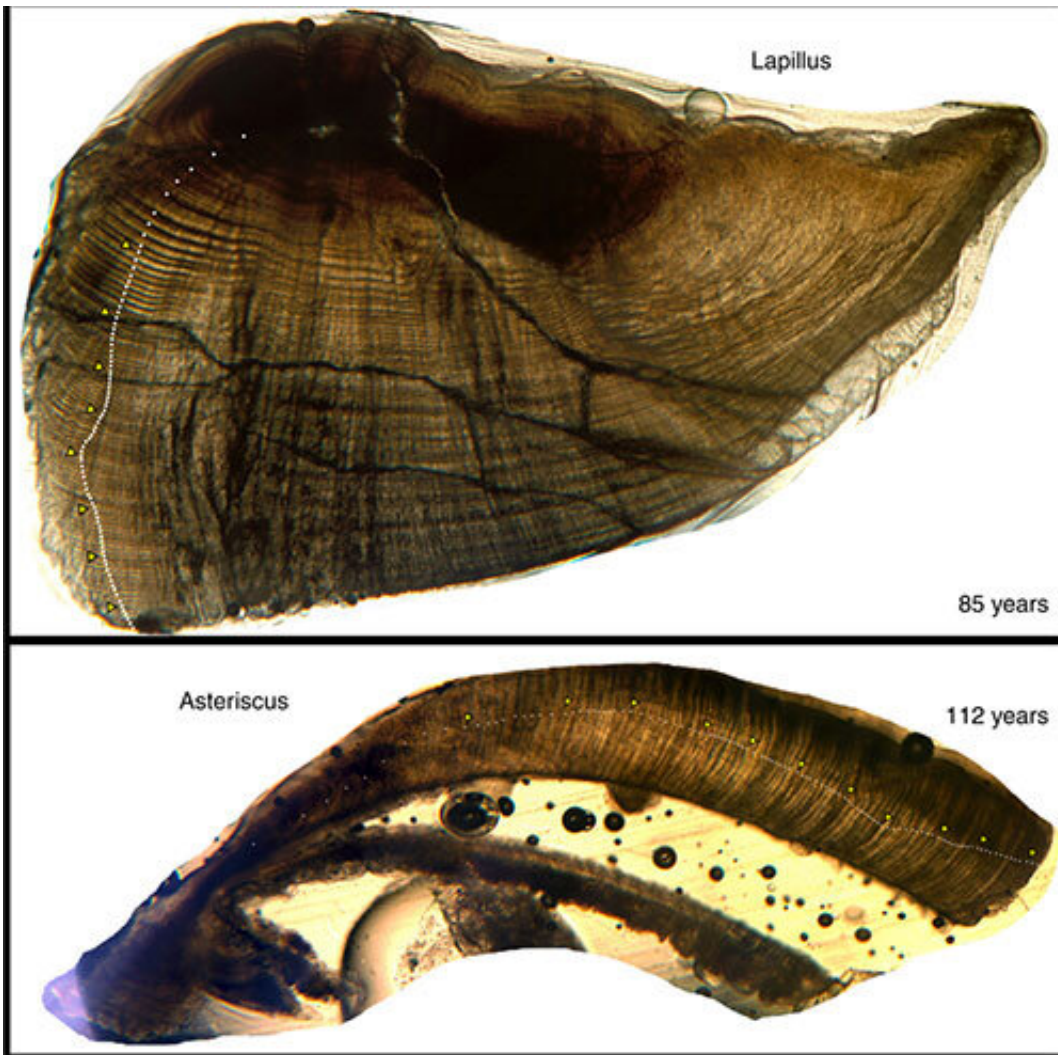


# Research proves Midwestern fish species lives beyond 100 years

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Credit: Lackmann, et. al 2019

Research recently completed at North Dakota State University has proven that the Bigmouth Buffalo (*Ictiobus cyprinellus*), a fish native to North America, lives more than eight decades longer than previously thought. The study published in *Communications Biology* documents several individuals more than 100 years of age, with one at 112 years, which more than quadruples all previous age estimates for this species. In addition, many populations were documented to be 85-90% comprised of individuals more than 80 years old, suggesting unsuccessful reproduction since the 1930s. The Bigmouth Buffalo is now known as the longest-lived freshwater teleost (a group of approximately 12,000 species) and the oldest age-validated freshwater fish (a group of about 14,000 species).

A research team led by Alec R. Lackmann, Ph.D., Department of Biological Sciences at NDSU, recently published their work about aging the [fish](#) (Lackmann, Andrews, Butler, Bielak-Lackmann, & Clark 2019. "Bigmouth Buffalo *Ictiobus cyprinellus* sets freshwater teleost record as improved age analysis reveals centenarian longevity." *Communications Biology*).

## **Methodology**

In order to determine the age of the fish, the team employed a relatively new approach utilizing thin-sectioned otoliths (stones from the inner ears of the fish) and carbon dating of a sequential set of microsamples from individual otoliths. Otoliths are present in the ear anatomy of most fish [species](#) and they grow continuously as a fish ages. Traditional methods of aging fish by counting rings on scales and fin rays (similar to the process of aging trees) placed a typical age for Bigmouth Buffalo at 5 to 20 years. One very small study of Bigmouth Buffalo in Oklahoma published in 1999 found a maximum age of 26 years via thin-sectioned otoliths. Lackmann et al. 2019 utilized bomb radiocarbon dating to validate their otolith readings of Bigmouth Buffalo from Minnesota.

This radiocarbon dating method shows time-specific markers in living creatures that are a result of the bomb-produced radiocarbon from atmospheric thermonuclear testing in the 1950s and 1960s. Using this method, the team conclusively validated their otolith age readings of Bigmouth Buffalo. Nearly 400 fish were aged in the study with five exceeding 100 years and the oldest at 112 years of age. Nearly 200 fish were aged in their 80s or 90s.



90 year old male Bigmouth Buffalo showing orange pigmentation spots. Credit: Alec Lackmann

### **Cultural impact**

Found in 22 states across the upper Midwest and into Canada, Bigmouth Buffalo have historically been a part of human culture. The Minnesota county and city name of Kandiyohi means "where the buffalofish come;" the city of Buffalo, MN is named after the fish; and Lewis and Clark harvested them during their famous journey. The fish has been a commercially valued product since the 1800s and a fishery in the upper Mississippi Basin places a value on their harvest at more than \$1 million

annually.

Despite their historic commercial food importance, today Bigmouth Buffalo are often incorrectly grouped with other invasive species of "rough fish" such as the Bighead Carp, Silver Carp, and Common Carp. While superficially similar in appearance to those species, Bigmouth Buffalo actually serve an important ecological role by displacing and keeping these invasive species in check, and belong to an entirely different family. In addition, the filter-feeding Bigmouth Buffalo consume other invasive creatures such as larval stage Zebra Mussels (Lackmann et al. in preparation).

## **Virtually unregulated harvest**

While Bigmouth Buffalo were given special concern status in the 1980s and their harvest remains regulated to this day in Canada, Bigmouth Buffalo harvest in the United States today is almost totally unregulated with no limits established in almost every state. Traditionally unpopular with anglers, the fish has rapidly become a premier (and easy) target for bowfishers given recent legal changes in the past 5-7 years that have allowed night bowfishing and an extended season that includes their vulnerable spawning period.

"We need to start recognizing Bigmouth Buffalo for the native, ecological asset that they are", said Lackmann. "Our neglect of under-appreciated, native species needs to be addressed immediately. For example, the term 'rough fish' should be eliminated from harvest regulation terminology because it promotes an inappropriate, negative image for the native species lumped together with real invasives. Our research has shown that the Bigmouth Buffalo is one of the longest-lived vertebrates. That alone is something worth preserving and understanding. Among [freshwater fish](#), the Bigmouth Buffalo is quite exceptional, and they deserve some protection like many other native species in North

America have already achieved. The Bigmouth Buffalo could be treasured one day."

**More information:** Alec R. Lackmann et al. Bigmouth Buffalo *Ictiobus cyprinellus* sets freshwater teleost record as improved age analysis reveals centenarian longevity, *Communications Biology* (2019). DOI: [10.1038/s42003-019-0452-0](https://doi.org/10.1038/s42003-019-0452-0)

Provided by North Dakota State University

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