American Currents

Publication of the North American Native Fishes Association

Volume 48 Number 4 Fall (October) 2023

(See Contents page.)

IN THIS ISSUE:

The North American Native Fishes Association

Est. 1972 — John Bondhus, founder

Mission: The North American Native Fishes Association (NANFA) is dedicated to the appreciation, study and conservation of the continent's native fishes. NANFA is a 501(c)(3) not-for-profit, tax-exempt corporation chartered in the State of Maryland. The purposes of the organization are: • to increase and disseminate knowledge about native North American fishes; • to promote practical programs for their conservation and the protection/restoration of their natural habitats; • to advance the educational, scientific and conservation benefits of captive maintenance and husbandry; • to encourage the legal, environmentally responsible collection of native fishes for private aquaria as a valid use of a natural resource; and • to provide a forum for fellowship and camaraderie among its members.

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An archive of *American Currents* articles from 1972 through the current year can be found at http://www.nanfa.org/ac2.shtml

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Gerald C. Corcoran (Deceased)

Casper Cox

Ray Katula

Fritz Rohde

Christopher Scharpf

Konrad Schmidt

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CONTENTS

FRONT COVER: Kentucky Arrow Darter *Etheostoma spilotum,* one of two new darter species in Kentucky (see page 28) (Photo by Matt Thomas)

BACK COVER: A Rainbow Darter *Etheostoma caeruleum* painted by Violet Binkley.

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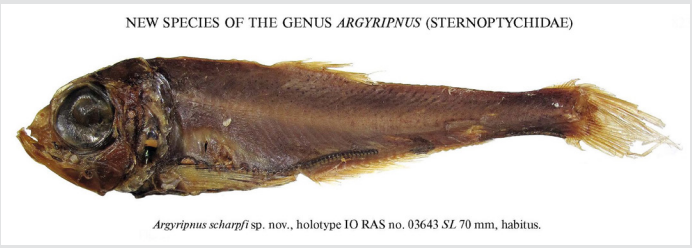
NANFA News

MEMBERS, EVENTS, ACCOMPLISHMENTS, AND ADMINISTRIVIA

CHRISTOPHER SCHARPF RECEIVES A VERY RARE HONOR!



Argyripnus scharpfi sp. nov., holotype IO RAS no. 03643 *SL* 70 mm, habitus.

Scharpf, a NANFA Fellow and *AC's* Editor Emeritus, got word in August 2023 that a new species had been named in his honor. *Argyripnus scharpfi* is a marine hatchetfish (Sternoptychidae) known only from one specimen trawled in April 1971 from the northwestern Pacific Ocean. It was described by Artem Prokofiev, an ichthyologist with the Russian Academy of Sciences, in *Voprosy Ikhtiologii* (Journal of Ichthyology).

Chris wrote, "the photo [above] shows a specimen that turned brown from decades in formalin. In life it was silvery, perhaps with a pearly sheen (from guanine in the scales), with bioluminescent photophores. The etymology section of the description reads: 'The species is dedicated to Christopher Scharpf, the author of the ETYFish project (www.etyfish.org).' I've been fascinated by fish names ever since opening a copy of William T. Innes' *Exotic Aquarium Fishes* sometime in the early 1970s and discovering that the Black Mollies and Coolie Loaches I kept in a 10-gallon aquarium had formal, 'scientific' names. I was 10 or 11 at the time. I never could have imagined then that one day a fish would be named after me. Thank you, Artem, for the unexpected honor.

"The fish even looks like me!"

SEVERAL NEW NANFA STATE REPS ANNOUNCED

California: Phil Farrell

I live in Placerville, a small town between Sacramento and Lake Tahoe. I've been keeping natives since I caught a stickleback in my local creek and thought it was a prehistoric fish that would make me a world-famous ichthyologist at 12 years old! I began working with fish out of high school at a local pet store and continued through college in San Diego, when I opened my own pet store (Tropical Fish World) and made my first collecting trip to Sulawesi. My wife and I eventually moved to south Florida, where I worked for Dolphin International Ltd importing fish from South America. I eventually left that job and collected native marine tropicals for a living until I got sick and had to quit all work for a multi-organ transplant, after which I began working more with exotic mammals. For much of my life I have raised exotics animals like cheetahs, zebras, and binturongs, over 25 species of ground birds (such as ibises, storks, cranes, true wild type Guinea fowl, and birds like ocellated turkeys that were so expensive I had to sell servals to pay for them!

I never lost my love of fish and went from mainly rainbowfish with a few natives to all natives today. My NANFA membership has spanned from the 80s until now. I was the editor for a while, bringing color to *AC* for the first time, though it was primitive compared to today's version! I have long maintained a large library, which I've cut way back to include only titles on North America (and only print books, as there is no substitute!)

Illinois: Dylan Bane

I am a teacher and coach in Rockford and I am proud to be the new NANFA Rep for our fine state. *I am excited!* My interests mainly center around ethical collection, transport, acclimation, and care of our native fishes in aquaria, although I've come to appreciate many more aspects of native fishes during my time with the organization. My favorite fish of all time is the Pirate Perch *Aphredoderus sayanus*. I collected some in North Carolina and South Carolina and keep a tank with them in my basement fish room.

I look forward to expanding our organization's following by hosting "Collection Cookouts" and other outreach opportunities in various locations around the state. My goal is for at least two or three events each year. Illinois is a tall state, so I am thinking of doing one northern event, one central event, and one southern event. I use the NANFA Facebook group for a lot of my communication, although I also use Instagram (intermittently). If you'd like to join us on future excursions, feel free to reach out and I'll add you to our outreach list!

Can't wait to hear from some of you and get our nets wet!

South Carolina (Coastal): Jake Wade

I am a resident of Charleston, South Carolina, and bring a wealth of knowledge and enthusiasm to NANFA. I have a bachelor's degree in Wildlife and Fisheries Management from the University of Tennessee. I am dedicated to conserving and understanding the native fish species found throughout the South. I enjoy helping individuals of all ages learn and appreciate the intricate web of life in their local environments. My hope is to educate and inspire others to join me in preserving the natural wonders that surround us.

NANFA FELLOW AND *AC* CO-EDITOR KONRAD SCHMIDT RECEIVES A WELL-DESERVED AWARD!

"We are very pleased to announce that Ramsey-Washington Metro Watershed District is awarding you, Konrad Schmidt, with the 2023 Watershed Excellence Award: Conservation Champion.

"Since you left the DNR as a fisheries biologist, you have invested significant personal time and money to complete important and valuable fish research in RWMWD, the metro area and the state. Your advocacy for quality lake and stream management that

improves habitat for fish and all native organisms, and your talents and in-depth knowledge are unique and impressive. You have given a strong voice to the importance of native fish communities as vital indicators of water quality and biological integrity.

"Your work has contributed significantly to calling attention to Minnesota's native nongame fish, many of which are rare, threatened and relatively unknown. You documented that a relative of the Walleye—Rainbow Darters—which are normally residents of streams with clear water and sandy bottoms, live in Lake Phalen, the only lake in the world supporting this fish species. I remember hearing about that a number of years ago and was amazed by this discovery.

"You go to great lengths to share your knowledge and educate community members and field experts. We applaud your dedication and volunteerism! We look forward to your future publishing of a book that documents the results of your many years of high-quality professional level work.

"We will be honoring you and six other Watershed Excellence Award winners at Ramsey-Washington Metro Watershed District's annual Recognition Dinner/Award ceremony on the evening of Thursday, November 16, from 6–9 PM at Keller Golf Course Clubhouse in Maplewood.

"Congratulations!"

Sage Passi, Watershed Education Specialist"

Way to go Kon!!

MISSOURI AQUARIUM SOCIETY TRIP WITH BOB HRABIK

In June, Bob Hrabik led a collecting trip for the Missouri Aquarium Society (MAS) to Dardenne Creek, where they found 30 species that included the first record of Mud Darter *Etheostoma asprigene* in the stream. One participant exclaimed this was the best Father's Day gift for her husband! Bob wrote an article about the trip for the MAS newsletter, *The Darter,* where he included a plug for NANFA. Bob is also the author of *Fishes of Missouri.* This has been a many-year tome and he recently wrapped up the final draft. The book will contain awesome photos of Missouri fishes that are now available in a poster series. Please see ordering information below.

MISSOURI CHAPTER OF THE AMERICAN FISHERIES SOCIETY (MOAFS) FUNDRAISER

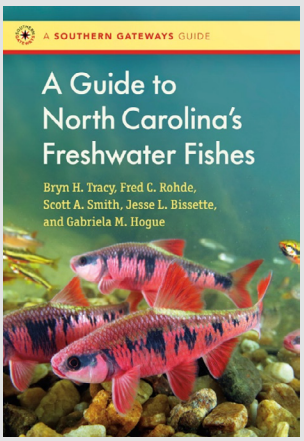
The Missouri Department of Conservation has given MOAFS permission to use the wonderful fish photographs provided by Lance Merry and Bob Hrabik that will appear in the upcoming revision of *Fishes of Missouri*. These posters are not only a fundraiser, but also an opportunity to showcase the many beautiful and often under-appreciated fishes found in Missouri's waters.

A 16-poster set compiles the current scientifically accepted fish species found in Missouri and can be purchased for $80.00. Each of the unique posters within the 16-poster set can be purchased individually for $10.00. A bulk buying discount is available: first 5 posters at $10.00 each and any additional posters at $5.00 each. A $10 charge for shipping will be added to all orders up to 1 full poster set. Additional shipping costs will be added to larger orders.

Posters can be viewed and ordered from the following link: http://www.moafs.org/posterform.html.

For questions on ordering contact Eric Rahm at eric_rahm@hotmail.com or 573-418-0035.

A GUIDE TO NORTH CAROLINA'S FRESHWATER FISHES



NANFA members Bryn Tracy, Fritz Rohde, and Scott Smith, along with Jesse Bissette and Gabriela Hogue, are happy to announce that their book will be released in March 2024. You can get a 30% discount by pre-ordering from UNC Press and using the code 01UNCP30 at checkout. The book is over 460 pages long and has 546 full-color images of all freshwater fishes found in North Carolina and a map for each species. Pre-order yours at: https://www.uncpress.org/book/9781469678115/a-guide-to-north-carolinas-freshwater-fishes/

WELL DESERVED BRAGGING RIGHTS

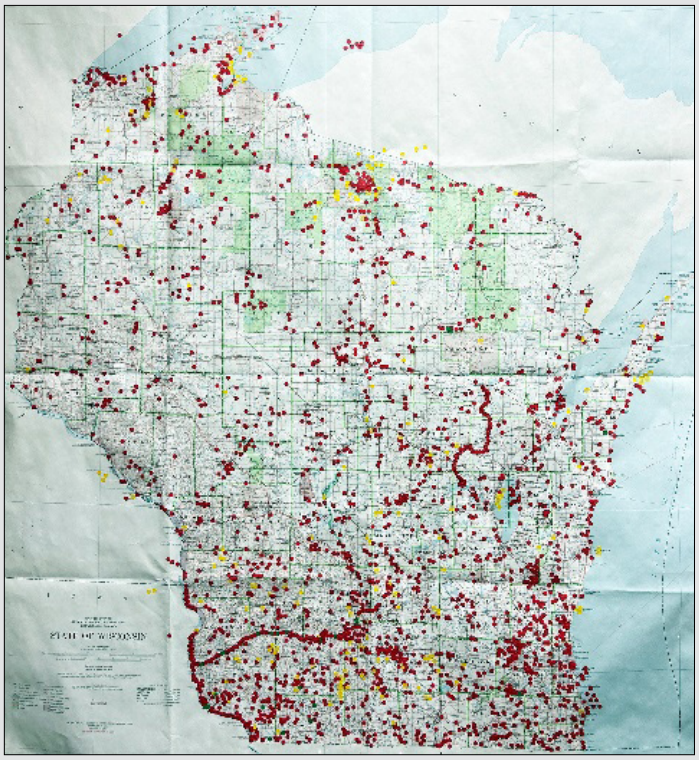
NANFA members pursue widely varying interests. Many anglers and micro-anglers keep life lists of species they have caught. Some hold contests to see who can catch the most species at a location (e.g., the annual Roughfish Round-up in Minnesota). Others, such as Brian Zimmerman (Ohio), hold diversity challenges online. Aquarium hobbyists like Ray Katula (Wisconsin) compile impressive lists and data on species they have propagated in captivity.

Konrad Schmidt's "Collecting Native Fishes 101" (*AC,* Summer 2023) included a map of his Minnesota survey locations over almost 50 years. John Lyons (Wisconsin) enjoyed the article and provided an equally impressive map of his Wisconsin collections. John has also surveyed (and angled) extensively throughout the US, including Hawaii, and intensively in Mexico for several decades.

Surveying Wisconsin's fishes from August 1979 through the present, John has visited about 200 different lakes and 1,200 different streams for a total of about 2,500 discrete stations visited at least once. Total site visits (i.e., sampling events) approach 5,000. His estimated total catch is over half a million fish and includes all 159 species still extant in the state (and, outside the state, the five species eliminated from Wisconsin). Before retiring from the

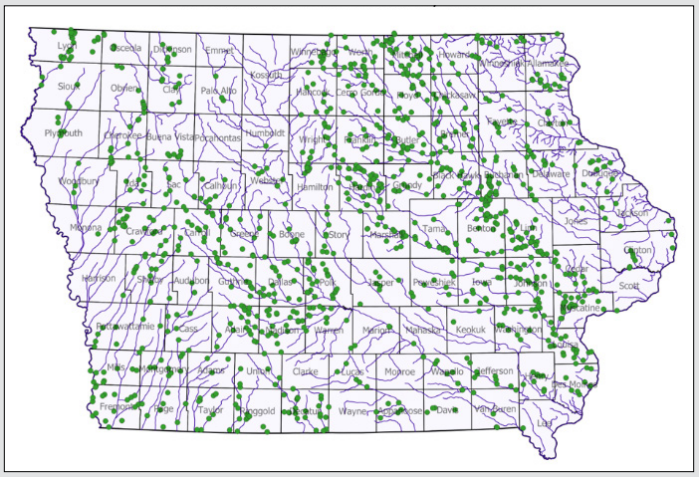
NANFA News, continued

WDNR, he had entered about half of his personal records in a database and believed he would quickly finish it. He soon realized there are much more enjoyable ways to spend one's golden years.



John Lyons' collection locations in Wisconsin, 1979–2023.

Having seen Konrad's and John's maps, John Olson (Iowa) was curious about his numbers. He's made about 1,280 stream/river collections in Iowa over the last 43 years. Overall, he has collected 121 of Iowa's 144 extant species, mostly during his time at Iowa State University in the early 1980s and as part of a stream classification project in the early 1990s when he was with Iowa DNR. Although he made very few collections between 1995 and 2010, the number of surveys per year picked up considerably after he met Konrad in 2009. John says his fascination with fish distributions and changes in those distributions over time is what keeps him collecting fish, even well into retirement.

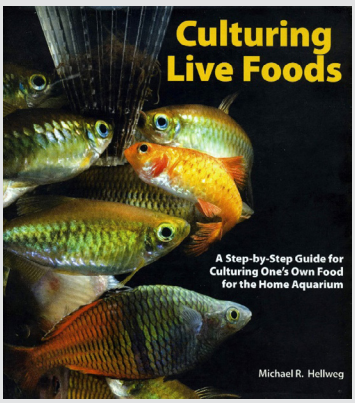


John Olson's Iowa fish collections, 1981–2023.

FIRE UP THE PRESSES! SUCKERS IN THE NEWSPAPER

AC's Design and Layout Editor Olaf Nelson (Illinois), a lover of redhorses and all the so-called "rough" or non-game native fishes, was featured in the *Chicago Sun-Times* on October 7, 2023. Olaf enjoyed the chance to share his appreciation of the sucker family with Chicagoland. Outdoor columnist Dale Bowman set out to write about sucker identification, one of Olaf's favorite topics (see his free redhorse ID cheatsheets on moxostoma.com), but they spoke for almost two hours about the importance of scientific management of native species, threats to diverse aquatic ecosystems, new discoveries about the life histories of various sucker species, and the changes beginning in Minnesota that will (hopefully) do away with the term "rough fish" and update native fish management practices that have been in place for over a century. A lot didn't fit in the space available, so we hope for a sequel. Are there any other major, big-city newspapers that will devote a two-page spread to suckers? This might be the only one (and it was not the first time Bowman has given so much space to under-appreciated fishes). See: https://chicago.suntimes.com/2023/10/6/23906053/suckers-respecting-native-fishes-fishing-redhorses

DRAGNETTING FOR A LONG OVERDUE AND NEEDED AMERICAN CURRENTS ARTICLE



A search of the *AC* archives (http://www.nanfa.org/ac2.shtml) reveals that the last article published about culturing live foods for natives was "Ceriodaphnia—A Newly Discovered Live Food" by Nancy Garcia in 1988. Live foods can be the success or failure in the initial rearing of newly hatched fry and conditioning adults for spawning. There have been many books written on the topic (e.g., *Encyclopedia of Live Foods* by Charles O. Masters and *Make and Grow your Own Tropical Fish Foods* by Gary C. Sutcliffe). Many NANFA members are quite accomplished at spawning and rearing native fishes and raising live foods for them. Maybe one of you will consider hammering out an article. The editors would very much appreciate your submission. Another good option would be a review of Michael Hellweg's 2008 book, pictured above.

Oklahoma is home to about 175 species of fish, including **Golden Topminnows, Bluehead Shiners, Creole Darters, Red River Pupfish, Cardinal Shiners, Banded Pygmy Sunfish, Paddlefish,** and **Alligator Gar.** This high species number is due largely to Oklahoma's varied climate, geology and topography, all of which contribute to its high habitat diversity. Although few people realize it, Oklahoma is **one of only four states with more than 10 ecoregions** (or broad habitat types) and, **per square mile, is the most habitat-diverse state in the contiguous United States**.

NANFA's 2024 Convention will be held in far southeast OK where the Ouachita Mountains meet the Gulf Coastal Plain. This area holds **the state's most diverse fish assemblage** and **both upland and lowland species** can be collected within a short drive of each other. **Species likely to be encountered include Orangethroat, Orangebelly, Slough, Cypress, Dusky, Channel, Harlequin and Creole darters, Western Starhead and Golden topminnows, Banded Pygmy, Longear and Bantam sunfish, Flier, Ouachita Mountain Shiners, and Grass Pickerel**.

The park is holding **30 cabins** for NANFA members until **March 1, 2024.** They cost approximately $115 – $170/night and can hold multiple guests. The Beavers Bend Lodge is holding **27 rooms** for NANFA members until **April 6, 2024.** They cost approximately $132 (2 queens) – $185 (suites). **Any cabins or rooms not reserved with deposits by the deadlines will be released.** Cheaper rooms are available in Broken Bow and Idabel. A new Choctaw Nation Lodge, scheduled to open in April, might be a good option. We're also working on a few low-cost (maybe even free) rooms for students approximately half an hour away. Beavers Bend State Park has seen a dramatic increase in visitation the past few years and is the most-visited state park in Oklahoma. **Rooms and cabins will fill quickly, so please make reservations as early as possible.**

Beavers Bend State Park Cabins (where the meeting room is): **580-494-6300.**

Beavers Bend Lakeview Lodge (a few miles away): **580-494-6179.**

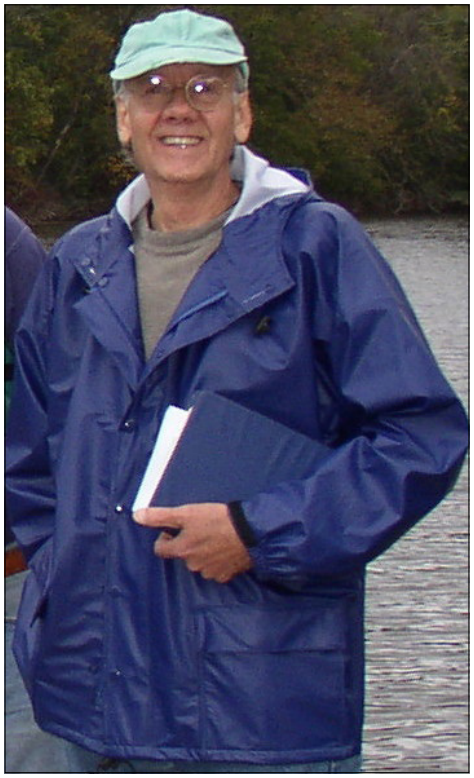
Or reserve at **https://www.travelok.com/state-parks/beavers-bend-state-park**

MY MEMORIES OF DR. ROBERT E. JENKINS

Bryn Tracy

Apex, North Carolina

As we age and become more mature, we reach that point in life where we fear receiving that dreaded telephone call or e-mail informing us that someone we love, a dear friend, or a colleague has passed. Upon receiving such a message, memories come flooding back of the brief time you spent with that person. I received such an e-mail several weeks ago informing me of the passing of Dr. Robert (Bob) E. Jenkins (February 9, 1940–July 12, 2023), Professor Emeritus at Roanoke College, Salem, Virginia.



I knew Bob only during the last quarter of his life. I first met Bob sometime during the early 2000s when he was making frequent visits to the North Carolina Museum of Natural Sciences to study specimens of *Moxostoma* with Dr. Wayne C. Starnes. At that time, I had begun investigating the distribution of introduced sucker species in the Yadkin River basin in North Carolina, which ultimately led me to learning everything I could about Edward Drinker Cope (1840–1897) and his contributions to North Carolina ichthyology. I had so many questions to ask Bob and he was always unselfish in sharing his knowledge of the freshwater fishes of North Carolina and Virginia and the history of southeastern ichthyology. More often than not, I would quit asking questions and just sit back and listen to Bob impart his ichthyological knowledge and his storied life experiences. He was such a great story teller, and his remembrances of events that happened decades previously were as sharp as if the event had happened just yesterday. When he would answer one of my countless e-mails, he would never reply back with a short sentence or two but would write quite a few paragraphs in much detail.

Several times I visited Bob at his home—I don't think I ever saw his office on campus—to talk about Cope (Bob was a self-proclaimed "Copephile"), an atlas of North Carolina fishes that was being compiled, an undescribed species of *Cyprinella* that Bob had worked on decades earlier but still had an interest in its formal description, or just to see how he was doing. Bob's modest house was spotless, his office/library in his refurbished basement was meticulously organized where he kept his life's work on the fishes of Virginia and *Moxostoma* suckers; everything organized by manilla folders and 3x5 cards in his ever-so-neat hand writing. For lunch or dinner, we always went to Mac and Bob's, one of his favorite restaurants, where he enjoyed a well-made margarita and literally everybody knew his name and knew he was the "fish" guy. In 2018 I visited Bob and, rather than talking about the atlas, Bob thought it was time better spent driving that afternoon to visit the Yellow Sulphur Spring Hotel near Christiansburg, Virgina, a place that Cope had visited in the 1860s. Along the way, I attentively listened as Bob conversed about Cope's and Jordan's (David Starr Jordan, 1851–1931) surveys of southwestern Virginia in the late 1800s.

I was fortunate to accompany Bob in the field in North Carolina several times looking for an undescribed species of *Moxostoma,* known as "Carolina" Redhorse, in the lower Yadkin River and Cape Fear River basins, or an introduced population of Roanoke Hog Sucker *Hypentelium roanokense* in the upper Yadkin basin, or Robust Redhorse *Moxostoma robustum* and Black Redhorse *M. duquesnei* in the upper Broad River basin. On such occasions, Bob would show up a little bit behind schedule driving his vehicle with the *Salmo* license plate with two of his favorite bands—the Grateful Dead or Pink Floyd—blaring from the speakers. Bob was an avid fan of these two bands, and we even went to a Dark Star Orchestra concert in Raleigh in the mid-2000s where Bob danced the night away on the floor with the rest of the swirling Dead Heads.

On one very memorable occasion, Bob came to our rescue when a hiking companion of mine hurt his knee near Dragon's Tooth on the Appalachian Trail (AT), northwest of Salem. I hitched a ride into Salem where I then walked to Bob's house in the rain, surprising him as he answered the front door. Bob graciously drove me back to the trailhead where we picked up my brother and our friend and then drove us more than 50 miles to where we had earlier that week parked our car near Peaks of Otter. Bob's AT shuttle service that day was more than 100 miles, free-of-charge!

Although I knew Bob for only a short time during his life, he was a dear friend and a mentor. Luckily, we were able to publish two papers together:

- Tracy, B.H. and R.E. Jenkins. 2021. Professor Edward Drinker Cope's travels through North Carolina, August–December 1869: Insights from the transcriptions and annotations of letters to his father and his contributions to North Carolina Ichthyology. Southeastern Fishes Council Proceedings No. 61. 65pp.; and
- Tracy, B.H., R E. Jenkins, and W.C. Starnes. 2013. History of fish investigations in the Yadkin Pee Dee River drainage of North Carolina and Virginia with an analy-

Bob preserves what might be the type specimen of *Moxostoma* sp. "Carolina" Redhorse, Little River (Yadkin River basin).

Bob preserving another specimen of *Moxostoma* sp. "Carolina" Redhorse, Deep River (Cape Fear River basin).

sis of nonindigenous species and invasion dynamics of three species of suckers (Catostomidae). Journal of the North Carolina Academy of Science. 129:82–106.

Regretfully looking back, we all wish we had spent more time with our friends, colleagues, and loved ones. But when I think of Bob, I will always remember him as: "One more specimen, one more seine haul, let's boat and backpack electrofish just a little longer and a little farther;" or as Dead Heads would sing: "a little bit further than you gone before." With Bob, "what a long, strange trip it's been."

REMEMBERING ROBERT E. JENKINS

Konrad Schmidt

St. Paul, Minnesota

I never met Bob, but we got to know each other well through countless emails and phone conversations. Our first introduction was definitely awkward. I had provided an image of a Greater Redhorse for a Chippewa National Forest report on sensitive species found there. Bob would always find anything and everything about redhorses, and he had a copy of this report. He called to introduce himself and went straight to the point: "I'm not trying to be a smart ass, but the image on the cover of the report is actually a River Redhorse." I was very much aware of Bob's reputation as "the" expert on suckers and especially redhorses. Of course, I was taken aback by his remark but knew I had to hear him out. On the defensive, I told him another biologist and I counted the scale rows around the caudal peduncle and we both got 16 scales, and that separated the redhorse on the cover of the report from other Minnesota red-finned redhorse species. He agreed this is what is written in keys, but other subtle characters he learned from examining many specimens for his research clearly made this fish a River Redhorse. His nail in the coffin that convinced me was that two percent of the specimens he examined had 16 scale rows. This was the first of many times I found that fish keys are not infallible. I was in awe of Bob's identification skills—infinitely superior to us mere mortals—and from then on, I refered to him as the god of redhorses. Bob later assisted me in correcting the Minnesota Department of Natural Resources' (MDNR) State Record Fish files. This time the species that Bob determined was misidentified, again by photos alone, was actually a Greater Redhorse that was initially identified as a Shorthead Redhorse by MDNR biologists. I and others were suspicious because, at almost 14 pounds, it was nearly twice the size of the world record. A two-pound Shorthead is a trophy in Minnesota! After that, Bob also "dethroned" two earlier record-holders before getting to the true state record Shorthead. Bob's expertise with fishes was unmatched, but he was always dismayed that others could not see what he saw in specimens. He possessed a unique gift and filled an important niche as a one-of-a-kind information resource. Thank you, Bob!

EIGHT WAYS TO NAME A FISH: A NATIVE FISH ENTHUSIAST'S GUIDE TO ZOOLOGICAL NOMENCLATURE

Christopher Scharpf

The ETYFish Project

I've been fascinated with the Latin (or scientific) names of fishes ever since picking up a copy of William T. Innes' *Exotic Aquarium Fishes* when I was a kid in the early 1970s.

My father dabbled in keeping tropical fishes, as did my oldest brother, who eventually tried his hand at saltwater aquaria when that hobby was still in its infancy. I enjoyed watching the fishes, but I also enjoyed thumbing through the pages of my father's one and only aquarium hobby book, a 1950s edition of Innes' classic reference.

The clarity of Innes' prose and the quality of the printing amaze me to this day. I love the book's dark green leatherette cover featuring an image of three *Rasbora* (now *Trigonostigma*) *heteromorpha* stamped in gold (Figure 1). I love the glossy pages and delicate typography. I love Innes' photography, austere black-and-white plates for most species, and hand-painted photos for many of the more-colorful ones. And I love the fact that the book introduced me to interesting aquarium fishes from right here in the USA, including the Everglades Pygmy Sunfish *Elassoma evergladei*.

Perhaps most of all I loved the fact that Innes provided name etymologies for the species he included. This was my introduction to zoological nomenclature. Not only did I learn (at a very early age) that each and every fish had a unique Latin or latinized name, but also that these names had meanings, that they told us something about the fish or the scientist who named it.

Fast-forward three decades. From 2005–2009, I published the five-part "Annotated Checklist of North American Freshwater Fishes" for *American Currents*. In addition to distribution, conservation status and other data, I also sought to indulge my fascination with fish names by including the name etymology of every included genus and species. That's when I noticed that while North America has arguably the most-studied, best-documented fish fauna in the world, the meanings of the names of these fishes were, in many cases, poorly or incorrectly known. This was especially prevalent in the names of fishes described in the 18th, 19th and early 20th centuries.

Take, for example, the specific name of the Bluegill *Lepomis macrochirus*, described by the French naturalist Constantine Samuel Rafinesque (1783–1840) in 1819. Using Greek and Latin dictionaries, it's easy to discern that the specific epithet is a combination of two words: *macros*, latinized from the Greek μακρός, meaning long or large, and *chirus*, latinized from the Greek χειρός, meaning hand. In other words, "large hand." According to *The Fishes of Tennessee* by Etnier and Starnes (1994), the name is "probably in reference to the body shape." While the Bluegill can be said to be superficially hand-shaped, that is not a definitive explanation. Consulting another excellent fish book, *Fishes of Alabama* by Boschung and Mayden (2000), one gets a different but still inconclusive explanation: "apparently alluding to its long opercular flap, its long pectoral fin, or the outline shape of its body."

Figure 1. The book that introduced me to zoological nomenclature: my father's copy of *Exotic Aquarium Fishes* by William T. Innes. (I don't know the exact date or edition; the copyright pages fell out a long time ago.)

This article is adapted from "Adventures in Etymology," Christopher Scharpf's presentation at the 2023 NANFA Convention in Columbia, South Carolina, and his essay "A Fish-centric Guide to Zoological Nomenclature," available at The ETYFish Project website, etyfish.org.

I was surprised that one of the most common and widely distributed fishes in North America had a scientific name whose meaning at which professional ichthyologists could only guess.

Certain that Rafinesque had a specific meaning in mind when he coined the name, I consulted the original paper in which it was proposed. Thanks to the Internet, I quickly located a digitized copy of volume 88 of *Journal de Physique, de Chimie et d'Histoire Naturelle* from January 1819. There, on page 420, Rafinesque wrote (in French) that *Lepomis macrochirus* differed from the Green Sunfish *Lepomis cyanellus* in having longer pectoral fins that reach the anal fin. In ichthyological parlance, a "hand" is homologous to the pectoral fin.

I had learned a valuable lesson when it comes to understanding the scientific names of fishes. Do not rely on secondary sources, such as regional "Fishes of …" books, no matter how good they are. Instead, *always begin with the original publication in which the name was proposed*.

THE ETYFISH PROJECT IS BORN

When I "retired" from editing *American Currents* in 2009, I started to dig around the etymologies of names of fishes from other parts of the world. Were they as poorly known as North America's? The answer was a resounding "Yes!"

Nowadays, clearly stating the etymology of a name is a standard part of new-taxa descriptions, but that was seldom the case for plants and animals described in the 18th, 19th and early 20th centuries. I am not sure why. Most biologists back then were classically trained in Latin and Greek, so maybe they thought it unnecessary to translate the names they coined. But even when you know the literal meaning of the name (e.g., "large hand"), how it applies to the fish is still often enigmatic. This intrigued me. A taxonomist devoted time and thought into describing a fish and assigning it a name, so the name must have a meaning. I wanted to pin that meaning down, like an insect to a mounting board. And not just North American fishes. All fishes (excluding fossils). In every class, order, and family. From every sea, river, brook, bay, billabong, continent, and country.

A new research project quickly took shape, one that no one else in the world had worked on or even attempted to work on, at least on such a large scale. I started with hagfishes and lampreys, worked my way through the sharks and rays, and on through the Order Cypriniformes (carps, minnows, suckers, loaches, etc.). Roughly 9,500 names. Ken Lazara, a prominent killifish hobbyist, Research Associate at the American Museum of Natural History, and fellow fish-name enthusiast helped me in the early stages until his health took a debilitating turn for the worse. (Ken passed away in 2020.)

In October 2013, I posted online the etymologies I had completed so far and officially announced The ETYFish Project (etyfish.org). Also, at that time, I started writing and posting at the site and on Facebook the "Name of the Week," a short essay documenting my "adventures in etymology." In September 2021, I completed my first pass through all the fishes. As of this writing, the ETYFish Project website covers 608 families, 5,256 genera, 342 subgenera, 35,760 species, and 488 subspecies. If you were to print all the PDFs I've posted online, you'd need a lot of paper: 2,365 pages.

Why am I doing this? Because I enjoy it. Because no one else has done it before. Because in my own small way I am contributing to ichthyological history. And, if I may borrow the famous answer English mountaineer George Mallory gave when asked why he wanted to climb Mount Everest, "Because it's there."

THE ETYMOLOGY OF ETYMOLOGY

Before I delivered the presentation version of this article at the 2023 NANFA Convention, I rehearsed it in front of my wife Stephanie. Her first comment was, "You need to add a slide that explains the term 'etymology.' Not everybody is a word geek like you." And so I did.

Etymology is the study of the origin of words and how their meanings have changed throughout history. It's a combination of the Greek word *etymon* (ἔτυμον), meaning "true sense or original meaning," and the Greek suffix *-logia* (-λογία), "a branch of learning."

ANATOMY OF A SCIENTIFIC NAME

Scientific names are sometimes referred to as "Latin" names. Since Latin was the language of scholarship in 18th-century Europe, scientific names were originally written in Latin or in latinized Greek.

A scientific name must always be shown in *italics*, underlined (now rare but common in typewriter days), or else set apart in some fashion so that you know it's a scientific name. The generic name (the genus) always starts with a capital letter; the specific or trivial name (the species) is always lower case. Sometimes the generic and specific names are the exact same words, e.g., *Catostomus catostomus* (Forster 1773), the Longnose Sucker. These names are called tautonyms. Interestingly, tautonyms are prohibited in botanical nomenclature.

Often you will see scientific names with the author's name and the date of authorship following it. An author is the person (or persons) who first officially proposed the name in a publication. Often the author's name is given in parentheses (as in the Forster example in the paragraph above). This means that the species has been assigned to a genus other than the one in which it was originally described. (Forster originally named the sucker *Cyprinus catostomus* thinking it was a type of *Cyprinus*, or carp.)

When a species is divided into two or more subspecies, a third word is added to its name. The third name of the nominate, or original, form of the species repeats the specific name, as in *Esox americanus americanus* Gmelin 1789, the Redfin Pickerel. Any subsequently described subspecies are assigned a third name that's different, as in the Grass Pickerel, *Esox americanus vermiculatus* Lesueur 1846.

FORMING NAMES: A FEW SIMPLE RULES

The rules for coining or forming a scientific name, as codified by the International Commission on Zoological Nomenclature (ICZN), are actually quite simple.

1. The name must be written in the Latin alphabet (as opposed to Arabic, Chinese, and other languages that employ a different lettering system).
2. The name must be at least two letters long. Numbers and diacritical marks are not allowed. (But hyphens are okay; e.g., the North American minnow *Erimystax x-punctatus*, named for its x-shaped spots.)

3. The name must be pronounceable. *Tahuantinsuyoa macantzatza* (a cichlid from Peru) may be a tongue-twister, but that's okay. Naming a fish "*dpjjlyzpyk*" is not.
4. The name must be non-offensive. No profanities and no racial, ethnic, sexual, political, and religious slurs or connotations. Naming a fish after someone who harbors racist or other offensive views (as many animals were in 19th- and early 20th-century America, when such views were the norm among educated elites) is acceptable (begrudgingly, in my opinion) as long as the description does not explicitly honor the person for such views.
5. The name is unique among animals. No two genera of animals can have the same genus name, and no two species within the same genus can share the same trivial epithet. For example, let's say you wanted to name a new species of darter in honor of 2023 Convention organizer Dustin Smith, "*Etheostoma smithi*." Well, you can't, because there already is an *Etheostoma smithi*, the Slabrock Darter, described by Page & Braasch in 1976. In order to honor Dustin, you'd have to be a bit more creative. "*Etheostoma dustinsmithi*," perhaps.

That's it, really. Coining a name for a new genus or species isn't all that complicated. Knowing and proving you have a genus or species that *warrants* a new name, however, is another matter entirely.

EIGHT WAYS TO NAME A FISH

An ichthyologist sits in her lab examining a fish that represents a new genus, a new species, or perhaps both. What to name it? She considers the fish itself for inspiration. What's the first thing you notice about it? What makes it different from other fishes? Where is it from? How does it spawn? Or maybe she considers something not about the fish but about herself. Who does she love? Who does she admire? Who nurtured her interest in ichthyology? What were the circumstances, personal or professional, that led to *this* fish ending up in *her* lab awaiting its formal inclusion in the grand registry of Life on Earth?

Whatever name she decides upon, it will likely fall into one of these eight broadly defined categories: Descriptive. Biological. Systematic. Anthropocentric. Commemorative. Toponymic. Vernacular. And a miscellaneous category called Nonsensical. These are informal categories of my own invention based on my analysis of over 42,800 currently valid genus- and species-level fish names. There is a lot of variation within these categories, and some names borrow elements from more than one. My objective in delineating these categories is simply to illustrate—and in so doing take pleasure in—the many ways ichthyologists have named the fishes of the world.

Below are examples that illustrate the eight types of names. Since this is NANFA, examples (except for two) are from the fresh waters of North America.

1. DESCRIPTIVE NAMES

Descriptive names are those that refer in some way to a physical characteristic possessed by the genus or species in question. This could be color, color pattern, size (Figure 2), shape, anatomy, proportion, peculiarity, general appearance, and more.

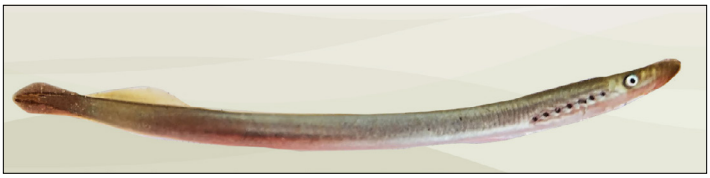


Figure 2. Some descriptive names refer to a fish's size. The specific epithet of the Miller Lake Lamprey *Entosphenus minimus* (Bond & Kan 1973) is the Latin word for "least." Up to 15.4 cm, it's the smallest known parasitic lamprey in the world. (Photo by Benjamin Clemens, Oregon Department of Fish and Wildlife, used with permission)

Most zoological epithets are descriptive in nature. That's what "describing" a species is all about. While many such names indicate a diagnostic character that helps to distinguish a taxon from its nearest relatives, this is not a requirement. If spots are the most noticeable feature of a fish, but all of its closest relatives are spotted as well, there's no rule against naming it *maculatus* or *punctatus* (both Latin adjectives meaning spotted)—assuming, of course, those names have not already been used in the genus.

Some descriptive names are easy to understand. The Black Bullhead *Ameiurus melas* (Rafinesque 1820) is named *melas* (latinized from the Greek μέλας) because it is black. But others require a little more work. The common name of the Rainbow Darter *Etheostoma caeuruleum* Storer 1845 may refer to its delightful combination of colors, but its specific epithet, Latin for sky blue (or blue in general), refers to one color in particular: the blue on the cheeks and sides of breeding males.

Many descriptive names refer to a particular aspect of a fish's anatomy. Rafinesque (he of the Bluegill mentioned above) proposed the hogchoker genus *Trinectes* in 1832. Numerous books and websites will tell you that *Trinectes* is a combination of *tri-*, the Latin prefix for "three," and the Greek *nḗktēs* (νήκτης), meaning "swimmer." What most references fail to explain is what "three swimmer" actually means. (Does the fish swim in groups of three?) The answer lies in Rafinesque's one-sentence description: "… it has only three fins, dorsal, anal and caudal." Clearly, Rafinesque referred to the fact that the specimen he examined (now known as *T. maculatus*) lacked pectoral fins (although present but rudimentary on some specimens) and, therefore, had only three fins with which to swim.

Some descriptive names are subjective in nature, reflecting the author's opinion of the appearance of the fish rather than any measurable, quantifiable character. The specific name of the Gilt Darter *Percina evides* (Jordan & Copeland 1877) is Latin for "pretty." The authors called it "one of the most beautiful of all the darters." I agree.

Many fishes are named for their similarity to other fishes. Many (but not all) such names include the latinized Greek suffix *-oides*, meaning like, resembling, or having the form of. Here are three examples. The specific epithet of the Goldeye *Hiodon alosoides* (Rafinesque 1819) means that the fish resembles the shad genus *Alosa*. The Blackbanded Sunfish *Enneacanthus chaetodon* (Baird 1855) is named for its resemblance (superficial, in my opinion) to the marine butterflyfish genus *Chaetodon*. The Trout-perch genus *Percopsis* Agassiz 1849 is a combination of

Figure 3. The Greek word for bull or ox (*boũs,* βοῦς) is often metaphorically used to mean "big." The Bigeye Shiner *Miniellus boops* (Gilbert 1884) is named for its large *ṓps* (ὤψ), or eye. The name is pronounced boo-ops and not boops (as in Betty Boop). (Photo by Uland Thomas)

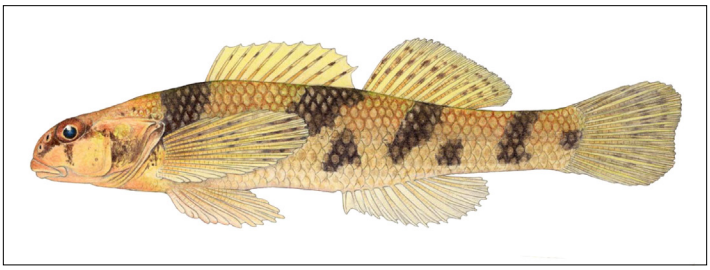


Figure 4. The specific epithet of the presumed-extinct Maryland Darter *Etheostoma sellare* (Radcliffe & Welsh 1913) is Latin for "saddled," referring to its four dorsal saddles. (Illustration by David Neely)

Figure 5. The Bridle Shiner *Notropis bifrenatus* (Cope 1867) is named (*bi-*, two; *frenatus,* bridled) for the black bridle-like preocular bars that unite across the snout. But why two instead of just one? Cope also described an orange band above the black one, so maybe that was bridle #2. (Photo by Fritz Rohde)

the Latin *perca* (originally from the Greek *pérkē*, πέρκη), meaning "perch," and the Greek *ópsis* (ὄψις), meaning "appearance," i.e., perch-like, with the adipose fin of a salmon and the jaws and ctenoid scales of a perch.

Fishes may also be named for non-fish animals (Figure 3). This practice is found in virtually every language and dates to the ancient Greeks, indicating that it was common to name unfamiliar fishes based on their resemblance to familiar animals that live on land, including dogs (*canis*), cats (*felis*), pigs (*porcus*), horses (*equinus*), zebras (*zebrina* and *quagga*), weasels (*mustelinus*), hedgehogs (*erinaceus*), eagles (*aquila*), guinea fowl (*meleagris*), parrots (*psittacus*), snakes (*ophis*, *serpens* and *vipera*), frogs (*batrachus*), butterflies (*papilio*), and many others. No one as far as I know has named a land animal after a fish.

Names that compare fishes to everyday objects are also common. Zoological nomenclature began in the day when horses were the primary mode of transportation, which may explain why saddles (Latin, *sella*) and bridles (Latin, *frenum*) are often evoked in fish names proposed in the 18th and 19th centuries. Among all the fishes of the world, I count at least eight named for the saddle-like markings on their backs (Figure 4) and 18 for the bridle-like markings on the sides of their heads (Figure 5). Other items common in these times are also well-represented, including knives (*culter*), swords (*xiphos*), saws (*serra*), plowshares (*vomer*), and wool cards (*carminifer*, i.e., bearing a wool card). Do you think any contemporary ichthyologists will name a fish after a gadget that's in vogue today? Earbuds, maybe? A webcam? A wireless gaming mouse?

2. BIOLOGICAL NAMES

Many fishes are named for some aspect of their biology: how they eat, what they eat (and what eats them), how long they live, how they swim, which habitat they prefer, if and when they migrate, and so on. Biological names presuppose that the describer has observed the fish in life (in an aquarium or ideally in the wild), but this isn't always the case. Inferring behaviors from dead specimens in jars has led to at least one unfortunate name. (This example is not from North America but it's too good to pass up.) In 1897 German-Dutch zoologist Max Weber (1852–1937) named an African minnow *Barbus* (now *Enteromius*) *viviparus,* believing it represented the first documented instance of viviparity (giving birth to live young) amongst an otherwise oviparous (egg-laying) group of fishes. In 1943, South African zoologist Keppel Harcourt Barnard (1887–1964) set the record straight when he discovered that fry with yolk sacs from a mouth-brooding cichlid, presumably collected at the same time, had been preserved in the same tube as the minnow! Although a misnomer, the name remains nomenclaturally valid. (See below for more misnomers.)

Unlike *Enteromius viviparus*, these five examples of specific epithets based on behavior or life history are all biologically accurate:

- Pit-Klamath Brook Lamprey *Entosphenus lethophagus* (Hubbs 1971); *léthē* (Gr. λήθη), forgetfulness, and *phagus*, latinized from *phageín* (Gr. φαγεῖν), to eat, i.e., not eating, referring to non-parasitic adults, which do not eat before they spawn and die
- Blueback Herring *Alosa aestivalis* (Mitchill 1814); *aestivalis* = Latin for "of the summer," presumably referring to its later spawning run compared with the spring spawning run of *A. pseudoharengus* (Mitchill called it the "Summer Herring")

- Freshwater Drum *Aplodinotus grunniens* Rafinesque 1819; *grunniens* = Latin for "grunting," referring to the drum-like sounds that resonate from its swim bladder
- Blackstripe Livebearer *Poeciliopsis prolifica* Miller 1960; *prolifica* = Latin for "prolific," referring to its production of frequent broods (as many as six per month)
- Guardian Darter *Etheostoma oophylax* Ceas & Page 1992; *ōón* (Gr. ᾠόν), egg, and *phýlax* (Gr. φῠλᾰ́ξ), guard, referring to the tenacious egg-guarding behavior of breeding males.

North America is teeming with fishes named for their habitat. Here are five examples from among many:

- Sea Lamprey *Petromyzon marinus* Linnaeus 1758; *marinus* = Latin for "of the sea," referring to its marine habitat (as a non-breeding adult)
- Longnose Dace *Rhinichthys cataractae* (Valenciennes 1842); *cataractae* = Latin for "of a cataract or cascade," i.e., waterfall, described from a specimen collected near Niagara Falls
- Torrent Sucker *Thoburnia rhothoeca* (Thoburn 1896); *rhóthos* (Gr. ῥόθος), rushing, and *eco-*, from *oĭkos* (Gr. οἶκος), house or home, referring to its preference for swift water
- Brook Trout *Salvelinus fontinalis* (Mitchill 1814); *fontinalis* = of or belonging to a *fontana* (Latin), spring or fountain, referring to its fondness for cold, spring-fed water
- Bear Lake Whitefish *Prosopium abyssicola* (Snyder 1919); *abyssus* (Latin), bottomless pit or abyss, from *ábyssos* (Gr. ἄβυσσος), the deep sea, and *-cola* (Latin), dweller or inhabitant, referring to its occurrence near the bottom in the deeper waters of Bear Lake at the Utah-Idaho border.

A handful of biological names refer to a fish's abundance or scarcity in the wild. The specific name of the Rio Grande Sucker *Pantosteus plebeius* (Baird & Girard 1854) is Latin for "commonplace," referring to its abundance in the 1850s (it is far less abundant today). The La Trinidad Pupfish *Cyprinodon inmemoriam* Lozano-Vilano & Contreras-Balderas 1993 vanished from existence shortly after its discovery in 1983. It occurred in Ojo de La Trinidad, an isolated desert spring in Nuevo León, Mexico. The spring was already drying up, so the authors collected only a single specimen to minimize impact, intending to collect additional specimens later. Upon their return in 1986, the spring was dry due to water extraction, and the species was gone. "*Inmemoriam*" is Latin for "in memory."

3. SYSTEMATIC NAMES

Systematics is the science of naming and classifying organisms based on their common ancestry (i.e., evolutionary relatedness). I define systematic names as those dealing in some way with how the taxon in question was identified, described, named, classified, or placed in a phylogenetic "tree" or diagram. There aren't many examples from the freshwater fishes of North America, but these two will suffice:

The Corrugated Darter *Etheostoma basilare* Page, Hardman & Near 2003 occurs in the Caney Fork system of the Cumberland River drainage of Tennessee. Its specific epithet is Latin for "at the base," referring to its relatively basal phylogenetic position in the Barcheek Darter species group. (A basal clade is the earliest clade to branch in a larger clade; it appears at the base of a cladogram.)

The Middle American killifish genus *Profundulus* was proposed by Carl Hubbs (1894–1979) in 1924. Several online references (e.g., FishBase) tell you that name is derived from the Latin *profundus*, meaning "deep." They are wrong. If the authors of these references had consulted Hubbs' original description, they would have discovered that the name is a combination of the Latin prefix *pro-*, meaning "in front of or before," and the name of the topminnow genus *Fundulus*. When combined with an established generic name, the prefix *pro-* often connotes a taxon that is believed to be "ancestral" compared with related genera (e.g., *Proeutropiichthys*, *Propimelodus*). Such is the case here. While Hubbs did not explicitly explain the etymology of the name, he did say "it seems not improbable that *Profundulus*, of all American genera, diverges least from a general ancestral cyprinodont type." While *Profundulus* and *Fundulus* are now placed in separate families (Profundulidae and Fundulidae), they were considered confamilials in 1924. It seems pretty clear that Hubbs named *Profundulus* because he believed it was an older, ancestral genus, figuratively "in front of" or "before" *Fundulus*.

4. ANTHROPOCENTRIC NAMES

Anthropocentric (human-centered) names are those that refer in some way to a fish's importance to humans. Is it good to eat? Is it recreationally or commercially important? Does it pose a danger to human health or safety (Figure 6)? Not many names fall into this category, but here are three:

Pickled, smoked, salted, canned, or planked (broiled over a charcoal fire), the American Shad *Alosa sapidissima* (Wilson 1811) of the Atlantic Coast of North America (and introduced elsewhere) lives up to its name: *sapidissima* is Latin for "most delicious," the very two words Wilson used to describe its palatability. The name of the closely related Hickory Shad *Alosa mediocris*

Figure 6. You don't need to be a Latin scholar to understand that the name of the Carolina Madtom *Noturus furiosus* Jordan & Meek 1889 means "furious" or "mad." The name may be a nod to its "madtom" vernacular, but more likely refers to the authors' belief that the "poison of its axillary gland is more virulent" than that of other madtom species. (I assume they scientifically tested this hypothesis by pricking themselves?) (Photo by D. Biggins, US Fish and Wildlife Service)

(Mitchill 1814) is Latin for "mediocre," referring to its taste or food value as compared with *A. sapidissima*.

The Pond Smelt *Hypomesus olidus* (Pallas 1814) has a limited distribution in North America, being restricted to the west coast of Alaska and the lower Mackenzie River drainage of the Northwest Territories. Many references tell you that *olidus* means "oily." It does not. It means "smelly." (*Oleaceus* means oily.) And while the Pond Smelt does indeed have oily flesh, Pallas did not mention this fact in his description. In fact, he made a point of saying, "Totus male olet." Translation: "Smells very bad." The Pond Smelt, like most members of the smelt family, smell like cucumbers. Some people like the smell. Pallas apparently did not.

It's easy to see why so many people believe *olidus* means smelly. After all, the fish is called a smelt! But as fitting as it seems, "smelt" is not derived from "smell" or "smelly." Instead, it appears to be derived from the Old Dutch *smalt*, meaning grease or melted butter, referring to how the fish's oily flesh gives it a "melt in your mouth" texture.

To summarize: While "smelt" in general means oily not smelly, the Pond Smelt's specific name means smelly not oily.

5. COMMEMORATIVE NAMES

A diverse but controversial category of animal names is that which honors or commemorates people. A taxonomist is free to name a genus or species after anyone she desires: colleague, collector, mentor, benefactor, philanthropist, helper, spouse, lover, parent, sibling, offspring, mythical or fictional character, favorite writer, composer, musician, painter, actor, politician, the list goes on and on. Such names are called eponyms (or matronyms for women and patronyms for men).

Some zoologists dislike eponyms. They believe the Earth's biodiversity is part of a global heritage that should not be trivialized by association with any single human individual, whatever their perceived worth. Others believe such names do not reveal useful information about the taxon being described. Instead, eponyms reveal information about the describer, as if the taxon *belongs* to the person who decided it needed a name. Other zoologists take a middle ground. They don't mind taxa being named after someone who has a legitimate connection with the new species or the taxonomic group to which it belongs: a goby expert, perhaps, for a new species of goby, or an intrepid explorer who risked life, limb and dengue fever to bring an unknown jungle catfish back to the lab. What they do find irritating are eponyms they consider irrelevant. Yes, John Lennon was a great singer-songwriter. And yes, his murder in 1980 was tragic and pointless. But what does any of this have to do with the Chacambero Splitfin *Ilyodon lennoni* of Guerrero, Mexico, named for Lennon by Meyer & Förster in 1983?

Whatever your opinion of eponyms, they are usually structured in one of three ways, as illustrated in this hypothetical example, a freshwater eel named after the American marine biologist, author and conservationist Rachel Carson (1907–1964): "*Anguilla carsonae*" (a noun in the genitive case: "Carson's eel"), "*Anguilla carson*" (a noun in apposition: "the eel Carson") or "*Anguilla carsoniana*" (adjective: "the Carsonian eel"). Note that the genitive noun has the feminine case ending "*-ae*." If an eel were named after Carson's fellow biologist-author-conservationist Aldo Leopold (1887–1948), the masculine case ending "*-i*" would apply: "*Anguilla leopoldi*." Eponyms named after multiple people receive a plural case ending: *-orum* for two or more men, *-arum* for two or more women, and *-orum* for men and women. These rules are set forth in the International Code of Zoological Nomenclature, but not all taxonomists follow them, either through ignorance, carelessness, or choice. (There are specialized exceptions to these rules, but explaining them would cure insomnia.)

I could easily fill this issue of *American Currents* with the stories of interesting people who've been honored in the names of North America's fishes. Here are three that make me smile:

- Arroyo Chub *Gila orcutti* (Eigenmann & Eigenmann 1890), in honor of naturalist Charles Russell Orcutt (1864–1929), who collected the holotype using a *blanket* as a seine!
- Dixie Chub *Semotilus thoreauianus* Jordan 1877, in honor of author-philosopher Henry David Thoreau (1817–1862), for penning this wonderful passage in 1842: "I am the wiser in respect to all knowledge, and the better qualified for all fortunes, for knowing that there is a minnow in the brook" (from the essay "Natural History of Massachusetts").
- Palomas Pupfish *Cyprinodon pisteri* Miller & Minckley 2002, in honor of fisheries biologist Edwin Philip ("Phil") Pister (1929–2023); the authors wrote: "For almost four decades, Phil Pister has unerringly and effectively performed the daunting task of preserving the integrity of natural aquatic habitats and biotas in North American deserts, along the way teaching others to do the same. His infectious and tireless persistence, enthusiasm, optimistic outlook, and unique capability to redirect conflicting views toward common goals have led to significant and enviable successes in equating science and a strong environmental ethic with political reality."

Sometimes the author conceals the commemoration. For over 130 years, the specific name of the Yellow Bullhead *Ameiurus natalis* Lesueur 1819 was believed to mean "having large nates or buttocks." Unfortunately, this explanation is based on the incorrect assumption that *natalis* is the adjectival form of *natis*, a Latin noun for rump or buttocks. A careful examination of Lesueur's original description, however, reveals that *natalis* is a Latin adjective meaning "of or belonging to birth," often used in association with the Christian holiday of Christmas (Noel in French). By naming this catfish *natalis*, Lesueur was in fact honoring his fellow Frenchman and colleague, fisheries inspector Simon-Barthélemy-Joseph Noël de La Morinière (1765–1822). See my article in the Spring 2020 *American Currents* for the complete story behind this long-misunderstood name.

Commemorative names are not limited to individuals. They can honor cultures or groups of people as well. One of my favorite names is that of the Umpqua Chub *Oregonichthys kalawatseti* Markle, Pearsons & Bills 1999, endemic to the Umpqua River drainage of Oregon. I like the name's evocative touch of poetry, history, and even justice. Say its describers, "Oregon once had a remarkable diversity of native peoples with more native languages than all of Europe. The Kalawatset, a tidewater Umpqua people best known for attacking Jedidiah H. Smith in 1828, were part of

this lost human diversity and serve to forewarn of a parallel decline in diversity of Oregon's native freshwater fishes."

In addition to people, commemorative names can also honor expeditions, ships, schools, museums, organizations, or any other institution or event that the describer deems worthy of recognition. Acronyms figure prominently in institutional names. The Australian rainbowfish *Melanotaenia angfa* Allen 1990 is named for NANFA's sister organization down under, ANGFA, the Australia New Guinea Fishes Association.

I think it's high time NANFA has a species named in its honor. Don't you?

6. TOPONYMIC NAMES

Many fishes are named for where they occur, not their habitats or biomes, but where they are distributed across the regions and localities of the Earth. In other words, where they are found on a map. Often these names refer to a specific (e.g., creek, village, island) or general (e.g., ocean, river system, state) area where the fish was first collected (the type locality), although it should be noted that the fish may occur elsewhere. Such names are called toponyms, from the Greek *tópos* (τόπος) place, and *ónoma* (ὄνομἄ) name.

Toponyms usually end with one of three adjectival suffixes whose terminal spellings vary depending on the gender of the genus (masculine, feminine, or neuter): *-anus*, *-ana*, *-anum*; *-icus*, *-ica*, *icum*; and the most commonly used toponymic suffix, *-ensis* or *-ense* (*-ensis* is both masculine and feminine). There are subtle differences between the forms but no rules dictating how they're to be used. Toponyms ending in *-anus* and *-icus* (Latin for "belonging to") tend to refer to larger geographic areas or political entities. For example, the Redfin Pickerel *Esox americanus* Gmelin 1789 is named for America in order to distinguish it from the circumpolar Northern Pike *Esox lucius* Linnaeus 1758, the only other pike known at the time. Compare this with *-ensis*-style toponyms (from a Latin suffix meaning "from"), which tend to refer to more specific locations. The Waccamaw Killifish *Fundulus waccamensis* Hubbs & Raney 1946 is named for Lake Waccamaw, North Carolina, the only place it occurs.

Taxonomists may choose to dispense with adjectives in favor of nouns in apposition. The Topeka Shiner *Miniellus topeka* (Gilbert 1884) is named for Topeka, Kansas, its type locality.

Some toponyms do not refer to a place but to a direction. Examples include *borealis* and *septentrionalis* (northern), *orientalis* (eastern), *australis* and *meridionalis* (southern), and *occidentalis* (western). Such names are usually given when describing a fish's distribution relative to one or more congeners. The Southeastern Blue Sucker *Cycleptus meridionalis* Burr & Mayden 1999 is named for its restricted geographic range in the southeastern US relative to its more-broadly and northernly distributed congener, Blue Sucker *Cycleptus elongatus* (Lesueur 1817).

7. VERNACULAR NAMES

Many fishes are named after what they are called, or were called at the time they were described, by the general populations in their countries of origin. Some vernacular names date to ancient times (e.g., *Anguilla* is Latin for eel). Others reflect local or indigenous

Figure 7. The Atlantic Tomcod was described from 18th-century New York, where locals called it "tomcod." Its "Latin" or scientific name is *Microgadus tomcod* (Walbaum 1792). Walbaum made no attempt to Latinize the name, e.g., *"tomcodus."* (Photo by Dave Neely)

names. Several Pacific salmons of the genus *Oncorhynchus*, which occur in both Russian and American waters, have distinctly Russian names—*gorbuscha*, *keta*, *kisutch* (pronounced *keez-utch*), *nerka*, and *tshawytscha* (pronounced *cha-vee-cha* or *cho-wee-cha*)—based on what locals called them in the Kamchatka Peninsula in the 16th century.

Non-Latin vernacular names do not need to be "latinized" in order to be valid "Latin" or scientific names (Figure 7). Some ichthyologists disagree. John C. Bruner (University of British Columbia) published an article in the June 2021 issue of *Fisheries* magazine arguing that the Walleye and Sauger genus *Sander* Oken 1817 should be changed to *Stizostedion* Rafinesque 1820 for a number of perceived technical violations, the most significant being the fact that "sander" is a common name for a related species, the European Zander *S. lucioperca* (Linnaeus 1758), used in Latvia. Collaborating with German ichthyologist Ronald Fricke (Staatliches Museum für Naturkunde), I penned a rebuttal to Bruner's article (*Fisheries*, April 2022), detailing the flaws in Bruner's argument and demonstrating that countless currently valid fish genera have names that mirror, letter for letter, their common names somewhere in the world. The Burbot, for example, known scientifically as *Lota lota* (Linnaeus 1758), is based on "lota," a common name for cod that dates to the Renaissance. Send me an email and I'll send you both articles. Judge for yourself.

8. NONSENSICAL NAMES

Sometimes taxonomists abandon their Greek and Latin dictionaries for names of their own devising, or borrow words or names from other sources without any significance to the taxon being described. Such nonsensical names are common among mega-diverse taxa (e.g., insects) but occur in fishes as well.

My go-to example of nonsensical naming belongs to French-American ichthyologist Charles Girard (1822–1895). In 1856, he named several North American fish genera after Native American words (*Agosia*, *Algansea*, *Codoma*, *Dionda*, *Lucania*, *Nocomis, Tiaroga*) because he liked the sound of them, and because he believed that all the good Greek names had already been taken. Some have suggested that the name of the river chub genus *Nocomis* was inspired by Longfellow's 1855 epic poem "The Song of Hiawatha," in which a major female character named Nokomis falls from the moon. My guess is that both Girard and Longfellow independently repurposed "*Nookomis*," the name of a grandmother in traditional stories

among the indigenous Ojibwe people of northeastern North America.

SPECIAL CASES #1: COMBO NAMES

Sometimes a taxonomist will coin a name that combines two of the categories as defined above. (I cannot recall a fish name that combines three or more categories, but don't quote me on that.) The monotypic Alabama Cavefish genus *Speoplatyrhinus* Cooper & Kuehne 1974 is a combination of three Greek words: *spéos* (σπέος), meaning cave, referring to its habitat (a biological name), plus *platýs* (πλατύς), flat, and *rhinos* (ῥινός), snout, referring to its flattened snout (a descriptive name).

This combo name defies easy categorization: Proserpine Shiner *Cyprinella proserpina* (Girard 1856). Its name is a Latinization of Persephone, queen of the infernal regions, so that would make it a commemorative name. But the reason Girard chose this "infernal" allusion is because the fish was described from the Devils River of Texas, which would make it a toponymic name.

SPECIAL CASES #2: ENIGMATIC NAMES

Some names are headscratchers. I've spent hours trying to figure out what they mean and either fail, or come up with an explanation that's so strained, or so far-fetched, that it can't possibly be what the author had in mind. Ichthyologists have long puzzled over the meaning of the name of the temperate bass genus *Morone* Mitchill 1814. I suggested the name derived from an archaic word meaning "maroon," referring to the reddish or ruddy colors in the specimens Mitchill examined. I'm not convinced that's what the name means, but at least I was able to connect a definition of the word with characters mentioned in Mitchill's text, however tenuous that connection may be. See my article in the Winter 2019 *American Currents* for a detailed analysis of the name.

Among American ichthyologists, the unquestioned master of the enigmatic name was Edward Drinker Cope (1840–1897), who seemed to take a perverse delight in coining names with elusive meanings known only to him (see Figure 5). In 1872, Cope described the Rio Grande Chub *Clinostomus* (now *Gila*) *pandora* from Sangre de Christo Pass, a tributary to Rio Grande River, in Costilla County, Colorado, in the middle of the state near its southern border. It was one of many vertebrates he described during his work as a prospector with the United States Geological Survey. In Greek mythology, Pandora was the first female human created by the deities. These deities gave her unique gifts (such as the secret of fire). But instead of sharing these gifts, Pandora opened a jar (mistranslated as a box), which released plagues and other evils upon humanity, leaving only hope inside once she closed it again. Today the phrase "to open Pandora's box" means to perform an action that may seem small or innocent but turns out to have severe and far-reaching consequences.

What does any of this have to do with a dusky, chub-shaped minnow of the American West? Your guess is as good as mine.

I return to enigmatic names every now and again, like a homicide detective giving a cold case a fresh look. A few years back a tantalizing clue emerged. I read that Cope owned silver mines in New Mexico, so I began looking for the names of mines in Colorado, from where the minnow was described. Sure enough, there was a Pandora mine (tungsten and silver) and subsequent Pandora mining town (circa 1875) just east of Telluride. I got very excited, thinking I had cracked the case, but came back down to earth when, upon checking a map, I saw that Pandora is 140 miles away from Sangre de Christo Pass.

"Pandora's case" remains open.

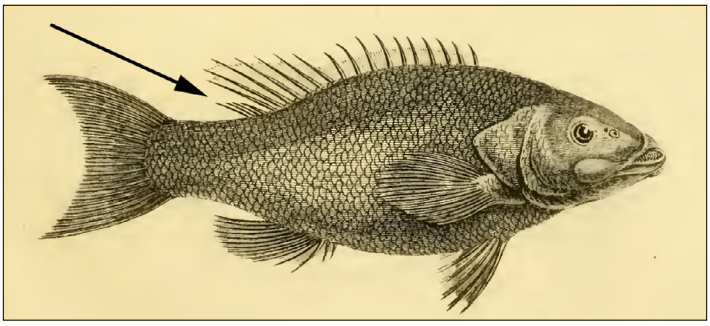


Figure 8. Illustration accompanying Lacepde's description of *Micropterus* and *M. dolomieu*. Arrow points to the "second" small fin for which the genus is named. From: Lacepède, B. G. E. 1802. Histoire naturelle des poissons. Vol. 4: i–xliv + 1–728, Pl. 1–16.

SPECIAL CASES #3: MISNOMERS

One of the quirks of zoological nomenclature is that a name need not be biologically accurate in order to be nomenclaturally valid. In other words, a name can *misrepresent* the fish that's being described. Once a name is affixed to a species, it's stuck with it for eternity. (There are rare exceptions, usually technical in nature.) Misnomers are usually honest mistakes on the author's part. In 1802, French naturalist Bernard Germain de Lacepède (1756–1825) established the black bass genus *Micropterus* for the Smallmouth Bass *M. dolomieu*. Lacepède was intrigued by his specimen's small second dorsal fin, so he named the genus *mikrós* (μικρός), meaning small, and *pterus*, from *pterón* (Gr. πτερόν) or *ptéryx* (πτέρυξ), meaning fin. Trouble is, the Smallmouth Bass—indeed all black bass species—have only one dorsal fin. Lacepède's specimen was damaged. Its posterior dorsal-fin rays were detached from the rest of the fin, which Lacepède mistakenly thought was a separate fin (Figure 8).

Lacepède's misnomer has a reasonable explanation. This next misnomer, however, is laughably bad and immediately misleading. Ask anyone where the Razorback Sucker *Xyrauchen texanus* comes from based on its name and they will probably guess Texas. And they would be wrong.

The Razorback Sucker was described as *Catostomus texanus* in 1860 by Charles C. Abbott (1843–1919), an American Civil War surgeon, archaeologist, and naturalist. He based his description on a dried specimen at the Academy of Natural Sciences of Philadelphia. This specimen was collected or acquired by entomologist John L. LeConte (1825–1883), responsible for naming and describing approximately half of the insect taxa known in the United States during his lifetime. From 1849 to 1851, LeConte explored California and the Colorado River of Arizona. He apparently acquired the holotype of *X. texanus* during this trip. His field notes indicate that the sucker came from the "Colorado and New" rivers. The Colorado River, of course, is a major river of the American Southwest, beginning in Colorado, flowing through Utah and

Arizona, then crossing the border into Mexico, where it now runs dry before reaching the Gulf of California. The New River is a tributary of the Gila River, itself a tributary of the Colorado, in central Arizona.

So how did a fish from Arizona get named for Texas? Well, it seems that Abbott mistook the Colorado River of Arizona for a different river of the same name, the Colorado River of Texas, which flows southeast for 1,387 km from Dawson County, through Austin, into the Gulf of Mexico. In addition, some have speculated that Abbott mistook the New River of Arizona for the Nueces River of Texas.

No one seemed to have noticed for nearly 70 years, because Abbott's description was overlooked by his colleagues. When Eigenmann & Kirsch proposed the genus *Xyrauchen* (*xyrón*, ξυρόν, razor; *auchḗn*, αὐχήν, nape, referring to its sharp dorsal keel) in 1889, they named it for *Quassilabia cypho*, described by Lockington in 1879. Even the authoritative *Fishes of North and Middle America* (1896–1900) failed to notice Abbott's paper. Henry Weed Fowler, curator of fishes at the museum where LeConte's dried specimen was housed, was the first to note the oversight, reported by John Otterbein Snyder in 1915. It wasn't until 1930 when American ichthyologists dropped *X. cypho* and started using *X. texanus* instead.

John LeConte lived in Philadelphia. Charles Abbott lived across the Delaware River in nearby New Jersey and no doubt frequented the Academy of Natural Sciences. One can help but wonder if LeConte ever pulled Abbott to the side and said, "Dude, regarding the name of that fish I collected? You got the location wrong."

THE JOY OF "ETYFISHING"

One of the things I find most interesting about fish names—and this goes for the scientific name of any plant and animal—is that naming and classifying organisms is a strictly human activity. When an ichthyologist describes a new species of fish, the work is supposed to be clinical and objective. Counting fin rays. Counting scales. Describing the shape and arrangement of the teeth. Measuring body proportions. Recording its color in life. Noting its color in alcohol. Sequencing its genome. Explaining how the fish is different from related species. And so on. Descriptive taxonomy is based on observation, measurement, and analysis. It's objective, clinical, and impersonal, what science is supposed to be.

But when a taxonomist assigns a name to a species—the name by which the species will always be known—this is the one time the scientist can be creative, personal, poetic, whimsical, and sometimes enigmatic or mysterious. I'm fascinated by that. I'm fascinated by the intersection of science and creative self-expression that biological nomenclature often represents.

What's more, knowing the correct derivation and meaning of any plant or animal name adds to our knowledge of the taxon, the intention of its author(s), and the historical setting in which it was described. Likewise, an incorrect explanation detracts from that knowledge.

We can explore and celebrate the diversity of fishes by exploring and celebrating the diversity of their names.

WHAT'S IN A NAME? FRECKLEBELLY MADTOM *NOTURUS MUNITUS*

Craig Springer

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When they hear the word "catfish," most people think of river fishing at night for Flatheads on the prowl, dunking worms for Channel Catfish in a pond, or laying chicken liver on the bottom below a hydraulic boil in a tailwater hoping to muscle out a big Blue. These species have a few things in common: they are active in low light, rely mostly on smell and touch, grow quite large, and make fine table fare.

Another group of catfishes, known for their *diminutive* size and equally secretive nature, has a curious name: the madtoms. Twenty-nine madtom species inhabit streams and rivers in the central and eastern United States and fall under the management purview of state fish and wildlife agencies.

Their common names pay tribute to the waters they swim (Neosho, Ouachita, Ozark, and Carolina madtoms) or describe shape, color, or other attributes (Smoky, Slender, Piebald, Pygmy, and Frecklebelly madtoms). Some are common; others, well, not so much. The Scioto Madtom of central Ohio was declared extinct in 2020. Most of the madtoms now have unnaturally fragmented and limited ranges and are the object of conservation concern.

The Frecklebelly Madtom was the subject of recent range-wide surveys. The tiny catfish naturally occurred in medium to large rivers in parts of Louisiana, Mississippi, Alabama, and Georgia, as well as a minute portion of Tennessee. A species status assessment paid for by State Wildlife Grants, administered by the US Fish and Wildlife Service's Wildlife and Sport Fish Restoration program, funded several years of population surveys by the fish and wildlife agencies in all five states. State Wildlife Grants are appropriated by Congress—versus Pittman-Robertson and Dingell-Johnson Act taxes paid by firearms, archery, and fishing tackle industries—are meant for conservation work for fish and wildlife with a high conservation need.

The Frecklebelly Madtom had that need, and the surveys proved it: populations have declined over the years. It has suffered from habitat loss due to damming, dredging, and agriculture. The Frecklebelly, like all madtoms (not to mention some sport fish that co-occur with it, such as the Redeye Bass), needs clean, swift-flowing water over a rocky bottom. Perturbations that cause sediments to fall to the stream bottom and clog the cobbles rob fish of places to hide, feed, and spawn.

Frecklebelly Madtoms are shaped for life in fast water: low profile, flattened head, and slender like a torpedo, all in the length of a finger. They subsist on mayfly and caddisfly larvae. Blackflies make up a large part of their diet, something anyone who frequents streams for work or fun can appreciate given the insect's propensity to inflict painful bites.

The Frecklebelly's scientific name, *Noturus munitus*, is something to unpack. Think "munitions." The little fish's pectoral spines are serrated like a buck saw blade and possess a venomous gland. They sting like a bee and turn a biologist's hand numb and send his or her feet into an involuntary dance in shin-deep water. That sting might be the origin of their unusual common name, implying an angry tomcat. They are also known to writhe and wriggle untiringly in captivity. All the madtoms are in the genus *Noturus*, attributed to eccentric 19th-century French polymath and naturalist Constantine Rafinesque. The man walked over the Alleghenies and long reaches of the Ohio and lower Wabash rivers in 1818 collecting plants, fishes, and fossils. He eschewed a horse because mounting and dismounting took too much time from looking at plants. Rafinesque ascribed the Greek genus name to a Stonecat from the Ohio River, referring to its long, fleshy adipose fin that adjoins the tail.[1]

An eerie coincidence: Rafinesque lost all his belongings—his papers and plant and fish collections—in a shipwreck on the Atlantic coast. Tulane University ichthyologist Royal Suttkus gave the Frecklebelly its scientific name in 1965, and he lost his belongings, collections, and papers in a 2005 hurricane. What's more, Suttkus had named the Yazoo Shiner *Notropis rafinesquei* in honor of the eccentric naturalist.

State Wildlife Grants are the juice that makes things go for research and management of obscure but not necessarily unappreciated fish and wildlife species. The Frecklebelly surveys conducted up to 2019 revealed that the fish was absent from the Tennessee-Tombigbee Waterway but was more abundant elsewhere than previously thought.

Such was not the case in the upper Coosa River, lying in part over the Georgia-Tennessee state line. Those Frecklebellies were afforded protection under the Endangered Species Act in 2023, its fiftieth year in existence.

[1] According to https://etyfish.org/siluriformes10, *Noturus* is from "*noton,* back; *oura,* tail, i.e., tail over the back, referring to connected caudal and adipose fins," and *munitus* means "armed or protected, referring to large spines and serrae"

Frecklebelly Madtom. (Photo by Zach Alley)

A previous version of this article appeared June 5, 2023, on *The Fisheries Blog.*

THIRTY-SIX HOURS ACROSS FLORIDA

Arthur Kosakowski

Davie, Florida

How far can I go in Florida, and can I catch a new species to my life list in 36 hours? Let's find out.

Growing up in New Jersey, every destination was one hour away. Going down to the shore? One hour. Going to the mountains? One hour. Going to Pennsylvania? One hour. Going to New York? One hour.

Not just New Jersey, but all of the Northeast is rather small compared to the rest of the United States. I would drive through five states in less than four hours on my way from New Jersey to New Hampshire when I was in graduate school. It was a shock when I moved down to Florida and realized that the drive from Miami to Jacksonville was over six-hours. To continue to the far side of the panhandle would add another few hours. Florida is big!

Combine Florida's size with my busy schedule and fishing trips to the far reaches of the state aren't often available to me. The farther it is from the Fort Lauderdale area, the less likely I'll be able to fish it. Roughly once per year, though, I'm able to find a weekend when I can make the trek up to northern Florida in search of fish species I've never caught or, at the very least, fish species I seldom encounter.

THURSDAY, MAY 25, 2023

The night before my 36-hour fishing marathon, I did some research on possible fish species to catch and where I could best do that. I singled out two species I had never caught and thought I had a good chance of catching: the Brown Darter *Etheostoma edwini* and the Metallic Shiner *Pteronotropis metallicus.* After consulting FishMap.org, I had several locations picked out where others have found Brown Darters and/or Metallic Shiners. I was ready.

FRIDAY, MAY 26, 2023

The day had arrived and I was ready to head north to the first spot, the New River in Worthington Springs. Thanks to my habit of prioritizing sleeping-in over almost everything else, I was on the road a little after 10:00 AM. One short pitstop for lunch and over 350 miles later, I made it.

The river was bigger in person than what I saw on Google Maps, but after walking the shore for a few minutes and not seeing any life in the sweet-tea-colored water, I finally spotted fish. A quick drop down with a little redworm produced my first fish of the trip: a Sooty-banded Darter *Percina westfalli* (Figure 1). While not the darter I was after, I rarely get to catch *any* darters given where I live, so this was a welcome sight.

Photos by the author.

Originally from Bayonne, New Jersey, Arthur Kosakowski is a recreational fisherman currently living in Davie, Florida. He has a passion for finding beauty in every fish species no matter the size. Since moving to Florida, he has been mesmerized by the variety of native and exotic fish species. Follow his fishing adventures on YouTube at www.YouTube.com/c/TheFishingNomad

I could see more darters on the bottom and a few smaller fish in the middle of the water column. Which should I target? Since I had already caught a darter, I decided to try for the smaller fish. It took a few missed hits, but I finally hooked an Ironcolor Shiner *Notropis chalybaeus* (Figure 2). Also not what I was looking for, but still a fish I don't get to catch often, so I couldn't be that upset.

I spent about an hour walking the shoreline and dropping my redworm all over, but the only spot I even got a bite was where I had already caught two fish. I managed to pick up a few more of each of these species before deciding to drive to the next spot.

Spot number two, on the Santa Fe River, was about a five-minute drive away. This was a big body of water without many features. I spent half an hour here without seeing a single fish or getting any bites. I fished around a downed tree in the water, but all I got for my efforts was a miniature Dollar Sunfish *Lepomis marginatus* (Figure 3). I usually love sunfish, but I didn't spend over six hours in the car to catch a species I could have caught much closer to home. It was time to call it quits in this spot as well.

I had picked out three more spots in the area and spent an hour driving to all of them without finding any fishable access. Given the setting sun and my lack of success, I quickly opened up Google Maps on my phone in hopes of finding one more spot to try. It took maybe 30 seconds to find it and I made the short drive to Cow Creek in High Springs to discover a few inches of water with a sandy bottom. I knew Brown Darters preferred sandy bottoms so I was at least hopeful I could find a deeper pool somewhere on this creek that held some. Fast-forward an hour. The sun had set and all I had caught was a duo of Eastern Mosquitofish *Gambusia holbrooki.*

The sun was gone and I was out of places to fish for the day. I found a cheap little hotel close to High Springs and decided to retire disappointed.

SATURDAY, MAY 27, 2023

It was a new day and, after learning of a new spot on the Santa Fe River where someone had seen Brown Darters while snorkeling, I was off. I arrived shortly after 8:00 AM. I wanted to get a somewhat early start since it was Memorial Day weekend and this was a popular kayaking and paddleboarding spot and also had a boat ramp. I was ready to catch my fish and be gone before the crowds showed up.

I immediately spotted a large school of shiners but couldn't quite tell what they were. I quickly caught one and it ended up be-

Figure 1. Sooty-banded Darter.

Figure 2. Ironcolor Shiner

ing an Ironcolor Shiner. Several Ironcolor Shiners later I decided to continue walking in search of either darters or different shiners.

Over the next couple hours I found and caught several more Ironcolor Shiners, which I was getting rather tired of. I also saw a couple Bluefin Killifish *Lucania goodei* and Sailfin Mollies *Poecilia latipinna*. Neither of these wanted anything to do with my bait and, after a frustrating three hours without a Brown Darter or Metallic Shiner, I was done.

While taking a quick break in my car, I decided to put the Brown Darter and Metallic Shiner on the back burner and just enjoy catching some fish. I knew of a backwater about a one-mile hike away that held a good number of Spotted Sunfish *Lepomis punctatus* and the occasional Suwannee Bass *Micropterus notius*. I tied on a small jig head with a small soft plastic caddisfly larva and I was off.

Immediately after making it to the spot, I spotted Spotted Sunfish. I caught roughly a dozen (Figure 4) within the next hour, as well as two Suwannee Bass (Figure 5) and a lone Largemouth Bass *Micropterus nigricans*. I had my fun and tried to figure out my next course of action while walking back to the car.

With the day half gone I knew I had to start making my way back south. I had a few places picked out near Ocala, but I got a tip that I might find Metallic Shiners in Gainesville. I decided to put all my eggs in the Gainesville basket. After a pit stop for lunch, I made it to Gainesville close to 4:00 PM but was unimpressed with the creek when I saw it.

The water was very clear and extremely shallow, with few deeper pools that only contained some sort of sunfish I wasn't interested in. I wasn't seeing anything small enough to even be mistaken for a shiner. I decided to keep working my way upstream to see if I could find something up there and I was happy I did.

I found one deeper pool that held no sunfish but only some sort of smaller, longer fish. They spooked easily as they could see me perfectly through the shallow, clear water. I stood behind some branches while I dangled my redworm in the water and after a few minutes I had my first fish out of this creek, a Metallic Shiner (Figure 6). This was certainly one of the better-looking shiner species I had ever caught, and it felt great to finally catch one of my target species after all the failures I had had on this trip.

Not wanting to quit just yet, I kept working my way up the creek and managed to pick up several more Metallic Shiners, a trio of Eastern Mosquitofish (Figure 7), and a lone Largemouth Bass. I'd call that a success.

Knowing I still had a roughly six-hour drive back home, I called it a day. I began making my way down south with the sun setting and made it home shortly before midnight, nearly 36 hours after I left. Going one-for-two on the target species is a win in my book. Not a bad way to spend a weekend.

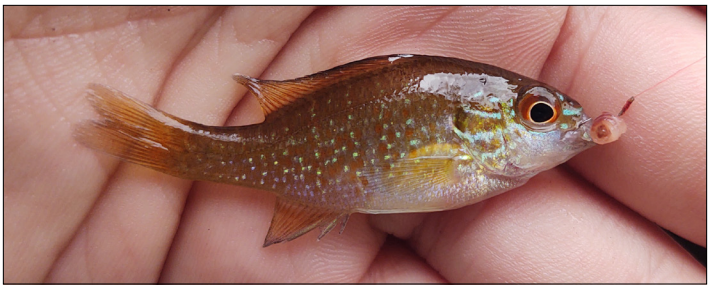

Figure 3. Dollar Sunfish.

Figure 4. Spotted Sunfish.

Figure 5. Suwannee Bass.

Figure 6. Metallic Shiner.

Figure 7. Eastern Mosquitofish.

NEW RECORDS OF AN ESTABLISHED INLAND POPULATION OF NON-NATIVE SHEEPSHEAD MINNOW *CYPRINODON VARIEGATUS* FROM ROCK CREEK, BRAZOS RIVER BASIN, TEXAS

Jeremy V. Jordan

Grapevine, Texas

INTRODUCTION

The Sheepshead Minnow *Cyprinodon variegatus* is a hardy freshwater and estuarine fish found primarily within coastal drainages of the Atlantic and Gulf coasts in the United States from Maine south through the Gulf of Mexico and the Caribbean to Venezuela (Hubbs et al. 2008). In Texas, the species is currently known to occur well upstream in coastal drainages and has been documented within the following drainage units: Sabine Lake (including minor coastal drainages west to Galveston Bay), Galveston Bay (including minor coastal drainages west to mouth of Brazos River), Brazos River, Colorado River, San Antonio Bay (including minor coastal drainages west of mouth of Colorado River to mouth of Nueces River), and Nueces River (Bonner et al. 2007; Hubbs et al. 2008) (Figure 1). Furthermore, the Sheepshead Minnow has been introduced to several inland drainage units, including the upper Brazos River, San Antonio basin, and in several localities throughout the Trans-Pecos region (Bonner et al. 2007; Nico and Fuller 2023).

Within the upper Brazos River basin, introduced Sheepshead Minnow is considered to be invasive since the species can cause rapid genetic changes in populations of other native pupfishes through hybridization, as documented with the Red River Pupfish *C. rubrofluviatilis* (Shepta et al. 2021). While this species is known from the upper Brazos River basin, distribution of Sheepshead Minnow in other parts of the basin (particularly within tributaries to the Brazos River) is poorly documented, except for several dated occurrence records collected after 2011 (Shepta et al. 2023; Hendrickson and Cohen 2022; Nico and Fuller 2023). This paper documents new, multi-age class, voucher specimen-backed occurrence records of Sheepshead Minnow collected in early May of 2023 and verifies a reproducing population in Rock Creek, a tributary to the Brazos River, located outside of Blum, Texas (Figure 1; 32.114529, -97.401022). The population of Sheepshead Minnow was first observed serendipitously in Rock Creek on April 17, 2023, during a fly-fishing trip, on United States Army Corps of Engineers (USACE) project lands associated with Lake Whitney, which surround Rock Creek.

Photos and graphics by the author.

Jeremy Jordan is a practicing Stream Ecologist in the natural resources consulting industry and owns a flyfishing guide service out of north-central Texas.

MATERIALS AND METHODS

The primary research objective was to document the occurrence of an introduced population of Sheepshead Minnow (Figure 2) via the collection and submittal of a representative subset of voucher specimens from Rock Creek where they were first observed to the Fishes of Texas project (FoTX). A secondary objective was to collect and submit a representative subset of voucher specimens of other fishes collected within Rock Creek to provide updated occurrence records to FoTX. Following definitions and methodology within the American Fisheries Society publication *Standard Methods for Sampling North American Freshwater Fishes* (Bonar et al. 2009), Rock Creek was considered a wadeable warmwater stream, which could best be sampled via seining (Figure 3).

Based on the observed habitat within Rock Creek (Figure 3), a 30 ft × 6 ft × ¼ in mesh straight seine was utilized to sample fishes for this study. Seining consisted of completing at least six effective seine hauls covering at least 60 meters. An effective seine haul is a completed seining effort that was not negatively affected in such a way as to have fishes avoid capture (e.g, getting snagged on vegetation, wood debris, etc.). The seining crew consisted of two persons operating the seine in an upstream direction parallel to the bank, with the person on the bank slightly behind the person in the channel. Collected fishes were then quickly placed in 5-gallon buckets with battery-operated aerators. Fishes were identified utilizing Craig and Bonner (2019), enumerated, photographed in a Photarium, and either released or vouchered in small numbers in 10% formalin. After one week, vouchered fishes were rinsed and placed in 70% ethanol for accessioning with FoTX. All fish lengths were reported as total length (TL) in millimeters (mm). Results of the survey were provided to both FoTX and United States Geological Survey (USGS) Nonindigenous Aquatic Species (NAS) staff.

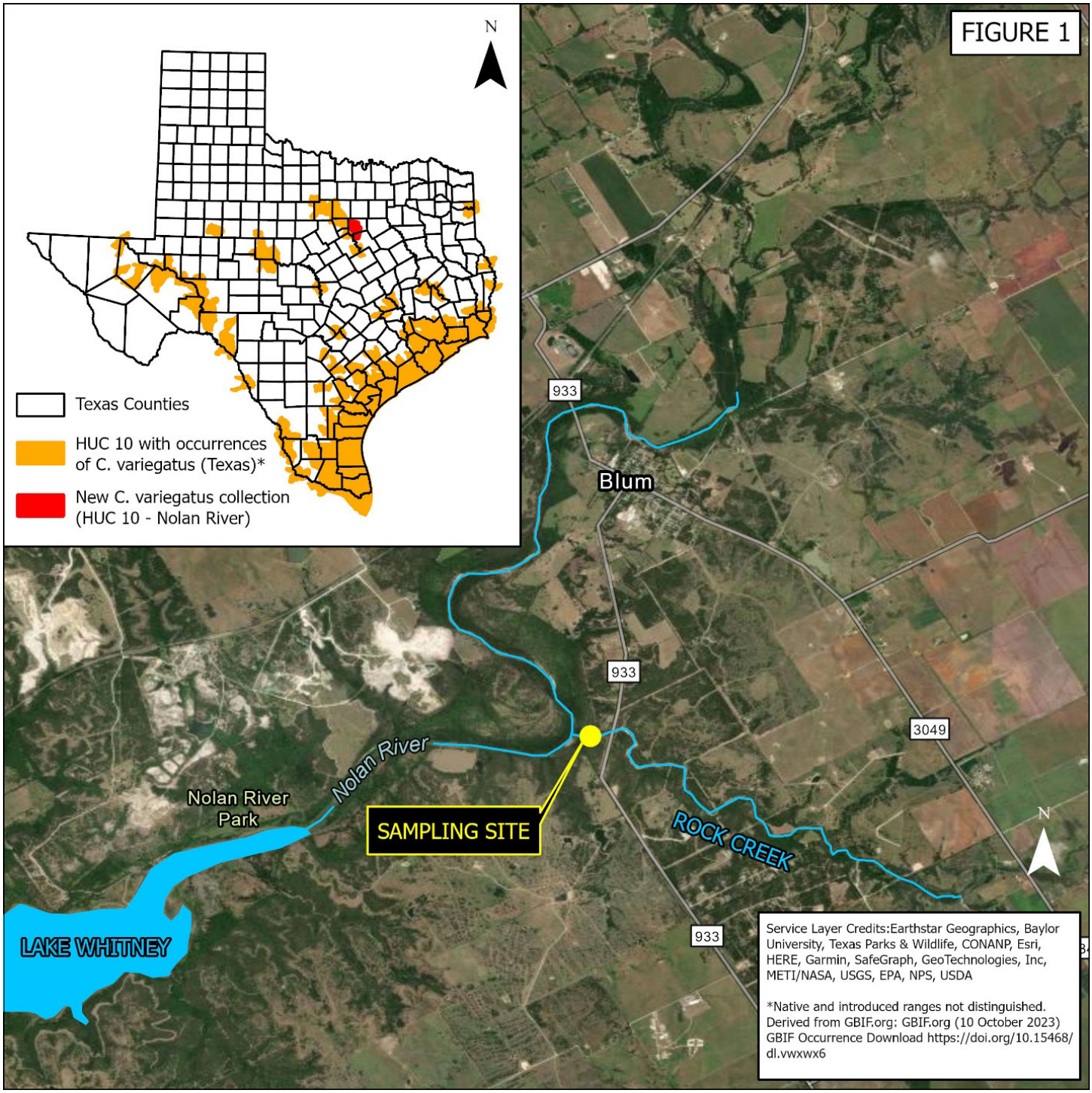

Figure 1. Map of Texas showing known occurrences of Sheepshead Minnow (orange) and new record (red).

RESULTS

A 500-foot segment of Rock Creek was sampled on May 6, 2023, to document the occurrence of Sheepshead Minnow as well as other species. Water temperature was approximately 70°F. Habitat within the sample reach consisted of 50% riffles, 25% runs, and 25% pools. Average water depth was approximately 1 foot or less across all in-stream habitat types (deepest in pools at approximately 2.5 feet and shallowest in riffles at approximately 6 inches or less). Substrate within the sampled reach of Rock Creek consisted of mostly bedrock with sparse gravel/cobble fragments in pools, with increased gravel and cobble in runs and riffles especially along the channel margins.

Sampling consisted of 13 effective seine hauls. In total, 274 specimens of seven species were collected (Table 1).

CONCLUSION

Fish data provided herein, as well as the donated voucher specimens and dataset reported to USGS NAS, formally document a population of Sheepshead Minnow within Rock Creek in the Brazos River basin in Texas. A records search utilizing the FoTX database and USGS NAS indicated that this population is introduced. As an introduced species, the Sheepshead Minnow is known to compete with native *Cyprinodon* (pupfish) species, therefore war-

Figure 2. Adult Sheepshead Minnow collected at Rock Creek.

Table 1. Fishes collected in Rock Creek.

Scientific Name	Caught and Released	Vouchered	Incidental Mortalities
Red Shiner *Cyprinella lutrensis*	40	10	1
Blacktail Shiner *Cyprinella venusta*	0	4	0
Sheepshead Minnow *Cyprinodon variegatus*	2	19	0
Western Mosquitofish *Gambusia affinis*	119	10	0
Plains Longear Sunfish *Lepomis aquilensis*[1]	2	1	0
Bigscale Logperch *Percina macrolepida*	0	2	0
Bullhead Minnow *Pimephales vigilax*	51	10	3
Totals	214	56	4
Total fish collected	274		

[1]As this dataset is being provided to the FoTX project, scientific names utilized in the current database are shown above. Based on the current FoTX database, all *Lepomis megalotis* occurrence records within the database are now considered *L. aquilensis*.

ranting classification as an invasive species. Although no other pupfishes are known from the Rock Creek basin, the Sheepshead Minnow is omnivorous and likely competes with species native to the drainage for food; therefore, the species should be considered invasive in the Rock Creek-Nolan river drainage unit where they were collected during this study (HUC12 – 120602020207). Additionally, adults as large as 45 mm and juveniles as small as 11 mm were collected and vouchered during this study, thus demonstrating that this population is established (Figure 4).

ACKNOWLEDGMENTS

This study would not have been possible without the assistance of Lindsey Elkins, a pupfish expert with TPWD who assisted with the initial observation, my good friend Nick Richardson who assisted with field work, Mary Devers of the USACE, and Dr. Matthew Neilson of USGS who reviewed this article. These individuals deserve the utmost praise for their assistance with this small study.

Figure 3. Rock Creek along the sampling reach.

Figure 4. Sheepshead Minnow specimens vouchered demonstrating the occurrence of multiple ages classes within Rock Creek at the time of sampling.

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DISTRIBUTION OF AMERICAN BROOK LAMPREY *LETHENTERON APPENDIX* IN NORTH CAROLINA

Fritz Rohde, Bryn H. Tracy and Michael Fisk

Wilmington, NC Apex, NC North Carolina Wildlife Resources Commission, Mebane, NC

The American Brook Lamprey *Lethenteron appendix* (Dekay, 1842) (Figure 1) was first discovered in North Carolina in August 1977 in the French Broad River at the mouth of Spring Creek in Hot Springs (Madison County) in western North Carolina by Tennessee Valley Authority. Until recently, this imperiled species has only been found in Spring Creek (Figure 2; Tracy et al. 2020). In March 2021 we received a report from well-known nature photographer Todd Pusser of a sighting by Rufus Johnson, an amateur fossil-hunter and landowner in Halifax County (Roanoke River basin), of spawning small lampreys in "his" stream. Our initial assumption was they were Least Brook Lamprey *Lampetra aepyptera* (Figure 3) (Abbott, 1860), because it is the only brook lamprey known to be found in eastern North Carolina (Figure 4), along with the much larger parasitic Sea Lamprey *Petromyzon marinus* Linnaeus, 1758 (Figures 5 and 6) (Tracy et al. 2020; Tracy et al. (in press)). One of us (Fritz) held out hope that it might be American Brook Lamprey, because it has been docu-

Figure 1. American Brook Lamprey *Lethenteron appendix*. Arrow pointing to pigmented caudal fin. (Photo by Scott Smith)

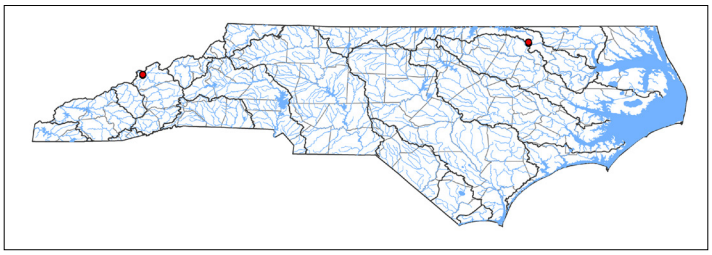

Figure 2. Distribution of American Brook Lamprey *Lethenteron appendix* in North Carolina (old locality on the left, new one on the right). (Tracy et al. in press).

Fritz Rohde is a fish biologist with NOAA Fisheries Service working on fish passage and hydropower projects in the Southeast US. Bryn Tracy retired after many years surveying the stream fishes throughout North Carolina for the NC Division of Water Resources. Michael Fisk is the Eastern Wildlife Aquatic Diversity Coordinator for the NC Wildlife Resources Commission.

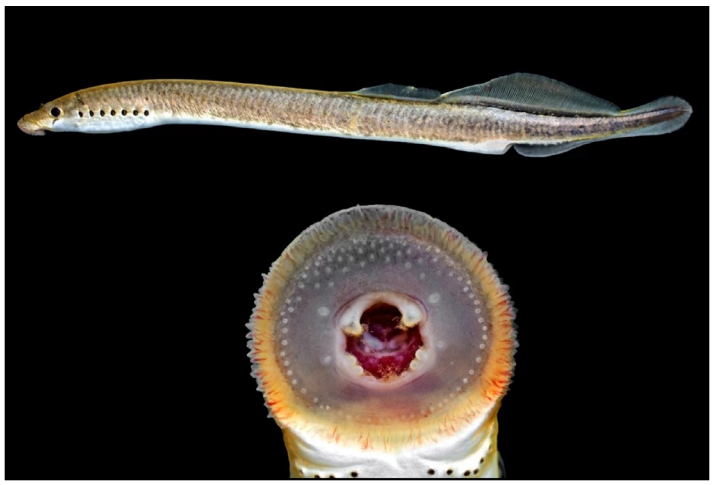

Figure 3. Least Brook Lamprey *Lampetra aepyptera*. (Photo by Scott Smith)

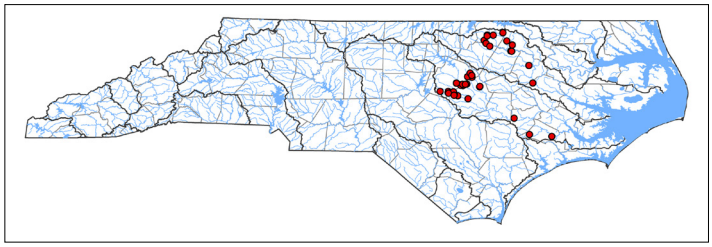

Figure 4. Distribution of Least Brook Lamprey *Lampetra aepyptera* in North Carolina. (Tracy et al. in press)

Figure 5. Sea Lamprey *Petromyzon marinus*. (Photo by Brian Zimmerman)

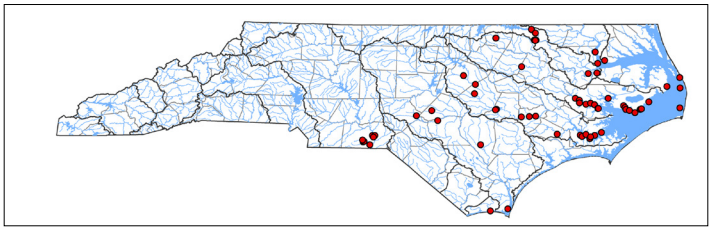

Figure 6. Distribution of Sea Lamprey *Petromyzon marinus* in North Carolina (Tracy et al. in press).

Figure 7. Bryn stalking the lampreys in the tiny stream with Michael supervising. (Photo by Fritz Rohde)

Figure 8. Nest with two lampreys in it. (Photo by Fritz Rohde)

Figure 9. One of the lampreys displaying the pigment in its caudal fin (at tip of arrow). (Photo by Fritz Rohde)

Figure 10. Michael measuring and sexing the lampreys; Bryn recording the data. (Photo by Fritz Rohde)

mented in the nearby Meherrin River drainage in Virginia (Jenkins and Burkhead 1994). He knew this since his master's thesis was on the systematics of this species (Rohde 1979). The Covid pandemic slowed us down for a year, but we visited the area on March 2, 2022. We quickly found adult lampreys in a tiny tributary of a larger unnamed tributary of Quankey Creek (Figure 7) in a nest (Figure 8) and immediately determined, based on dentition (Figure 1) and pigmented caudal fin (Figure 9), that they were indeed American Brook Lamprey. Excitement reigned and there were huge grins on our faces! It's not often that you make a discovery of this magnitude. More individuals were observed in the adjacent, larger unnamed tributary (11 caught overall), and later that afternoon, an additional six adults were also found in nearby Little Quankey Creek. Individuals were measured and sexed (Figure 10) and two saved as voucher material; the rest were released back into the stream after the appropriate amount of viewing (Figure 11). At the end of the day, we caught 17. Thus, this represents the second location of the species in North Carolina, approximately 370 air miles east of the Spring Creek site (Figure 2) and at the southeastern end of its North American range (Figure 12). Surveys for American Brook Lamprey within the Roanoke River basin will continue to document the species' current distribution in North Carolina.

Figure 11. Bryn and Fritz admiring the catch. (Photo by Michael Fisk)

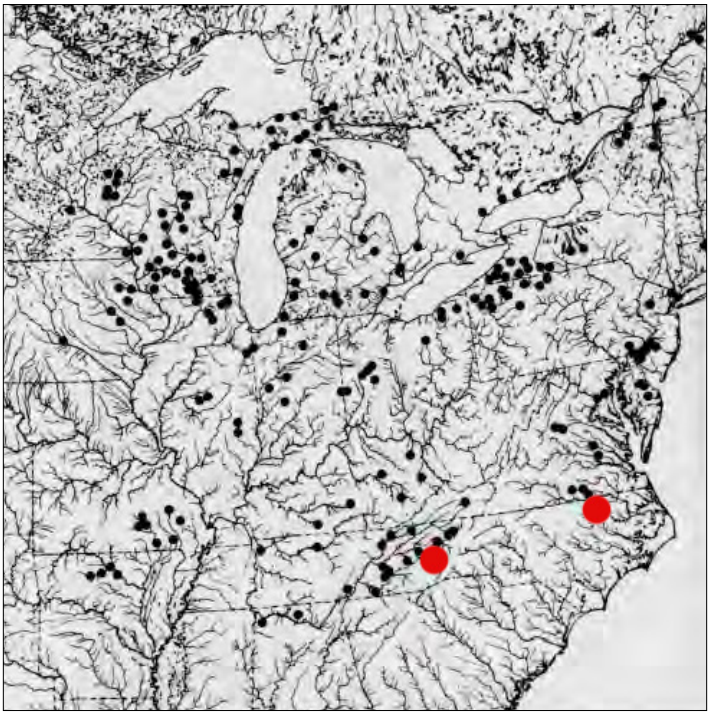

Figure 12. Distribution of the American Brook Lamprey; the two red dots represent the only North Carolina localities. Map adapted from Rohde (1980).

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RIFFLES

NOTES ON CAPTIVE HUSBANDRY, BIOLOGY, CONSERVATION, NOMENCLATURE, AND RECENT PUBLICATIONS

Munson Creek, Tillamook County, OR

Compiled by Bruce Stallsmith

AGAINST ALL ODDS, THE ENDANGERED DEVILS HOLE PUPFISH KEEPS ON SWIMMING

Devils Hole Pupfish *Cyprinodon diabolis*. (Photo by USGS)

This small, iridescent blue-or-green fish swims in the hot waters of an inhospitable fishbowl made of rock in a Nevada section of Death Valley National Park. In 2013, its population hit a low of only 35 fish. But over the last couple of years, the Devils Hole Pupfish *Cyprinodon diabolis* has bounced back. Last year, in the spring, they counted 175 observable fish. This spring, the count was the same, which means that the population has been holding steady. "Times are good now with Devils Hole Pupfish, compared to how they've been in the past," says Jenny Gumm, a fish biologist with the US Fish and Wildlife Service.

Over the decades, several efforts have been made to set up a captive population of these fish in a separate tank, as a back-up insurance policy in case the wild fish met an untimely end. Past attempts all failed for various reasons, such as mechanical issues.

"The approach that we take now for the refuge population is a much larger scale," says Gumm, who manages a fish conservation facility located near Devils Hole. There, its unique ecosystem has essentially been recreated in a 100,000-gallon tank with about 300 fish.

Climate change could make Devils Hole even hotter, and that's a concern for the future.

"It's certainly, in many ways, an inspiring story of survival," says Steve Beissinger of the University of California, Berkeley. "You've got to admire that, something that can cling on and adapt to such a difficult environment—with nowhere to go."

(https://www.npr.org/2023/07/07/1182118098/against-all-odds-the-rare-devils-hole-pupfish-keeps-on-swimming)

Devils Hole visited by NANFA members during October 2010 convention. (Photo by Fritz Rohde)

'HARD TO BELIEVE': DOWNSTREAM FISH POPULATIONS EXPLODE FOLLOWING MILL CLOSURE

Pigeon River and the mill. (Photo by Luke Etchison)

A stretch of the Pigeon River in North Carolina is cleaner now with both more fish species and individual fish with the closing of a paper mill in Canton. In late July, the Wildlife Commission sampled fish populations at three sites downstream from the mill—just below it at Blackwell Drive, midway between Clyde and Canton, and at the Charles Street bridge in Clyde. When they sampled the same three sites in May, before paper production ceased, they observed 14 species between the three sites, and 157 total fish. July's sampling yielded double the diversity and a 15-fold increase in fish found—28 different species and 2,626 fish. The change in temperature likely played a role in the explosion of aquatic life. Data gathered between 2016 and 2018 showed an average temperature difference of six degrees in the Pigeon River above the mill and below its discharge point.

Typically, the Wildlife Commission would conduct fish surveys on a body of water like the Pigeon once every year or every couple of years, but the agency is taking advantage of this "one-in-a-lifetime opportunity" to track the river's recovery. Another round of sampling is planned for early fall, and after that samples will likely take place in June each year. "The improvement gives me hope that we're going to potentially have the Pigeon be a happy, healthy river way sooner than I expected," said Luke Etchison of the Commission.

(https://smokymountainnews.com/outdoors/item/36105-hard-to-believe-downstream-fish-populations-explode-following-mill-closure)

Electrofishing in the Pigeon River. (Photo by Luke Etchison)

Whitetail Shiner *Cyprinella galactura* caught in the Pigeon River. (Photo by Luke Etchison)

SCIENTISTS WORK TO SAVE THE MOAPA DACE IN NEVADA

Moapa Dace *Gila coriacea* (formerly *Moapa coriacea*). (USFWS photo)

The endangered Moapa Dace, found only in the southern Nevada desert 50 miles northeast of Las Vegas, recently got a big boost. Eighteen captive bred and raised Moapa Dace were released into a warm springs home at the Moapa Valley National Wildlife Refuge in June. They are the first of the species bred in captivity to be released into the wild, said Nevada Department of Wildlife biologist Amos Rehm. This is important for a species whose total population has hovered around 2,000 in recent years and represents a monumental step toward bolstering and safeguarding the species that has been under federal protection for more than half a century.

This release follows years of work and research to boost the species' population and included staff from the US Fish and Wildlife Service, Nevada Department of Wildlife and Southern Nevada Water Authority. The Moapa Dace populations have come a long way since the mid-2000s, when their numbers plunged to fewer than 500. The species' natural habitat is entirely contained within the 116-acre Moapa Valley National Wildlife Refuge, some adjacent private land and the Warm Springs Natural Area, a 1,218-acre stretch of land that the water authority purchased for $69 million in 2007. Biologists have struggled to get the dace to move back into areas that had been devastated by floods and wildfires, Rehm said.

(https://www.reviewjournal.com/local/local-nevada/how-scientists-are-saving-this-tiny-nevada-fish-one-cooler-at-a-time-2800752/)

SAWFISH TAGGED IN CEDAR KEY, FLORIDA, FOR FIRST TIME IN DECADES

In 2003, Smalltooth Sawfish *Pristis pectinata* had the unenviable distinction of being the first native marine fish listed under the Endangered Species Act. The classification followed decades of declining populations due to habitat loss, overharvesting, and mortality as fisheries bycatch. Now, 20 years later, a 13-foot adult female captured off the coast of Cedar Key, FL, suggests the species may be making a slow but spirited comeback.

The sawfish was caught, tagged and released June 6 during an annual shark field course co-taught by Dean Grubbs, the associate director of research at Florida State University's Coastal and Marine Laboratory and a member of the US Smalltooth Sawfish Recovery Implementation Team; and by Gavin Naylor, director of the Florida Museum of Natural History's shark research program. "This is the furthest north an individual has been tagged by the sawfish recovery team in the last 30 to 40 years," Naylor said.

Smalltooth Sawfish *Pristis pectinata.* (Photo by Alex Tate)

According to Naylor, the sawfish sighting taught a lesson that would otherwise have been impossible to convey. "I can't think of a better way for a group of young people studying environmental and conservation biology to learn about this critically endangered and incredibly spectacular animal. So much of the news about Earth's climate and environment is doom and gloom, but this is a potent reminder that if you leave things alone, many species are capable of recovery."

(https://www.floridamuseum.ufl.edu/science/large-13-foot-sawfish-tagged-in-cedar-key-for-first-time-in-decades/)

THE SCIOTO MADTOM HAS BEEN DELISTED FROM THE ENDANGERED SPECIES ACT DUE TO EXTINCTION

An Ohio fish species is among 21 species delisted from the Endangered Species Act due to extinction. The Scioto Madtom *Noturus trautmani* was found in a small section of the Big Darby Creek, a tributary of the Scioto River and became listed as endangered in 1975. Only 18 individuals were collected, and the last confirmed sighting was in 1957, according to the US Fish and Wildlife Service. "Federal protection came too late to reverse these species' decline, and it's a wake-up call on the importance of conserving imperiled species before it's too late," said Service Director Martha Williams. The exact cause of the Scioto Madtom's decline remains unknown but was likely due to modification of its habitat from siltation, industrial discharge into waterways, and agricultural runoff, the department said.

(https://www.whio.com/news/state-and-regional/ohio-species-among-23-now-listed-extinct/MS4NCYES6VH6JLVJXMYI7XPKYQ/)

A preserved museum specimen of the Scioto Madtom *Noturus trautmani* (Photo from Ohio State University)

RARE FISH BREEDING FACILITY IN THE UK NARROWLY ESCAPES DAMAGES DUE TO WATER LINE CUT

Monterrey Platyfish *Xiphophorus couchianus.* (Photo by CC Marfrubio)

The accident happened on Tuesday when contractors were working in Smithyard Lane, Washford, not far from Tropiquaria Zoo. It cut off the water supply to Tropiquaria just as the zoo was in the process of changing the water in some of its aquarium fish tanks, leaving them half-empty. Tropiquaria director Chris Moiser told the *Free Press* how Wessex Water would not provide an emergency bowser [water tanker] because the disconnection did not affect people, only animals.

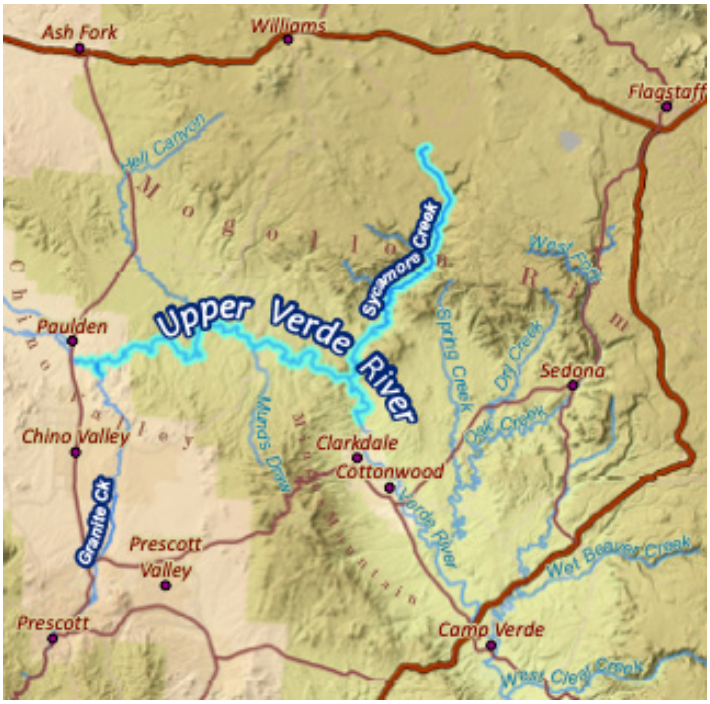
"I have 50 percent of the world population of some species of fish, which are extinct in the wild. We are one of the smallest zoos and we are working with some of the smallest numbers of the most endangered fish in the world. There are several species that are extinct in the wild, and one of them was down to about seven individuals at one stage."

They include Mexican goodeids and the Monterrey Platyfish *Xiphophorus couchianus*, and Finescale Splitfin *Allodontichthys polylepis*. Tropiquaria has the second largest breeding program of Mexican goodeids in the world, holding about 32 species, and is one of only about five organizations globally which have them, the population totaling about 100. It has

about 40 adult Monterrey Platyfish, which is already extinct in the wild.

(https://www.wsfp.co.uk/news/rare-fish-species-nearly-became-extinct-after-west-somerset-water-mains-mishap-630255)

ARIZONA'S UPPER VERDE RIVER IS A CANDIDATE FOR DESIGNATION AS A WILD AND SCENIC RIVER



Basin of the Upper Verde River, Arizona.

The Verde River is an extraordinary ribbon of life through the heart of Arizona. The Upper Verde—extending from east of Paulden to the town of Clarkdale—is one of the most clean, healthy, economically important, and culturally significant free-flowing rivers remaining in Arizona. The effort to designate the Upper Verde is gaining significant support, including the official support of the Yavapai Apache Nation, and the cities of Prescott, Prescott Valley, Chino Valley, Sedona, Camp Verde, Cottonwood, Clarkdale, and Jerome. The campaign also has over 140 local business supporters. In 2023, the Prescott National Forest found the Upper Verde River to be *suitable* for Wild and Scenic designation, meaning that they consider this level of protection, the highest and best use for the river under the national Wild and Scenic Rivers Act. This is the strongest form of federal river protection in the US.

Designation as a Wild and Scenic River will ensure clean water keeps flowing downstream to towns, cities, and farms. It would conserve the many outstanding values of the Upper Verde, including critical wildlife habitat for multiple threatened and endangered species, and the cultural sites and traditional use areas of the Yavapai-Apache Nation. It would prevent new federally licensed projects such as large dams that could harm the river, but designation does not affect existing water rights, grazing permits, or private lands. In other words, designating the Upper Verde as a Wild and Scenic River would keep the river as it is.

(https://www.americanrivers.org/the-upper-verde-river-a-wild-and-scenic-river/)

TWO DARTER SPECIES ADDED TO KENTUCKY'S FISH LIST

Recently, NANFA Kentucky Rep Josh Blaylock proudly informed the *AC* editors that two new darters had been added to the fishy fauna of the Bluegrass State—one was elevated from subspecies status while the other was hiding within another species. The impressive-looking Kentucky Arrow Darter *Etheostoma spilotum*, endemic to the upper Kentucky River basin of eastern Kentucky, is redescribed and recognized as a distinct species closely related to the Arrow Darter *E. sagitta* in the upper Cumberland River basin and the Niangua Darter *E. nianguae* in the Osage River drainage (Missouri River basin). Originally described as a subspecies of *E. nianguae*, the Kentucky Arrow Darter was later considered a full species and then a subspecies of *E. sagitta* based on its close geographic proximity to Cumberland basin populations and overlapping meristic variation interpreted as character intergradation. The work by NANFA friend Matt Thomas and Tom Near along with Rebecca Blanton and Ava Ghezelayagh presented meristic, morphometric, and genetic data that support species-level recognition of *E. spilotum*.

Etheostoma spilotum (see front cover.) (Photo by Matt Thomas)

(https://doi.org/10.3374/014.064.0103)

Much more subtle in appearance is the newly described Clarks Darter *Etheostoma xanthovum*, endemic to the Clarks River drainage in Kentucky and Tennessee. The work done by NANFA members Julia Wood and Zach Alley, NANFA friends Matt Thomas and Tom Near, along with Richard Harrington and Jeffrey Simmons, recently appeared in the *Bulletin of the Peabody Museum of Natural History*. The Clarks Darter is part of the Spottail Darter *E. squamiceps* group, which currently includes 10 species, several of which have highly restricted distributions. Molecular phylogenetic tools have become increasingly important in the discovery, delineation, and eventual description of new species of darters. Using these tools, recent molecular phylogenetic analyses revealed that populations of the Guardian Darter *E. oophylax* in the Clarks River drainage, a tributary of the Tennessee just upstream of its confluence with the Ohio River in western Kentucky and Tennessee, were distinct from the Guardian Darter. Morphologically, the Clarks Darter differs slightly from the Guardian Darter in the modal number of dorsal fin rays (12 versus 11) and in the average number of scale rows around the caudal peduncle (21.8 versus 20.4). *Etheostoma xanthovum* does not share mitochondrial DNA haplotypes with *E. oophylax* or the closely related Relict Darter *E. chienense*.

(https://doi.org/10.3374/014.064.0102)

Etheostoma xanthovum type specimen. (Photo by Zach Alley)

WELCOME, NEW MEMBERS!

Joshua Brown, MD
Carole Cox, WV
Rich Dennison, MD
Gabriele Elli, NM
Nathan Farnau, GA
Jacob Fisher, NC
Peyton Henny, CT
Samuel Leslie, DC
James Madola, NJ
Colby Menden, MN
Tyler Straight, NY
Leslie Suranyi Jr., NH
Coleman Swartzfager, MS
Zelie Wooten, GA

FishMap.org

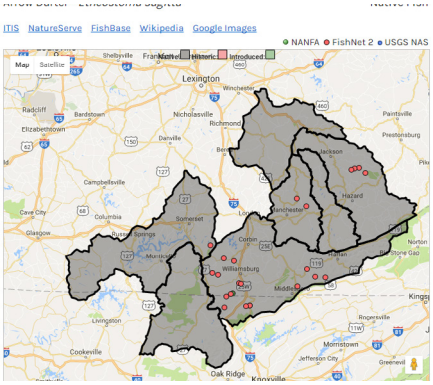
NORTH AMERICAN NATIVE FISHES ASSOCIATION (NANFA)

FishMap.org is for anglers, aquarium hobbyists, scientific researchers, or anyone else with a passion for fishes who wants to visually explore species' ranges or learn what species are in their local waters. The site is dedicated to spreading knowledge and respect for all fish species.

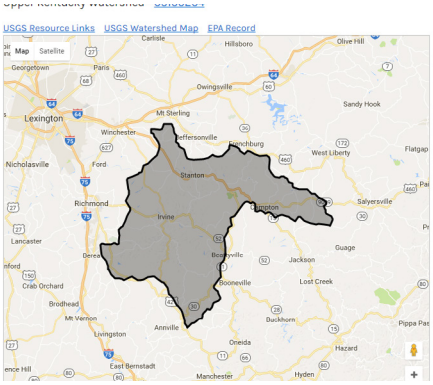
FishMap.org combines numerous data sources to provide a better view and more complete understanding of fish species distribution. It uses data from NatureServe, the National Atlas, the USGS water resources and Nonindigenous Aquatic Species programs, FishNet2, iNaturalist.org, GBIF, and iDigBio.

FishMap.org is sponsored by NANFA. Users can submit their own data to the portal to help map species distribution, so FishMap.org has been working with NANFA members to create an additional database of fish sightings and collections (currently nearly 30,000 records and growing).

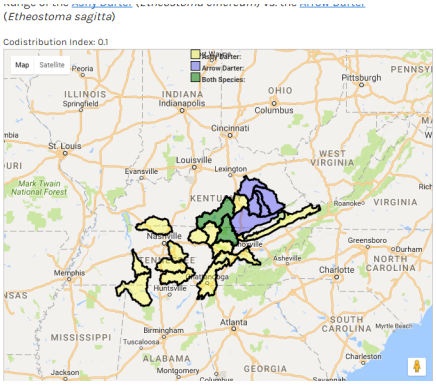
Range and Collection Data



Explore Watersheds



Compare Ranges



FISHES OF WISCONSIN POSTERS

The University of Wisconsin Zoological Museum has some amazing fish posters for sale. The 13-foot canvas poster shows all 183 species found in the state, at life size, and costs $150. Nine smaller posters, each depicting a subset (eight show families: the sunfishes, the pikes, the perches, the gars, the suckers, the salmonids, the catfishes, and the minnows; "The Little Fishes of Wisconsin" includes 16 families) are also available. The excellent art is by Kandis Elliot, UW-Senior Artist Emerita, and reference photos were provided by NANFA member John Lyons. See https://charge.wisc.edu/zoology/items.aspx for more info.

THE NORTH AMERICAN NATIVE FISHES ASSOCIATION

DEDICATED TO THE APPRECIATION, STUDY AND CONSERVATION OF THE CONTINENT'S NATIVE FISHES

AN INVITATION TO JOIN OR RENEW

The North American Native Fishes Association is a 501(c)(3) not-for-profit, tax-exempt corporation that serves to bring together professional and amateur aquarists, anglers, fisheries biologists, ichthyologists, fish and wildlife officials, educators, and naturalists who share an interest in the conservation, study, and captive husbandry of North America's native fishes. A portion of each member's dues helps support three important initiatives: NANFA's Conservation Research Grant Program, which funds research on the biology and conservation of North America's most neglected and imperiled fishes; the Gerald C. Corcoran Education Grant, which funds educational outreach programs aimed at children and the general public; and the John Bondhus Conservation Grant, which supports organizations and groups working to conserve native fish populations.

MEMBER BENEFITS

- ***AMERICAN CURRENTS,*** a quarterly publication featuring articles and news items on collecting, keeping, observing, conserving, and breeding North American fishes.
- **REGIONAL NANFA CHAPTERS.** State and regional aquarium groups where members may get together to collect and discuss native fishes, remove exotics, and perform conservation and stream restoration work.
- **NEW MEMBER PACKET.** An 8-page newsletter that's sent to new NANFA members introducing them to NANFA, and to the fascinating world of collecting, keeping and conserving North America's native fishes.
- **ANNUAL CONVENTION.** Where NANFA members from around the country meet for lectures, collecting trips, auctions, fun and finship. **The 2024 convention will be held June 6–9 at Beavers Bend State Park in Broken Bow, OK.**
- **GRANT FUNDING.** Only NANFA members can apply for NANFA's Conservation Research Grant and Gerald C. Corcoran Education Grant programs. For details, see NANFA's website (www.nanfa.org), or contact Dr. Bruce Lilyea, Conservation Grant Chair, 863-513-7611, bruce.lilyea@gmail.com, or Scott Schlueter, Education Grant Chair, scott_schlueter@hotmail.com.

DUES: USA, $30/year ◆ CANADA and MÉXICO, $40/year ◆ ALL OTHER COUNTRIES, $60/year (All amounts in US$)

Please renew or begin my NANFA membership, or send a gift membership to the person named below.

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(See Contents page.)