Great Lakes, Great People, Great Memories: A Report from the 2002 NANFA Convention in Ann Arbor, Michigan

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I have a favorite memory from every NANFA Convention I've attended. In Chattanooga, it was first setting eyes on the woman who would later become my wife, Stephanie. In Champaign-Urbana, it was seining for darters with Dr. Darter himself, Larry Page. In Jackson, it was simply getting there after our Jeep had broken down in the aptly named Ft. Payne, Alabama. In Hocking Hills, Ohio, it was the surprise party in celebration of my 40th birthday. Last year in Ann Arbor my favorite memory was this:

A small group of us had arrived at the University of Michigan Museum of Zoology and had gathered in the lobby, or rotunda. While we waited for Dr. Gerald Smith to arrive to unlock the door to the Museum's cavernous fish collection, we amused ourselves by browsing the informative exhibit on Great Lakes fishes that had just opened in the rotunda to coincide with the start of the NANFA Convention. When I turned my attention to the final glass cabinet I could scarcely believe my eyes.

Carefully mounted in the upper left hand corner of the display was the Spring 2001 issue of *American Currents*. Under it was a text panel containing a brief description of NANFA and information on how to join, including NANFA's mailing address, 1107 Argonne Drive, which also happens to be my own.

Imagine going to an art museum and finding, hanging between masterpieces by Renoir and Monet, a charcoal sketch you did in high-school art class. That's a little what it felt like seeing the humble publication I crank out of my home computer so prominently displayed in a world-famous natural history museum.

"Hey, how did this get in here?"I asked Leo Long, who, along with Bob Muller, co-organized the Ann Arbor meeting (with the help of several others, acknowledged below. I should also mention that NANFA shared the display cabinet with Leo's exquisite wood carving of a shoal of bluespotted sunfish.)

"That was Dr. Smith's idea," Leo answered.

Later that evening I thanked Dr. Smith for including NANFA in the Great Lakes exhibit. (Just so you know, Dr. Smith is one of North America's most active ichthyologists, an expert on fossil fishes, zoogeography and suckers, and curator of the University of Michigan fish collection.) What prompted him, I asked, to pay NANFA this honor?

Dr. Smith explained that NANFA performs a valuable service in educating people about North America's fishes, particularly nongame fishes, which are easily overlooked but often greatly imperiled. After a career in academia, Dr. Smith is devoting much of his retirement to getting the general public more aware of, and more involved in, biodiversity issues. NANFA helps bridge the gap between professionals and amateur enthusiasts, and serves as a much-needed advocacy group for a faunal group with few advocates outside academia.

At this moment I felt tremendous pride in the organization, and thanked Dr. Smith for his kind words.

"Thank *you*," he replied.

While this was my favorite memory from NANFA 2002, it was just one of many great ones. And so I write this summary report not just to relive these memories, nor just to record what happened and inform non-attendees of what they missed. I also write this report to show my appreciation for the efforts of Bob Muller, Leo Long, and the entire Great

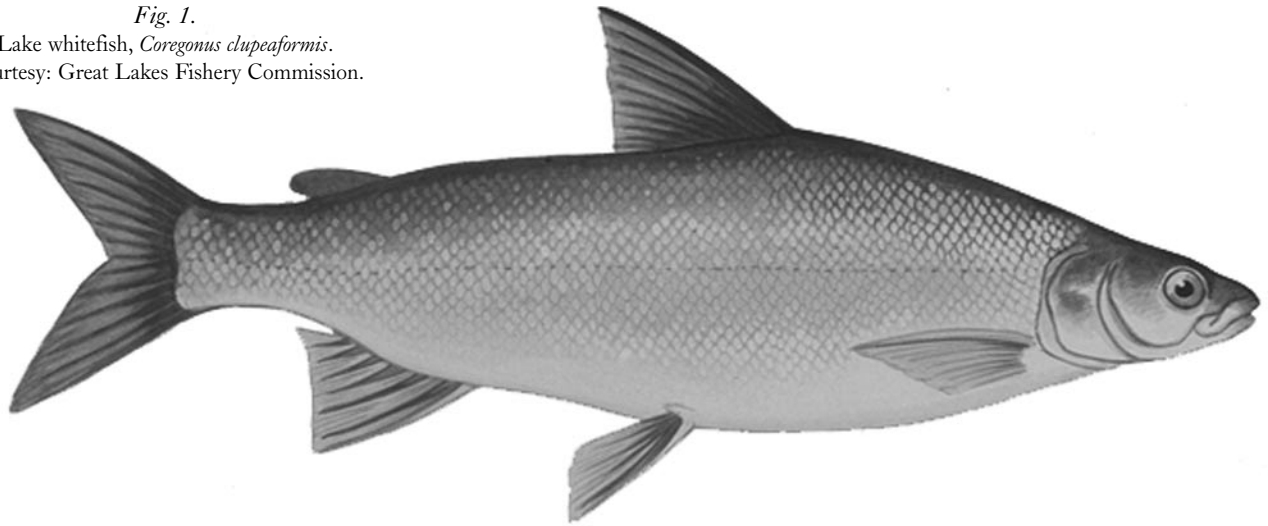

Fig. 1.
Lake whitefish, *Coregonus clupeaformis*.
Courtesy: Great Lakes Fishery Commission.

Lakes committee (Dr. Smith, Emily Damstra, Carol Long), who worked their anal fins off to make this convention a great success in every way.

Sweet Talking Mussels

Bob and Leo came up with something different for the 2002 get-together: a special Thursday evening talk for those of us who arrived early. Doug Sweet was the speaker. Doug's the Curator of Fishes at Detroit's Belle Isle Aquarium, and he's one of the most impassioned fish guys you'll ever meet. Doug didn't talk about fish, though. He talked about mussels.

"My heart goes out to the little creatures that no one pays attention to," Doug said. And mussels top his list.

Doug gave us a fascinating crash course in mussel biology, debunking the notion that mussels are boring creatures that don't do much except sit there with their heads in the mud. What really got Doug into mussels is that they are the most endangered freshwater fauna in the world. North America is mussel central, with more species (around 300) than any other continent. Yet 60-70 of these species are federally protected. At least a hundred others deserve protection. And at least 18 species are gone for good.

As an aquarist, Doug is interested in finding ways to propagate mussels in captivity as a safeguard against total extinction, and to reintroduce captive-born mussels back into suitable habitat. Trouble is, mussels are notoriously difficult to keep alive for longer than 3-6 months. They're filter feeders that need a constant supply of microscopic food to stay alive—100,000 cells per milliliter, according to one estimate. Any less and they slowly starve to death. Any more and their systems can't handle it; the mussels shut down and starve to death anyway. And even though all mussels are filter feeders, they don't all filter the same thing. Some eat algae. Others phytoplankton. Some a combination of both. And some only take microorganisms of a particular size (usually between 4 and 120 microns).

Doug devised a simple but ingenious way to keep his mussels fed with the right amount, right types, and right sizes of food. His mussel unit is outfitted with an in-current and ex-current siphon that runs underground from the aquarium basement to an outdoor koi and goldfish pond. Several mixing valves allow Doug to control how much microorganism-rich pond water flows into the unit. In the winter, when the pond is shut down, Doug packs his mussels into "containment pods," sinks them at secret locations in local rivers, and retrieves them in the spring.

How to Move to Michigan Without Feeling a Thing

Dr. Smith kicked off Friday's speakers program. He explained how the Great Lakes system was covered with ice 14,000 years ago, and how many of the region's fishes got there after the ice started to melt. Cold-tolerant fishes such as the cisco, or lake herring (*Coregonus artedi*), were there all along, living in the meltwater lakes on the southern edge of the glaciers. The six or so species of deepwater ciscoes (see below) likely arose during a period of rapid evolution over the past 10,000-11,000 years (apparently there weren't any glacier lakes for them to live in).

Warmwater, headwater fishes such as minnows, darters and sunfishes—which lived in glacial refugia in the Atlantic and Mississippi River drainages—entered the Great Lakes

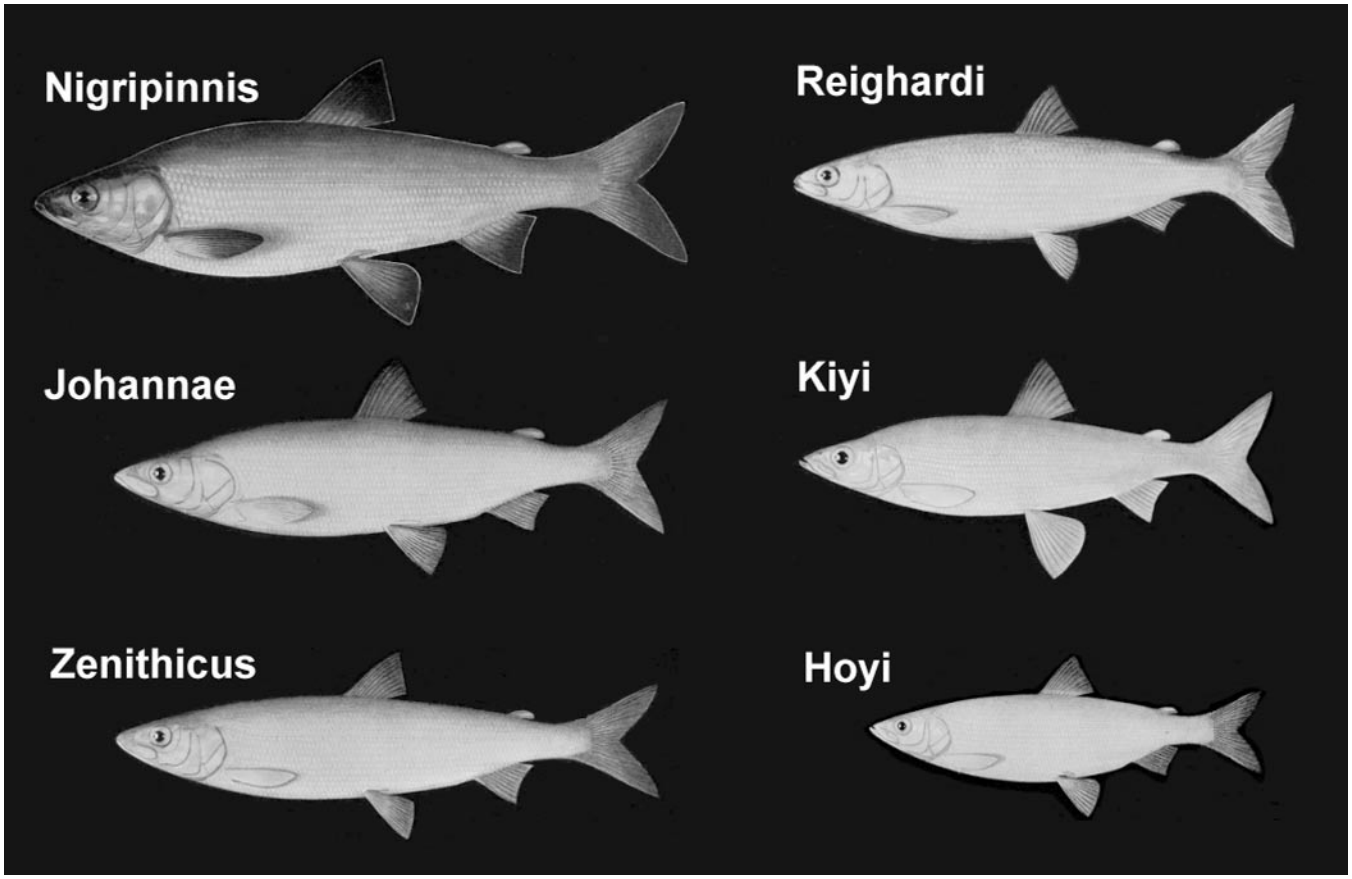

Fig. 2.
Great Lakes deepwater cisco (*Coregonus*) species flock. Courtesy: Great Lakes Fishery Commission.

system through stream capture. Stream capture is a geological process in which one stream erodes into another and "captures" the water in it. Plants and animals are often exchanged when the two streams are in contact.

Around 70 species of fish shifted into the Great Lakes drainage, Dr. Smith said, "without ever feeling a thing."

The Tragic History of Great Lakes Ciscoes

The next speaker was Thomas Todd, Research Biologist with the U.S. Geological Survey's Great Lakes Science Center. He spoke on ciscoes, a group of native fishes that most native fish enthusiasts likely know little about. Taxonomically, they're members of Coregoninae, a subfamily of Salmonidae, which contains the more familiar salmons and trouts. Among coregonids are the inconnu (*Stenodus leucichthys*), the round whitefish (*Prosopium cylindraceum*, back cover, top), and the ciscoes of the genus *Coregonus*.

Two species of *Coregonus*—lake whitefish (*C. clupeaformis*, Fig. 1) and the aforementioned cisco, or lake herring—once were the most important commercial species in the Great Lakes. Overfishing, habitat degradation, predation from nonindigenous sea lamprey (*Petromyzon marinus*), and competition from nonindigenous alewife (*Alosa pseudoharengus*) ended their commercial dominance. The two species remain in the Great Lakes, though in greatly reduced numbers.

Ciscoes that live in the deeper waters of the Great Lakes have fared much worse. These ciscoes represent a species flock (Fig. 2)—a group of closely related species that share a common ancestor and are endemic to an isolated region, such as a lake. Each species had a unique morphological specialization (e.g., shape of mouth, number and length of gill rakers), a discrete spawning time, and a particular depth at which it lived. Some are still with us, some are disappearing, and at least one species is gone:

- bloater, *C. hoyi*. So named because it bloats when yanked up from the depths. Largely bottom-oriented, usually living at 200-400 feet. Common in lakes Superior and Michigan, where it still supports a commercial fishery.
- deepwater cisco, *C. johannae*. Extinct. Last captured in Lake Michigan in 1951 and Lake Huron in 1952. Overfishing, predation by sea lamprey, and hybridization with other ciscoes prevented its recovery. Preferred depths of 100-600 feet and was rarely caught above 200 feet.

• kiyi, *C. kiyi*. Stable in Lake Superior, extirpated from Lake Michigan. Lives at depths over 500 feet. Name rhymes with "eye-eye."

• blackfin cisco, *C. nigripinnis*. Extirpated from Lake Huron in 1923 and from Lake Michigan in 1969. Still exists in Canada. Lives at 360-480 feet.

• shortnose cisco, *C. reighardi*. Possibly extinct. Formerly found in lakes Michigan, Ontario and Huron. Not collected since 1985. Lives (lived?) at 120-360 feet.

• shortjaw cisco, *C. zenthicus*. Uncommon and declining in lakes Nipigon and Superior; extirpated from lakes Michigan, Huron and Erie. Lives at 200-400 feet.

Tom ended his talk by answering the question, Is there a future for the surviving deepwater ciscoes in the Great Lakes? His answer was neither definitive nor optimistic.

"I certainly hope there is."

The Minnow and Darter Dilemma

Our next presenter was Jay Hemdal, who's been Curator of Fishes at the Toledo Zoo since 1989. He spoke about the seven native freshwater exhibits at the Zoo, and some of the work going on behind the scenes. For example, every wild caught fish is quarantined for 6-8 weeks before going on exhibit. Jay uses salt and malachite green to control protozoans, and successive formalin treatments of 150 ppm per hour to eliminate flukes. Jay never resorts to antibiotics unless a fish has a specific bacterial infection.

Jay also spoke about the Zoo's pirate perch breeding program. But instead of me telling you about it, you can read it for yourself, in Jay's own words, on page 9 of this issue.

Jay ended his presentation with a candid look at the dilemma faced by aquarium exhibit planners about what kind of fishes to have on display. Jay would love to devote an exhibit to minnows and darters because these fishes need all the attention they can get. But Jay worries that such an exhibit would be "panned" by most visitors.

"The most common questions about fish asked by zoo-goers," Jay explained, "especially the children, are: *Is it a species familiar to me? Does it grow really large? Will it eat me? Or can I eat it?* Small native fishes just don't give most of our visitors very interesting answers to these questions. Now, this doesn't mean we have to cater to this lowest common denominator. But we do have to be mindful of the basic tenets of a public aquarium, which are education, conservation and entertainment. If we ignore the last one, we won't have any visitors coming to the facility to educate, or funds to use for conservation."

Sculpins and Catfish Make Especially Good Models

The fish featured on the NANFA 2002 Convention's logo and stationery was a greenside darter, illustrated by our next speaker, Emily Damstra. Emily gave us a brief history of scientific illustration, and then surveyed some of the artists who've contributed to ichthyology over the years.

The hardest part of illustrating a fish, Emily said, is getting accurate colors from dead specimens. Emily prefers making a quick field sketch of a living fish, or having a live "model" in front of her. The most willing model she's ever had was a mottled sculpin, which didn't mind being placed into position and cooperated by staying still.

Catfish are also nice to illustrate. Why? They lack scales, which are tedious to render.

The back cover of this issue shows some of Emily's beautiful work, unfortunately in atrocious black-and-white.

One Goodeid Deserves Another*

When the University of Michigan closed its fish labs in 1979, the research stocks of goodeids collected by Robert Rush Miller were transferred to the best possible hands: those of then-Belle Isle Aquarium curator James Langhammer. Since then at least two goodeid species have gone extinct in the wild, but remain in the hobby thanks to Jim's husbandry skills and those of several dedicated members of the American Livebearer Association.

For those unfamiliar with goodeids, they're an ancient family of killifish-like fishes with a disjunct distribution in the Death Valley system of central Nevada and the Mesa Central of México. The four American species (one is extinct) are egg-layers. The 36 or so species from México are livebearers (viviparous). Unlike traditional livebearers (poeciliids), males of which fertilize females through a modified anal fin called a gonopodium, Mexican goodeids (subfamily Goodeinae) possess an internal, muscular structure called a pseudophallus that connects the sperm ducts to the genital opening. It is through the extrudible pseudophallus that males fertilize females. Females in all species give nutrition to their young through a structure (called a trophotaenia) that's analagous to the placenta in mammals.

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* Credit (or blame) for this shameless fish pun goes to ichthyologist J. M. Fitzsimons, who described courtship, karyotypes, and isolating mechanisms for several goodeid species in the 1970s.

Fig. 3.
A male Turner's sailfin goodeid, *Hubbsina turneri*. Courtesy: American Livebearer Association.

"They're remarkable fishes," Jim says. And they're disappearing. The entire family is in jeopardy due to habitat destruction.

Jim showed slides and commented on several species, including the following:

• golden skiffia, *Skiffia francesae*. Brought into captivity and disappeared from the wild around 1978. Captive stocks are in pretty good condition.

• redtail goodeid, *Xenotoca eiseni*. One of the nastiest fish Jim has ever worked with. It particularly dislikes catfish and will strip one of its fins, leaving only "a sausage in the tank!"

• opal allotoca, *Allotoca maculata*. Once thought to be extinct, but is still thriving in heavily vegetated habitat that's difficult to sample.

• banded allotoca, *Allotoca goslinei*. Possibly extinct in wild but presently secure in captivity.

• Turner's sailfin goodeid, *Hubbsina turneri* (Fig. 3). Jim's favorite fish. This is the only nocturnal goodeid. If you arrive any time before dark, the tank will appear to be empty. Will only come out when the sun goes down, even if the lights are still on in the fish room.

• blackfin goodeid, *Goodea atripinnis*. A large fish that grows to up to 10 inches. Because it's valued as a food fish, its range is extending.

• bulldog goodeid, *Allophorus robustus*. The largest species in the family, often maturing at more than 11 inches in length.

Big Results in Small Tanks

Bob Muller is one of the few native fish enthusiasts out there who's actually *breeding* native fishes. He's been sharing his techniques and results in a series of informative articles for *American Currents*, and promises more are on the way. Bob's brisk and entertaining slide presentation was a virtual tour of his fishroom, proving that one doesn't need a lot of space nor a lot of big tanks to do big things with smaller fishes like minnows and darters. Bob attributes a lot of his success to green water (the perfect food for very small fry) and keeping broodstock cold during the winter.

Part of Bob's basement hatchery is what he calls his "wintering room"—a cement-lined crawlspace under his porch that allows tank water to chill down to below 50°F during Michigan winters but doesn't freeze. Lights in this room are on timers set to simulate the natural daylength outside. Most of the fishes in the wintering room are ready to spawn in May. But since that's too many fishes to deal with at the same time, Bob accelerates the change of seasons for some species by bringing them indoors and increasing the amount of light they receive.

Bob clicked through slides of some of the native fishes he's spawned and raised (at least 18 by my count), stopping on a beautiful flagfin shiner (*Pteronotropis signipinnis*).

"They breed like zebra danios," Bob said. Yet despite their beauty and relative ease of breeding, they and most other

Table 1. Bob Muller's darter egg/fry comparisons.

Greenside darter, *Etheostoma blennioides*
Sinking mop; eggs found tight where the yarn strands enter the knot. So tight they are often misshaped.
Hatching in 8-10 days.
Fry clear and pelagic.

Rainbow darter, *Etheostoma caeruleum*
Eggs cemented with gravel (2-3 mm diameter) into clusters.
Yellow yoke.
Hatching in 8-10 days.

Fantail darter, *Etheostoma flabellare*
Eggs 3 mm diameter.
Deposited in half flowerpots.

Dusky darter, *Percina sciera*
Eggs 1.5 mm diameter; clear yoke.
Found individually in gravel; mildly adhesive.
Hatching in 5-6 days.
Fry small, clear and pelagic.

Iowa darter, *Etheostoma exile*
Eggs 1.1 mm diameter.
Floating mop, eggs deposited on inside strands midway between knot and strand ends.
Hatching 5-10 days.
Fry 4.5 mm long, clear and pelagic; 20 mm long at 60 days.

Least darter, *Etheostoma microperca*
Eggs oval or bean-shaped, 0.8 x 1.1 mm.
Floating mop; eggs deposited on outermost strands almost at water line.
Hatching 5-6 days at 60˚F.
Semi-pelagic fry 3.8-4.2 mm long.
Fry often appear bent as if twisted by the egg shape.

Johnny darter, *Etheostoma nigrum*
Eggs 2.5 mm diamater.
Deposited in half flowerpots.
Hatching in 10 days.

Banded darter, *Etheostoma zonale*
Eggs 1.5 mm diameter; yellow yoke.
Found deposited inside 6" hanging yarn mop 1/4-3/8 of the way down from knot on the outer few strands.
Hatching in 12 days.
Pelagic fry 5.5 mm long.

Orangethroat darter, *Etheostoma spectabile*
Eggs 1.5 diameter; yellow yoke.
Egg and gravel clusters same as rainbow darter.
Hatching in 9-11 days.
Fry 5.0 mm long; 15 mm long at 30 days.

native minnows and darters are not available in the pet trade. Why? Bob's answer helps explain why natives are not a bigger part of the aquarium hobby:

"Well, in three months I can raise a tropical fish to a saleable size. These guys [flagfin shiners] take a *year* to get to saleable size. Darters take *two years* to get fully grown. And I'm feeding a lot of frozen brine shrimp to these guys, not flake food. So I'd have to be selling them for $25 a pair to break even on what I feed them. . . . They don't grow fast enough to be marketable. If I went to the local pet shop they'd give me 35 cents a piece for them, but I put 10 times as much food into each fish."

Bob enjoys counting eggs and fry, and records hatching times and sizes. He provided three hand-outs to supplement his presentation, two of which are reproduced here as Table 1 and Table 2.

The Winter Stonefly Search

Our next presenter, Dr. Joan Martin, is an entomologist and environmental activist who runs the Huron River Watershed Council's Adopt-a-Stream program. She spoke about ways to get citizens involved in river protection. Based on her experience the best way to get people into streams is to get them literally into streams—preferably, in the dead of winter—catching, counting and identifying stoneflies and other benthic macroinvertebrates in what's turned out to be a popular annual event, the Winter Stonefly Search.

Like canaries in coal mines, winter stoneflies are excellent indicators of stream quality because they usually are the first to go when conditions deteriorate. Unlike most other river critters, winter stoneflies are dormant during the summer when problems associated with warm weather (e.g., stormwater runoff, excessive plant growth) limit oxygen levels. Since they require high levels of oxygen, winter stoneflies are active in January when the solubility of oxygen is high. At that time of year an absence of stoneflies suggests that toxic pollutants may be present in the river. By monitoring winter stonefly populations, the Huron River Watershed Council can see the effects of the chemicals entering the river, which is much harder to gauge in the summer.

The Winter Stonefly Search is aimed at adults, many of whom bring their kids. Usually 80-100 volunteers show up. Prior knowledge of stream ecology or stoneflies is not required. All volunteers are assigned to a team of 4-5 people. An "educator" gives each team instructions and answers

Table 2. Bob Muller's Cyprinidae egg data.

Northern redbelly dace, *Phoxinus eos*
Eggs 1.8 mm diameter.
Hatching in 5 days.
Fry 5 mm long.

Rosyface shiner, *Notropis rubellus*
Hatching in 3 days.

Blackchin shiner, *Notropis heterodon*
Eggs 2.1 mm diameter.
Hatching in 96-120 hours.
Fry 4.8 mm long.

Flagfin shiner, *Pteronotropis signipinnis*
Eggs 1.1 mm diameter.
Hatching in 48-60 hours.
Fry 3.5 mm long.

questions. The other people in the group are assigned to roles such as equipment manager and "bug picker." Each group collects samples from two stream areas: one that's likely to be of good quality and another that's likely to be more degraded.

By involving citizens in the collection of scientific data, the Huron River Watershed Council seeks to inspires attitudes, behaviors, and ultimately value systems that protect and rehabilitate the Huron River system.

Cold Fish, Cool Fish, Warm Fish

Ever find a particular fish species in one section of a creek and not find it in another section up- or downstream? Ever wonder why? One explanation, according to our next speaker, may be temperature. Kevin Wehrly is an ecologist who studies the affects of stream temperature on the distribution and abundance of Michigan's fishes. Some fishes prefer cold water (summer temperatures less than 20°C), some cool water (summer temperatures between 20-24°C, and others warm water (summer temperatures greater than 24°C).

What makes a stream cold, cool or warm? No, it's not the temperature of the air. It's groundwater. The more groundwater that enters a stream, the colder that stream's temperature.

"Michigan's streams don't fit the general classic zonation pattern where streams that start in the headwaters of cold springs, flow downstream, become warmer, transition into cool water, and then into warm water," Dr. Wehrly explained. "Many of our streams originate in lakes and wetlands that start out as warmwater streams, and then flow across the landscape, accruing groundwater and cooling off, with some of them actually becoming coldwater streams."

Dr. Wehrly's data shows that species richness generally increases as temperature increases. In other words, the warmer the stream, the more different kinds of fishes in it. But another factor affecting fish abundance and distribution is temperature *fluctuation*. Some species can tolerate a wider range of stream temperatures throughout the year than others. Dr. Wehrly found that cold, thermally stable streams contain the lowest fish diversity, and that the fish diversity of warmwater streams decrease as the potential for thermal fluctuations increase.

Based on my unscientific analysis of Dr. Wehrly's data, rock bass (*Ambloplites rupestris*) are warmwater fish that don't mind the air conditioner blowing full blast every now and then, whereas brook trout (*Salvelinus fontinalis*) can't stand anyone cranking up the heat at all.

"Walking the Cloud"

The final presentation of the day was underwater video footage of Nancy S. Washburne's snorkeling excursions in Michigan's inland lakes. I was not allowed to record Nancy's presentation so I cannot provide a more detailed summary here. (See her article in the Summer 2002 *American Currents* instead.) But three images from her video were quite memorable:

- A male bluegill fruitlessly trying to save his fry from other bluegills. Every time he chased a bluegill off, two or more would sneak in and eat some fry.
- A determined spotfin shiner trying to eat the freckles on Nancy's arms.
- A male bowfin watching over a black swirling mass of bowfin fry. The fry moved as one as they attempted to stay close to daddy. Nancy called the image "walking the cloud."

3½ Miles of Fish

After the talks, some of the attendees elected to hang back at the hotel, have dinner, and talk fish over a bottle or two of medicinal hydration. The rest of us drove over to the University of Michigan Museum of Zoology (UMMZ) where we enjoyed bottles of a different sort—more than three million catalogued specimens of pickled fishes (Fig. 4). Lay the bottles out in a straight line, Dr. Smith said, and the line would extend for three-and-a-half miles.

The UMMZ fish collection began in 1882 and took on its modern character in 1920 when the Division of Fishes was formed by Dr. Carl L. Hubbs. When Hubbs left in 1944, the collection numbered nearly 1.7 million in contrast to the few thousand specimens it contained when he began.

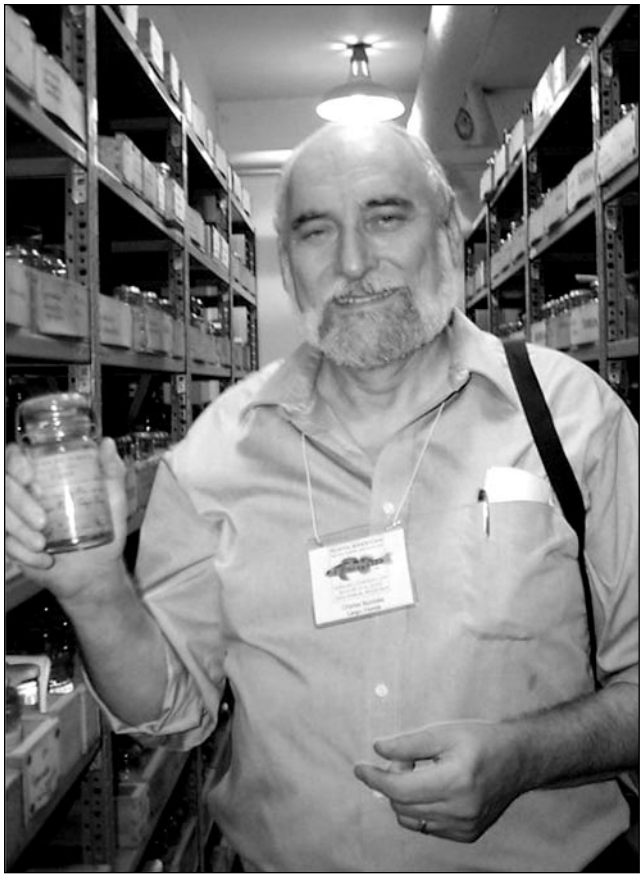

Fig. 4.
Charlie Nunziata (FL) holding a jar of rare *Cyprinodon* at the University of Michigan fish collection. Being the killie enthusiast that he is, Charlie headed straight to the killifish stacks. Photo by the author (but using Charlie's camera).

Subsequent curators added over a million more specimens, making it the fourth largest (among eight) International Ichthyological Resource Center in North America.

In the Summer 2002 issue of *American Currents*, advance copies of which were given to convention attendees, I wrote a short article on the desert collecting adventures of Dr. Hubbs and his pupil Robert Rush Miller. It was a treat for me to see the very same specimens these two legendary ichthyologists collected during their famous expeditions to the American West. I got to hold in my hands the all-but-forgotten Las Vegas dace (*Rhinichthys deaconi*), knowing that this fish went extinct for the benefit of Las Vegas fountains and golf courses. Many specimen jars were adorned with the red "EXTINCT" label and I examined them all, wondering how many others would soon be joining their ranks.

While we were touring the stacks, Dr. Smith had some of us doing some work. The University had developed a beta version of an on-line database of Great Lakes flora and fauna (see box at right), and wanted us to test the fish portion of it while the site's designers looked on. We were more than happy to comply, especially since Dr. Smith treated us to beer, pop, and assorted snack goodies.

Okay, Enough of the Pickled Fish, Let's See Some Live Ones

After a day of sitting in a dark auditorium listening to speakers, it was nice to get out and get wet. Our first of two sampling trips for the day was in the section of the Huron River that flows through Hudson Mills Metropark. Some people seined. Some dipnetted. Ken Wintin of Tucson, Arizona, fished. A few, including me and Stephanie, snorkeled. We saw or caught 25 species, 26 if we include an unconfirmed sighting of sand shiner (*Notropis stramineus*).

Our second sampling trip was at Lake Patterson. Lunch was waiting for us when we got there—burgers and dogs served up by Venture Crew 1338 of the Boy Scouts of America (who also manned canoes to help with our collecting). We were hungry and enjoyed lounging by the lake. But I didn't lounge for long. After seeing Nancy Washburne's video yesterday, I was eager to snorkel one of Michigan's inland lakes. Unfortunately, the water at Lake Patterson was turbid and visibility was poor. The sampling, however, wasn't. We saw or caught at least 23 species. Dr. Smith gave us lessons on how to distinguish between blacknose (*Notropis heterolepis*) and blackchin (*N. heterodon*) shiners (Fig. 5).

Flora and Fauna of the Great Lakes Region: A Multimedia Digital Collection

The University of Michigan Library and its project partners, the Fish and Mammal Divisions of the University of Michigan Museum of Zoology and the Fungus Collection of the University of Michigan Herbarium, announce a new digital library resource, "Flora and Fauna of the Great Lakes Region" at:

`www.lib.umich.edu/programs/greatlakes/index.html`

This Web site provides access to specimen materials selected from the three museums' extensive Great Lakes holdings. When complete, the resource will include 11 sub-collections, containing many images as well as collection data. A working prototype for a system to provide integrated access to all of the Museum Divisions' collections and additional content such as field notes and other supplementary information, the site is intended to facilitate access to natural history collections for the general user as well as the specialist interested in searching across domains.

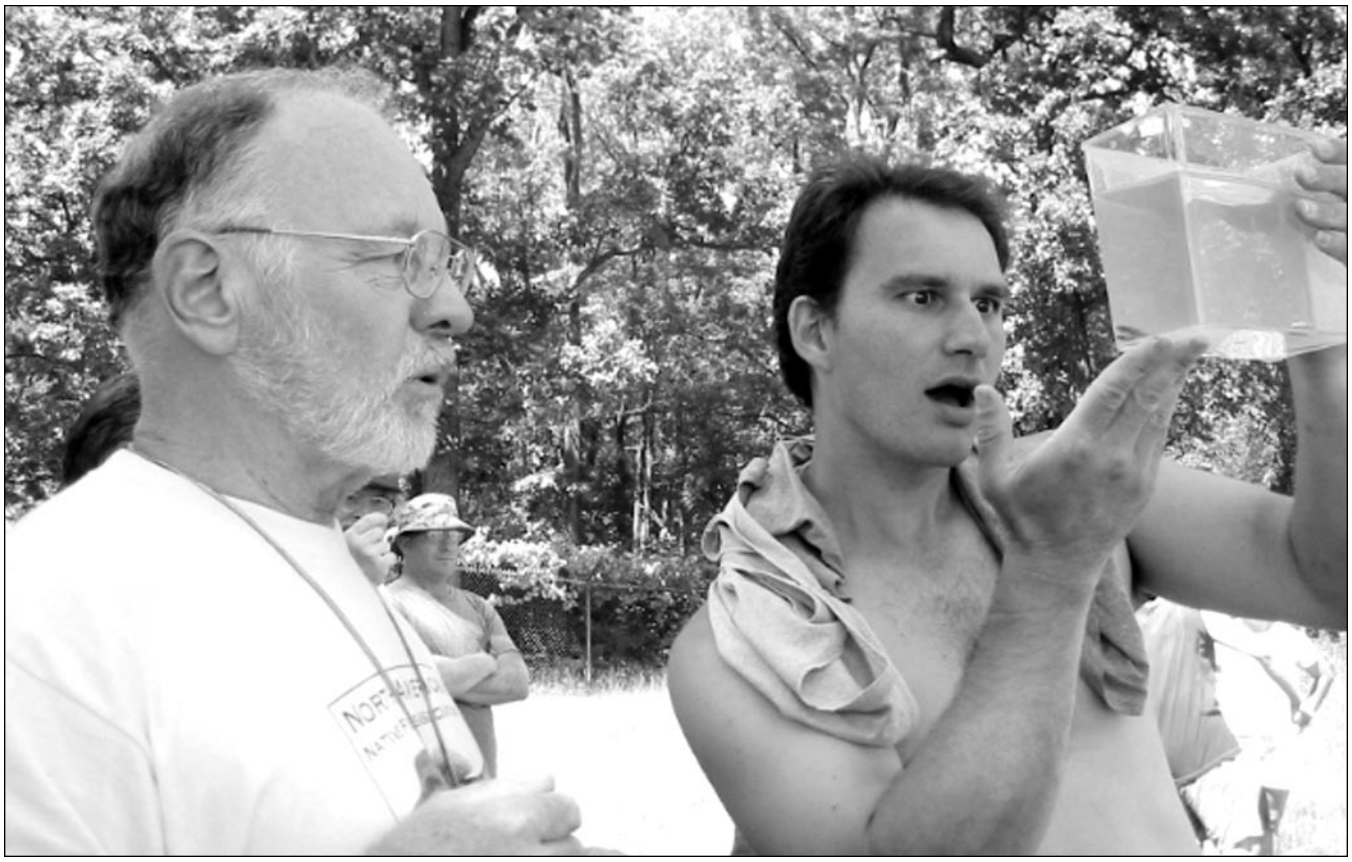

Fig. 5.
Nick Zarlinga (OH) looks downright astonished as Dr. Gerald Smith (MI) explains the subtle differences between blacknose and blackchin shiners. Photo by the author.

An Extremely Painful After-Dinner Talk

I suppose we should be thankful that North America is not home to the candirú, the legendary catfish that's the most-feared fish in Amazonia. I'm sure we've all heard tales about how this tiny catfish has a predilection for blood and/or urine, and occasionally swims up the urogenital openings of bathers and waders, lodging itself in delicate membrane and causing what must be unfathomable pain. Are these tales for real? Or are they jungle legend? Our banquet speaker, Paolo Petry, an expert on South American fishes, put the matter to rest—and had the graphic medical photographs to prove it.

We cringed. We laughed. We protectively grabbed our crotches and yelled a collective "*Ouch!*" And we were thankful that Dr. Petry gave his talk after we had eaten. So what if this fish is from a different continent and ordinarily should have no place in a convention devoted to North America? This material is too good and unbelievable to pass up. Even if some of us wanted to pass out.

In October 1997, a well-respected urogenital surgeon in Brazil named Anoar Samad attended a 22-year-old man from a local Amazon town. The patient's urethra was obstructed, having been attacked, he said, by a candirú four days earlier. The patient had a fever, a swollen scrotum, a bleeding urethra, and a distended abdomen caused by urine retention. One can only imagine his burning, insufferable pain. Dr. Samad inserted an endoscope into the urethra, grasped the fish at the caudal peduncle with an alligator clip, and removed it in one piece. It was a trichomycterid catfish alright, 5.25 inches long, and beginning to decay. In fact, it was too decayed for Dr. Petry to positively identify the species (but he suspects it was *Vandellia erythrura*). Now here's the weird part:

The patient claims his penis was not underwater when he was urinating, nor when the candirú began its fateful ascent. According to the patient, the candirú emerged from the water and forced its way inside the penis with alarming dispatch. The patient tried to grab the fish but it was too slippery. A sphincter muscle blocked the fish's forward progress, so it turned and bit its way into the scrotum. (By the way, the patient's fine and is suffering from no long-term effects.)

Candirú have been called "the only vertebrate parasite of man." This is not accurate, Dr. Petry says. In the wild candirú parasitize on larger fishes, feeding on blood from the gill membranes. But candirú that attack humans invariably get stuck and die. There is no true parasitic relationship.

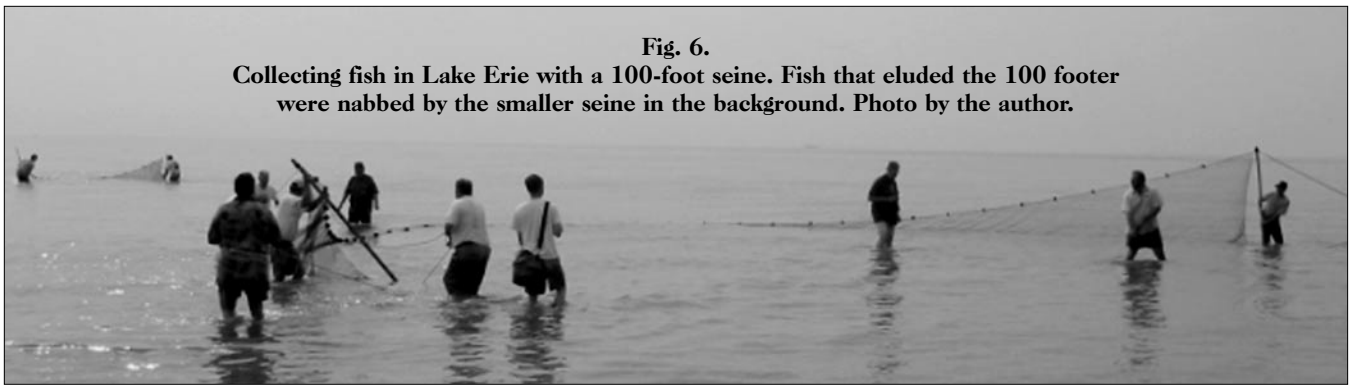

Fig. 6.
Collecting fish in Lake Erie with a 100-foot seine. Fish that eluded the 100 footer were nabbed by the smaller seine in the background. Photo by the author.

Dr. Petry can't explain what provoked the candirú to attempt its fatal micturturial migration. Laboratory tests show that candirú are not attracted to urine. Dr. Petry surmises that they are instead attracted to some unknown nitrogen-based compound, or perhaps to minute electrical charges generated by laminar flow, and that the candirú simply mistook the poor man's penis for a gill.

Winning and Bidding

After we recovered from Dr. Petry's *penetrating* examination of the candirú phenomenon, we were ready to have some fun. Namely, the NANFA raffle and auction.

First up was the raffle. Leo drew the winners from a big blue drum and Bob read them aloud. Winners need not be present to win and none of them were:

- Richard Kessler (KY) won the 6th prize, a set of Joseph R. Tomelleri fish prints.
- Nathan Pate (MO) won the 5th prize, a copy of Robert J. Goldstein's *American Aquarium Fishes*.
- Kathy Thomas (MI) won the 4th prize, a copy of the out-of-print *Handbook of Darters* by Lawrence M. Page.
- Vic Starostka (CO) won the 3rd prize, The Perfect Dipnet (courtesy of Jonah's Aquarium) and a 4' x 8' seine (courtesy of Jim Graham).
- Matt Cooper (MI) won the 2nd prize, a greenside darter carving by Leo S. Long.
- And Paul Silvagni (AZ) won the first prize, a 29-gallon A-PLEX system from Aquatic Habitats.

The auction was another marathon affair, this time with David Hemmerlein serving as auctioneer. As always, it was interesting to see how fairly worthless items sold at high prices and valuable items sold dirt cheap. Go figure.

Combined, the raffle and auction raised $1852 for NANFA's coffers. Thanks to everyone who bought a ticket or closed a bid.

Final Trip, Final Words

We left the masks and snorkels behind for Sunday morning's outing to Lake Erie since we were told that the water would too murky for snorkeling, and indeed it was. We did bring along the University of Michigan's 100-foot seine (Fig. 6), and seined up 17 species of fish. Sadly, the most common fish we encountered was the round goby (*Neogobius melanostomus*), an aggressive Caspian Sea exotic that is single-handedly wiping out Lake Erie's native darters and sculpins.

Lake Erie marked the close of the convention, and most of us departed for home from there. We lingered around our cars for a while, saying our good-byes and thanking Bob, Leo and Dr. Smith for all their hard work. This is the only part of NANFA conventions I hate. We're all a little tired and a little anxious to get going because of long drives or departing flights, yet we still want to hang around a little while longer and shoot the breeze. Yes, it's native fish that bring us together, but it's the camaraderie—the information exchanged, the good-natured ribbing, the friendships kindled and strengthened—that keeps us coming back year after year.

Bob and Leo are quick to point out that they didn't do it all. In addition to Emily Damstra and Dr. Smith, Heather Muller did all the printing for signs, name tags and note books. Heather and Carol Long did most of the copying at work, saving NANFA money. Bob's wife Kelly, "did so many things to help me," Bob said, "that I wouldn't have been able to keep up without her help." And many individuals and companies donated items to our raffle and auction:

Marine Enterprises International. Joseph R. Tomelleri. Rolf C. Hagen Corporation. T.F.H. Publications, Inc. Kent Marine. Aquaria-Marineland. Seachem Laboratories. Hikari Sales USA, Inc. Florida Tropical Fish Farmers Association, Inc. Jim Graham. Jonah's Aquarium. And Bob Bock.

Great people make great conventions, and NANFA has plenty of both.