WERE BLUE PIKE (*SANDER VITREUS GLAUCUS*) STOCKED IN MINNESOTA?

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BACKGROUND

The Blue Pike (*Sander vitreus glaucus*), also known as Blue Walleye (Figure 1), was a subspecies of the Walleye (*S. vitreus*). It was a valuable commercial species endemic to lakes Erie and Ontario, and the Niagara River (Figure 2). From the 1880s to 1950s about a half-million metric tons were harvested, which sometimes comprised more than half the annual commercial catch from Lake Erie. The first decline in abundance was observed in 1958 and the last fish reported in 1971 (NatureServe 2017, Wikipedia contributors 2017). Compared to the "yellow" Walleye, the Blue Pike has larger eyes, narrower interorbital width (i.e., distance between eyes), blue back and sides, bluish lower fins, and is much smaller, reaching a maximum length of about 14 inches and weight of two pounds (University of Michigan 2017).

THE PAPER TRAIL BEGINS

I had heard a wild story years earlier, as it unfolded, and hopes were high that Blue Pike might not be extinct if the stocking in Minnesota had been a success and that the progeny could be used to restore it to its former habitats. In 2016, I decided to get the truth from the Minnesota Department of Natural Resources (MDNR) Fisheries files in case it was needed for *The Fishes of Minnesota,* currently in preparation by Gary Phillips and NANFA members Jay Hatch and me.

In 1969, a pair of Lake Erie *Sander,* believed to be Blue Pike, were spawned at the Pennsylvania Fish Commission's Linesville Fish Culture Station. About 9,000 of the fry were transferred to Gavins Point National Fish Hatchery at Yankton, South Dakota (Smith unpublished), and some of the fingerlings were stocked in an isolated lake in northern Minnesota (Figure 3).

Little Horn Lake (Itasca County), in the Chippewa National Forest, became the fingerlings' new home (Figure 4). Information about Little Horn is posted on the MDNR web page (LakeFinder 2017). It is located about 10 miles northeast of Deer River, has a surface area of 40 acres, and a maximum depth of 68 feet. LakeFinder shows only one fish survey of the lake, in 1988; the following species and numbers were recorded: White Sucker (*Catostomus commersonii*) (6), Largemouth Bass (*Micropterus salmoides*) (5), Yellow Perch (*Perca flavescens*) (28), and what was recorded as Walleye (2). A hard copy file at MNDR gives a summary of a 1959 survey when only Largemouth Bass and Yellow Perch were found and notes the lake was "reclaimed" in 1960 with the fish toxicant rotenone. Reclamation was once a common management practice to create "stream trout lakes," which required annual stocking because none of these species reproduce in lakes. Early stocking records show the lake received Smallmouth Bass (*M. dolomieu*) in 1950. After reclamation, Brook Trout (*Salvelinus fontinalis*), Rainbow Trout (*Oncorhynchus mykiss*), and Ohrid Trout (*Salmo letnica*) were stocked, along with Coho Salmon (*O. kisutch*), and ending with Largemouth Bass in 1978. There is a public access on the lake, but canoes and small boats must be carried in on a 500-foot trail. Several years ago, NANFA member Nick Proulx and I attempted to collect specimens by angling to photograph for *The Fishes of Minnesota.* We got skunked, but it was a gorgeous fall day to be out fishing (Figure 5).

Photos by the author.

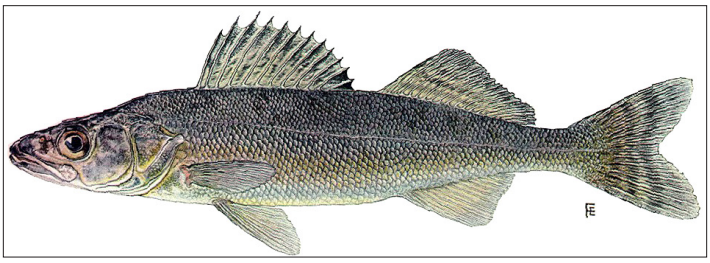

Figure 1. Blue Pike illustration. New York Department of Environmental Conservation (DEC).

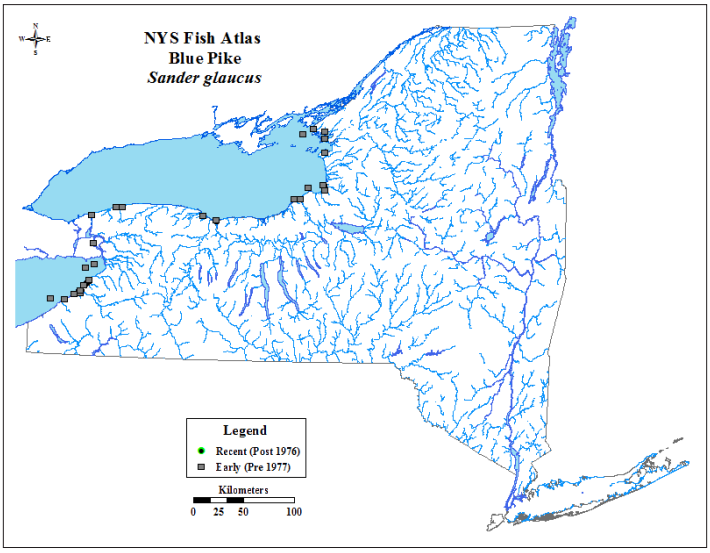

Figure 2. Historic occurrences (pre-1977) of Blue Pike in New York. Map composed by Richard McDonald (DEC). Symbols modified for clarity.

E Nº 5855

MINNESOTA CONSERVATION DEPARTMENT
DIVISION OF GAME & FISH

☐ Rescue ☒ Transfer ☐ Distribution

To Reg. V.--Grand Rapids County Itasca
T. R. S. Location
From U.S. Fish & Wildlife Hatchery County
T. R. S. Location
Temperature: Water Air Time

Species	Size	Number	Rate	Pounds
Blue Pike	Fgl.	525	75	7

Remarks Brood fish from Lake Erie

I hereby certify the above information is true and correct U.S.F.&W.S. Shipper
Signed Oct. 30,1969 Date Receiver
Driver Source of Fish Gavins Point, So. Dakota
U.S. Fish Hatchery Gavins Point, So. Dakota
G. F. 88 Station Stamp Transfer Number

Figure 3. 525 Blue Pike fingerlings transferred to Minnesota.

Figure 5. Nick Proulx at Little Horn Lake access.

Figure 4. Little Horn Lake in the Chippewa National Forest.

STATE OF MINNESOTA
DEPARTMENT NATURAL RESO ES-AREA FISHERIES
Office Memorandum

TO : Bob Davis
Fisheries Biologist
Area Fisheries Headquarters
Box 296
Hutchinson, MN. 55350

DATE: 6 January 1987

FROM : David Holmbeck
Grand Rapids Area Fisheries Supervisor

PHONE: 327-4431

SUBJECT: Blue Pike

As we discussed on the telephone a few weeks ago, we have a specimen of a 2 pound walleye in our freezer at the area headquarters lab. It was caught on 23 December 1986 by Mr. Jim Tarbell, Box 326, Deer River, Minnesota 56636 from:

Little Horn Lake (D.O.W. #31-588)
Itasca County, Minnesota

The fish looks suspicious and I would encourage you to do some genetic testing on it if possible to confirm the theory that it is a blue walleye (Stizostedion v. glaucum). Please let me know what you want us to do with this fish.

Figure 6. Putative Blue Pike specimen acquired for genetic analysis.

In the 1980s, word of Little Horn's Blue Walleyes spread among anglers, who brought their catches to the area fisheries office in Grand Rapids for identification. Genetic analysis was in its infancy, but a research biologist was collecting fish from around the state for that purpose and the Grand Rapids fisheries supervisor made sure a specimen from Little Horn would be part of the study (Figure 6).

Additional specimens were collected from Little Horn for a second independent genetic analysis as well as for a morphological analysis by Dr. James Underhill at University of Minnesota. A year later, the preliminary results were in and hopes began to dim that an extinct legend could be brought back from oblivion. Both analyses indicated strongly that the specimens were Walleye (Figure 7). Dr. Milton Trautman, author of *Fishes of Ohio*, had previously identified these fish as Walleye, but it is not clear if he examined fingerlings or brood stock. It was also no small feat any of these fish survived to maturity and reproduced: the fingerlings from Gavins Point that were stocked in Little Horn arrived in a "quite emaciated" condition that "resembled swimming eyeballs."

Perhaps the most interesting observation was made by Dr. Underhill who noted in his analysis that the blue color of the specimens stained his hands and the paper in which they were wrapped. Many years later I experienced deja vu from a chance meeting in the tiny town of Welch, MN. NANFA Regional Representative Jenny Kruckenberg hosts annual Darter Hunts. On one of these "hunts," I was taking pictures of the group from a bridge over the Cannon River. A Goodhue County road maintenance crew pulled up wondering what all the hubbub was about. I replied they were on a Darter Hunt, and of course, I got bewildered stares. I then went on to explain that darters are small cousins of the Walleye. A spark of acknowledgement ignited from one of the crew. He excitedly told me about a lake in northern Minnesota where he goes ice fishing. He was mystified why the Walleyes were dark blue and not yellow. However, what really intrigued him was the blue stained impressions left in the snow when they gathered up their catch up at the end of the day. Do I need to mention the name of that lake?

The final results confirmed the earlier ones (the fish were Walleye), but the MDNR was still uncertain what was in Little Horn Lake and recommended retaining the angling ban. The memo again mentions the Walleyes' unusual blue color but added that Largemouth Bass and Yellow Perch also exhibit the same trait to varying degrees (Figure 8).

RECENT RESEARCH DISCOVERIES

Since then, "blue" Walleyes have been reported from many localities over the species' range. This has kept the legend of Blue

STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES
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DNR INFORMATION
(612) 296-6157

16 February 1988

Jim E. Brewer, Supervisor
Chippewa National Forest
U.S. Department of Agriculture
Cass Lake, MN 56633

Dear Mr. Brewer:

I am writing in regard to the history and identification of the blue colored walleye type fish in Little Horn Lake in Itasca County. In recent years, anglers have commented on the blue walleye they have infrequently caught in this lake. Several specimens have been brought to the Area Fisheries Office in Grand Rapids.

In the fall of 1987, the Area Office personnel collected these blue walleye so that a positive identification could be made as to whether they were walleye, Stizostedion vitreum vitreum, or the now extinct blue pike, Stizostedion vitreum glaucum. To assist in this identification, specimens were sent for electrophoretic purposes to the Illinois Natural History Survey, Champaign, Illinois and to the Chemistry Laboratory, Department of Natural Resources, at Carlos Avery. Other specimens were sent to Dr. James Underhill, an ichthyologist at the University of Minnesota.

Dr. Underhill has tentatively identified the specimens sent him as walleye. This identification is certain at the 90 percent level. After ice-out this spring, Dr. Underhill wants to examine fresh specimens before making a positive identification. He also mentioned that the blue on the frozen specimens provided to him were staining his hands and the paper in which they were wrapped.

The electrophoretic analysis has not shown any allele systems that are not commonly found in walleye populations. Some initial work at Carlos Avery indicated some minor differences but work at the Illinois Natural History Survey did not substantiate this difference.

Some history on the stocking of Little Horn Lake might help to explain the above results. This "blue" pike that were stocked in Little Horn Lake in 1969 came from Gavins Point National Fish Hatchery, Yankton, South Dakota. They received the advanced fry (fingerlings) from a hatchery in Ohio. These fish were thought to have come from a Lake Erie source. The fish as received by Gavins Point were quite emaciated. In fact, they resembled swimming eyeballs. Because of the emaciated condition and transportation stresses, it is doubtful if many survived the trip to Little Horn Lake. We may or may not be looking at progeny of these survivors.

At the time of the stocking of these "blue" pike, there was a great deal of discussion within and outside the U.S. Fish and Wildlife Service as to whether these fish were blue pike. Dr. Milton Trautman, Professor Emeritus, Ohio State University identified them (it is unclear if the identification was from the fingerlings or the brood stock) as walleye (yellow pike). Officials within the Fish and Wildlife Service felt they were blue pike.

As you can see, confusion as to what was initially stocked in Little Horn Lake existed from the beginning. Hopefully, Dr. Underhill can settle this identification problem when he examines live fish this spring.

Little Horn Lake has been closed to all angling and will remain closed until Dr. Underhill has made a positive identification. If he identifies these fish as walleye, we plan on conducting a fish assessment of Little Horn Lake this summer. If he identifies these fish as blue pike, we will take the appropriate steps to preserve, protect and propagate this species.

If you have further questions, please contact me.

Sincerely,

Richard Hassinger
Fisheries Chief

Figure 7. Preliminary results indicate Walleye.

Pike alive among anglers. There are also reports of yellow and blue Walleye occurring in the same lake. However, recent research and advances in DNA analysis may have finally put these rumors to rest.

All walleyes produce a blue pigment known as sandercyanin in their surface mucous. However, this pigment is only exhibited in blues because these fish do not produce the yellow pigment found in a type of chromatophore (i.e., pigment bearing cells) called xanthophores. The evolutionary benefits to blue walleyes (if any) of this adaption are not known, but the pigment may function as UV protection and camouflage (Schaefer et al. 2015). Although Schaefer et al. did not mention the blue trait in other species, it

file Little Horn Lake Itasca Co

STATE OF MINNESOTA
Office Memorandum

DEPARTMENT : Natural Resources
DATE : August 16, 1988
TO : Richard Hassinger
Fisheries Chief
FROM : Paul J. Wingate JACK
Operations Manager
PHONE : 6-0793
SUBJECT : Blue Pike

This memo is to bring to a conclusion the "blue pike" issue in Little Horn Lake, Itasca County. Dr. Underhill, in his memo dated 5 July 88, has identified the "blue pike" in Little Horn Lake as Stizostedion vitreum vitreum (walleye). These fish do not have the typical yellowish coloration of the walleye but are blue to grayish in color. Both the yellow perch and largemouth bass in this lake tend to have unusual amounts of blue pigment around the mouth and appear to have a darker coloration than the same species from other lakes.

Stocking records seem to indicate that the existing walleye population in Little Horn Lake is derived from the 1969 stocking of fingerling "blue pike" from the Gavins Point National Fish Hatchery in Yankton, South Dakota. Dr. Underhill suspects that these fish were in reality intergrades from brood stock that had introgressed with walleye in Lake Erie.

I would recommend that this lake not be stocked with any walleye to try to protect the genetic pool of variability in this population. I would further recommend that Dr. Underhill and/or other researchers be encouraged to conduct further studies on this population for the purpose of better understanding what we have in Little Horn Lake. It would be improper at this time to continue lake surveys in this lake until such time as appropriate research has been completed. The ban on angling should be continued as well.

Figure 8. Final results.

has been observed in Little Horn Lake Walleyes (Figure 8), as well as evidenced by several Yellow Perch images available on the web from other localities.

The final nail in the coffin comes from a range-wide DNA and morphological analyses which found the historic "Blue Pike" is indistinguishable from Walleye and is not a valid subspecies (Haponski and Stepien 2014). On one hand, it is comforting that science has proven we never lost the Blue Pike, but I do feel some regret over the demise of a legend.

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