

## PUTTING BACK THE PISCES

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The Knife River meanders about 25 miles through small farms and woodlands in Mille Lacs and Kanabec Counties before joining the Snake River near Mora (See map). The first permanent dam on the river was constructed in 1929 about six miles above the mouth which formed an 1100 acre reservoir now known as Knife Lake. In 1972, a sixteen inch rain fall and resulting flood breached the county road adjoining the dam which had also served as a barrier preventing carp from entering the lake. A temporary dam was completed in the same summer, but carp could still get over this obstacle whenever the river flooded.

I began visiting the area about the same time to fish and hunt with a friend who had a cabin on Knife Lake. I really enjoyed those weekends and was always amazed how this special place could be overlooked barely an hour from the Twin Cities. However, pursuits wax and wane, and mine "evolved" into a highly specialized interest in nongame fishes which brought me back years later for an entirely different purpose.

In 1988, I heard about the Knife Lake Rehabilitation Project. These projects are proposed for lakes where rough fish, usually carp and bullheads, have become the most abundant species in the fish community. A fish toxicant called rotenone is applied to remove these species. Rotenone is derived from the bark of a tropical tree found in South America where native peoples for centuries have used it to catch and safely eat fish. Unfortunately this chemical is toxic to all species of fish. I was confident that the game fish community in Knife Lake would be reestablished through DNR stocking programs. However, this project included the treatment of all streams in the watershed above the lake. Streams generally contain not only more types of habitats than lakes, but also possess richer, much more diverse fish communities which are dominated with nongame species. Most are less than five inches long and are much more abundant than game fish in both species and numbers. In this melting pot, there are hunters like the stonecat which stalk riffles in search of aquatic bugs and vegetarians like the central stoneroller which grazes on algae. Some are grotesquely armored like the brook stickleback which erects spines for battle as potential predators approach. And finally, some are gorgeous gems like the male northern redbelly dace who struts about in courting colors of scarlet red and lemon yellow. These are only a few examples of the nongame community which I was far less certain would be naturally reestablished because the completion of a new dam to impound Knife Lake once again functioned as a total fish barrier.

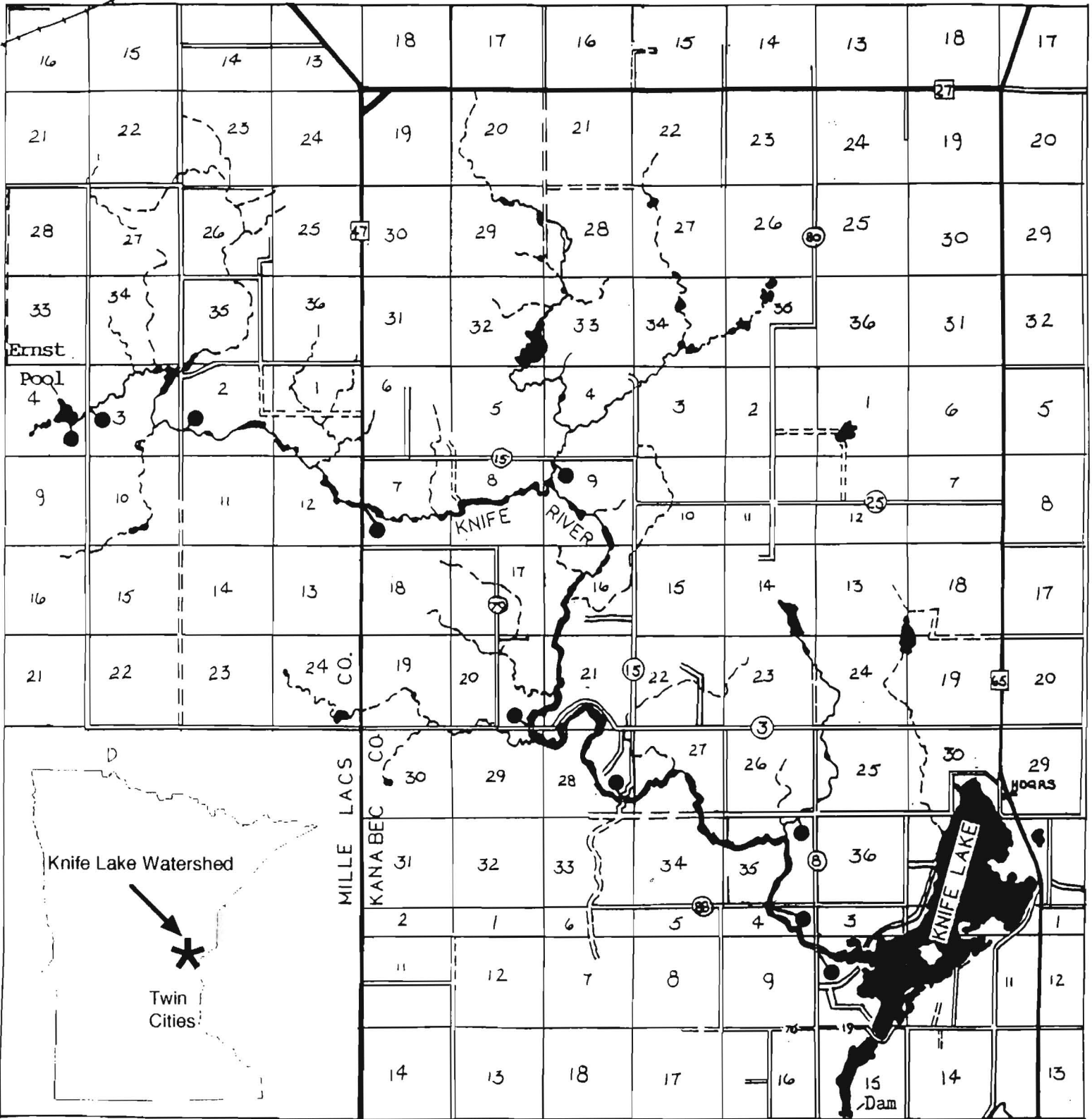
At this same time, I was volunteering for Minnesota State Parks conducting fish surveys and pooling these results with historical records to develop a species list for each park. It seemed like a natural move to expand my project to include the Upper Knife Lake watershed. This also gave me the opportunity to visit my friend's cabin on

Knife Lake which disappointingly no longer held the same appeal. The water was a vivid pea green and I could not believe that I use to swim in this once dark but always clear lake. My friends were even more disappointed by the poor fishing and spent most of their time on other area lakes.

My surveys began in April 1989 and continued through the rotenone treatment in October. The last survey was the most bizarre I have ever conducted and had looked forward to it with mixed feelings. Rotenone is probably the most effective way to survey a fish community and I was optimistic that new species would be found that have never been reported before from the watershed. However, this was the first time I had ever witnessed an intentionally induced fish kill and was not prepared for the magnitude. At least I could say that on this rare occasion I felt not even a twinge of guilt preserving specimens for a museum fish collection. I did find a new species which was unexpected because it was not a fish, but a very unique amphibian called the mudpuppy which resembles a salamander, but never loses its gills. I had also hoped someone would turn in a rare lake sturgeon which a few anglers had reported catching in Knife Lake through the 1970s and I seined one, barely six inches long, below the temporary dam in 1974, but never did hear even a rumor of a sighting. I also encountered more people on the river than I had seen in the previous six months. Most were from the area and had incredible childhood tales of trophy northern pike and smallmouth bass which had not been caught in the river for decades and they all hoped these desperate measures would some day bring that back.

I compiled a final species list of 45 fishes for the Knife River Lake Watershed from my results and DNR surveys going back to 1963. I believed the best chance to successfully restore the historically native nongame portion of this community would be early reintroductions conducted at the same time game fish were being stocked. I contacted the DNR regional fisheries office in Brainerd where I met Tim Brastrup who informed me the intent was to eventually replace as many species as possible and he also favored the early rather than later approach. That was enough to make plans for the following year. I met Tim in Mora before sunrise one spring day and to my surprise he brought a fish transport truck with all the bells and whistles. I was very impressed! We agreed to collect fish only from the Snake River watershed which would likely be similar genetically to what had been present in the Knife Lake watershed. After a very long day we released a smorgasbord of about 1500 "pioneers" - not too bad for the first time. Tim made several more collecting trips with me, but the transport truck was diverted for its primary purpose - stocking walleyes. We resorted to trash cans which needed bungi cords to hold the lids down as our ark "sloshed" up and down the country roads. I always wondered what people thought as they would drive by watching us haul "garbage" down to the stream. As primitive as it

# KNIFE LAKE WATERSHED



● - 1989 Fish Stations.

was, these early efforts were very successful. Stream surveys conducted by the DNR and myself in the first three years found the nongame community growing rapidly in both species and abundance. As of the fall of 1993, thirty fishes had been found in the Upper Knife River. Now our efforts are focused on species which are still absent. This does include a few which we unfortunately still refer to as rough fish. Perceptions are slow to change, but many of these fishes are actually indicators of excellent water quality and habitat. Although rarely appreciated, they are also tenacious fighters when hooked, and believe it or not, make a delicious meal. This includes the silver, golden, and shorthead redhorse, and the northern hog sucker. All are native to Minnesota and were a small, but integral part of the Knife Lake watershed community. The Hinckley Area Fisheries office released silver redhorse during the spring of 1993 and there were plans to continue with their cousins in 1994. I spend my time on the "little odds and ends" such as madtoms, minnows, and mudpuppies. However, as the list gets smaller, the remaining items get much harder to find. More than once, very much welcomed assistance has come from the local conservation officer, Paul Hoppe, who consistently points me to the right stream. With his most recent tip, I probably stocked enough tadpole madtoms (a small catfish) to take hold, but it was a painful process. They really don't get "mad" - they just sting like a bee! I have also managed to round-up about 150 mudpuppies which pose yet another occupational hazard to this fish squeezer-their body slime bonds to human skin like super glue!

We've still got a ways to go and realistically the entire community can never be fully restored, but at least it will almost mirror what was.

### Update

I have revised the species list to reflect surveys conducted through 1996. This also indicates fishes which have not been reestablished (Table 1).

Table 1. Knife Lake watershed fish species list before (1964-89) and after (1990-96) reclamation. Compiled from my sampling results and Minnesota DNR fish surveys. Plus (+) indicates presence and minus (-) not sampled during the survey period.

FAMILY	Before	After
Common Name (Scientific Name)		
<b>PETROMYZONTIDAE - LAMPREYS</b>		
chestnut lamprey ( <i>Ichthyomyzon castaneus</i> )	+	-
<b>AMIIDAE - BOWFINS</b>		
bowfin ( <i>Amia calva</i> )	+	-
<b>CYPRINIDAE - MINNOWS</b>		
central stoneroller ( <i>Campestris anomalum</i> )	+	+
largescale stoneroller ( <i>Campestris oligolepis</i> )	-	+
common carp ( <i>Cyprinus carpio</i> )	+	-
brassy minnow ( <i>Hybognathus hankinsoni</i> )	+	+
common shiner ( <i>Luxilus cornutus</i> )	+	+
pearl dace ( <i>Margariscus margarita</i> )	+	+
honeyhead chub ( <i>Nocomis biguttatus</i> )	+	+

golden shiner ( <i>Notemigonus crysoleucas</i> )	+	+
emerald shiner ( <i>Notropis atherinoides</i> )	+	-
blacknose shiner ( <i>Notropis heterolepis</i> )	-	+
spottail shiner ( <i>Notropis hudsonius</i> )	+	-
northern redbelly dace ( <i>Phoxinus eos</i> )	+	+
finescale dace ( <i>Phoxinus neogaeus</i> )	+	+
bluntnose minnow ( <i>Pimephales notatus</i> )	+	+
fathead minnow ( <i>Pimephales promelas</i> )	+	+
blacknose dace ( <i>Rhinichthys atratulus</i> )	+	+
longnose dace ( <i>Rhinichthys cataractae</i> )	+	+
creek chub ( <i>Semotilus atromaculatus</i> )	+	+

### CATOSTOMIDAE - SUCKERS

white sucker ( <i>Catostomus commersoni</i> )	+	+
northern hog sucker ( <i>Hypentelium nigricans</i> )	+	+
silver redhorse ( <i>Moxostoma anisurum</i> )	+	-
golden redhorse ( <i>Moxostoma erythrurum</i> )	+	+
shorthead redhorse ( <i>Moxostoma macrolepidotum</i> )	+	+

### ICTALURIDAE - BULLHEAD CATFISHES

black bullhead ( <i>Ameiurus melas</i> )	+	+
yellow bullhead ( <i>Ameiurus natalis</i> )	+	-
brown bullhead ( <i>Ameiurus nebulosus</i> )	+	-
channel catfish ( <i>Ictalurus punctatus</i> )	+	+
stonecat ( <i>Noturus flavus</i> )	+	-
tadpole madtom ( <i>Noturus gyrinus</i> )	+	-

### ESOCIDAE - PIKES

northern pike ( <i>Esox lucius</i> )	+	+
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### UMBRIDAE - MUDMINNOWS

central mudminnow ( <i>Umbra limi</i> )	+	+
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### GADIDAE - CODFISHES

burbot ( <i>Lota lota</i> )	-	+
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### CYPRINODONTIDAE - KILLIFISHES

banded killifish ( <i>Fundulus diaphanus</i> )	+	-
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### GASTEROSTEIDAE - STICKLEBACKS

brook stickleback ( <i>Culaea inconstans</i> )	+	+
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### CENTRARCHIDAE - SUNFISHES

rock bass ( <i>Ambloplites rupestris</i> )	+	+
green sunfish ( <i>Lepomis cyanellus</i> )	-	+
pumpkinseed ( <i>Lepomis gibbosus</i> )	+	-
bluegill ( <i>Lepomis macrochirus</i> )	+	+
smallmouth bass ( <i>Micropterus dolomieu</i> )	+	+
largemouth bass ( <i>Micropterus salmoides</i> )	+	+
white crappie ( <i>Pomoxis annularis</i> )	+	+
black crappie ( <i>Pomoxis nigromaculatus</i> )	+	+

### PERCIDAE - PERCHES

Iowa darter ( <i>Etheostoma exile</i> )	-	+
johnny darter ( <i>Etheostoma nigrum</i> )	+	+
yellow perch ( <i>Perca flavescens</i> )	+	+
logperch ( <i>Percina caprodes</i> )	+	+
slenderhead darter ( <i>Percina phoxocephala</i> )	-	+
walleye ( <i>Stizostedion vitreum</i> )	+	+

### SCIAENIDAE - DRUMS

freshwater drum ( <i>Aplodinotus grunniens</i> )	+	-
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Species Totals:	45	38
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### ADDITIONAL TAXA

mudpuppy ( <i>Necturus maculosus</i> )	+	-
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Ideally, I would still like to see 10 more historically native fishes plus the mudpuppy reestablished. I have released over 300 tadpole madtoms and believed this would be sufficient, but none have been sampled in follow up surveys. The stonecat has never been collected in sufficient numbers. Hind sight is 20/20, but I now wish I had lobbied the DNR to use Antimycin B instead of rotenone. This would not have affected the catfish, but fisheries managers hoped the rotenone would also eliminate the black bullheads, which not surprisingly, survived the holocaust. I have unsuccessfully tried to survey mudpuppies using traps which have worked very well elsewhere. However, one landowner was certain he saw them under a county road bridge along his property in 1995. The DNR Fisheries office in Hinckley has done one stocking of adult golden and shorthead redhorse. Young of the year of both species were sampled in one follow up survey along with northern hog suckers. In the spring of 1996, I carefully and diplomatically requested at least one more redhorse stocking effort be made for good measure. After some deliberation, fisheries agreed to provide a transport truck and Jack Enblom with the Ecological Services would use a boom shocking boat to collect redhorse and northern hog suckers in the Snake River. However, nature had another agenda and heavy spring floods persisted far beyond the sucker's spawning run. Everyone involved agreed it was best to wait another year.