

Walleye Population Restoration Efforts in the Lower Milwaukee River and Harbor

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In an effort to improve the nearshore fisheries in the Lower Milwaukee River and Harbor, fry and fingerling walleye, northern pike and smallmouth bass were stocked by Wisconsin Department of Natural Resources (WDNR) since 1986 (Table 1). However, fry stocking did not appear to be effective with walleye. Surveys conducted by WDNR suggested very limited survival. In 1995, with the initial funding support of \$10,000 from the Lakeshore Fisherman Sports Club, WDNR developed a plan to raise and stock extended growth walleye fingerlings as part of walleye population restoration effort (Table 2). Since then, the project has evolved to include many other aspects to understand and evaluate the developing walleye population in the area, and its impact on other species as well as angler response. In addition to WDNR's annual funding to operate the project, several fishing clubs have partnered in this venture through their contributions (Table 3). Initially, walleye fingerlings for stocking were obtained from regular walleye stocks. In 1998, a detailed Milwaukee River Walleye Restoration Plan¹ was developed which called for the use of only Lake Michigan strain walleye for stocking. Genetic tests were performed by the Illinois Natural History Survey laboratory to determine if eggs collected from populations of walleye to raise extended growth fingerlings conform to the Lake Michigan strain. Walleye from the Wolf River, Winnebago system, Fox River and Puckaway Lake were found to be matching the Lake Michigan strain. This allowed the flexibility to obtain eggs from various locations for raising stocking material for our Milwaukee River Walleye Restoration Plan.

WDNR conducts annual surveys to evaluate the predatory impact of the stocked walleye on stocked salmonid smolts. We have embarked on a much larger effort to examine the seasonal movement pattern of adult walleye using radio telemetry. A marking evaluation study to compare fin clipping vs. elastomer marking is also incorporated using these walleye. We also conduct a spring spawning survey using electroshocking to examine and document any natural reproduction. In addition, creel survey data are gathered to assess angling activity directed toward walleye fishing in the area. Based on the data on growth, survival, movement patterns, impact on other species and angler response, we believe that the project has lived up to its positive expectations. Shore anglers frequently report catching walleye on the Milwaukee River all the way up to Kletzsch Park, as well as on Menomonee River and its canals. The growth rates seem to be equal or better than most of the walleye populations around the state. The radio telemetry study showed a clear seasonal and spatial movement pattern. We have not yet documented any natural spawning, although we did observe some mature individuals during the spring survey in 2001.

The current effort is not the first time walleye were stocked in this area. Table 1 below indicates previous attempts to stock walleye in the Milwaukee harbor area. Much of the stocking was done with fry. A small number of yearlings and age 2 walleye were spread in different parts of the harbor including Black Can (Green Can) Reef in 1990 and 1991. Very few have been reported caught from these yearling stockings.

Table 1. Historical records of walleye stocking in Milwaukee Harbor and the vicinity.

YEAR	NUMBER	SIZE	STOCKING SITE
1986	2,000,000	FRY	Milwaukee River
1988	2,920,000	FRY	Milwaukee Harbor
1990	2,500,000	FRY	Milwaukee Harbor
	1,000	YLG	Milwaukee Harbor
	1,000	YLG	South Milwaukee
	1,000	YLG	Fox Point
	1,000	YLG	Milwaukee South Shore Yacht Club
	1,000	YLG	Milwaukee Black Can Reef
1991	550	AGE 2	Milwaukee Harbor
1992	2,300,000	FRY	Milwaukee Harbor

Table 2 shows the number of walleye fingerlings stocked since 1995. Although our goal was to stock 10,000 extended growth fingerlings annually, we could not achieve that goal consistently due to several constraints such as insufficient number of eggs and hatchery space requirements. In 1998, poor survival of fry failed to produce the required number of fingerlings. We did not stock any walleye in 1997 as we were in the process of gathering public input and developing the walleye restoration plan which was overwhelmingly supported by the local fishing clubs. According to the plan, the WDNR will continue to stock 10,000 extended growth Lake Michigan strain walleye fingerlings in the Lower Milwaukee River through 2004.

An additional component of the study is marking technique evaluation. Northwest Marine Technology, Inc. out of Washington State has developed this technology. Each year stocked walleye are given a specific mark (fin clip or an elastomer mark) to identify their year class. As part of the marking evaluation, one half of the fish stocked are given a fin clip and the other half are marked with a colored elastomer injected under the jaw. Since 1995 there are a total of 20,314 stocked walleye marked with elastomer using a different color each year. When the fish are captured these marks will help us to readily separate the year classes. In addition, we will be able to evaluate the survival and growth rates of these marked walleye and detect differences between the two marking techniques.

Table 2. Number of walleye fingerlings stocked in the Lower Milwaukee River below the former North Ave. Dam.

Year	# stocked	Age at stocking	Source	Strain	Mark type
1995	7,626	EG-FGL ¹	WDNR Spooner Hatchery	Unknown	RP/REL
1996	9,972	EG-FGL	WDNR Spooner Hatchery	Unknown	LP/GEL
1997	None				
1998	3,155	EG-FGL	Private Hatchery	Lake Michigan	RV/BEL
1999	7,700	Fingerlings ²	WDNR KMSH ³	Lake Michigan	None
2000	9,880	EG-FGL	WDNR Spooner Hatchery	Lake Michigan	LV/OEL
2001	10,000	EG-FGL	WDNR Spooner Hatchery	Lake Michigan	RP/REL

¹ Extended growth fingerlings (6")

² Fingerlings (2.5")

³ Kettle Moraine Springs Hatchery

Legend:

RP = right pectoral fin clip

LP = left pectoral fin clip

RV = right ventral fin clip

LV = left ventral fin clip

REL = red elastomer

GEL = green elastomer

BEL = blue elastomer

OEL = orange elastomer

PEL = purple elastomer

The funding for stocking, as well as subsequent evaluation of the performance of the stocked fish, was a critical factor from the inception. However, as the project evolved and progressed, we received a lot of support from our external partners who provided money for raising extended growth walleye fingerlings and purchasing equipment (Table 3). Currently, the project is funded by WDNR with an annual operational cost of \$8,347.

Table 3. Monetary support for walleye population restoration effort in the Lower Milwaukee River. (This does not include any equipment or labor provided by clubs.)

Date	Source	Purpose	Amount
June 1995	Lakeshore Fisherman Sports Club	Initial funding to raise 10,000 extended growth walleye fingerlings and to evaluate their impact.	\$10,000
July 1996	Lakeshore Fisherman Sports Club, and Lake Ridge Boat Club (joint offer)	Continuation of the project	\$2,500
1997-98	WDNR annual funding	Approved project costs	\$2,812.50
1998-99	WDNR annual funding	Approved project costs	\$2,812.50
Oct. 1998	Walleyes for Tomorrow	Paid private hatchery to raise extended growth walleye fingerlings	unknown
1999-00	WDNR annual funding	Approved project to cover the cost of evaluation, radio telemetry, and marking evaluation	\$15,650
2000-01	WDNR annual funding	Approved project to cover the cost of evaluation, radio telemetry, and marking evaluation	\$15,650
2000	Walleyes for Tomorrow	Funded WDNR to cover the cost of raising extended growth walleye fingerlings	\$5,000
Sept. 2000	Walleyes Unlimited	Funded to purchase new radio tracking equipment	\$2,800
Mar. 2001	Lakeridge Boat Club	Funded to purchase equipment for fish age determination	\$4,000
2001	Walleyes for Tomorrow	Funded WDNR to cover the cost of raising extended growth walleye fingerlings	\$5,000
2001-02	WDNR annual funding	Approved project to cover the cost of evaluation, radio telemetry, and marking evaluation	\$8,347

Marina in the Milwaukee Harbor. In addition, the Milwaukee Area Great Lakes Sport Fisherman Club provided net pens to hold chinook salmon smolts in the Marina water for 48 hours to better acclimatize the smolts. The results from our continued evaluation of predatory impact since 1998 indicated no direct impact on the smolts immediately after releasing due to predation².

Table 5. Predatory Impact on the Stocked Salmonid Smolts in the Lower Milwaukee River and the Harbor.

Year	# Chinook stocked	Location	Impact
1996	144,250	Below N. Ave. Dam	Moderate
1997	181,000	Below N. Ave. Dam	High
1998	145,000	McKinley Marina	Nil
1999	144,000	McKinley Marina	Nil
2000	143,900	McKinley Marina	Nil
2001	151,000	McKinley Marina	Nil

In Spring 1999, we initiated a pilot radio telemetry study using refurbished transmitters and loaned equipment from another office (Table 6). This allowed us to learn from experts in another region and perfect the procedures. Unfortunately, these refurbished transmitters lasted only for 90 days and provided us with limited data. In April 2000 we had a funded project to implant 15 walleye and 5 smallmouth bass with radio transmitters. By this time the previously stocked walleye had grown large enough to implant transmitters, which were approximately 2% of the body weight of the receiving fish. Advanced Telemetry Systems, Inc. (ATS) built these transmitters to last year-round to capture seasonal movement data. We continued this effort in Fall 2000 and Spring 2001. In September 2000 Walleyes Unlimited funded the purchase of new tracking and data collection equipment. The radio telemetry data have provided valuable information on the movement pattern of walleye in Milwaukee River and harbor for the first time (Figure 2). There are signs posted all along the river informing the anglers about the study. Anglers are requested to handle these study fish gently and release them back if they are caught.

Certain batches of walleye implanted with radio transmitters were released in the Milwaukee River below the former North Ave. dam. These fish stayed upriver during the spring and early summer. As the summer progressed these fish moved out of the river and were subsequently found in the harbor, especially in lagoon east of the Summerfest grounds. This was probably due to the increased water temperature in river causing the fish to seek refuge in the deeper, cooler harbor water. By coincidence, this movement pattern helps keep adult walleye away from chinook salmon smolts when they are stocked in the harbor in late spring. The preliminary data on the seasonal movement also indicate that the adult walleye follow a

temperature regime and take refuge in the warmer Menomonee River canals during late fall and in winter. A nearby electric power plant discharges warm water into these canals.

Table 6. Number and species of fish implanted with radio transmitters

Date of implanting	# of transmitters	Species
May 1999 (pilot project)	9 (refurbished)	Walleye
April 2000	15	Walleye
April 2000	5	Smallmouth bass
September 2000	11	Walleye
May 2001	10	Walleye
May 2001	5	Smallmouth bass

Angler response to the renewed opportunity to fish walleye in the area is positive and very encouraging. The majority of anglers we have talked to follow catch and release practices. With the complete removal of the North Ave. dam in 1997, the Milwaukee River opened up an additional 6 river miles for fishing. The most popular areas to fish are near the former North Ave. dam, Estabrook Park, Kletzsch Park, and also along the Menomonee canals. The WDNR has enhanced habitat quality in certain areas by adding some habitat improvement structures and bank stabilization features. At this point, the goal of the WDNR is to continue stocking 10,000 extended growth walleye fingerlings through 2004. We will also continue to monitor their growth, movement, survival, natural reproduction, and impact on stocked salmonid smolts.

References:

¹ WDNR, 1998. An assessment of the impact of stocked walleye on stocked salmonids in the Milwaukee estuary. 17 pages.

² Hirethota, P.H. 1999. Predatory impacts on stocked chinook salmon smolts in Milwaukee Harbor – 1999. 7 pages.

Internet Site for reports: <http://www.dnr.state.wi.us/org/water/fhp/fish/lakemich/>

Acknowledgments:

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Figure 1.

COMPARISON OF THE GROWTH OF WALLEYE IN THREE WISCONSIN WATERS

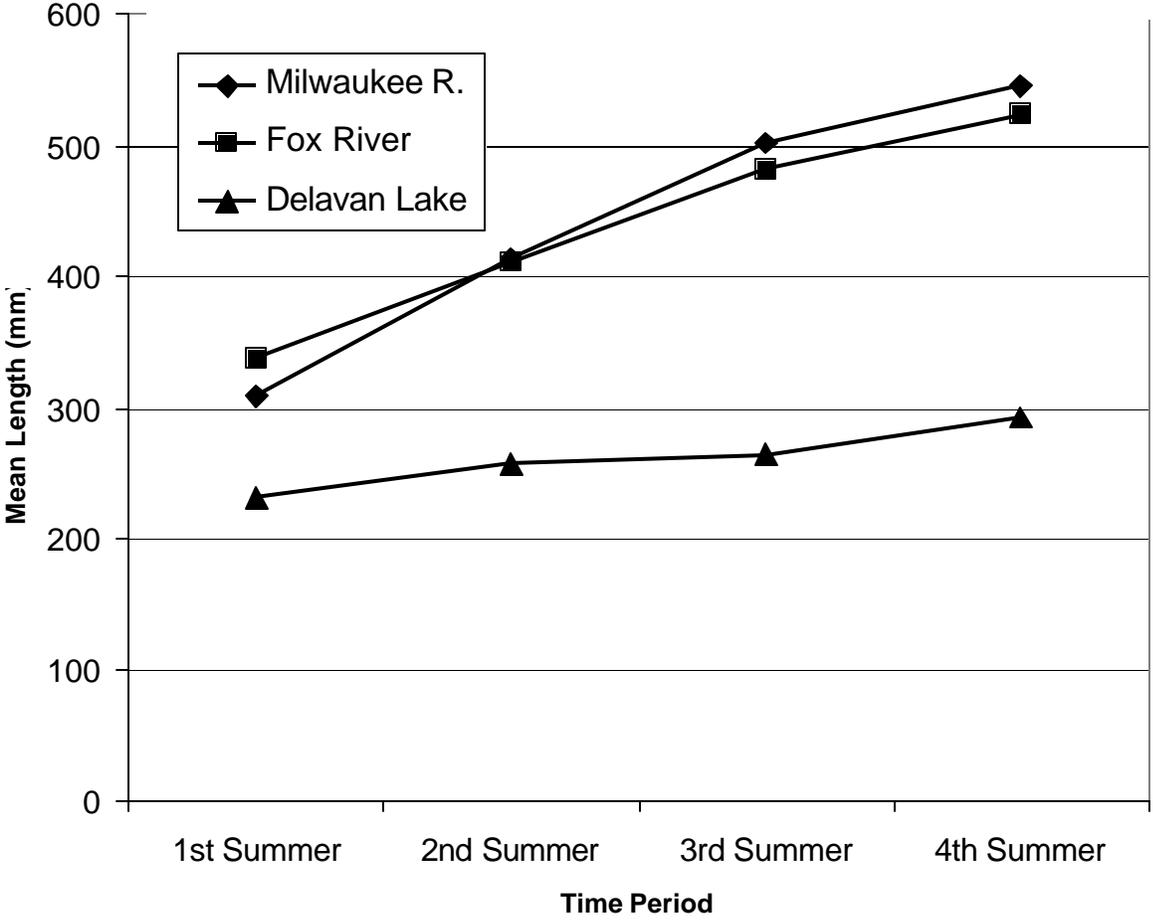


Figure 2. Movement pattern of walleye in Milwaukee River and harbor after initial release below the former North Ave. dam.



