

DATE: October 8, 2012

TO: Michael Donofrio, Randy Schumacher

FROM: Brad Ryan, Tammie Paoli, and Steve Hogler

SUBJECT: 2012 Great Lakes Spotted Muskellunge Fyke Net Survey - Lower Menominee River, Wisconsin/Michigan boundary waters

The Great Lakes strain of muskellunge is native to waters of Green Bay, Lake Michigan. This strain is also referred to as spotted muskellunge which were extirpated from Wisconsin waters of Lake Michigan in the early to mid-1900's. The extirpation was likely due to habitat loss, overexploitation, and pollution. Wisconsin Department of Natural Resources began a Great Lakes musky rehabilitation project in 1988 and obtained gametes from various sources since the inception of the project. These sources include: the Michigan Department of Natural Resources from 1989-1993, from a captive broodstock created in Long Lake of Waushara County, (1995-2001) the Fox River (1995-2001 and 2009-2012), Georgian Bay (2006-2007) and Michigan DNR (2011-2012). In addition to stocking Long Lake, WDNR has stocked various waters since 1989 in the Green Bay watershed, including the Menominee River (Marinette County). From 1989 to 2007, spotted musky have been stocked annually into the lower Menominee River (Table 1). A lapse in stocking occurred in 2008 and 2009 after confirmation of viral hemorrhagic septicemia virus (VHS) in Lake Michigan. The average number of fingerlings is 1,227 per year and yearlings is 60 per year over this period. The next closest stocking site is the Peshtigo River, approximately 10 miles from the Menominee River.

METHODS

In May 2012, WDNR staff assessed the spotted muskellunge population within the Lower Menominee River using five foot diameter fyke nets set in four locations. These sites included the Interstate tower (Net 3), "Mystery Ship" Island/small island north of Strawberry Island (Net 2), the Turning Basin (Net 1), and Menekaunee Harbor (Net 4) (see map below). Nets were lifted daily from May 9-11 and from May 13-17, 2012. The nets were tied open for May 11 and 12. Total length was taken on all muskellunge in addition to being assessed for the presence of PIT or floy tags, fin/maxillary clips, and sex/spawning condition. All fish were given a PIT tag that did not already have one. A small fin tissue sample was taken from each fish and sent to Dr. Brian Sloss at UWSP for genetic analysis. We also obtained lengths or counts on all other species in the nets as well as daily surface water temperatures. Data was collected by Wisconsin DNR Peshtigo staff: Tammie Paoli, Brad Ryan, Garret Schacht, Ron Rhode, and Cory Weinandt.

Lower Menominee River Fyke Net Locations 2012



All nets set from 5/9/12 to 5/17/12
Nets left tied open 5/11/12 and 5/12/12

{Scale 1:15,652}

Total net nights = 28

RESULTS

Great Lakes Spotted Muskellunge

WDNR staff captured 43 spotted muskellunge in 28 net nights, with one of those 43 fish recaptured during the survey. One additional fish was sampled after being caught by an angler while WDNR staff was nearby. The majority (84% or 36 total) of muskellunge were captured from Net 2. Net 3 captured 4 muskellunge, while Net 1 captured 3 muskellunge, followed by Net 4 which captured 1 fish (Table 2). Surface water temperatures ranged from 58-65 F throughout the survey, with an average temperature of 62 F.

The 44 muskellunge sampled ranged in length from 36.75 to 54.7 inches (average = 46.2 inches). Approximately, one-third of these fish were over 50 inches (Figure 2). Three muskellunge could

not be sexed, while the remainder included 19 males and 22 females that were all in ripe condition through the conclusion of the survey on May 17, 2012. Female muskellunge ranged in size from 40.5-54.7 inches (average = 47.3 inches), while males ranged from 36.75-48 inches (average = 42.5 inches) (Table 2).

All but 4 muskellunge had obvious fin clips indicative of being from a stocked source, while a fifth fish had a right maxillary/right pectoral clip which is not a typical clip for any Wisconsin stockings. Thirty-three fish (9 males and 24 females) had right ventral clips indicating they were stocked as yearlings. Seven fish (5 males and 2 females) had left maxillary clips indicating they were stocked as fall fingerlings. All four fish with no clips were males. Eleven fish had previous PIT tags, while five fish had floy tags.

Recapture information from previously tagged fish is noted below. A 50 inch female was PIT tagged in 2006 at 44 inches. At the time, it had a floy tag indicating that it was stocked as a yearling in 2000. The floy tag was gone when the fish was recaptured in the 2012 survey. A 51.25 inch female was PIT tagged in 2006 at 47 inches and had also lost a floy tag since that year. This fish was stocked as a yearling in 1999. Therefore, these two fish were 13 and 14 years old and have had average growth rates of 2.5 and 2.4 inches/year, respectively, since being stocked. Floy tag information indicated the age of two of the three female muskellunge at 13 years and one female at 14 years. Average growth rates of these four fish ranges from 2.2 to 2.5 inches per year since being stocked as yearlings. Tag information for the third musky was not available.

Other Species

Eighteen species of fish, including muskellunge, were captured throughout this survey with a total sample size of 523 (Table 3). The most abundant species caught were bluegill, black crappie, and pumpkinseed, followed by (in order of highest to lowest abundance) muskellunge, rock bass, common carp, brown bullhead, bowfin, redhorse spp., white sucker, yellow perch, smallmouth bass, northern pike, walleye, yellow bullhead, longnose sucker, gizzard shad, and quillback carpsucker.

SUMMARY

A total of four fyke nets set in the Lower Menominee River captured 43 spotted muskellunge within a two week period from May 9-17, 2012. The majority of muskellunge were paired in nets with multiple fish, and were ripe with eggs or milt. Despite the early spring of 2012, females continued to be ripe with eggs to end of the survey on May 17. All but five muskellunge were of known hatchery origin, with almost five times as many yearling stocked muskellunge sampled compared to fish stocked as fingerlings. The most recent survey conducted on the Lower Menominee River was in 2006, when an effort of 3 fyke nets captured 21 muskellunge in a two week period from May 3-10, 2006. Two of the four nets set in 2012 were in the same locations as in 2006 (Interstate tower, Turning basin). Further studies of muskellunge can aid in the evaluation of habitat use, as well as movement in the Lower Menominee River and Green Bay. The Lower Menominee River is a native fishery for spotted muskellunge and should continue to be stocked in future years to continue to restore this population. The current

regulation for muskellunge for the lower Menominee River includes: a closed season from December 1 to May 14, and a 50-inch minimum length limit with one fish daily limit during the open season.

All other fish species sampled in this survey were similar to other Lake Michigan tributaries in composition and abundance. These non-target species can provide important insight into the fishery such as habitat and water quality, and give indications of the state of a fish community as a whole. The Lower Menominee River is deemed a Great Lakes Area of Concern by the U.S. Environmental Protection Agency due to past industrial practices. Cleanup efforts to delist this Area of Concern are in progress. This survey as well as future fisheries surveys will be valuable in monitoring the state of the fishery within the Lower Menominee River.

For additional background and management information on Great Lakes spotted musky, see the following WDNR reports:

<http://dnr.wi.gov/fish/reports/final/marinette-menominee-riverspotted-musky2006.pdf>
<http://dnr.wi.gov/fish/musky/SpottedMuskyManagementPlan-2012.pdf>

Table 2. Summary of catch and biological information collected from spotted muskellunge in the Lower Menominee River, May 9-17, 2012.

Date	Net	Length	Sex	Condition	Fin clip	PIT #	Recap?	Floy #	Recap?	Year class
05/09/2012	1	49.5	Female	Ripe	RV	985121014779882	No	F 024714	Yes	1998
05/09/2012	2	44.75	Unknown	Green	RV	985121014800606	No			
05/09/2012	2	43	Male	Ripe		985121015346083	No			
05/09/2012	2	50.3	Female	Ripe	RV	985121013735525	No			
05/09/2012	2	47.8	Male	Ripe	RV	985121013735480	No			
05/09/2012	2	46.5	Male	Ripe		985121013763534	No			
05/09/2012	2	48.8	Female	Ripe	RV	985121015357761	No	141264	Yes	1999
05/09/2012	4	41.4	Male	Ripe	RV	985121014835081	No			
05/09/2012	4	No biological data available – fish escaped prior to handling								
05/10/2012	1	51	Female	Ripe	RV	985121014800331	No			
05/10/2012	1	46.25	Male	Ripe	RMAX, RP	985121014715574	No			
05/10/2012	2	51	Female	Ripe	RV	985121014799616	No	B 01536	Yes	
05/10/2012	2	40.5	Male	Ripe		985121001368753	Yes			
05/10/2012	2	46.75	Male	Ripe	RV	985121001346838	Yes			
05/10/2012	2	49.5	Female	Ripe	RV	985121014779882	Yes	F 024714	Yes	1998
05/11/2012	2	50	Female	Ripe	RV	430E542A70	Yes			1999
05/11/2012	2	41.75	Male	Ripe	LMAX	985121019872865	No			
05/11/2012	2	39.5	Male	Ripe	LMAX	985121019875643	No			
05/11/2012	2	44.5	Female	Ripe	LMAX	985121019889121	No			
05/11/2012	2	46.75	Female	Ripe	RV	985121019901698	No			
05/11/2012	2	44.5	Male	Ripe	RV	985121019886806	No			
05/11/2012	2	44.5	Male	Ripe	RV	985121001324051	Yes			
05/11/2012	2	51.25	Female	Ripe	RV	43105E4F04	Yes			1998
05/11/2012	2	48	Male	Ripe	RV	985121001443277	Yes			
05/11/2012	2	50.25	Female	Ripe	RV	985121019889608	No	141288	Yes	1999
05/11/2012	3	40	Male	Ripe	LMAX	985121019772077	No			
05/14/2012	2	41.2	Male	Ripe	RV	985121015351670	No			
05/14/2012	2	51.2	Female	Ripe	RV	985121014780976	No	141261	Yes	1999
05/14/2012	2	41.2	Female	Ripe	RV	985121014808284	No			
05/14/2012	2	49.3	Female	Ripe	RV	985121015344537	No			
05/14/2012	2	54.7	Female	Ripe	RV	985121014718472	No			
05/14/2012	3	52.3	Female	Ripe	LMAX	985121014805183	No			
05/14/2012	3	No biological data available – fish escaped prior to handling								
05/15/2012	2	52.5	Female	Ripe	RV	985121014791602	No			
05/15/2012	2	47.3	Female	Ripe	RV	985121001353557	Yes			
05/15/2012	2	38.3	Male	Ripe	RV	985121015336588	No			
05/15/2012	2	48	Unknown	Green	RV	985121001365382	Yes			
05/15/2012	2	40.5	Female	Ripe	RV	985120028921650	Yes			
05/16/2012	2	50.5	Female	Ripe	RV	985121014802710	No			
05/16/2012	2	37.5	Male	Ripe		985121014780068	No			
05/16/2012	3	51.4	Female	Ripe	RV	985121015356335	No			
05/17/2012	*Angler	43	Male	Ripe	LMAX	985121019904554	No			
05/17/2012	2	36.75	Male	Ripe	RV	985121003040269	Yes			
05/17/2012	2	50.25	Female	Ripe	RV	985121019862193	No			
05/17/2012	2	40.75	Male	Ripe	LMAX	985121019772439	No			
05/17/2012	2	50.8	Female	Ripe	RV	985121019891140	No			
05/17/2012	3	47.8	Unknown	Green	RV	985121019831901	No			

Figure 2. Length Frequency of Great Lakes Spotted Muskellunge, Lower Menominee River, WI May 2012

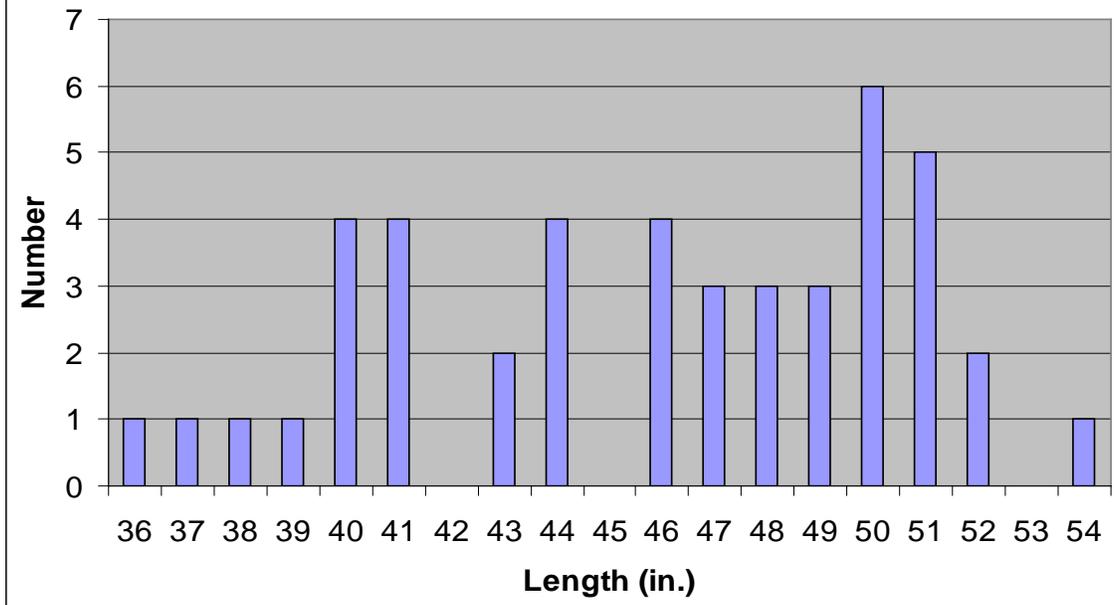


Table 3. Catch summaries from Lower Menominee River Fyke Net Survey May 9-17, 2012.

Species	Size Range (in.)	Ave. Length (in.)	Total	% Total	Catch/net nights
Bluegill	3.7 - 8.0	4.9	184	35.2	6.6
Black Crappie	4.5 - 13.6	7.6	55	10.5	2.0
Pumpkinseed	3.3 - 6.2	4.6	55	10.5	2.0
Muskellunge	36.75 - 54.7	46.2	43	8.2	1.5
Rock Bass	3.6 - 7.3	4.9	32	6.1	1.1
Common Carp	*	*	28	5.4	1.0
Brown Bullhead	*	*	22	4.2	0.8
Bowfin	*	*	21	4.0	0.8
Redhorse spp.	*	*	17	3.3	0.6
White Sucker	*	*	15	2.9	0.5
Yellow Perch	5.6 - 8.5	6.6	12	2.3	0.4
Smallmouth Bass	7.4 - 20.25	16.0	11	2.1	0.4
Northern Pike	21.6 - 36.2	25.1	10	1.9	0.4
Walleye	14.3 - 25.8	20.2	10	1.9	0.4
Yellow Bullhead	*	*	4	0.8	0.1
Longnose Sucker	*	*	2	0.4	0.1
Gizzard Shad	*	*	1	0.2	0.0
Quillback Carpsucker	*	*	1	0.2	0.0

Total 523