

## STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-80-R-15

Study No.: 230763

Title: Investigation of stocking methods for expanding the steelhead fishery in Lake Huron

Period Covered: October 1, 2013 to September 30, 2014

### Study Objectives:

- (1) Evaluate the effects of pen acclimation on returns to creel of spawning-phase steelhead at each of three ports.
- (2) Evaluate effect of size at stocking on returns to creel of spawning-phase steelhead at each of three ports.
- (3) Compare and describe recreational fisheries for spawning-phase steelhead produced by stocking in rivers with those produced by stocking in harbors lacking tributaries.
- (4) Assess diets and other life history parameters of steelhead so as to better understand the trophic niche occupied by the species and potential opportunities and limitations of this species in Lake Huron.

**Summary:** Last year marked the final year of the stocking and marking phase of this study. In 2014, the pens were operated similar to the way they were operated during the study, but the fish were not marked and evaluation of the comparative condition of the two study groups was not made. Evaluation of coded-wire-tag returns will continue until at least 2016. The final report was initially planned for preparation in 2017, but due to the nature of the preliminary returns of marked fish, we will assess in 2015 whether the study can be concluded a year early. By the end of the 2013 fishing season, 162 marked steelhead from the two study groups stocked in 2011 had been collected from all sources. The 2012 and 2013 cohorts have not fully recruited to the fishery yet, and 116 marked steelhead from the 2012 cohort had been collected by the end of the 2013 season. Very few marked fish from the 2013 cohort have been collected. Slightly more than half of all fish collected from all ports and cohorts have been from the direct plant groups. The ratios of direct plant to net pen returns vary between the three sites with ratios being approximately 1:1 at Au Sable, 1.7:1 at Harrisville, and 0.7:1 at Harbor Beach. Field and research unit staffs electrofished the Au Sable River and Harrisville study sites and collected fish with our study marks at both locations. The Great Lakes Creel Survey, including sites at Harbor Beach, Oscoda, and Harrisville, was conducted as planned (Study 230499) and snouts from AD-clipped steelhead were collected. An additional grant was secured to conduct a year-round creel survey of the Au Sable River from fall 2012 through September 2014. The first two years of this survey documented a substantial steelhead fishery in the Au Sable River. The river harvest included some of this study's CWT fish. Coded-wire tagged fish were also collected through the collaborative Great Lakes Mass Marking project, which deployed "head hunters" to major fishing ports on Lake Huron in 2012 and 2013. Creel, Mass Marking Project, and electrofishing data collected in 2013 and 2014 seasons will be analyzed this winter.

**Findings:** Jobs 3, 4, and 5 were scheduled for 2013-14, and progress is reported below.

**Job 3. Title: Measure return to creel.**—Creel surveys of the major recreational fishing ports on Lake Huron were conducted as planned (Study 230499) in 2014. The creel estimates for 2013 were summarized and showed a drop in steelhead harvest and catch rates relative to 2012, although they remain on average with harvest and catch rates from 2011 and 2010 and above harvest and catch rates from 2004 to 2009. Two- and three-year-old steelhead comprised 45% of the harvest in 2013. Of 68 two- and three-year old fish measured from the 2013 creel, 34% were AD clipped

(Tables 1 and 2). Comparisons of relative return rates for direct-planted and acclimation penned fish from the 2011 cohort are detailed in Figure 1. Comparisons of return rates for the 2012 cohort are provided in Figure 2. Insufficient returns for the 2013 cohort are available to describe relative returns of the 2013 cohort. All return rates were adjusted to a 10,000 fish stocked standard. Funding was obtained to conduct a year-round creel survey of the lower Au Sable River, including the study site, from October 2012 through September of 2014. Harvest and use estimates were made for the winter 2012-2013 season (October to May). Steelhead comprised 91% of the catch in 2013. Because the river is too warm to support significant reproduction, most of the steelhead caught are likely of hatchery origin. Of the 749 fish harvested in 2013, 15% of steelhead had CWTs, and the total fishing effort was 38,032 hours. This number of hours is somewhat higher than the average number of fishing hours measured at the more important Lake Huron main basin ports. Thus, a substantial fishing opportunity has been generated by the steelhead stocking program for the Au Sable River. The incidence of study fish in this harvest is being determined (see Job 4).

**Job 4. Title: Collect life history data.**—Creel census clerks (study 230499) collected snouts from AD-clipped steelhead whenever possible, and the U.S. Fish and Wildlife Service and Michigan Department of Natural Resources (DNR) funded “head hunter” positions in 2013 and 2014 to collect snouts of AD-clipped salmonids in the Lake Huron and Lake Michigan recreational harvest through the collaborative “Mass Marking Project”. The number of Study 230763 steelhead CWT returns from 2014 will not be known until the extractions and data analysis are completed.

The Northern Lake Huron Management Unit electrofished the stocking sites at the Au Sable River, Van Etten Creek, and Harrisville in the spring of 2012, 2013, and 2014 to determine if there was a significant return to the northern study sites. During 2014, 42 AD-clipped fish originating from this study were electrofished in 4.3 hours of fishing. A total of 21.5 hours were devoted to field work for this study from 2012 to 2014. An additional 52 AD-clipped fish were collected and 103 unmarked fish were captured and released. The U.S. Fish and Wildlife Service Mass Marking Project tag-recovery crew sampled 21 AD-clipped steelhead during 2013 from Lake Huron anglers. Other CWT-marked steelhead from Lake Huron were probably collected by the Lake Michigan CWT recovery project crew. Lake Huron creel survey personnel collected 45 AD-clipped steelhead from Lake Huron anglers from November 2012 through September 2013 and others were probably collected by Lake Michigan creel survey personnel during this same period. Only some of these CWTs have been extracted and read to date.

Although it is likely too soon to draw any conclusions regarding survival of all the test groups, the spring electrofishing demonstrated that most of the test groups were present and that a sufficient number of steelhead had returned as two- and three-year old fish to Harrisville and Au Sable River study sites to produce a recreational fishery in those areas. Of the 2011 to 2013 stockings, only the 2011 and 2012 cohorts have fully recruited to the recreational sport fishery; thus CWT returns should increase substantially in 2014 and 2015.

We collaborated with the U.S. Geological Survey - Great Lakes Science Center (USGS) on a diet analysis of recreationally caught fish from Lake Huron. A total of 87, 253, and 138 rainbow/steelhead trout stomachs were collected in 2009, 2010, and 2011. USGS staff continue to conduct quality control on these stomachs this winter (Jeff Schaeffer, USGS Great Lakes Science Center, personal communication). Results should be peer reviewed and published during the coming year. We will use the results to describe the diet and food web niche of steelhead in Lake Huron in the context of the food habits of other Lake Huron predators.

**Job 5. Title: Write annual, final, and other reports.**—This performance report was prepared.

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**Date:** September 30, 2014

Table 1.—Number of coded-wire tagged steelhead returned from 2011 cohort by capture year, age, location, and treatment, 2011 to 2014.

Capture year	Age	Treatment					
		Van Etten		Harrisville		Harbor Beach	
		Creek	Pen	Direct	Pen	Direct	Pen
2011	1	2	2	0	0	0	0
2012	2	20	20	10	2	1	2
2013	3	15	14	6	6	8	10
2014	4	17	16	5	6	0	0
Totals		54	52	21	14	9	12

Table 2.—Number of coded-wire tagged steelhead returned from 2012 cohort by capture year, age, location, and treatment, 2012 through 2014.

Capture year	Age	Treatment					
		Van Etten		Harrisville		Harbor Beach	
		Creek	Pen	Direct	Pen	Direct	Pen
2012	1	1	2	1	0	0	0
2013	2	12	7	22	11	3	2
2014	3	9	13	20	11	0	2
Totals		22	22	43	22	3	4

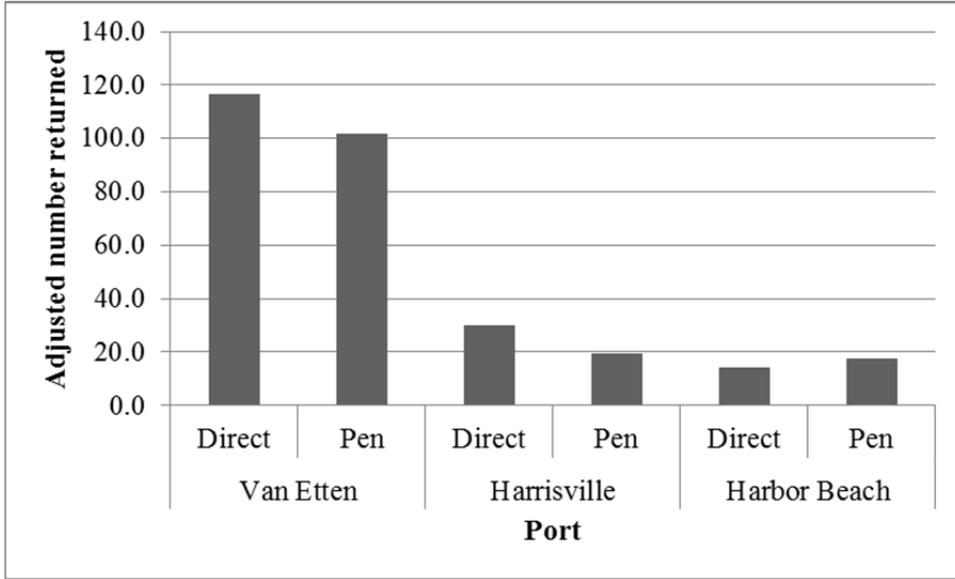


Figure 1.—Comparison of returns of coded-wire-tagged steelhead from the 2011 cohort by treatment and port, 2011 to 2014 (adjusted per 10,000 fish stocked).

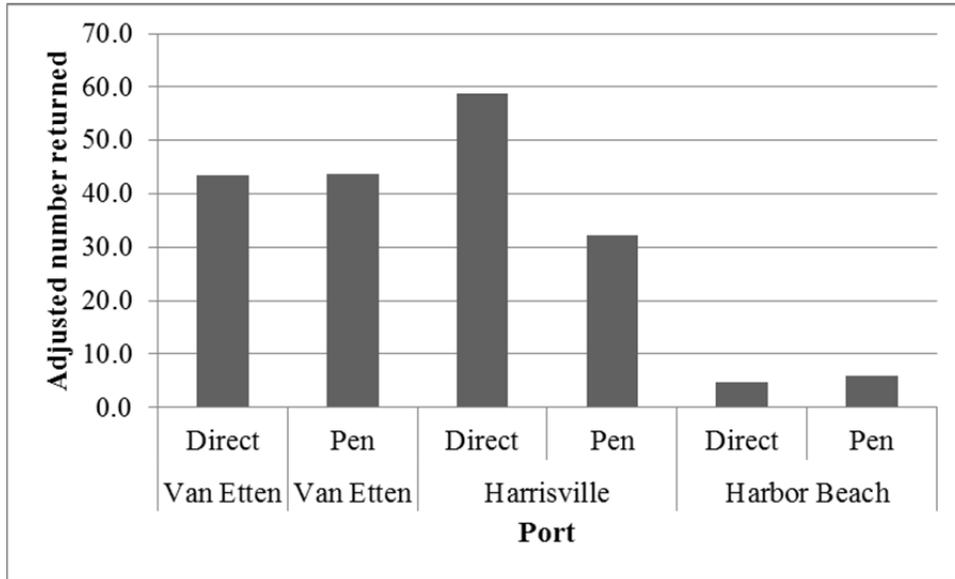


Figure 2.—Comparison of returns of coded-wire-tagged steelhead from the 2012 cohort by treatment and port, 2012 to 2014 (adjusted per 10,000 fish stocked).