

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-53-R-13

Study No.: 487

Title: Performance, survival and production of steelhead strains in tributaries of Lake Michigan and Lake Huron.

Period Covered: April 1, 1996 to March 31, 1997

Study Objectives: To estimate smolt production and evaluate strain performance (growth, survival, homing fidelity) and stocking location of steelhead in tributaries of lakes Michigan and Huron. (1) Estimate relative survival to lake and river fisheries of upstream and downstream plants in 4 Lake Michigan tributaries and the Au Sable River. (2) Estimate homing fidelity to river of origin. (3) Compare relative survival, growth, homing, age at first maturity, percent repeat spawn between strains, rivers, and years. (4) Estimate relative abundance of naturally-produced steelhead. (5) Evaluate size-selective mortality.

Summary: Steelhead with coded-wire-microtags have been stocked for two years. The study design has been refined to better focus on key goals, and further define evaluation criteria. Creel surveys will be initiated on rivers in the fall of 1997. Study fish are just beginning to return to the fishery.

Job 1. Title: Design study to evaluate performance and survival of Michigan and Skamania-strain steelhead.

Findings: A meeting was held on December 17, 1996 to more clearly define the study objectives and evaluation criteria (See amended study 487). Five objectives and evaluation criteria were agreed upon by all participating individuals. The objectives are one, to evaluate strain performance of skamania vs. Michigan steelhead; two, to evaluate performance of steelhead in six different tributary river systems and in Lakes Michigan and Huron; three, to evaluate the performance of upstream and downstream plants; four, to describe year-to-year variation in growth and survival of Great Lakes steelhead populations; and five, to define the quality, condition, and health of hatchery reared fish. Performance of steelhead is defined by evaluation of distribution/movement patterns, growth, abundance, homing fidelity, survival, and contribution to lake and river fisheries. Efforts have been made to balance the study design by stocking similar numbers of steelhead of each strain, within a given river system. The condition/health of hatchery reared steelhead is evaluated by application of Goede's health assessment index (Goede 1993), as well as determination of percent water in a sub-sample of fish from each hatchery and strain. Table 1 summarizes the agreed upon study design. Stocking dates have been coordinated among hatcheries to decrease the amount of temporal variation among treatments. The duration of the study has been extended to allow for three years of stocking marked steelhead according to the agreed upon study design.

Job 2. Title: Mark, stock and release steelhead smolts in selected lake tributaries.

Findings: A total of 306,049 steelhead were tagged and released in 1996, and 400,546 were tagged and released in 1997. Table 2 summarizes the allocation of coded-wire-tagged steelhead at each stocking site for the years of 1996 and 1997. In 1996 the state of Indiana was not able to mark steelhead according to the study design. Changes were also made to the allocation of stocked fish in the Manistee River to balance out the upstream and downstream plants. The project will be extended one year to provide three years of stocking at levels allocated in the study design.

Job 3. Title: Evaluate tag loss.

Findings: Tag loss was evaluated for steelhead stocked in both 1996 and 1997 (Table 3). For the earliest tagging events in 1996, tag retention rates were lowest around 85%. After eliminating errors in the tagging process tag retention rates have increased substantially and have consistently remained in the high 90 percentile range. The 30 day tag retention rates differed from 0-5% from initial tag retention measurements, with an average difference of 1%. Future estimates of tag loss will be based on initial estimates less 1%.

Job 4. Title: Estimate harvest and effort for steelhead in study tributaries.

Findings: There is an ongoing census on Lake Michigan, Lake Huron and on the St. Joe River. Creel census is scheduled to begin on three additional rivers (Manistee, Muskegon, and AuSable) in August of 1997. The 1996 fish are just beginning to show up in the creel and at tournaments.

Job 5. Title: Estimate growth and survival of marked steelhead to lake and river fisheries.

Findings: Small numbers of steelhead with coded-wire-tags are being turned in by anglers, creel clerks, headhunters, and DNR personnel working fishing tournaments. It is too early to make statements about growth or survival of study fish.

Literature Cited:

Goede, R. W. 1993. Fish health/ condition assessment procedures. Part 1 of Report to Utah Division of Wildlife Resources, Logan, UT.

Table 1.—Summary of rivers, study sites, and design of stocking strategy for study 487.

River	Stocking Location	Classification	Design	
			Skamania	Michigan
St. Joseph	Pier 33	Mouth	10,000	10,000
	Sportsman's Club-Arden Pond	Mid-17 mi. from mouth, imprinting pond	10,000	10,000
	Shamrock Park-Berrien Springs	Mid-23 mi. from mouth	10,000	10,000
	Buchanan City Launch-Smittys	Mid-32 mi. upstream, above dam	10,000	10,000
	St. Patrick's Park	Mid-47 mi. upstream, above 3 dams	15,000	
	Mishawaka-Lincoln Park	Up-55 mi. upstream, above 4 dams,	30,000 (30,000 ¹)	20,000
	Indiana-Merrifield Park S. Bend	Up-60 mi. upstream, above 5 dams, close to hatchery		
Manistee	Manistee	Mouth	0 ²	16,600
	High Bridge	Mid	16,600	16,600
	Tippy Dam	Up	16,600	16,600
Manistique	City of Manistique Pass	Mouth, below first dam		8,000
Muskegon	Muskegon Lake Outlet	Mouth		10,000
	Henning Park	Mid		20,000
	Pine Street	Up		20,000
Sturgeon	Big Bay DeNoc-499 Bridge	Mouth	5,000	5,000
	Sturgeon River	Up	5,000	5,000
Au Sable	Harbor	Mouth		25,000
	Rea Road	Up		25,000

¹ fish listed in parentheses are fish raised to a larger size and stocked later.

² No Skamania are planted at the mouth of the Manistee River because of concerns that Skamania stocked at this site have a greater potential to interfere with naturally reproducing populations of steelhead in the Little Manistee River.

Table 2.–Summary of rivers, study sites, numbers of each strain of steelhead (Skamania and Michigan) marked and stocked in 1996 and 1997.

River	Stocking Location	1996		1997	
		Skamania	Michigan	Skamania	Michigan
St. Joseph:	Pier 33	0	9,961	15,811	15,076
	Sportsman's Club-Arden Pond	10,723	10,921	15,440	11,000
	Shamrock Park-Berrien Springs	0	9,847	15,666	14,911
	Buchanan City Launch-Smittys	10,697	9,801	15,672	14,780
	St. Patrick's Park			15,535	
	Mishawaka-Lincoln Park			31,755(31,209)	19,819
	Indiana-Merrifield Park S. Bend	0	20,931		
Manistee:	Manistee		14,795		15,000
	High Bridge	15,357	15,787	16,494	14,787
	Tippy Dam	21,340	15,950	16,000	15,005
Manistique:	City of Manistique Pass		8,161		8,549
Muskegon:	Muskegon Lake Outlet		10,163		10,056
	Henning Park		21,489		19,965
	Pine Street		22,072		20,198
Sturgeon:	Big Bay DeNoc-499 Bridge	5,397	5,430	5,020	5,110
	Sturgeon River	6,284	5,345	4,998	4,983
Au Sable:	Harbor		28,426		2,995
	Rea Road		27,172		24,712
Total		69,798	236,251	183,600	216,946

Table 3.—Tag retention of steelhead stocked in 1996 and 1997. Tag retention was determined at 0 days (initial) and 30 days after marking.

River	Stocking Location	Strain	1996		1997	
			Initial	30 day	Initial	30 day
St. Joseph:	Pier 33	MI	90	-	98	97
	Pier 33	SK	-	-	83	-
	Sportsman's Club-Arden Pond	MI	85	85	-	-
	Sportsman's Club-Arden Pond	SK	85	-	-	-
	Shamrock Park-Berrien Springs	MI	85	-	100	-
	Shamrock Park-Berrien Springs	SK	-	-	84	-
	Buchanan City Launch-Smittys	MI	85	-	99	99
	Buchanan City Launch-Smittys	SK	85	-	91	-
	St. Patrick's Park	SK	-	-	92	-
	Mishawaka-Lincoln Park	MI	-	-	96	93
	Mishawaka-Lincoln Park	SK	-	-	76	-
	Mishawaka-Lincoln Park ¹	SK	-	-	90	-
	Indiana-Merrifield Park S. Bend	MI	86	-	-	-
Manistee:	Manistee	MI	98	97	98	97
	High Bridge	MI	98	97	99	96
	Tippy Dam	MI	98	97	98	97
	High Bridge	SK	93	-	98	-
	Tippy Dam	SK	95	-	98	97
Manistique:	City of Manistique Pass	MI	100	-	99	-
Muskegon:	Muskegon Lake Outlet	MI	94	-	98	-
	Henning Park	MI	62	57	97	-
	Pine Street	MI	99	-	100	-
Sturgeon:	Big Bay DeNoc-499 Bridge	MI	97	-	98	-
	Sturgeon River	MI	98	-	98	98
	Big Bay DeNoc-499 Bridge	SK	94	-	98	-
	Sturgeon River	SK	95	-	96	96
Au Sable:	Harbor	MI	100	-	98	98
	Rea Road	MI	98	99	100	100

¹ Late release steelhead.

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