

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-80-R-6

Study No.: 230743

Title: Evaluation of Eagle Lake and Lake Michigan steelhead-strain rainbow trout stocked into inland lakes in Michigan

Period Covered: October 1, 2004 to September 30, 2005

Study Objective: To determine the relative survival, growth, and return to creel of steelhead and Eagle Lake-strain rainbow trout stocked into inland lakes.

Summary: Eagle Lake (EL) and Michigan steelhead (STT) strain rainbow trout were given distinctive fin clips and stocked into seven experimental lakes in 2004 and 2005. Relative survival and growth of the strains was evaluated from samples collected by angler census, gill netting, and electrofishing. Anglers fishing Maceday Lake caught 2.6 times more STT than EL strain fish. Both strains were caught at similar frequencies in survey gear. Incremental growth in total length between stocking and capture in survey gear was approximately 1 in greater for the EL strain compared to STT. However, because EL were smaller at planting, mean lengths of both strains were similar when they were collected 3 to 11 months later.

Findings: Jobs 1, 2, 3, 4, 6, and 7 were scheduled for 2004-05, and progress is reported below.

Job 1. Title: Fin clip rainbow trout strains. – EL- and STT-strains rainbow trout planted in 2004 and 2005 were fin clipped at the Thompson State Fish Hatchery. The left pectoral fin was clipped from the EL-strain and STT were given a right pectoral fin clip.

Job 2. Title: Perform fish quality assessment and rate fin clip quality.–Hatchery personnel performed detailed assessments of fish quality before fish were planted. They examined a random sample of 60 fish of each strain to determine if eyes, gills, pseudobranchia, thymus, and opercles were normal. A subsample of 20 fish of each strain was examined to determine fat levels on pyloric caeca or in the body cavity, condition of the spleen, hind gut, kidney, and liver, and bile color. Fins were examined for erosion and fin clip quality was rated for a sample of 100 fish of each strain.

In 2004, health quality ratings were very good for both strains and fat levels were similar between strains. In 2005, corneal turbidity was observed in approximately 20% of STT while gill abnormalities were observed on approximately 30% of EL. Fin clip quality was excellent during both years.

Job 3. Title: Stock fish into test lakes.—Yearling rainbow trout were stocked into seven experimental lakes in both 2004 and 2005 (Table 1). On average, STT were 0.9 in longer than EL stocked in 2004 and 1.2 in longer at planting in 2005.

Job 4. Title: Conduct creel census and collect biological data.—An angler census of Maceday Lake began in late April 2005 and will be completed at the end of October 2005. Field data on angler harvest and catch rates have not been analyzed, to date. Data on total lengths and strain frequencies for scale-sampled rainbow trout are presented under Job 6. Rainbow trout were also sampled with nets and electrofishing gear in four of the seven experimental lakes (See Job 6).

Job 6. Title: Analyze data.—Anglers caught 2.6 times more STT strain than EL from Maceday Lake ($\chi^2 = 7.1$, $df = 1$, $P \leq 0.05$). From July through mid-September 2005, the Maceday Lake census clerk collected scale samples from 26 STT compared to only 10 from EL. The mean total lengths of STT and EL caught by anglers were not different in Maceday Lake ($F = 0.46$, $df 1, 34$, $P = 0.50$). The mean lengths of angler-caught EL and STT fish were 10.1 and 10.3 in, respectively.

Four study lakes were surveyed with graded-mesh experimental gill nets, by electrofishing, or both methods. No trout were captured in either gear type in Heart Lake. I used analysis of variance to test for differences in mean total lengths and growth increments between strains from the time of stocking to sampling for the three lakes where trout were captured in survey gear. The EL strain grew significantly faster during the first summer after planting into Shupac, Big Chub, and Maceday lakes (Table 2). However, because the EL strain fish were smaller at planting there were no significant differences between the mean total lengths of the two strains for any sample (Table 2). Eagle Lake fish grew 0.8 in more than STT during the first 6 months after being planted into Shupac and Big Chub lakes and 1.3 in more than STT during the first 3 months after being stocked into Maceday Lake.

Chi-square comparisons of frequency of capture for each strain collected in survey gear were made for each sample where expected frequencies in each cell were at least 5. This minimum threshold is recommended to meet the assumption of a normal distribution. There were no significant differences between the strains in frequency of capture for age-1 fish from Shupac, Big Chub, or Maceday lakes. There were likewise no differences between frequencies of capture for age-1 or age-2 fish of either strain when data were pooled across lakes.

Job 7. Title: Write annual performance report.—This performance report was completed as scheduled.

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Date: September 30, 2005

Table 1.–Eagle Lake (EL) and Michigan Steelhead (STT) plantings into experimental lakes. Mean lengths are in inches.

Lake name (acres)	Year	Number stocked		Mean length	
		STT	EL	STT	EL
Elk Lake (7,730)	2004	21,480	21,500	7.8	6.8
	2005	21,500	21,500	8.0	6.9
Big Glen Lake (4,865)	2004	10,000	10,000	7.8	6.8
	2005	13,279	13,116	7.8	6.8
Walloon Lake (5,487)	2004	14,000	14,000	7.9	6.9
	2005	14,000	14,000	8.0	6.8
Maceday Lake (419)	2004	6,000	6,000	7.8	6.9
	2005	6,000	6,000	8.0	6.8
Shupac Lake (107)	2004	2,700	2,700	7.6	6.9
	2005	2,700	2,700	8.0	7.1
Big Chub Lake (75)	2004	2,500	2,500	7.6	6.9
	2005	2,500	2,500	8.0	6.6
Heart Lake (65)	2004	2,000	2,000	7.6	6.9
	2005	2,000	2,000	8.0	6.6

Table 2.—Mean total length (in), incremental increases in length from planting (in) and sample sizes of Michigan steelhead (STT) and Eagle Lake (EL) rainbow trout captured by gill nets or electrofishing from experimental lakes. Survey date refers to the date that a survey began. P-values are given for analysis of variance comparisons of growth increments between strains for each sample. All comparisons of mean total length were non-significant.

Lake name (survey date)	Rainbow trout strain	Mean length	Growth increment	Sample size	F	df	P
Shupac Lake (10/26/04)	EL	12.1	5.2	8	6.202	1, 9	0.034
	STT	12.0	4.4	3			
Shupac Lake (4/20/05)	EL	12.8	5.8	4	14.538	1, 7	0.007
	STT	12.1	4.5	5			
Big Chub Lake (11/03/04)	EL	13.8	6.9	18	4.158	1, 41	0.048
	STT	13.7	6.1	25			
Big Chub Lake (4/20/05)	EL	15.5	8.6	1	0.817	1, 4	0.417
	STT	15.5	7.9	5			
Maceday Lake (7/28/05)	EL	10.5	3.7	9	22.879	1, 15	<0.001
	STT	10.4	2.4	8			