

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-80-R-7

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, 2005 to September 30, 2006

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 2004-06. Relative abundance and growth of the strains was evaluated from samples collected by on-site angler census, gill netting, electrofishing, and by volunteer anglers. Nearly 73% of 172 rainbow trout harvested from Maceday Lake were STT. Sixty percent of rainbow trout caught by volunteer anglers fishing in two small stocked lakes were STT. Rainbow trout stocked into large inland lakes were caught in very low numbers in survey gear. No angler-caught rainbow trout of any strain were observed by a full-time census clerk who conducted census on three large lakes during October 2005 and on two large lakes during February and March 2006. Michigan steelhead were 2.7 times more abundant than EL in the pooled samples of rainbow trout from six study lakes. Mean total lengths of both rainbow trout strains were similar within each lake. In small lakes incremental growth in total length between stocking in April and capture in survey gear in October was approximately 1 in greater for the EL strain compared to STT. However, because the EL strain was smaller at planting, mean lengths of both strains were similar by fall.

Findings: Jobs 1–7 were scheduled for 2005-06, and progress is reported below.

Job 1. Title: Fin clip rainbow trout strains.–EL- and STT-strain rainbow trout planted in 2004-06 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 health 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 and 2006 overall 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. In 2006, mild hemorrhages in the thymus occurred in 12% of STT and 32% of EL. Fin clip quality was excellent during all years.

Job 3. Title: Stock fish into test lakes.—Yearling rainbow trout were stocked into seven experimental lakes in 2004-06 (Table 1). On average, STT were 0.9 in longer than EL stocked in 2004, 1.2 in longer in 2005, and 0.7 in longer in 2006.

Job 4. Title: Conduct creel census and collect biological data.—An angler census of Maceday Lake was conducted during daylight hours from 1-April 2005 through the end of October. Both weekend days and three randomly selected weekdays were selected for sampling during each week of the survey season. Estimated total catch of rainbow trout during these 7 months was 370 and harvest was estimated at 172. Nearly 73% of the 172 rainbow trout harvested from Maceday Lake were STT.

An on-site angler census was also conducted on Elk, Big Glen, and Walloon lakes during October 2005, and on Elk and Walloon lakes in February and March 2006. No rainbow trout of either strain were observed by the census clerk during either survey. Volunteer anglers collected fin clip and total length data from rainbow trout caught from Heart, Big Chub, and Bridge lakes during 2005-06. In Big Chub and Bridge lakes 57% of the 149 rainbow trout caught by volunteer anglers were STT. In Heart Lake 71% of 31 rainbow trout caught were STT. The mean length of STT caught from Big Chub and Bridge lakes was 14.9 in compared to 13.5 in for EL. In Heart Lake the mean length of both strains in volunteer angler catches was approximately 13 in.

Job 5. Title: Conduct netting surveys.—Biological and relative strain abundance data were collected in five lakes by electrofishing or with experimental gill nets in 2006. Data collected during these surveys are presented under Job 6.

Job 6. Title: Analyze data.—Michigan steelhead were caught 2.7 times more frequently than EL in the pooled samples of rainbow trout collected from six study lakes (Table 2). With the exception of Maceday Lake most trout samples were collected by electrofishing or graded-mesh experimental gill nets. Recreational anglers caught 2.7 times more STT than EL from Maceday Lake ($\chi^2 = 7.1$, $df = 1$, $P \leq 0.05$). Most of the pooled sample of STT and EL (312 fish) were collected from the small- and medium-sized lakes. Small but equal numbers of STT and EL were captured from 5,487-acre Walloon Lake (8 of each strain) in April 2006, while only wild rainbow trout were captured in 7,730-acre Elk Lake.

I used analysis of variance (ANOVA) to test for differences in mean total lengths between strains for each lake and survey period. Mean total lengths were similar between strains within each lake (Table 2). Many scale samples have not been aged, to date, so I could not evaluate incremental growth rates from stocking to time of capture for most of the data set. When age data were available I used ANOVA to test for differences in incremental growth rates between strains. The EL strain grew significantly faster than STT during the first summer after planting into Shupac, Big Chub, and Maceday lakes. However, because the EL strain fish were smaller at planting there were no significant differences between the mean total lengths of the two strains by the end of summer.

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

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Date: September 30, 2006

Table 1.—Eagle Lake (EL) and Michigan Steelhead (STT) plantings into experimental lakes. Mean total lengths are reported 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
	2006	16,797	16,797	8.0	7.3
Big Glen Lake (4,865)	2004	10,000	10,000	7.8	6.8
	2005	13,279	13,116	7.8	6.8
	2006	12,000	12,000	7.8	7.4
Walloon Lake (5,487)	2004	14,000	14,000	7.9	6.9
	2005	14,000	14,000	8.0	6.8
	2006	15,000	15,000	8.0	7.2
Maceday Lake (419)	2004	6,000	6,000	7.8	6.9
	2005	6,000	6,000	8.0	6.8
	2006	8,000	8,000	8.1	7.3
Shupac Lake (107)	2004	2,700	2,700	7.6	6.9
	2005	2,700	2,700	8.0	7.1
	2006	2,700	2,700	8.0	7.2
Big Chub Lake (75)	2004	2,500	2,500	7.6	6.9
	2005	2,500	2,500	8.0	6.6
	2006	2,500	2,500	7.8	7.4
Heart Lake (65)	2004	2,000	2,000	7.6	6.9
	2005	2,000	2,000	8.0	6.6
	2006	2,000	2,000	7.8	7.4

Table 2.—Mean total length (in) of Michigan steelhead (STT) and Eagle Lake (EL) rainbow trout collected from experimental lakes. Sample sizes are shown in parentheses. “—” = not sampled.

Lake	Rainbow trout strain	Survey period							
		October 2004		April 2005		October 2005		April 2006	
Shupac Lake	EL	12.1	(8)	12.8	(4)	14.1	(5)	12.5	(5)
	STT	12.0	(3)	12.1	(5)	12.3	(20)	12.9	(29)
Big Chub and Bridge lakes	EL	13.8	(18)	15.6	(2)	13.3	(4)	16.2	(5)
	STT	13.7	(25)	15.4	(10)	14.8	(13)	15.8	(36)
Heart Lake	EL		(0)	—	—	12.4	(2)	12.9	(2)
	STT		(0)	—	—	12.4	(23)	12.3	(21)
Walloon Lake	EL	—	—	—	—	—	—	22.1	(8)
	STT	—	—	—	—	—	—	22.4	(8)
Elk Lake	EL	—	—	—	—		(0)		(0)
	STT	—	—	—	—		(0)		(0)
	Wild	—	—	—	—	18.8	(18)	16.4	(1)
Maceday Lake ¹	EL	—	—	—	—	10.3	(19)	—	—
	STT	—	—	—	—	10.4	(37)	—	—

¹ Most of the fish in this sample were trout harvested by recreational anglers during July and August 2005.