

## STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-81-R-6

Study No.: 230646

Title: Inland creel surveys

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

**Study Objective:** To provide a consistent series of guidelines, data collection methods, and timely analysis to fisheries managers and research biologists conducting access point creel surveys on inland waters.

**Summary:** Winter surveys were conducted on three lakes: Grand and Long lakes, and Peavy Pond. Open water surveys were conducted on eight sites: Black, Gogebic, Belleville, Maceday and Lotus, Murray, Campau, Paw Paw lakes, and Fletcher Pond; and two rivers: Boardman, and Tahquamenon rivers. Summary survey information is given in Table 1 for each survey site. All lake and river sites were surveyed to estimate angling pressure, harvest and catch by species. In addition, Grand, Long, Black, and Gogebic lakes, Peavy Pond, and Tahquamenon River were surveyed to evaluate the walleye fishery. Belleville, Murray, Campau, and Paw Paw lakes were surveyed to evaluate warmwater fishery. Maceday and Lotus lakes were surveyed to evaluate the trout fishery. Boardman River was surveyed to evaluate the effect of future dam removal on fish populations.

Effort and catch estimates were calculated for summer 2002 fisheries on Upper Grand River, Lower Grand River and Rogue River, Buck Creek and Coldwater River, Gull Lake, Muskallonge Lake, Sucker River, Cisco Thousand Island; summer 2003 fisheries on Upper Grand, Lower Grand and Rogue Rivers, Crockery Creek and three trout lakes (Half, Lime, Clear lakes), Green Lake, and Manistee River; summer 2004 fisheries on Kalamazoo River.

**Findings:** Jobs 1–8 were scheduled for 2004-05, and progress is reported below.

**Job 1. Title: Examine creel survey sites.**—Grand Lake and Long Lake were examined during 2004 survey season (Su 2004). Belleville, Maceday, and Lotus lakes were examined with field personnel. Field personnel examined other sites. Each site sampled during current survey season was examined to determine appropriate locations for counting and interviewing anglers, and sampling methods.

**Job 2. Title: Sampling intensity, techniques, and proposed level of statistical significance.**—Statistical significance of 75% or greater was considered appropriate by all unit managers conducting surveys. Error bounds (2 SE) were calculated for each estimate and provided statistical significance, depending on distribution shape and  $N \geq 10$ , of 75% to 95% (Dixon and Massey 1957). Rates of precision (mean/2 SE) were not predetermined for any of the surveys. Unless otherwise noted, all estimates in this report were  $\pm 2$  SE.

Design and estimation methods used for surveys given in this report followed the multiple-day period (Lockwood et al. 1999). Survey planning in each instance followed general funding and supervisory procedures given in Lockwood (2000a). Survey design naming conventions followed those given Lockwood (2000b).

**Job 3. Title: Prepare stratified-random schedules.**—Schedules were prepared and distributed to appropriate personnel. All survey schedules were generated by the Creel Survey Designer program (Su, 2004).

General information for surveys given in this report is listed in Table 1. Work shifts and expansion values for these surveys are available in a database file. Instructions and schedules for these surveys are available on separate documents.

**Job 4. Title: Train creel clerks.**—A two-day training session was given to clerks. Written instructions were prepared for all surveys conducted during current segment. Management Unit personnel provided additional on-site training for clerks. Training descriptions for surveys conducted during previous survey season were given in Lockwood (2000a).

**Job 5. Title: Survey inland waters.**—Winter surveys were conducted on three lakes: Grand and Long lakes, and Peavy Pond. Open water surveys were conducted on eight sites: Black, Gogebic, Belleville, Maceday and Lotus, Murray, Campau, Paw Paw lakes, and Fletcher Pond; and two rivers: Boardman, and Tahquamenon rivers. Summary survey information is given in Table 1 for each survey site. All lake and river sites were surveyed to estimate angling pressure, harvest and catch by species. In addition, Grand, Long, Black, and Gogebic lakes, Peavy Pond, and Tahquamenon River were surveyed to evaluate the walleye fishery. Belleville, Murray, Campau, and Paw Paw lakes were surveyed to evaluate warmwater fishery. Maceday and Lotus lakes were surveyed to evaluate the trout fishery. Boardman River was surveyed to evaluate the effect of future dam removal on fish populations.

**Job 6. Title: Supervise count and interview data processing, and quality control.**—Count and interview data from current segment surveys were processed at the Institute for Fisheries Research. Additional range checking of all data was done at the Institute for Fisheries Research.

**Job 7. Title: Calculate and distribute catch and pressure estimates.**—Effort and catch estimates were calculated by the inland creel survey estimation program (**MiCreel**). This program is capable of reading in or querying creel survey data stored in plain text, Excel (.xls), dbase (.db), and Access database (.mdb) formats. The calculations of catch rate, effort, and catch estimates are based on Lockwood et al. (1999) multiple-day estimation methods.

Effort and catch estimates were calculated for summer 2002 fisheries on Upper Grand River, Lower Grand River/Rogue River, Buck Creek/Coldwater River, Gull Lake, Muskallonge Lake, Sucker River, Cisco Thousand Island; summer 2003 fisheries on Upper Grand, Lower Grand/Rogue Rivers, Crockery Creek/three trout lakes (Half, Lime, Clear lakes), Green Lake, and Manistee River; summer 2004 fisheries on Kalamazoo River.

Total effort and harvest estimates for survey site and season, harvest of dominate species, and species caught are given in Table 2. Detailed estimates for each species are available on separate database files.

**Job 8. Title: Prepare annual report.**—This report was prepared on schedule.

#### **Literature Cited:**

Arkin, H., and R. R. Colton. 1962. Tables for statisticians, second edition. Barnes and Noble, Inc., New York, New York.

- Dixon, W. J., and F. J. Massey, Jr. 1957. Introduction to statistical analysis, second edition. McGraw-Hill Book Company, Inc., New York, New York.
- Lockwood, R. N. 2000a. Conducting roving and access site angler surveys. Chapter 14 *in* Schneider, James C. (ed.) 2000. Manual of fisheries survey methods II: with periodic updates. Michigan Department of Natural Resources, Fisheries Special Report 25, Ann Arbor.
- Lockwood, R. N. 2000b. Sportfishing angler surveys on Michigan Inland waters, 1993-99. Michigan Department of Natural Resources, Fisheries Technical Report 2000-3, Ann Arbor.
- Lockwood, R. N., D. M. Benjamin, and J. R. Bence. 1999. Estimating angling effort and catch from Michigan roving and access site angler survey data. Michigan Department of Natural Resources, Fisheries Research Report 2044, Ann Arbor.
- Su, Z. 2004. Inland creel surveys, progress report, study 646. Michigan Department of Natural Resources, Federal Aid in Sport Fish Restoration, Annual Reports for Projects F-81-R-2, F-80-R-2, and F-80-R-3.

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**Date:** September 30, 2005

Table 1.—Inland creel surveys conducted in the inland waters of Michigan from October 1, 2004 to October 31, 2005.

Water body	County	Sites	Survey period	Method		Full time clerks (N)	Notes
				Count	Interview		
Grand Lake	Alpena	Grand Lake	12/1/04–3/31/05	progressive	Roving	1	Only make interviews
Long Lake	Alpena	Long Lake	12/1/04–3/31/05	progressive	Roving	1	Only make interviews
Grand and Long lakes	Alpena	Grand and Long Lake	12/1/04–3/31/05	progressive	Roving	1	Only make counts
Peavy Pond	Iron	Peavy Pond	12/16/04–2/28/05	progressive	Roving	1	
Black Lake	Cheboygan	Black Lake	4/30/05–10/20/05	air flight	Roving	1	Clerk also made a progressive count for half of the lake each shift
Fletcher Pond	Alpena	Fletcher Pond	4/30/05–9/30/05	progressive	Roving	1	
Lake Gogebic	Gogebic and Ontonagon	Lake Gogebic	5/15/05–9/30/05	air flight	Roving	1	Clerk also made a progressive count for half of the lake each shift
Belleville Lake	Wayne	Belleville Lake	4/1/05–10/31/05	progressive	Roving & Access	1	
Maceday and Lotus lakes	Oakland	Maceday and Lotus Lake	4/1/05–10/31/05	progressive	Roving & Access	1	
Murray and Campau lakes	Kent	Murray and Campau Lake	4/1/05–10/31/05	progressive	Roving	1/2	Share time with Great Lakes survey
Paw Paw Lake	Berrien	Paw Paw Lake	4/1/05–10/31/05	progressive	Roving	1/2	Share time with Great Lakes survey
Tahquamenon River	Luce	Dollarville Dam and Boat Launch to Sage River (Site 445); Sage River to Joy Island (Site 446)	5/15/05–10/31/05	progressive	Access (Site 445) Roving (Site 446)	1/2	Share time with Great Lakes survey
Sucker River	Alger	River mouth to Whitewash	4/1/05–5/14/05	progressive	Access	1/2	Share time with Great Lakes survey
Boardman River	Grand Traverse	River mouth to downstream of Brown Bridge Pond; Brown Bridge Pond to Forks	4/25/05–9/30/05	progressive	Access	1	

Table 2.—Effort (angler hours) and harvest estimates and their 2 standard errors (2 SE) in parentheses during 2002, 2003, and 2004.

Water body	Season	Fishery	Angler hours	Harvest	Top three species harvested	Species caught
Summer 2002						
Grand River Upper	Mar–Nov	Shore angling	21,936 (2,788)	1,557 (733)	Bluegill 527 (604), coho salmon 457 (274), rainbow trout 206 (246)	<u>Harvested:</u> coho salmon, Chinook salmon, rainbow trout, walleye, yellow perch, black crappie, bluegill, channel catfish. <u>Released:</u> coho salmon, Chinook salmon, rainbow trout, smallmouth bass, largemouth bass, walleye, northern pike, white sucker, rock bass, carp, bluegill, pumpkinseed.
Lower Grand & Rogue rivers	Mar–Nov	Shore angling	107,761 (11,814)	7,048 (1,486)	Rainbow trout 4,171 (1,245), Chinook salmon 1,915 (653), coho salmon 360 (332)	<u>Harvested:</u> coho salmon, Chinook salmon, rainbow trout, Atlantic salmon, brown trout, walleye, bluegill, rock bass, channel catfish, green sunfish. <u>Released:</u> coho salmon, Chinook salmon, rainbow trout, brown trout, smallmouth bass, walleye, white sucker, rock bass, bluegill.
Buck Creek & Coldwater rivers	Apr–Aug	Shore angling	10,437 (2,551)	533 (469)	Brown trout 533 (469)	<u>Harvested:</u> Brown trout. <u>Released:</u> rainbow trout, brown trout, smallmouth bass, largemouth bass, bluegill, common white sucker, yellow perch
Gull Lake	Apr–Aug	Boat angling	22,359 (6,319)	15,147 (7,653)	Bluegill 13,103 (7,594), rock bass 911 (683), largemouth bass 737 (550)	<u>Harvested:</u> smallmouth bass, yellow perch, black crappie, bluegill, largemouth bass, rock bass. <u>Released:</u> smallmouth bass, largemouth bass, northern pike, rock bass, bluegill, yellow perch.
Muskallonge Lake	Jun–Aug	Boat angling	20,985 (4,494)	4,703 (1,078)	Northern pike 2,372 (734), yellow perch 1,031 (642), rock bass 817 (391)	<u>Harvested:</u> smallmouth bass, walleye, yellow perch, northern pike, pumpkinseed, rock bass. <u>Released:</u> smallmouth bass, largemouth bass, walleye, northern pike, white sucker, rock bass, bluegill, pumpkinseed, yellow perch.
Sucker River	Apr–May	Shore angling	3,689 (1,390)	474 (234)	Rainbow trout 457 (233), white sucker 11 (21), brook trout 6 (12)	<u>Harvested:</u> rainbow trout, white sucker, brook trout. <u>Released:</u> rainbow trout
Cisco Thousand Island	May–Oct	Boat angling	171,310 (9,841)	113,135 (10,851)	Yellow perch 58,769 (7,631), bluegill 37,906 (7,206), walleye 2,737 (704)	<u>Harvested:</u> brook trout, lake herring, lake whitefish, smallmouth bass, walleye, yellow perch, northern pike, black crappie, bluegill, largemouth bass, pumpkinseed, rock bass, round whitefish. <u>Released:</u> lake whitefish, lake herring, smallmouth bass, largemouth bass, walleye, northern pike, muskellunge, rock bass, carp, bluegill, pumpkinseed, yellow perch.
Summer 2003						
Lower Grand & Rogue rivers	Mar–Nov	Shore angling	91,236 (10,959)	8,552 (1,495)	Rainbow trout 5,142 (1,208), Chinook salmon 1,620 (573), walleye 798 (462)	<u>Harvested:</u> coho salmon, Chinook salmon, rainbow trout, brown trout, lake trout, walleye, rock bass, channel catfish, white sucker <u>Released:</u> coho salmon, Chinook salmon, rainbow trout, brown trout, lake trout, smallmouth bass, walleye, white sucker

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Table 2.—Continued.

Water body	Season	Fishery	Angler hours	Harvest	Top three species harvested	Species caught
Manistee River	May–Aug	Boat & shore angling	19,957 (5,093)	869 (463)	Rainbow trout 390 (298), bluegill 185 (285), smallmouth bass 113 (157)	<u>Harvested</u> : rainbow trout, brown trout, smallmouth bass, walleye, yellow perch, bluegill <u>Released</u> : rainbow trout, brown trout, smallmouth bass, common white sucker, carp, bluegill
Green Lake	May–Sep	Boat angling	23,624 (3,789)	11,012 (1,768)	Bluegill 4,540 (1,396), yellow perch 2,919 (806), rock bass 2,299 (630)	<u>Harvested</u> : lake trout, smallmouth bass, yellow perch, northern pike, bluegill, largemouth bass, pumpkinseed, rock bass, green sunfish <u>Released</u> : smallmouth bass, largemouth bass, northern pike, white sucker, rock bass, bowfin, bluegill, pumpkinseed, yellow perch
Summer 2004						
Kalamazoo River	Apr–Oct	Boat & shore angling	84,999 (11,442)	28,133 (7,833)	Bluegill 12,827 (7,082), channel catfish 4,412 (2,430), rainbow trout 2,696 (931)	<u>Harvested</u> : coho salmon, Chinook salmon, rainbow trout, brown trout, smallmouth bass, walleye, black crappie, bluegill, rock bass, channel catfish, freshwater drum <u>Released</u> : coho salmon, Chinook salmon, rainbow trout, brown trout, smallmouth bass, largemouth bass, walleye, rock bass, bowfin, bluegill