

# **Angler Surveys on Michigan Inland Waters, 2000 – 2006**

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## Survey 1 Burt Lake, Cheboygan County, Summer, 2001

<b>Waterbody</b>	Burt
<b>Year</b>	Summer, 2001
<b>County</b>	Cheboygan County
<b>Sites</b>	201,202,203,204
<b>Survey period</b>	April 28 to September 30
<b>Survey design</b>	Aerial-roving (aerial counts, roving interviews)
<b>Interview type/mode</b>	roving/boat
<b>Count type/mode</b>	aerial/boat
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

*Burt Lake, summer 2001*—Survey followed an aerial-roving design. All funding was provided through Fisheries Division. One clerk working from a boat collected angler interview data. Counts of fishing boats were made on Burt, Crooked, and Pickerel lakes. Counts progressed from Burt to Crooked to Pickerel or from Pickerel to Crooked to Burt. This sequence was randomized. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and one instantaneous count of fishing boats was made per day. One of two shifts was selected each sample day for interviewing (Table 1). Interview starting location (north or south end of lake) and direction of travel (clockwise or counter-clockwise) was randomized daily. Time of count was randomized to cover daylight times within the sample period. Survey period is from April 28 through September 30, 2001. were estimated separately. Estimates are given in Table 2.

Figure 1.—Burt Lake count and interview grids used during summer 2001 angler survey.

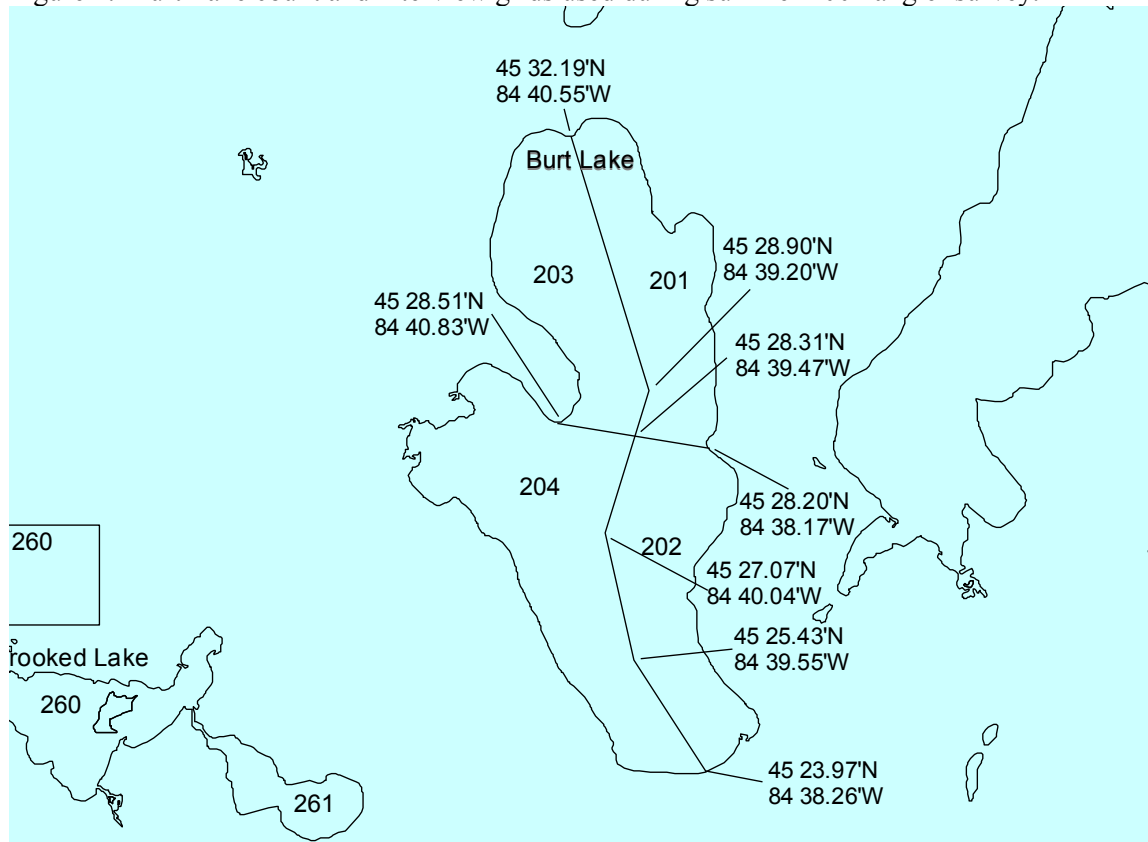


Figure 2.—Burt Lake count grids used during summer 2001 angler survey.

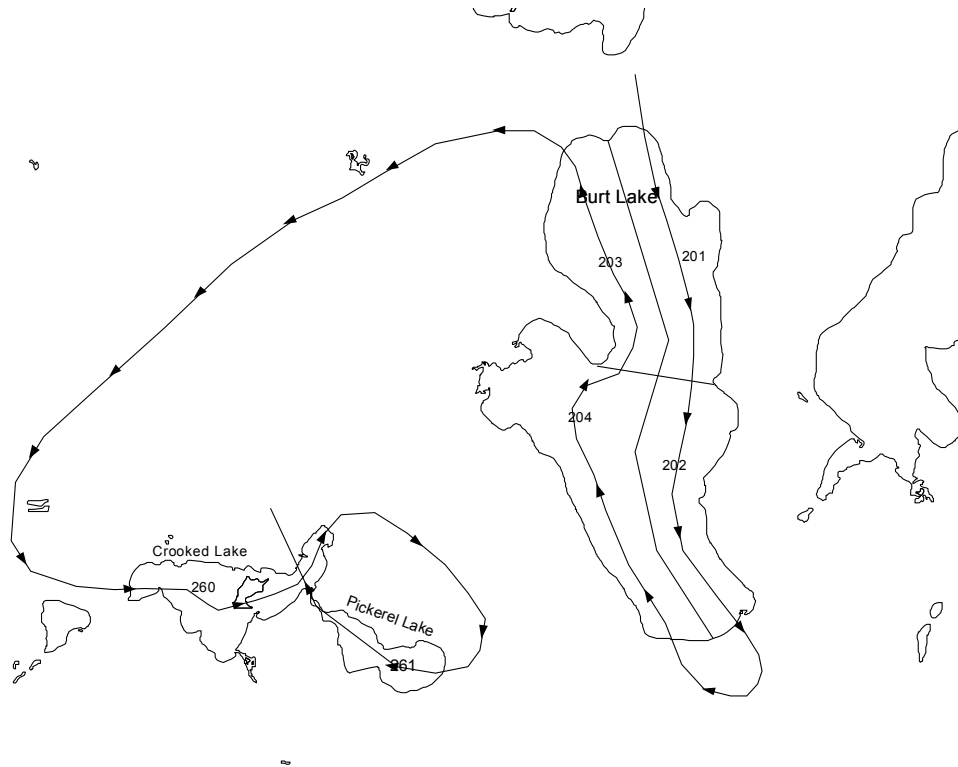


Table 1. Work shifts and F values used to estimate catch and effort at Burt (Cheboygan County), Crooked, Pickerel (Emmet County), Higgins, and Houghton lakes (Roscommon County), and Michigamme Reservoir, April 28 to September 30, Summer, 2001.

Month	Shift	
	Early	Late
April	0600 h – 1430 h	1330 h – 2200 h
May	0600 h – 1430 h	1330 h – 2200 h
June	0600 h – 1430 h	1330 h – 2200 h
July	0600 h – 1430 h	1300 h – 2130 h
August	0630 h – 1500 h	1230 h – 2100 h
September	0630 h – 1500 h	1200 h – 2030 h

	Year	Month	F
1	2001	4	16
2	2001	5	16
3	2001	6	18
4	2001	7	18
5	2001	9	16
6	2001	8	17

Table 2. Total estimated boat angling harvest, catch per hour, and fishing pressure for Burt Lake. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Rainbow trout	0.0031 (0.0023)	4 (7)	17 (21)	68 (99)	85 (123)	91 (110)	266 (193)
Brown trout	0.0006 (0.0009)	49 (78)	0 (0)	0 (0)	0 (0)	0 (0)	49 (78)
Smallmouth bass	0.0014 (0.0012)	46 (92)	5 (10)	0 (0)	41 (35)	26 (32)	118 (104)
Walleye	0.0603 (0.0122)	1,359 (580)	1,084 (324)	437 (292)	761 (289)	1,547 (546)	5,188 (953)
Yellow Perch	0.2642 (0.0951)	139 (175)	193 (243)	1,151 (1,025)	3,414 (1,344)	17,858 (7,756)	22,755 (7,944)
White bass	0.0001 (0.0003)	0 (0)	11 (22)	0 (0)	0 (0)	0 (0)	11 (22)
Northern pike	0.0029 (0.0028)	106 (212)	0 (0)	60 (71)	80 (80)	0 (0)	246 (237)
Largemouth bass	0.0000 (0.0001)	0 (0)	0 (0)	0 (0)	0 (0)	4 (9)	4 (9)
Rock bass	0.0013 (0.0013)	0 (0)	0 (0)	0 (0)	94 (112)	18 (27)	112 (115)
<b>TOTAL HARVEST</b>	<b>0.3339 (0.0974)</b>	<b>1,703 (653)</b>	<b>1,310 (406)</b>	<b>1,717 (1,073)</b>	<b>4,476 (1,387)</b>	<b>19,545 (7,777)</b>	<b>28,750 (8,009)</b>
<b>RELEASED</b>							
Rainbow trout	0.0002 (0.0004)	0 (0)	0 (0)	13 (25)	9 (17)	0 (0)	21 (31)
Smallmouth bass	0.0078 (0.0046)	102 (204)	128 (167)	215 (225)	125 (124)	99 (125)	668 (389)
Largemouth bass	0.0002 (0.0004)	0 (0)	0 (0)	0 (0)	19 (31)	0 (0)	19 (31)
Walleye	0.0119 (0.0038)	19 (37)	0 (0)	158 (118)	658 (273)	188 (88)	1,023 (313)
Northern pike	0.0067 (0.0035)	0 (0)	0 (0)	93 (155)	329 (195)	151 (162)	573 (297)
Yellow Perch	0.3927 (0.1263)	0 (0)	0 (0)	1,601 (944)	7,828 (2,299)	24,391 (10,174)	33,820 (10,473)
<b>TOTAL RELEASED</b>	<b>0.4195 (0.1271)</b>	<b>121 (208)</b>	<b>128 (167)</b>	<b>2,080 (990)</b>	<b>8,968 (2,327)</b>	<b>24,829 (10,176)</b>	<b>36,125 (10,489)</b>
<b>TOTAL CATCH</b>	<b>0.7534 (0.1667)</b>	<b>1,824 (686)</b>	<b>1,438 (439)</b>	<b>3,796 (1,460)</b>	<b>13,444 (2,710)</b>	<b>44,373 (12,807)</b>	<b>64,875 (13,197)</b>
<b>ANGLER HOURS</b>		<b>19,125 (3,297)</b>	<b>19,670 (3,582)</b>	<b>20,624 (4,220)</b>	<b>16,008 (2,608)</b>	<b>10,686 (2,784)</b>	<b>86,113 (7,488)</b>
<b>ANGLER TRIPS</b>		<b>5,521 (1,241)</b>	<b>5,189 (1,312)</b>	<b>6,768 (1,830)</b>	<b>6,610 (1,812)</b>	<b>3,008 (898)</b>	<b>27,097 (3,272)</b>



## Survey 2 Crooked, Emmet County, Summer, 2001

<b>Waterbody</b>	Crooked
<b>Year</b>	Summer, 2001
<b>County</b>	Emmet
<b>Sites</b>	260
<b>Survey period</b>	April 28 to September 30
<b>Survey design</b>	Aerial-roving (aerial counts, roving interviews)
<b>Interview type/mode</b>	roving/boat
<b>Count type/mode</b>	aerial, progressive/boat
<b>Clerk time</b>	1/2 time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

*Crooked and Pickerel lakes, summer 2001*—Survey followed an aerial-roving design. All funding was provided through Fisheries Division. One clerk working from a boat collected angler interview data. Clerk's time was split between Crooked and Pickerel lakes, and only one lake was selected for sampling each day. Counts of fishing boats were made on Burt, Crooked, and Pickerel lakes. Counts progressed from Burt to Crooked to Pickerel or from Pickerel to Crooked to Burt. This sequence was randomized. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and one instantaneous count of fishing boats was made per day. One of two shifts was selected each sample day for interviewing (Table 1). Interview starting location (area within a lake) and direction of travel (clockwise or counter-clockwise) was randomized daily. Time of count was randomized to cover daylight times within the sample period. Survey period is from April 28 through September 30, 2001.

Figure 1.—Crooked and Pickerel lakes. Site codes and boundaries remained the same during winter and summer surveys. Crooked Lake survey area included lake area only, while Pickerel Lake included lake and channel area to shoreline edge of Crooked Lake.

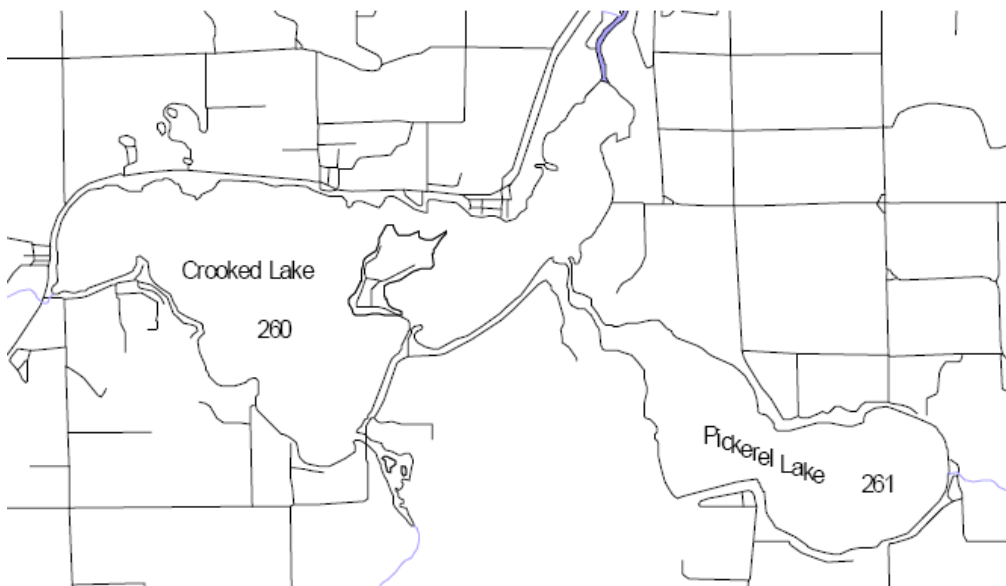


Table 1. Work shifts and F values used to estimate catch and effort at Burt (Cheboygan County), Crooked, Pickerel (Emmet County), Higgins, and Houghton lakes (Roscommon County), and Michigamme Reservoir, April 28 to September 30, Summer, 2001.

Month	Shift	
	Early	Late
April	0600 h – 1430 h	1330 h – 2200 h
May	0600 h – 1430 h	1330 h – 2200 h
June	0600 h – 1430 h	1330 h – 2200 h
July	0600 h – 1430 h	1300 h – 2130 h
August	0630 h – 1500 h	1230 h – 2100 h
September	0630 h – 1500 h	1200 h – 2030 h

Year	Month	F
2001	4	16
2001	5	16
2001	6	18
2001	7	18
2001	9	16
2001	8	17

Table 2. Total estimated boat angler harvest, catch-and-released fish, catch per hour and fishing pressure, Crooked Lake, Emmet County. Period is from April 28 through September 30, 2001. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
Harvested							
Smallmouth bass	0.0052 (0.0036)	0 (0)	14 (27)	0 (0)	69 (63)	55 (63)	138 (93)
Walleye	0.0694 (0.0232)	272 (145)	113 (114)	841 (490)	466 (205)	142 (77)	1,834 (568)
Yellow perch	0.0897 (0.0431)	6 (10)	907 (962)	137 (166)	449 (224)	874 (451)	2,373 (1,098)
Northern pike	0.0001 (0.0003)	3 (7)	0 (0)	0 (0)	0 (0)	0 (0)	3 (7)
Bluegill	0.0416 (0.0288)	6 (12)	0 (0)	703 (674)	159 (180)	233 (268)	1,101 (747)
Largemouth bass	0.0006 (0.0010)	0 (0)	0 (0)	0 (0)	0 (0)	17 (26)	17 (26)
Pumpkinseed	0.0056 (0.0066)	0 (0)	0 (0)	0 (0)	65 (91)	84 (149)	149 (175)
Rock bass	0.0182	3	0	0	227	250	480

	(0.0120)	(7)	(0)	(0)	(188)	(248)	(311)
TOTAL	0.2305 (0.0637)	290 (146)	1,034 (969)	1,681 (849)	1,435 (414)	1,655 (607)	6,095 (1,490)
Released							
Smallmouth bass	0.0251 (0.0226)	89 (75)	469 (580)	14 (34)	73 (69)	19 (20)	664 (590)
Largemouth bass	0.0039 (0.0060)	0 (0)	0 (0)	104 (157)	0 (0)	0 (0)	104 (157)
Walleye	0.1832 (0.0541)	520 (318)	1,521 (949)	1,499 (686)	833 (310)	471 (302)	4,844 (1,288)
Northern pike	0.0362 (0.0155)	387 (252)	330 (245)	41 (58)	159 (157)	39 (40)	956 (391)
Yellow perch	0.1245 (0.0470)	0 (0)	0 (0)	335 (312)	2,041 (1,019)	915 (481)	3,291 (1,169)
TOTAL	0.3729 (0.0859)	996 (412)	2,320 (1,138)	1,993 (772)	3,106 (1,078)	1,444 (569)	9,859 (1,883)
Total catch	0.6034 (0.1196)	1,286 (437)	3,354 (1,495)	3,674 (1,148)	4,541 (1,155)	3,099 (832)	15,954 (2,402)
Angler hours		3,810 (1,127)	5,425 (1,945)	8,912 (2,048)	5,323 (1,102)	2,972 (1,071)	26,442 (3,407)
Angler trips		1,900 (692)	1,612 (735)	10,032 (1,925)	1,492 (1,483)	1,126 (1,247)	16,162 (2,912)

## Survey 3 Pickerel, Emmet County, Summer, 2001

<b>Waterbody</b>	Pickerel
<b>Year</b>	Summer, 2001
<b>County</b>	Emmet
<b>Sites</b>	261
<b>Survey period</b>	April 28 to September 30
<b>Survey design</b>	Aerial-roving (aerial counts, roving interviews)
<b>Interview type/mode</b>	roving/boat
<b>Count type/mode</b>	aerial/boat
<b>Clerk time</b>	1/2 time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

*Pickerel Lake, summer 2001*—Survey followed an aerial-roving design. All funding was provided through Fisheries Division. One clerk working from a boat collected angler interview data. Clerk's time was split between Crooked and Pickerel lakes, and only one lake was selected for sampling each day. Counts of fishing boats were made on Burt, Crooked, and Pickerel lakes. Counts progressed from Burt to Crooked to Pickerel or from Pickerel to Crooked to Burt. This sequence was randomized. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and one instantaneous count of fishing boats was made per day. One of two shifts was selected each sample day for interviewing (Table 5). Interview starting location (area within a lake) and direction of travel (clockwise or counter-clockwise) was randomized daily. Time of count was randomized to cover daylight times within the sample period. Survey period is from April 28 through September 30, 2001.

Figure 1.—Crooked and Pickerel lakes. Site codes and boundaries remained the same during winter and summer surveys. Crooked Lake survey area included lake area only, while Pickerel Lake included lake and channel area to shoreline edge of Crooked Lake.

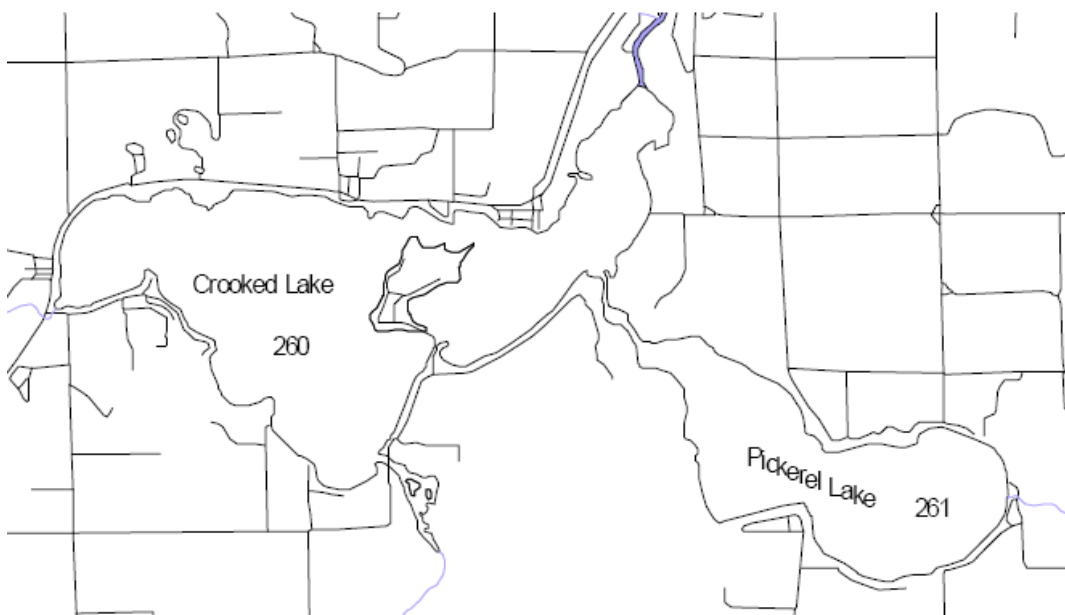


Table 1. Work shifts and F values used to estimate catch and effort at Burt (Cheboygan County), Crooked, Pickerel (Emmet County), Higgins, and Houghton lakes (Roscommon County), and Michigamme Reservoir, April 28 to September 30, Summer, 2001.

Month	Shift	
	Early	Late
April	0600 h – 1430 h	1330 h – 2200 h
May	0600 h – 1430 h	1330 h – 2200 h
June	0600 h – 1430 h	1330 h – 2200 h
July	0600 h – 1430 h	1300 h – 2130 h
August	0630 h – 1500 h	1230 h – 2100 h
September	0630 h – 1500 h	1200 h – 2030 h

Year	Month	F
2001	4	16
2001	5	16
2001	6	18
2001	7	18
2001	9	16
2001	8	17

Table 2.–Total estimated boat angler harvest, catch-and-released fish, catch per hour and fishing pressure, Pickerel Lake, Emmet County. Period is from April 28 through September 30, 2001. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
Harvested							
Smallmouth bass	0.0021 (0.0029)	0 (0)	0 (0)	5 (3)	35 (55)	0 (0)	40 (55)
Walleye	0.0181 (0.0100)	52 (54)	133 (134)	67 (72)	44 (49)	47 (59)	343 (179)
Yellow perch	0.0365 (0.0189)	0 (0)	100 (113)	328 (252)	231 (187)	32 (48)	691 (337)
Black crappie	0.0010 (0.0019)	0 (0)	0 (0)	18 (36)	0 (0)	0 (0)	18 (36)
Bluegill	0.1115 (0.0535)	15 (30)	181 (209)	751 (553)	991 (706)	174 (198)	2,112 (942)
Largemouth bass	0.0005 (0.0008)	0 (0)	10 (16)	0 (0)	0 (0)	0 (0)	10 (16)
Pumpkinseed	0.0164 (0.0140)	0 (0)	0 (0)	214 (217)	81 (138)	15 (29)	310 (259)
Rock bass	0.0301 (0.0175)	0 (0)	0 (0)	288 (232)	174 (141)	109 (160)	571 (315)

TOTAL	0.2161 (0.0694)	67 (61)	424 (273)	1,671 (690)	1,556 (760)	377 (267)	4,095 (1,097)
Released							
Smallmouth bass	0.0242 (0.0158)	37 (38)	37 (46)	178 (206)	104 (113)	102 (157)	458 (289)
Largemouth bass	0.0017 (0.0019)	19 (28)	0 (0)	0 (0)	13 (23)	0 (0)	32 (36)
Walleye	0.2147 (0.0797)	415 (283)	837 (662)	1,590 (864)	1,109 (685)	117 (164)	4,068 (1,327)
Northern pike	0.0469 (0.0242)	254 (178)	214 (276)	141 (128)	279 (248)	0 (0)	888 (431)
Muskelunge	0.0013 (0.0025)	0 (0)	0 (0)	24 (48)	0 (0)	0 (0)	24 (48)
Yellow perch	0.0567 (0.0493)	0 (0)	0 (0)	86 (147)	739 (871)	250 (236)	1,075 (914)
TOTAL	0.3455 (0.1082)	725 (337)	1,088 (718)	2,019 (910)	2,244 (1,141)	469 (327)	6,545 (1,693)
Total catch	0.5616 (0.1455)	792 (342)	1,512 (768)	3,690 (1,142)	3,800 (1,371)	846 (422)	10,640 (2,017)
Angler hours		2,207 (751)	3,313 (1,498)	6,900 (2,270)	4,100 (1,340)	2,426 (1,205)	18,946 (3,348)
Angler trips		883 (434)	890 (482)	3,673 (1,835)	1,672 (890)	791 (501)	7,909 (2,198)

## Survey 3 Higgins Lake, Summer, 2001

<b>Waterbody</b>	Higgins Lake
<b>Year</b>	Summer 2001
<b>Sites</b>	272-275
<b>Survey period</b>	April 28 through September 30, 2001
<b>Survey design</b>	Aerial-roving (aerial counts, roving interviews)
<b>Interview type/mode</b>	roving/boat
<b>Count type/mode</b>	aerial/boat
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

*Higgins Lake, summer 2001.* Survey followed an aerial-roving design. All funding was provided through Fisheries Division. One clerk working from a boat collected angler interview data. Counts of fishing boats were made on Higgins and Houghton lakes. Counts progressed from Higgins to Houghton or from Houghton to Higgins. This sequence was randomized. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, each sample day for interviewing (Table 1). Interview starting location (area within Higgins Lake) and direction of travel (clockwise or counter-clockwise) was randomized daily. Time of count was randomized to cover daylight times within the sample period. Survey period is from April 28 through September 30, 2001.

Figure 1.—Higgins Lake count and interview grids used during summer 2001 angler survey. Included are GPS coordinates indicating grid boundaries.

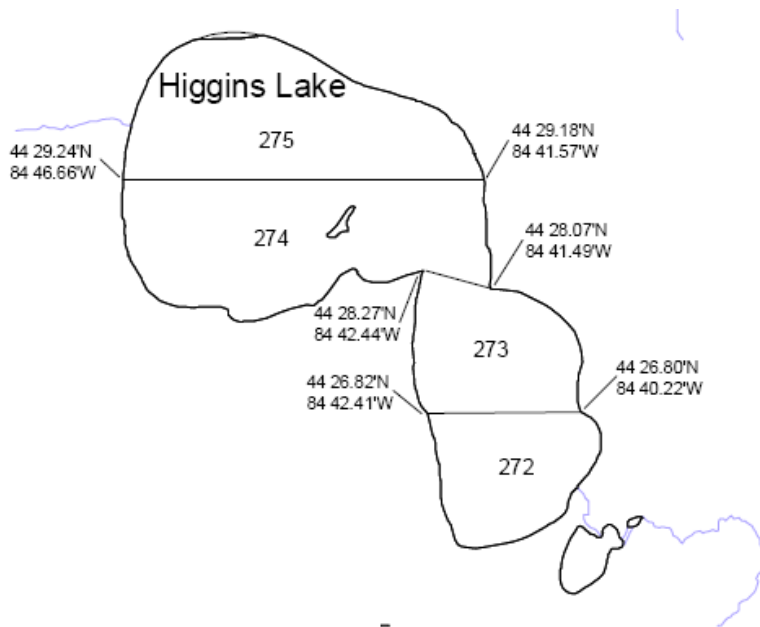


Table 1. Work shifts and F values used to estimate catch and effort at Burt (Cheboygan County), Crooked, Pickerel (Emmet County), Higgins, and Houghton lakes (Roscommon County), and Michigamme Reservoir, April 28 to September 30, Summer, 2001.

Month	Shift	
	Early	Late
April	0600 h – 1430 h	1330 h – 2200 h
May	0600 h – 1430 h	1330 h – 2200 h
June	0600 h – 1430 h	1330 h – 2200 h
July	0600 h – 1430 h	1300 h – 2130 h
August	0630 h – 1500 h	1230 h – 2100 h
September	0630 h – 1500 h	1200 h – 2030 h

Year	Month	F
2001	4	16
	5	16
	6	18
	7	18
	8	17
	9	16

Table 2.–Higgins Lake 2001 summer boat angler survey catch and effort estimates.

Species	C/H	April-May	June	July	August	September	Season
HARVEST							
Rainbow trout	0.0010 (0.0007)	21 (24)	17 (34)	8 (16)	17 (34)	24 (29)	87 (63)
Brown trout	0.0006 (0.0006)	5 (10)	0 (0)	16 (32)	17 (34)	16 (32)	54 (58)
Lake trout	0.0138 (0.0047)	170 (146)	350 (253)	386 (212)	170 (147)	173 (111)	1,250 (405)
Splake	0.0001 (0.0001)	0 (0)	5 (7)	0 (0)	0 (0)	0 (0)	5 (7)
Lake herring	0.0009 (0.0012)	0 (0)	77 (110)	0 (0)	0 (0)	0 (0)	77 (110)
Smallmouth bass	0.0792 (0.0297)	0 (0)	289 (232)	68 (96)	6,277 (2,465)	563 (780)	7,196 (2,598)
Lake whitefish	0.0004 (0.0006)	0 (0)	0 (0)	0 (0)	24 (47)	9 (19)	33 (51)
Yellow perch	0.9406 (0.1752)	4,914 (4,208)	10,700 (3,623)	29,179 (8,912)	25,965 (6,577)	14,656 (5,218)	85,415 (13,444)
Pumpkinseed	0.0005 (0.0007)	0 (0)	0 (0)	0 (0)	25 (50)	16 (33)	42 (60)
Rock bass	0.1608 (0.0806)	230 (287)	3,871 (1,763)	9,135 (6,875)	510 (340)	856 (971)	14,602 (7,177)
White sucker	0.0009 (0.0012)	0 (0)	49 (97)	0 (0)	0 (0)	37 (55)	86 (112)
Smelt	0.0001	0	0	0	9	0	9



	(0.0002)	(0)	(0)	(0)	(19)	(0)	(19)
TOTAL HARVEST	1.1987 (0.2079)	5,340 (4,221)	15,358 (4,046)	38,792 (11,258)	33,013 (7,034)	16,351 (5,366)	108,855 (15,466)
RELEASED							
Lake trout	0.0095 (0.0051)	211 (193)	243 (256)	109 (126)	267 (294)	35 (52)	865 (455)
Smallmouth bass	0.0026 (0.0018)	13 (25)	160 (123)	47 (95)	0 (0)	13 (26)	233 (160)
Largemouth bass	0.0001 (0.0002)	0 (0)	9 (18)	0 (0)	0 (0)	0 (0)	9 (18)
White sucker	0.0002 (0.0004)	0 (0)	0 (0)	0 (0)	0 (0)	19 (38)	19 (38)
Rock bass	0.0005 (0.0006)	0 (0)	0 (0)	0 (0)	25 (35)	23 (46)	48 (58)
TOTAL RELEASED	0.0129 (0.0055)	224 (195)	412 (284)	156 (158)	292 (296)	90 (83)	1,174 (488)
TOTAL CATCH	1.2116 (0.2087)	5,564 (4,225)	15,770 (4,056)	38,949 (11,259)	33,306 (7,040)	16,441 (5,367)	110,029 (15,474)
ANGLER HOURS		11,557 (3,160)	17,005 (3,787)	26,069 (5,406)	22,273 (3,896)	13,908 (3,600)	90,812 (9,038)
ANGLER TRIPS		3,984 (1,184)	4,476 (1,196)	7,917 (2,095)	6,259 (1,401)	3,713 (1,049)	26,349 (3,207)

## Survey 4 Houghton Lake, Summer, 2001

<b>Waterbody</b>	Houghton Lake
<b>Year</b>	Summer 2001
<b>Sites</b>	284-288
<b>Survey period</b>	28 through September 30, 2001
<b>Survey design</b>	Aerial-roving (aerial counts, roving interviews)
<b>Interview type/mode</b>	roving/boat
<b>Count type/mode</b>	aerial/boat
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

*Houghton Lake, summer 2001*—Survey followed an aerial-roving design. All funding was provided through Fisheries Division. One clerk working from a boat collected angler interview data. Counts of fishing boats were made on Higgins and Houghton lakes. Counts progressed from Higgins to Houghton or from Houghton to Higgins. This sequence was randomized. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and 1 instantaneous count of fishing boats was made per day. One of two shifts was selected each sample day for interviewing (Table 1). Interview starting location (area within Houghton Lake) and direction of travel (clockwise or counter-clockwise) was randomized daily. Time of count was randomized to cover daylight times within the sample period. Survey period is from April 28 through September 30, 2001.

Figure 1.—Houghton Lake count and interview grids used during summer 2001 angler survey. Included are GPS coordinates indicating grid boundaries.

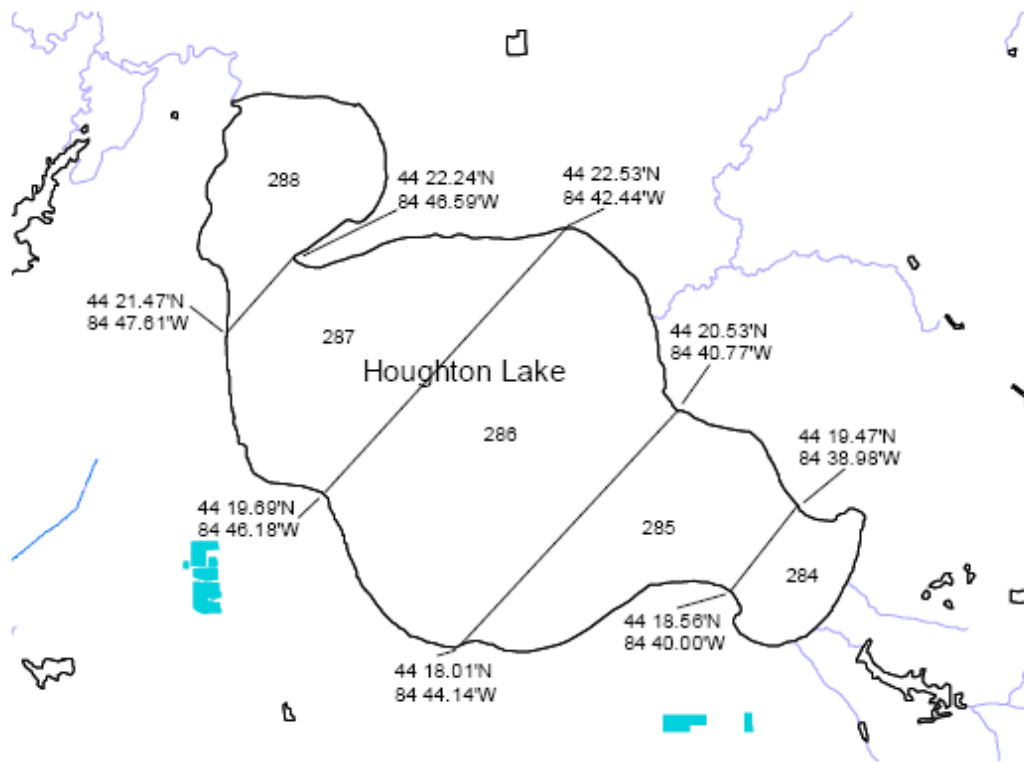


Table 1. Work shifts and F values used to estimate catch and effort at Burt (Cheboygan County), Crooked, Pickerel (Emmet County), Higgins, and Houghton lakes (Roscommon County), and Michigamme Reservoir, April 28 to September 30, Summer, 2001.

Month	Shift	
	Early	Late
April	0600 h – 1430 h	1330 h – 2200 h
May	0600 h – 1430 h	1330 h – 2200 h
June	0600 h – 1430 h	1330 h – 2200 h
July	0600 h – 1430 h	1300 h – 2130 h
August	0630 h – 1500 h	1230 h – 2100 h
September	0630 h – 1500 h	1200 h – 2030 h

	Year	Month	F
1	2001	4	16
2	2001	5	16

3	2001	6	18
4	2001	7	18
5	2001	9	16
6	2001	8	17

Table 2. Houghton Lake creel catch estimates for summer 2001 creel census.

Species	C/H	Apr-May	June	July	August	September	Season
<b>Harvested</b>							
Smallmouth bass	0.0068 (0.0037)	396 (473)	261 (283)	596 (533)	425 (491)	210 (423)	1,888 (1,004)
Walleye	0.0485 (0.0164)	2,498 (975)	1,249 (570)	4,304 (2,902)	2,301 (1,696)	3,134 (2,556)	13,486 (4,371)
Yellow perch	0.1055 (0.0522)	1,291 (743)	4,147 (2,355)	10,476 (8,950)	11,665 (10,703)	1,759 (1,545)	29,338 (14,253)
Northern pike	0.0059 (0.0063)	191 (139)	208 (226)	807 (1,625)	365 (535)	75 (296)	1,646 (1,756)
Black crappie	0.0625 (0.0508)	2,948 (1,345)	1,562 (794)	2,473 (2,231)	7,344 (12,355)	3,049 (6,098)	17,376 (14,044)
Bluegill	0.4870 (0.1170)	3,935 (1,453)	12,645 (4,669)	67,249 (23,042)	46,311 (16,924)	5,343 (7,189)	135,483 (29,882)
Largemouth bass	0.0012 (0.0011)	0 (0)	211 (250)	56 (22)	0 (0)	73 (151)	340 (293)
Pumpkinseed	0.3709 (0.1204)	969 (565)	7,095 (2,864)	51,539 (22,310)	25,417 (13,304)	18,156 (18,507)	103,176 (32,028)
Rock bass	0.0796 (0.0397)	542 (317)	751 (759)	16,380 (10,431)	4,273 (2,829)	201 (269)	22,147 (10,842)
White sucker	0.0010 (0.0019)	0 (0)	0 (0)	0 (0)	268 (534)	0 (0)	268 (534)
<b>Total harvest</b>	<b>1.1687 (0.2103)</b>	<b>12,770 (2,466)</b>	<b>28,129 (6,103)</b>	<b>153,880 (35,126)</b>	<b>98,369 (27,245)</b>	<b>32,000 (20,990)</b>	<b>325,148 (49,599)</b>
<b>Released</b>							
Smallmouth bass	0.0041 (0.0034)	30 (14)	284 (248)	289 (415)	0 (0)	543 (810)	1,146 (943)
Largemouth bass	0.0033 (0.0026)	32 (17)	226 (272)	390 (582)	84 (103)	193 (278)	925 (707)
Walleye	0.0057 (0.0047)	0 (0)	0 (0)	0 (0)	1,585 (1,285)	0 (0)	1,585 (1,285)
Northern pike	0.0017 (0.0016)	37 (13)	0 (0)	0 (0)	433 (442)	0 (0)	470 (443)
<b>Total released</b>	<b>0.0148 (0.0066)</b>	<b>99 (25)</b>	<b>510 (367)</b>	<b>679 (713)</b>	<b>2,102 (1,362)</b>	<b>736 (856)</b>	<b>4,126 (1,798)</b>
<b>Total catch</b>	<b>1.1835 (0.2112)</b>	<b>12,869 (2,466)</b>	<b>28,639 (6,115)</b>	<b>154,559 (35,134)</b>	<b>100,471 (27,278)</b>	<b>32,736 (21,008)</b>	<b>329,274 (49,631)</b>
Angler hours		36,135	50,201	115,886	53,155	22,837	278,214

	(8,279)	(9,742)	(19,022)	(10,760)	(8,041)	(26,566)
Angler trips	10,633	14,990	54,614	19,417	7,315	106,969
	(3,197)	(3,367)	(12,606)	(7,230)	(3,236)	(15,595)

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## Survey 5 Michigamme Reservoir, Iron County, Summer, 2001

<b>Waterbody</b>	Michigamme
<b>Year</b>	Summer, 2001
<b>County</b>	Iron
<b>Sites</b>	130,131,132,133,134
<b>Survey period</b>	May 18 to October 9
<b>Survey design</b>	Aerial-roving (aerial counts, roving interviews)
<b>Interview type/mode</b>	roving/boat
<b>Count type/mode</b>	aerial/boat
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Michigamme Reservoir, summer 2001—Survey followed an aerial-roving design. Partial funding for this project was provided by Wisconsin Electric. This funding covered data collection (creel clerk), transportation, and air flights. Fisheries Division provided survey design, scheduling, data processing and clerk guidelines. One clerk working from a boat collected angler interview data. Counts were made by air flights. Count starting location was randomized and count took approximately 12 min to complete. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and one instantaneous count of fishing boats was made per day. One of two shifts was selected each sample day for interviewing. Interview starting location (grid within reservoir) and direction of travel (grid order) was randomized daily. Time of count was randomized to cover daylight times within the sample period. Survey period was from April 28 through October 9, 2001. Estimates are given in Tables 3-8.



Table 1. Work shifts and F values used to estimate catch and effort at Burt (Cheboygan County), Crooked, Pickerel (Emmet County), Higgins, and Houghton lakes (Roscommon County), and Michigamme Reservoir, May 18 to October 9, Summer, 2001.

Month	Shift	
	Early	Late
April	0600 h – 1430 h	1330 h – 2200 h
May	0600 h – 1430 h	1330 h – 2200 h
June	0600 h – 1430 h	1330 h – 2200 h
July	0600 h – 1430 h	1300 h – 2130 h
August	0630 h – 1500 h	1230 h – 2100 h
September	0630 h – 1500 h	1200 h – 2030 h

Table 2. Expansion values (F) used to estimate effort.

Year	Month	F
2001	5	16
	6	18
	7	18
	8	17
	9	16
	10	16



Table 3. Total estimated boat angling harvest, catch per hour, and fishing pressure for Michigamme Reservoir. Two standard errors are given in parentheses.

Species	C/H	May-June	July	August	September-October	Season
<b>HARVEST</b>						
Smallmouth bass	0.0113 (0.0051)	218 (247)	153 (141)	322 (202)	155 (127)	847 (372)
Walleye	0.0594 (0.0135)	1,886 (569)	1,256 (581)	640 (264)	685 (241)	4,467 (888)
Yellow Perch	0.0942 (0.0246)	1,303 (531)	1,528 (647)	1,118 (429)	3,136 (1,392)	7,086 (1,680)
Northern pike	0.0062 (0.0035)	96 (86)	126 (124)	161 (200)	82 (74)	465 (261)
Black crappie	0.0277 (0.0099)	68 (76)	428 (276)	1,026 (570)	559 (304)	2,081 (707)
Bluegill	0.0444 (0.0169)	165 (118)	629 (758)	1,623 (781)	922 (536)	3,338 (1,219)
Largemouth bass	0.0001 (0.0002)	0 (0)	0 (0)	0 (0)	8 (16)	8 (16)
Rock bass	0.0163 (0.0098)	184 (243)	454 (539)	425 (383)	159 (186)	1,223 (728)
Common white sucker	0.0004 (0.0005)	0 (0)	8 (16)	19 (37)	0 (0)	27 (41)
Other	0.0006 (0.0011)	43 (85)	0 (0)	0 (0)	0 (0)	43 (85)
<b>TOTAL HARVEST</b>	<b>0.2603 (0.0438)</b>	<b>3,962 (872)</b>	<b>4,582 (1,316)</b>	<b>5,334 (1,190)</b>	<b>5,706 (1,560)</b>	<b>19,584 (2,518)</b>
<b>RELEASED</b>						
Smallmouth bass	0.0475 (0.0120)	1,106 (494)	789 (410)	1,157 (433)	525 (259)	3,577 (817)
Largemouth bass	0.0001 (0.0003)	10 (20)	0 (0)	0 (0)	0 (0)	10 (20)
Walleye	0.2713 (0.0526)	6,613 (2,154)	4,816 (1,528)	4,970 (1,413)	4,016 (1,324)	20,415 (3,275)
Northern pike	0.1606 (0.0337)	3,581 (1,305)	2,249 (868)	3,594 (1,053)	2,664 (1,071)	12,087 (2,171)
Muskellunge	0.0000 (0.0001)	0 (0)	0 (0)	2 (5)	0 (0)	2 (5)
<b>TOTAL RELEASED</b>	<b>0.4797 (0.0746)</b>	<b>11,310 (2,567)</b>	<b>7,854 (1,805)</b>	<b>9,722 (1,815)</b>	<b>7,205 (1,722)</b>	<b>36,091 (4,013)</b>
<b>TOTAL CATCH</b>	<b>0.7400 (0.1021)</b>	<b>15,273 (2,711)</b>	<b>12,436 (2,233)</b>	<b>15,056 (2,170)</b>	<b>12,910 (2,323)</b>	<b>55,675 (4,737)</b>
<b>ANGLER HOURS</b>		<b>24,176 (5,460)</b>	<b>18,820 (4,278)</b>	<b>17,417 (3,009)</b>	<b>14,827 (3,102)</b>	<b>75,240 (8,173)</b>
<b>ANGLER TRIPS</b>		<b>NAN (NAN)</b>	<b>NAN (NAN)</b>	<b>NAN (NAN)</b>	<b>NAN (NAN)</b>	<b>NAN (NAN)</b>

## Survey 6 Burt Lake, Cheboygan County, Winter, 2002

<b>Waterbody</b>	Burt Lake
<b>Year</b>	Winter, 2002
<b>County</b>	Cheboygan
<b>Sites</b>	201, 202
<b>Survey period</b>	January 1 through March 31
<b>Survey design</b>	roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	roving/open ice, shanty
<b>Count type/mode</b>	progressive/open ice and shanty
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

*Burt Lake, winter 2002.* Survey followed a progressive-roving design. All funding was provided through Fisheries Division. One clerk working from a snowmobile collected angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. The clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day (Table 1). Either section 201 or section 202 was sampled each day (Figure 1). Starting location within a section and direction of travel were randomized for both counting and interviewing. Instantaneous counts of open-ice anglers and occupied shanties were made once per day. Survey period was January 4 through March 31, 2002. Months were estimated separately.

Figure 1.—Burt Lake count and interview grids used during winter 2002 angler survey. Boundary separating grids 201 and 202 extends from 45°28.51'N, 84°40.83'W to 45°28.20'N, 84°38.17'W.

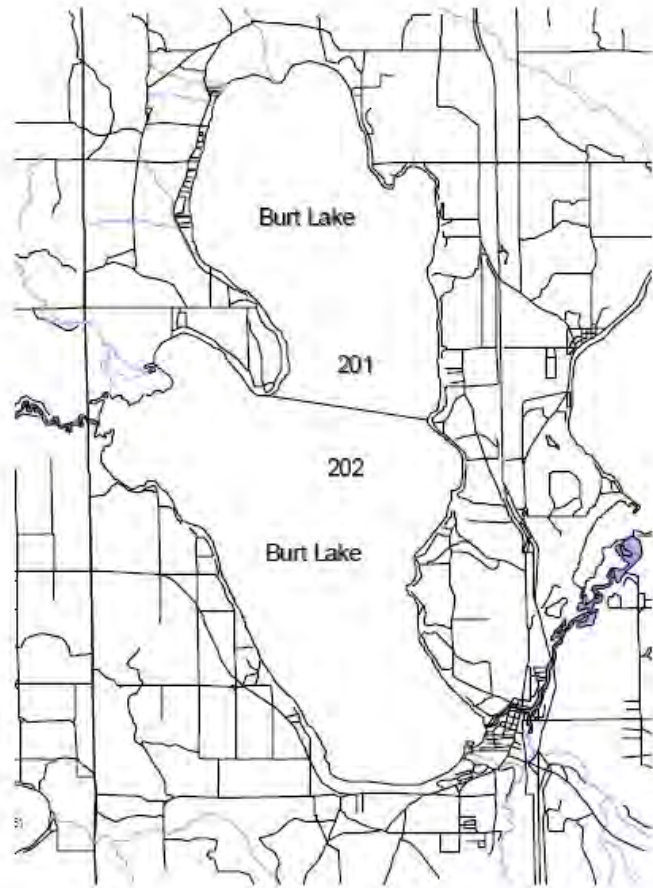


Table 1.—Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Burt (Cheboygan County), Crooked and Pickerel lakes (Emmet County), winter 2002.

Month	Shift		Expansion values
	Early	Late	
January 4-31	0700 h – 1530 h	1100 h – 1930 h	14
February	0700 h – 1530 h	1100 h – 1930 h	14
March	0700 h – 1530 h	1100 h – 1930 h	14

Table 2. Angler survey estimates for winter 2002 from Burt Lake. Survey period was from January 1 through March 31, 2002. Two standard errors are given in parentheses.

Species	Catch/hour	January	February	March	Season
<u>Number Harvested</u>					
Brown trout	0.0039 (0.0032)	122 (140)	59 (48)	7 (5)	188 (148)
Walleyes	0.0496 (0.0239)	1,645 (956)	723 (414)	42 (51)	2,410 (1,043)
Yellow perch	0.7570 (0.2524)	5,637 (2,587)	13,409 (5,403)	17,772 (7,326)	36,818 (9,463)
Northern pike	0.0010 (0.0014)	30 (64)	0 (0)	20 (13)	50 (65)
Total harvest	0.8115 (0.2619)	7,434 (2,982)	14,191 (5,426)	17,841 (7,327)	39,466 (9,593)
<u>Number caught and released</u>					
Largemouth bass	0.0120 (0.0117)	585 (557)	0 (0)	0 (0)	585 (557)
Walleyes	0.0155 (0.0087)	416 (303)	279 (236)	61 (75)	756 (391)
Northern pike	0.0008 (0.0008)	29 (50)	11 (11)	0 (0)	40 (51)
Yellow perch	0.9721 (0.9721)	4,751 (2,437)	14,303 (5,929)	28,223 (11,419)	47,277 (13,095)
Total catch and release	1.0005 (0.3450)	5,781 (2,910)	14,593 (5,996)	28,284 (11,419)	48,658 (13,222)
Total (harvest + release)	1.8119 (0.5107)	13,215 (4,174)	28,784 (8,087)	46,125 (13,568)	88,124 (16,337)
<u>Fishing effort</u>					
Angler hours		22,525 (7,929)	17,628 (5,621)	8,482 (3,488)	48,635 (10,326)
Angler trips		6,143 (2,305)	4,164 (1,437)	1,558 (799)	11,865 (2,831)

## Survey 7 Crooked Lake, Emmet County, Winter, 2002

<b>Waterbody</b>	Crooked Lake
<b>Year</b>	Winter, 2002
<b>County</b>	Emmet
<b>Sites</b>	260
<b>Survey period</b>	January 1 through March 31
<b>Survey design</b>	roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	roving/open ice, shanty
<b>Count type/mode</b>	progressive/open ice and shanty
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

Figure 1.—Crooked and Pickerel lakes. Site codes and boundaries used during winter surveys. Crooked Lake survey area included lake area only, while Pickerel Lake included lake and channel area to shoreline edge of Crooked Lake.

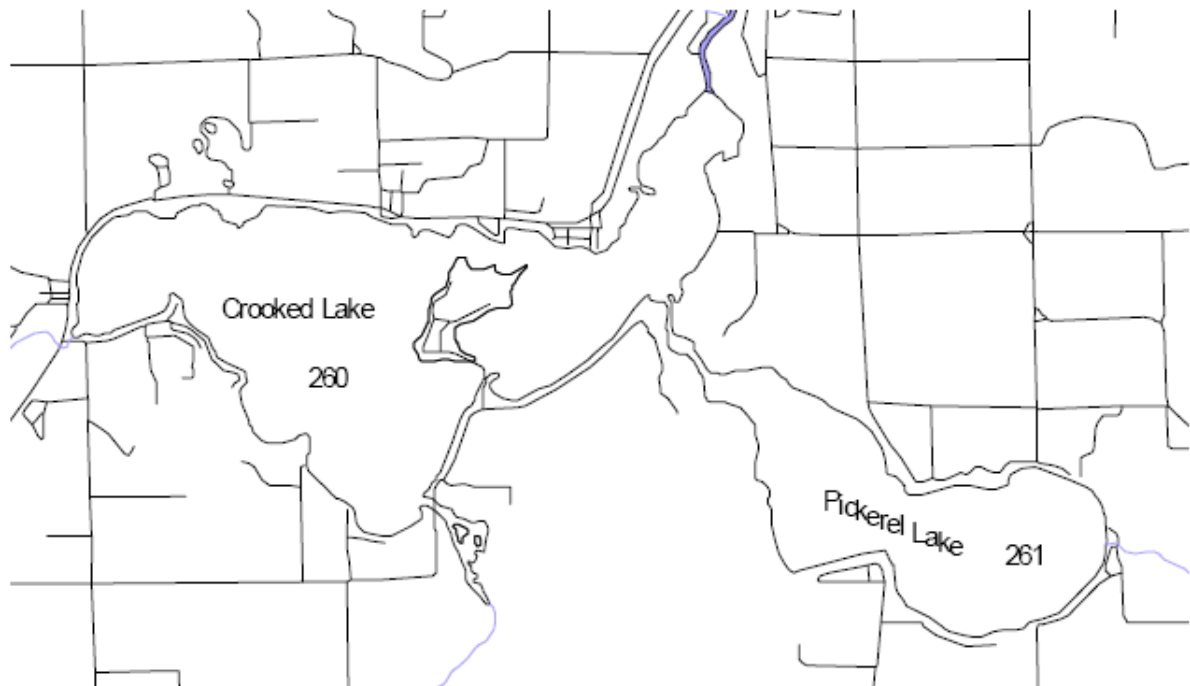


Table 1.–Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Burt (Cheboygan County), Crooked and Pickerel lakes (Emmet County), winter 2002.

Month	Shift		Expansion values
	Early	Late	
January 4-31	0700 h – 1530 h	1100 h – 1930 h	14
February	0700 h – 1530 h	1100 h – 1930 h	14
March	0700 h – 1530 h	1100 h – 1930 h	14

Table 2. Total estimated harvest, catch-and-released fish, catch per hour and fishing pressure, Crooked Lake, Emmet County. Period is from January 1 through March 31, 2002. Two standard errors are given in parentheses. Estimates are for open ice and shanty anglers.

Species	C/H	January	February	March	Season
Harvested					
Brown trout	0.0009 (0.0014)	0 (0)	0 (0)	7 (11)	7 (11)
Walleye	0.0121 (0.0105)	21 (42)	66 (60)	10 (15)	97 (75)
Yellow perch	0.2443 (0.1417)	765 (616)	813 (453)	383 (356)	1,961 (843)
C. white sucker	0.0083 (0.0170)	0 (0)	0 (0)	67 (134)	67 (134)
TOTAL	0.2656 (0.1486)	786 (617)	879 (456)	467 (380)	2,132 (856)
Released					
Walleye	0.0050 (0.0045)	10 (20)	26 (25)	4 (6)	40 (33)
Northern pike	0.0112 (0.0117)	37 (74)	43 (44)	10 (15)	90 (87)
Yellow perch	0.0681 (0.0598)	297 (391)	103 (91)	147 (156)	547 (430)
TOTAL	0.0843 (0.0638)	344 (398)	172 (103)	161 (156)	677 (439)
Total catch	0.3499 (0.1815)	1,130 (734)	1,051 (468)	628 (411)	2,809 (963)
Angler hours		4,594 (2,803)	2,806 (1,274)	627 (532)	8,027 (3,125)
Angler trips		1,749 (1,282)	849 (515)	199 (197)	2,797 (1,396)

## Survey 8 Pickerel Lake, Emmet County, Winter, 2002

<b>Waterbody</b>	Pickerel Lake
<b>Year</b>	Winter, 2002
<b>County</b>	Emmet
<b>Sites</b>	261
<b>Survey period</b>	January 1 through March 31
<b>Survey design</b>	roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	roving/open ice, shanty
<b>Count type/mode</b>	progressive/open ice and shanty
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

Figure 1.—Crooked and Pickerel lakes. Site codes and boundaries used during winter surveys. Crooked Lake survey area included lake area only, while Pickerel Lake included lake and channel area to shoreline edge of Crooked Lake.

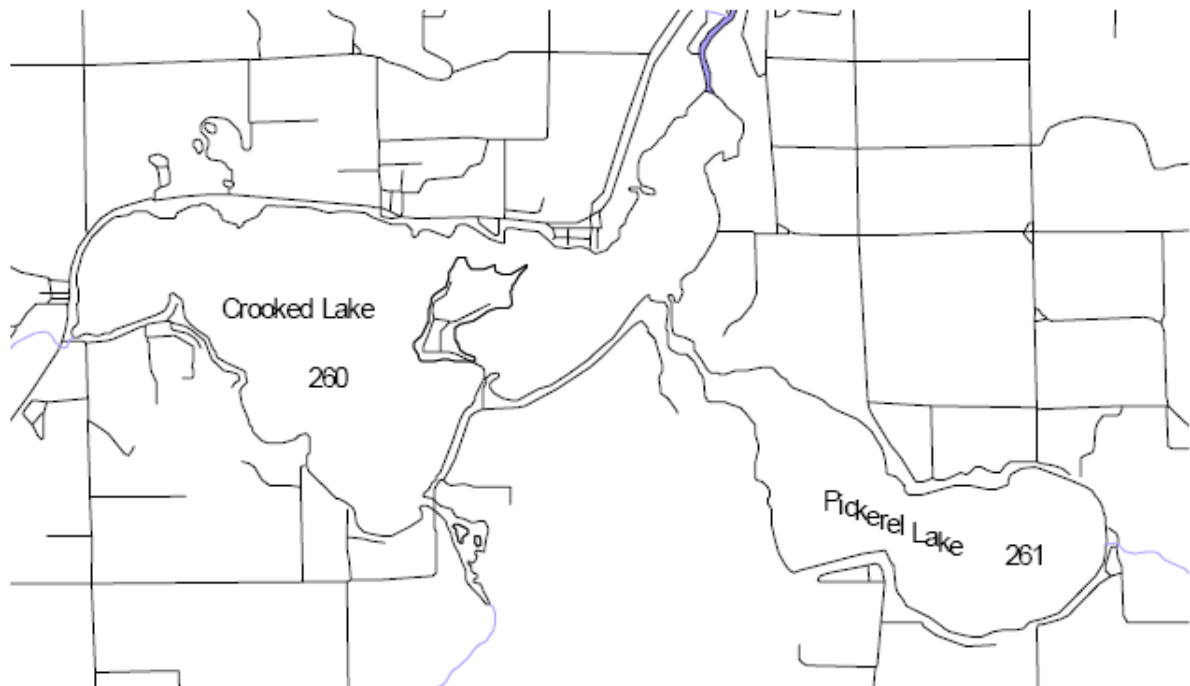


Table 1.–Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Burt (Cheboygan County), Crooked and Pickerel lakes (Emmet County), winter 2002.

Month	Shift		Expansion values
	Early	Late	
January 4-31	0700 h – 1530 h	1100 h – 1930 h	14
February	0700 h – 1530 h	1100 h – 1930 h	14
March	0700 h – 1530 h	1100 h – 1930 h	14

Table 2. Total estimated harvest, catch-and-released fish, catch per hour and fishing pressure, Pickerel Lake, Emmet County. Period is from January 1 through March 31, 2002. Two standard errors are given in parentheses. Estimates are for open ice and shanty anglers.

Species	C/H	January	February	March	Season
Harvested					
Brown trout	0.0012 (0.0025)	0 (0)	3 (6)	0 (0)	3 (6)
Walleye	0.0012 (0.0029)	3 (7)	0 (0)	0 (0)	3 (7)
Yellow perch	0.5205 (0.5770)	881 (1,275)	344 (233)	60 (105)	1,285 (1,300)
Northern pike	0.0041 (0.0057)	6 (10)	0 (0)	4 (9)	10 (13)
TOTAL	0.5269 (0.5782)	890 (1,275)	347 (233)	64 (105)	1,301 (1,300)
Released					
Brown trout	0.0024 (0.0046)	0 (0)	0 (0)	6 (11)	6 (11)
Walleye	0.0219 (0.0297)	0 (0)	54 (69)	0 (0)	54 (69)
Northern pike	0.0215 (0.0281)	7 (10)	16 (20)	30 (61)	53 (65)
Yellow perch	0.4034 (0.3339)	204 (257)	477 (502)	315 (398)	996 (690)
TOTAL	0.4492 (0.3476)	211 (257)	547 (506)	351 (402)	1,109 (696)
Total catch	0.9761 (0.7430)	1,101 (1,300)	894 (558)	415 (415)	2,410 (1,475)
Angler hours		1,019 (888)	971 (499)	479 (461)	2,469 (1,118)
Angler trips		267 (253)	307 (186)	148 (146)	722 (347)



## Survey 9 Higgins Lake, Roscommon County, Winter, 2002

<b>Waterbody</b>	Higgins Lake
<b>Year</b>	Winter, 2002
<b>County</b>	Roscommon
<b>Sites</b>	270, 271
<b>Survey period</b>	January 4 through March 31, 2002
<b>Survey design</b>	roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	roving/open ice, shanty
<b>Count type/mode</b>	progressive/open ice and shanty
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

*Higgins Lake, winter 2002.* Survey followed a progressive-roving design. All funding was provided through Fisheries Division. One clerk working from a snowmobile collected angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of three shifts was selected each sample day (Table 1). Either section 270 or section 271 was sampled each day (Figure 1). Starting location within a section and direction of travel were randomized for both counting and interviewing. Instantaneous counts of open-ice anglers and occupied shanties were made once per day. Survey period was January 4 through March 31, 2002.

Figure 1.—Higgins Lake count and interview grids used during winter 2002 angler survey. Boundary separating grids 270 and 271 extends from 44°28.27'N, 84°42.44'W to 44°28.07'N, 84°41.49'W.



Table 1. Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Higgins Lake (Roscommon County), winter 2002.

Month	Shift			Expansion values
	Early	Middle	Late	
January 4–31	0700 h – 1530 h	0900 h – 1730 h	1530 h – 2330 h	18
February	0700 h – 1530 h	0900 h – 1730 h	1530 h – 2330 h	18
March	0700 h – 1530 h	0900 h – 1730 h	1530 h – 2330 h	18

Table 2. Higgins Lake winter 2002 combined open ice and shanty angler survey catch and effort estimates.

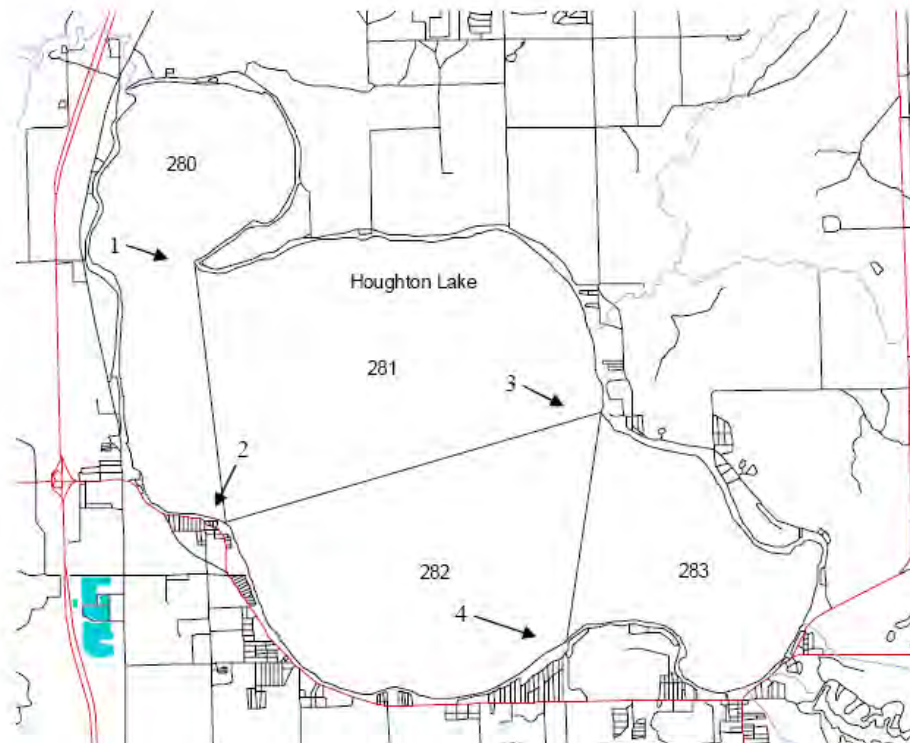
Species	C/H	Jan-Feb	March	Season
<b>HARVEST</b>				
Rainbow trout	0.0133 (0.0091)	770 (615)	1,355 (1,216)	2,125 (1,363)
Brown trout	0.0025 (0.0019)	272 (231)	129 (185)	401 (296)
Lake trout	0.0160 (0.0099)	433 (331)	2,123 (1,431)	2,556 (1,469)
Lake whitefish	0.0072 (0.0059)	53 (87)	1,094 (896)	1,147 (900)
Yellow perch	1.6109 (0.5914)	106,816 (44,380)	151,174 (57,703)	257,990 (72,796)
Northern pike	0.0011 (0.0012)	181 (187)	0 (0)	181 (187)
Rock bass	0.0011 (0.0022)	175 (349)	0 (0)	175 (349)
White sucker	0.0021 (0.0022)	98 (150)	245 (299)	343 (335)
Smelt	1.9886 (0.7533)	67,474 (56,633)	251,007 (75,863)	318,481 (94,671)
<b>TOTAL HARVEST</b>	<b>3.6428 (1.1349)</b>	<b>176,273 (71,955)</b>	<b>407,126 (95,338)</b>	<b>583,399 (119,444)</b>
<b>RELEASED</b>				
Brown trout	0.0001 (0.0002)	17 (33)	0 (0)	17 (33)
Lake trout	0.0013 (0.0016)	0 (0)	201 (251)	201 (251)
Lake whitefish	0.0015 (0.0022)	0 (0)	240 (351)	240 (351)
White sucker	0.0001 (0.0002)	18 (37)	0 (0)	18 (37)
Yellow perch	0.6545 (0.2856)	39,743 (23,620)	65,073 (30,472)	104,816 (38,555)
<b>TOTAL RELEASED</b>	<b>0.6575 (0.286)</b>	<b>39,778 (23,620)</b>	<b>65,514 (30,475)</b>	<b>105,292 (38,557)</b>
<b>TOTAL CATCH</b>	<b>4.3003 (1.2783)</b>	<b>216,051 (75,733)</b>	<b>472,640 (100,090)</b>	<b>688,690 (125,513)</b>
<b>ANGLER HOURS</b>		<b>65,149 (25,885)</b>	<b>95,002 (27,283)</b>	<b>160,150 (37,609)</b>
<b>ANGLER TRIPS</b>		<b>14,981 (6,044)</b>	<b>18,918 (5,942)</b>	<b>33,899 (8,476)</b>

## Survey 10 Houghton Lake, Roscommon County, Winter, 2002

<b>Waterbody</b>	Houghton Lake
<b>Year</b>	Winter, 2002
<b>County</b>	Roscommon County
<b>Sites</b>	280-283
<b>Survey period</b>	January 4 through March 31, 2002
<b>Survey design</b>	roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	roving/open ice, shanty
<b>Count type/mode</b>	progressive/open ice and shanty
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

*Houghton Lake, winter 2002.* Survey followed a progressive-roving design. All funding was provided through Fisheries Division. One clerk working from a snowmobile collected angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day (Table 1). One of the lake's 4 sections was sampled each day (Figure 1). Starting location within a section and direction of travel were randomized for both counting and interviewing. Instantaneous counts of open-ice anglers and occupied shanties were made once per day. Survey period was divided into two major sampling periods, January 4 through February 14 and February 15 through March 31, 2002. Each period was further stratified by day type (weekday or weekend day).

Figure 1.—Houghton Lake count and interview grids used during winter 2002 angler survey. Markers indicate grid boundary-line points.



Marker	Latitude	Longitude	Marker	Latitude	Longitude
1	44°22.24'N	84°46.59'W	3	44°20.74'N	84°40.99'W
2	44°19.69'N	84°46.18'W	4	44°18.53'N	84°41.50'W

Table 1. Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Houghton Lake (Roscommon County), winter 2002.

Month	Shift		Expansion values
	Early	Late	
January 4 – February 14	0700 h – 1530 h	1100 h – 1930 h	14
February 15 – March 31	0700 h – 1530 h	1100 h – 1930 h	14

Table 2. Total estimated harvest, catch per hour and fishing pressure, Houghton Lake, Roscommon County for winter 2002. Two standard errors are given in parentheses.

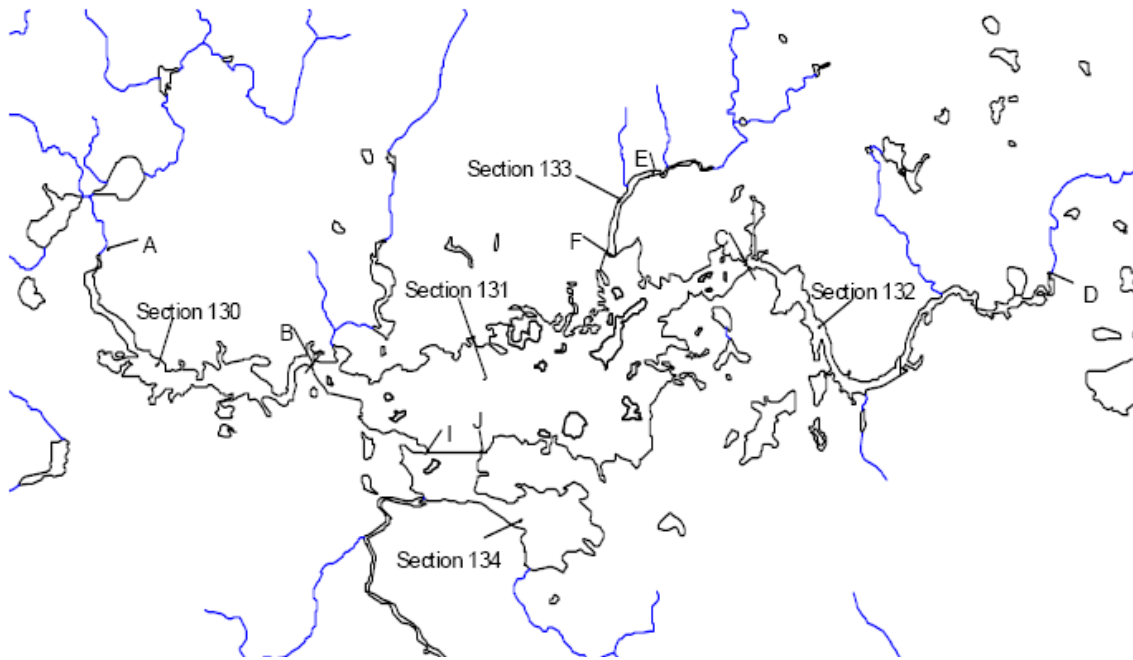
Species	C/H	Jan-Feb14	Feb15-Mar	Season
<b>Harvested</b>				
Walleye	0.0216 (0.0099)	3,364 (1,262)	1,415 (781)	4,779 (1,484)
Yellow perch	0.0904 (0.0429)	12,972 (5,732)	6,982 (3,474)	19,954 (6,702)
Northern pike	0.0346 (0.0171)	4,729 (1,884)	2,916 (2,028)	7,645 (2,768)
Black crappie	0.0395 (0.0306)	1,704 (925)	7,028 (6,012)	8,732 (6,082)
Bluegill	0.0759 (0.0470)	1,556 (1,382)	15,198 (8,622)	16,754 (8,732)
Pumpkinseed	0.0088 (0.0066)	195 (125)	1,758 (1,293)	1,953 (1,299)
Rock bass	0.0060 (0.0040)	612 (420)	710 (625)	1,322 (753)
<b>Total harvested</b>	<b>0.2769 (0.1100)</b>	<b>25,132 (6,398)</b>	<b>36,007 (11,372)</b>	<b>61,139 (13,048)</b>
<b>Released</b>				
Smallmouth bass	0.0001 (0.0002)	15 (41)	0 (0)	15 (41)
Northern pike	0.0101 (0.0089)	77 (46)	2,153 (1,825)	2,230 (1,826)
<b>Total released</b>	<b>0.0102 (0.0089)</b>	<b>92 (61)</b>	<b>2,153 (1,825)</b>	<b>2,245 (1,826)</b>
<b>Total catch</b>	<b>0.2870 (0.1132)</b>	<b>25,224 (6,398)</b>	<b>38,160 (11,517)</b>	<b>63,384 (13,175)</b>
<b>Angler hours</b>		<b>140,065 (53,854)</b>	<b>80,769 (50,763)</b>	<b>220,834 (74,008)</b>
<b>Angler trips</b>		<b>57,962 (22,285)</b>	<b>34,125 (19,820)</b>	<b>92,087 (29,824)</b>

## Survey 11 Michigamme Reservoir, Iron County, Winter, 2002

<b>Waterbody</b>	Michigamme Reservoir
<b>Year</b>	Winter, 2002
<b>County</b>	Iron
<b>Sites</b>	130-134
<b>Survey period</b>	January 4 to February 28
<b>Survey design</b>	Roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	roving/open ice, shanty
<b>Count type/mode</b>	progressive/open ice and shanty
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

*Michigamme Reservoir, winter 2002.* Survey followed a progressive-roving design. Partial funding for this project was provided by Wisconsin Electric. This funding covered data collection (creel clerk). Fisheries Division provided survey design, scheduling, data processing, equipment, fuel, and clerk guidelines. One clerk working from a snowmobile collected angler count and interview data. Count starting location and direction were randomized (Figure 1). Time of count was randomized to cover sample period. Instantaneous counts (one each) of occupied shanties and open ice anglers were made per day. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days. One of two shifts was selected each sample day for interviewing (Table 1). Interview starting location (grid within reservoir) and direction of travel (grid order) was randomized daily. Survey period is from January 4 through February 28, 2002.

Figure 1.–Michigamme Reservoir count and interview grids, and GPS latitude-longitude coordinates used by creel clerk to distinguish between grids.



Map location code and description	Latitude	Longitude
A – WPA bridge	46°12.23' N	88°19.11' W
B – boundary sections 130-131	46°10.93' N	88°15.90' W
C – boundary sections 131-132	46°12.10' N	88°09.42' W
D – upper end of section 132	46°12.08' N	88°04.83' W
E – upper end of section 133	46°12.78' N	88°11.31' W
F – boundary sections 131-133	46°12.15' N	88°11.47' W
I – west edge of section 131-134 boundary	46°10.04' N	88°14.14' W
J – east edge of section 131-134 boundary	46°10.04' N	88°13.33' W

Table 1. Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Michigamme Reservoir (Iron County), winter 2002.

Month	Shift		Expansion values
	Early	Late	
January 4-31	0700 h – 1530 h	1100 h – 1930 h	14
February	0700 h – 1530 h	1100 h – 1930 h	14



Table 2. Total estimated harvest, catch-and-released fish, catch per hour and fishing pressure, Michigamme Reservoir, Iron County. Period is from January 1 through March 31, 2002. Two standard errors are given in parentheses. Estimates are for open ice and shanty anglers.

Species	C/H	December-January <sup>1</sup>	February	Season
Harvested				
Walleye	0.0553 (0.0178)	439 (208)	574 (163)	1,013 (264)
Yellow perch	0.0173 (0.0072)	157 (102)	160 (57)	317 (117)
Northern pike	0.0083 (0.0032)	32 (10)	120 (51)	152 (52)
Black crappie	0.0263 (0.0114)	154 (98)	328 (161)	482 (188)
Bluegill	0.0041 (0.0010)	71 (12)	4 (1)	75 (12)
TOTAL	0.1114 (0.0284)	853 (252)	1,186 (240)	2,039 (348)
Released				
Smallmouth bass	0.0001 (0.0000)	1 (0)	0 (0)	1 (0)
Largemouth bass	0.0033 (0.0009)	21 (7)	40 (10)	61 (12)
Walleye	0.0449 (0.0146)	392 (166)	430 (140)	822 (217)
Northern pike	0.1297 (0.0401)	691 (260)	1,682 (519)	2,373 (580)
TOTAL	0.1779 (0.0477)	1,105 (308)	2,152 (537)	3,257 (619)
Total catch	0.2894 (0.0671)	1,958 (398)	3,338 (588)	5,296 (710)
Angler hours		6,397 (1,996)	11,906 (2,831)	18,303 (3,464)
Angler trips		2,066 (651)	3,008 (707)	5,074 (961)

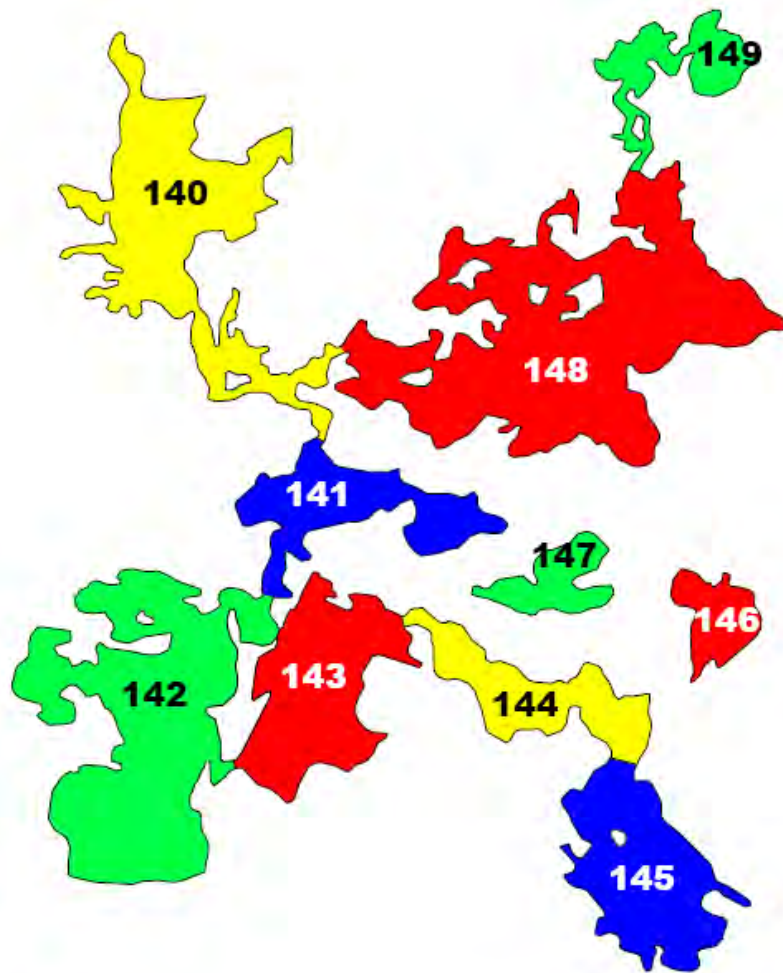
<sup>1</sup> All shanty counts during the December-January period were 0. However, 29 shanty anglers were interviewed and empirical data from these interviews are included in the December-January estimates. Inclusion of these data provide minimum December-January shanty estimates.

## **Survey 12 Cisco Thousand Island Chain, Gogebic County, summer, 2002**

<b>Waterbody</b>	Cisco–Thousand Island Chain
<b>Year</b>	Summer, 2002
<b>County</b>	Gogebic
<b>Sites</b>	See Figure 1
<b>Survey period</b>	May 4 through October 31
<b>Survey design</b>	aerial-roving (aerialcounts and interviews)
<b>Interview type/mode</b>	roving/boat
<b>Count type/mode</b>	aerial/boat
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

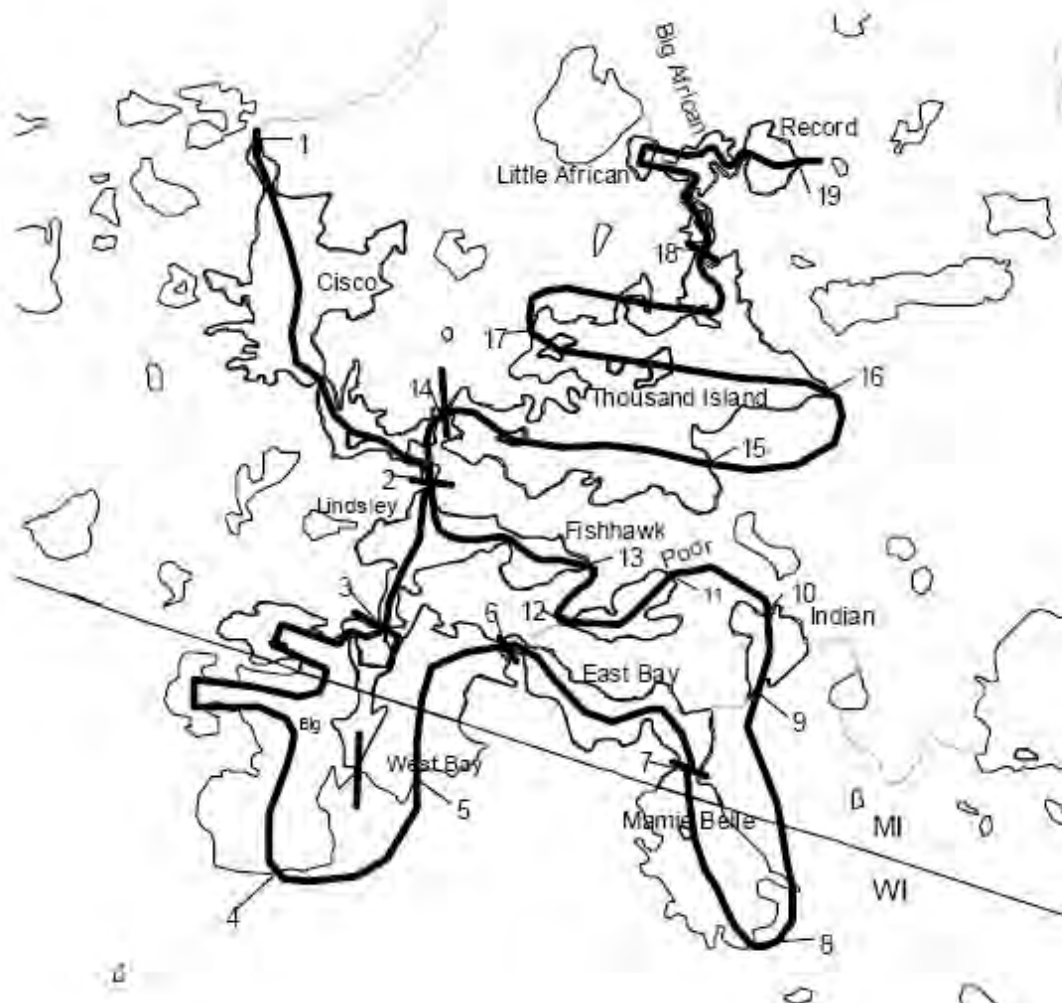
*Cisco–Thousand Island Chain of Lakes, summer 2002.* Survey followed an aerial-roving design. All funding was provided through Fisheries Division. Two clerks working from boats collected angler interview data. Chain of lakes was stratified into 10 lake-sampling units (Figure 1). Counts progressed along a flight path from Cisco Lake to Record Lake or from Record Lake to Cisco Lake (Figure 2). Flight took approximately 16 min to complete. This sequence was randomized. Time of count was randomized to cover sample period. Only fishing boats were counted. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and one instantaneous count of fishing boats was made per day. One of two shifts was selected each sample day for interviewing (Table 1). One clerk was assigned to interview anglers on lakes: Cisco, Lindsley and Fishhawk, Thousand Island, and Little and Big African and Record. The other clerk was assigned to interview anglers on lakes: Big, West Bay, East Bay, Mamie Belle, Indian, and Poor. Starting location (lake) and direction of travel with their assigned lakes was randomized each sample day. Survey period is from May 4 through October 31. Estimates were by month for each lake sampling unit.

Figure 1.—Lake names and codes for the Cisco-Thousand Island Chain of Lakes angler survey.



Lake name	Lake code
Cisco	140
Lindsley and Fishhawk	141
Big	142
West Bay	143
East Bay	144
Mamie Belle	145
Indian	146
Poor	147
Thousand Island	148
Little and Big African, and Record	149

Figure 2.—Cisco-Thousand Island Chain of Lakes map with flight path, markers and GPS latitude-longitude coordinates.



Marker	Latitude	Longitude	Marker	Latitude	Longitude
1	46°15.13'	89°27.14'	11	46°12.95'	89°23.91'
2	46°13.33'	89°25.76'	12	46°12.71'	89°24.72'
3	46°12.93'	89°25.89'	13	46°12.98'	89°24.52'
4	46°11.33'	89°26.74'	14	46°13.76'	89°25.61'
5	46°11.85'	89°25.74'	15	46°13.55'	89°23.65'
6	46°12.55'	89°25.15'	16	46°13.94'	89°22.76'
7	46°11.95'	89°23.70'	17	46°14.19'	89°25.02'
8	46°11.05'	89°23.17'	18	46°14.62'	89°23.78'
9	46°12.41'	89°23.20'	19	46°15.14'	89°23.05'
10	46°12.77'	89°23.16'			

Table 1.—Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999)

used to estimate catch and effort, Cisco-Thousand Island chain of lakes (Gogebic County) and Lake Leelanau (Leelanau County), summer 2002.

Month	Shift		Expansion values
	Early	Late	
May 15-31	0600 h – 1430 h	1330 h – 2200 h	17
June	0600 h – 1430 h	1330 h – 2200 h	17
July	0600 h – 1430 h	1300 h – 2130 h	17
August	0630 h – 1500 h	1230 h – 2100 h	16
September	0630 h – 1500 h	1200 h – 2030 h	15
October	0630 h – 1500 h	1030 h – 1900 h	14

Table 2. Cisco Thousand Island summer 2002 boat angling estimates for all sites combined.

Species	C/H	May	June	July	August	September	October	Season
<b>HARVEST</b>								
Brook trout	0.0002 (0.0004)	0 (0)	0 (0)	34 (67)	0 (0)	0 (0)	0 (0)	34 (67)
Lake herring	0.0008 (0.0010)	0 (0)	0 (0)	38 (76)	97 (148)	10 (19)	0 (0)	145 (167)
Lake whitefish	<0.0001 (0.0001)	0 (0)	0 (0)	0 (0)	7 (10)	0 (0)	0 (0)	7 (10)
Smallmouth bass	0.0097 (0.0043)	11 (22)	283 (257)	644 (567)	469 (318)	253 (205)	0 (0)	1,660 (729)
Walleye	0.0160 (0.0042)	1,024 (480)	767 (350)	532 (329)	197 (150)	150 (95)	67 (44)	2,737 (704)
Yellow perch	0.3431 (0.0487)	11,358 (4,381)	11,270 (2,714)	12,674 (3,673)	9,496 (2,636)	11,189 (3,135)	2,781 (1,186)	58,769 (7,631)
Northern pike	0.0135 (0.0047)	213 (204)	746 (473)	507 (269)	115 (124)	692 (517)	46 (63)	2,318 (790)
Black crappie	0.0286 (0.0115)	560 (626)	2,297 (1,437)	1,523 (1,102)	104 (85)	413 (325)	5 (9)	4,901 (1,945)
Bluegill	0.2213 (0.0439)	124 (182)	5,493 (2,450)	16,898 (5,445)	8,711 (3,064)	6,070 (2,428)	609 (978)	37,906 (7,206)
Largemouth bass	0.0048 (0.0024)	0 (0)	167 (171)	579 (372)	62 (77)	13 (18)	0 (0)	821 (417)
Pumpkinseed	0.0103 (0.0056)	0 (0)	529 (686)	789 (595)	190 (144)	256 (243)	0 (0)	1,763 (951)
Rock bass	0.0117 (0.0060)	0 (0)	1,205 (817)	716 (592)	49 (65)	29 (59)	0 (0)	2,000 (1,013)
Round whitefish	0.0004 (0.0006)	0 (0)	0 (0)	0 (0)	62 (105)	0 (0)	0 (0)	62 (105)
<b>TOTAL HARVEST</b>	<b>0.6604 (0.0738)</b>	<b>13,290 (4,460)</b>	<b>22,756 (4,125)</b>	<b>34,933 (6,761)</b>	<b>19,573 (4,068)</b>	<b>19,075 (4,026)</b>	<b>3,507 (1,539)</b>	<b>113,135 (10,851)</b>
<b>RELEASED</b>								
Lake whitefish	0.0103 (0.0121)	0 (0)	0 (0)	1,771 (2,073)	0 (0)	0 (0)	0 (0)	1,771 (2,073)
Lake herring	<0.0001 (0.0001)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	7 (13)	7 (13)
Smallmouth bass	0.1036 (0.0202)	691 (352)	3,259 (1,087)	6,402 (2,247)	5,283 (1,981)	1,902 (792)	204 (172)	17,741 (3,307)
Largemouth bass	0.0320 (0.0077)	525 (348)	1,086 (548)	2,263 (870)	907 (540)	657 (399)	38 (65)	5,476 (1,278)
Walleye	0.0954 (0.0159)	4,335 (1,527)	3,675 (1,387)	2,842 (914)	2,217 (743)	2,271 (687)	1,006 (623)	16,346 (2,550)
Northern pike	0.0697 (0.0150)	2,464 (1,460)	3,149 (1,073)	2,389 (1,110)	1,980 (858)	1,701 (920)	253 (192)	11,936 (2,477)
Muskellunge	0.0018 (0.0009)	67 (105)	43 (46)	70 (59)	58 (45)	4 (6)	62 (72)	304 (155)
Rock bass	0.0350 (0.0102)	534 (401)	1,801 (832)	3,080 (1,393)	462 (355)	87 (64)	25 (27)	5,990 (1,710)
Carp	0.0001 (0.0001)	0 (0)	0 (0)	11 (22)	0 (0)	0 (0)	0 (0)	11 (22)
Bluegill	0.6090 (0.0998)	425 (445)	12,973 (4,766)	37,590 (9,230)	33,354 (9,706)	18,826 (6,994)	1,155 (2,238)	104,323 (16,007)
Pumpkinseed	0.0547 (0.0380)	63 (80)	665 (674)	6,501 (6,294)	1,686 (1,324)	461 (527)	0 (0)	9,376 (6,489)
Yellow perch	0.3772 (0.0715)	8,132 (6,113)	6,241 (2,089)	21,278 (7,913)	15,138 (4,269)	12,800 (3,659)	1,038 (530)	64,626 (11,672)
<b>TOTAL RELEASED</b>	<b>1.3887 (0.1493)</b>	<b>17,236 (6,516)</b>	<b>32,891 (5,726)</b>	<b>84,196 (14,196)</b>	<b>61,085 (10,946)</b>	<b>38,709 (8,043)</b>	<b>3,789 (2,399)</b>	<b>237,905 (21,611)</b>
<b>TOTAL CATCH</b>	<b>2.0492 (0.1838)</b>	<b>30,527 (7,896)</b>	<b>55,647 (7,057)</b>	<b>119,129 (15,724)</b>	<b>80,658 (11,678)</b>	<b>57,783 (8,995)</b>	<b>7,296 (2,850)</b>	<b>351,040 (24,182)</b>

ANGLER HOURS	26,393	38,124	41,049	30,835	26,570	8,339	171,310
	(4,534)	(4,375)	(4,891)	(3,456)	(4,080)	(2,155)	(9,841)
ANGLER TRIPS	6,224	9,542	9,365	7,681	6,521	1,755	41,087
	(1,773)	(3,334)	(2,910)	(2,049)	(1,716)	(596)	(5,498)

## Survey 13 Muskegon Lake, Muskegon County, Summer, 2002

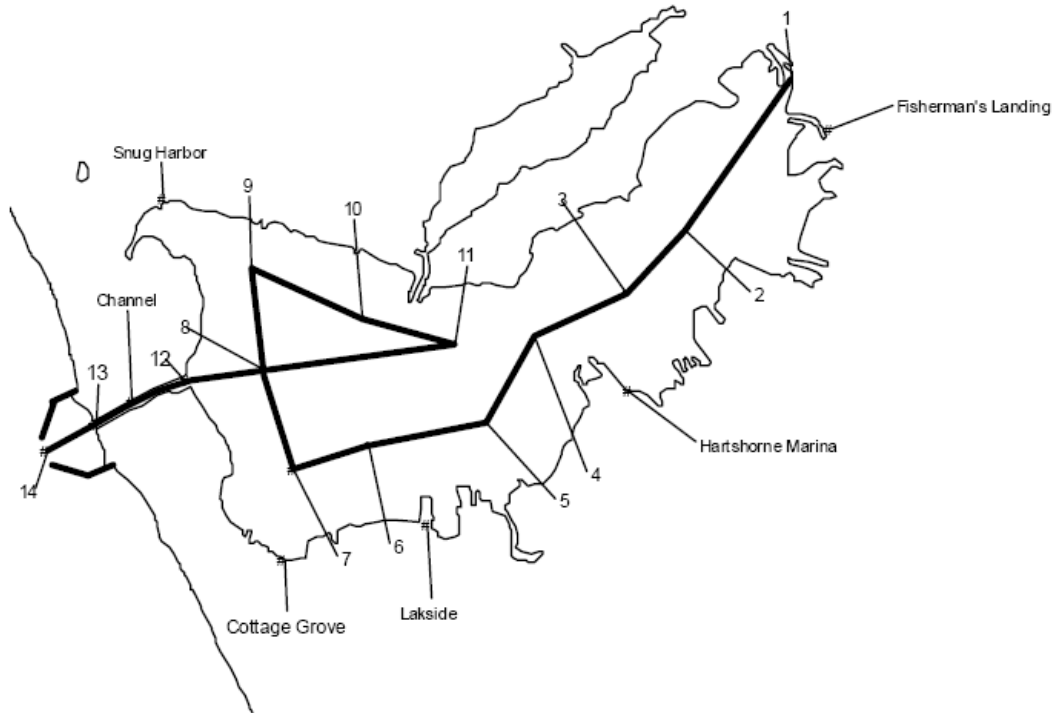
<b>Waterbody</b>	Muskegon Lake
<b>Year</b>	2002
<b>County</b>	Muskegon
<b>Sites</b>	310
<b>Survey period</b>	April 27, 2002 to November 30, 2002
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access
<b>Count type/mode</b>	progressive
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Methods

*Muskegon Lake, summer 2002*. Survey followed a progressive-access design. All funding was provided through Fisheries Division. One clerk working from a boat collected angler count and interview data. Lake was divided into three grids (Figure 4): lake proper, channel, and pier area. Counts progressed along count path from markers 1-12 (lake proper) then from 12-13 (channel), and then from 13-14 (pier area); or from markers 14-13 then from 13-12, and then 12-1. This sequence was randomized. Fishing boats were counted within the lake proper, channel and the pier area. Shore anglers were counted along lake proper and channel. Time of count was randomized to cover daylight times and night times to 2330 h within the sample period. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and one instantaneous count was made per day. One of three shifts was selected each sample day (Table 1). Each sample day the clerk was randomly assigned three locations to collect interview data (Figure 1): Fisherman's Landing, Hartshorne Marina, Lakeside, Cottage Grove, Channel, Snug Harbor. While at the Channel, only roving interviews of shore anglers were collected. At all other locations, the clerk collected access boat and shore party interviews. Anglers fishing from the piers were not interviewed, boat anglers fishing within the pier area were interviewed upon their return to the access locations previously mentioned. When not counting, the clerk's day was divided approximately equally between the assigned interviewing locations. Survey period is from April 27 through November 30, 2002. Estimates will be by month for each grid.



Figure 1. Muskegon Lake map with count path, markers and GPS latitude-longitude coordinates. Darkened line represents boat used for counting fishing boats. Markers 1-12 are within the lake, 12-13 the channel, and 13-14 the pier area.



Marker	Latitude	Longitude	Marker	Latitude	Longitude
1	43°15.66' N	86°14.88' W	8	43°13.99' N	86°19.05' W
2	43°14.80' N	86°15.72' W	9	43°14.57' N	86°19.16' W
3	43°14.43' N	86°16.19' W	10	43°14.28' N	86°18.27' W
4	43°14.19' N	86°16.92' W	11	43°14.13' N	86°17.54' W
5	43°13.69' N	86°17.30' W	12	43°13.92' N	86°19.66' W
6	43°13.56' N	86°18.23' W	13	43°13.67' N	86°20.39' W
7	43°13.42' N	86°18.82' W	14	43°13.52' N	86°20.76' W

Table 1.—Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Muskegon Lake (Muskegon County), summer 2002.

Month	Shift		
	Early	Middle	Late
April 27 - May 31	0600 h – 1430 h	1000 h – 1830 h	1530 h – 2400 h
June	0600 h – 1430 h	1000 h – 1830 h	1530 h – 2400 h
July	0600 h – 1430 h	1000 h – 1830 h	1530 h – 2400 h
August	0600 h – 1430 h	1000 h – 1830 h	1530 h – 2400 h
September	0600 h – 1430 h	1000 h – 1830 h	1530 h – 2400 h
October	0600 h – 1430 h	1000 h – 1830 h	1530 h – 2400 h
November	0600 h – 1430 h	1000 h – 1830 h	1530 h – 2400 h

	Year	Month	F
1	2002	4	18
2	2002	5	18
3	2002	6	18
4	2002	7	18
5	2002	8	18
6	2002	9	18
7	2002	10	18
8	2002	11	18

Table 2. Estimated harvest, catch per hour, and fishing pressure for Muskegon Lake, summer 2002, boat angler survey. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	October	November	Season
<b>HARVEST</b>									
Coho salmon	0.0010	0	0	0	0	85	7	0	92
	(0.0013)	(0)	(0)	(0)	(0)	(121)	(15)	(0)	(122)
Chinook salmon	0.0102	81	0	0	0	871	0	41	993
	(0.0088)	(90)	(0)	(0)	(0)	(825)	(0)	(83)	(834)
Rainbow trout	0.0001	0	0	0	0	14	0	0	14
	(0.0003)	(0)	(0)	(0)	(0)	(27)	(0)	(0)	(27)
Brown trout	0.0029	32	245	0	0	0	0	0	278
	(0.0051)	(47)	(491)	(0)	(0)	(0)	(0)	(0)	(493)
Smallmouth bass	0.0017	0	0	161	0	0	7	0	169
	(0.0020)	(0)	(0)	(192)	(0)	(0)	(15)	(0)	(192)
Walleye	0.0183	65	147	489	72	415	37	554	1,780
	(0.0086)	(83)	(254)	(377)	(102)	(498)	(47)	(329)	(763)
Yellow Perch	0.3685	3,288	15,313	5,354	5,026	5,872	418	536	35,807
	(0.1335)	(2,327)	(7,820)	(2,130)	(3,638)	(6,020)	(554)	(462)	(11,005)
Northern pike	0.0064	225	0	0	36	167	45	154	626
	(0.0036)	(249)	(0)	(0)	(71)	(154)	(47)	(132)	(332)
Muskellunge	0.0002	0	0	0	0	0	0	20	20
	(0.0004)	(0)	(0)	(0)	(0)	(0)	(0)	(40)	(40)
Black crappie	0.0217	32	600	205	0	27	769	472	2,105
	(0.0152)	(65)	(685)	(275)	(0)	(41)	(1,071)	(564)	(1,419)
Bluegill	0.3618	2,277	7,727	9,622	4,554	7,214	3,448	310	35,153
	(0.1231)	(1,562)	(4,070)	(4,101)	(2,367)	(7,174)	(2,123)	(380)	(9,876)
Largemouth bass	0.0012	0	60	0	36	0	22	0	118
	(0.0015)	(0)	(119)	(0)	(71)	(0)	(34)	(0)	(143)
Pumpkinseed	0.1063	995	3,856	3,098	1,002	289	1,073	21	10,333
	(0.0399)	(1,033)	(2,260)	(1,710)	(827)	(577)	(983)	(41)	(3,330)
Rock bass	0.0065	149	98	0	36	347	0	0	631
	(0.0068)	(299)	(196)	(0)	(72)	(539)	(0)	(0)	(650)
Channel catfish	0.0032	0	196	71	0	41	0	0	308
	(0.0028)	(0)	(237)	(101)	(0)	(52)	(0)	(0)	(263)
Freshwater drum	0.0014	0	74	0	0	58	0	0	131
	(0.0017)	(0)	(111)	(0)	(0)	(116)	(0)	(0)	(160)
Common white sucker	0.0003	0	25	0	0	0	0	0	25
	(0.0005)	(0)	(49)	(0)	(0)	(0)	(0)	(0)	(49)
<b>TOTAL</b>	<b>0.9116</b>	<b>7,145</b>	<b>28,341</b>	<b>19,000</b>	<b>10,762</b>	<b>15,398</b>	<b>5,828</b>	<b>2,109</b>	<b>88,583</b>
<b>HARVEST</b>	<b>(0.2353)</b>	<b>(3,016)</b>	<b>(9,150)</b>	<b>(4,954)</b>	<b>(4,422)</b>	<b>(9,451)</b>	<b>(2,633)</b>	<b>(901)</b>	<b>(15,296)</b>
<b>RELEASED</b>									
Chinook salmon	0.0001	0	0	0	0	14	0	0	14
	(0.0003)	(0)	(0)	(0)	(0)	(27)	(0)	(0)	(27)
Smallmouth bass	0.0285	489	425	955	499	343	30	31	2,772
	(0.0112)	(433)	(352)	(636)	(312)	(288)	(48)	(45)	(949)
Largemouth bass	0.0434	1,316	401	848	935	619	60	41	4,219
	(0.0189)	(1,000)	(402)	(630)	(818)	(676)	(94)	(82)	(1,644)
Walleye	0.0067	0	49	347	35	112	38	72	654
	(0.0042)	(0)	(71)	(328)	(71)	(145)	(77)	(70)	(387)
Northern pike	0.0258	556	278	498	143	384	263	381	2,503
	(0.0108)	(553)	(293)	(408)	(175)	(329)	(219)	(343)	(929)
Common white sucker	0.0006	0	60	0	0	0	0	0	60
	(0.0013)	(0)	(121)	(0)	(0)	(0)	(0)	(0)	(121)
Rock bass	0.0221	219	194	153	897	153	507	20	2,144
	(0.0143)	(375)	(193)	(191)	(1,024)	(161)	(685)	(40)	(1,327)
	0.0031	16	134	41	35	71	0	0	298
	(0.0024)	(32)	(150)	(82)	(71)	(119)	(0)	(0)	(222)
Bluegill	0.2583	4,740	6,435	4,359	1,863	3,946	3,758	0	25,101

	(0.0955)	(3,523)	(3,241)	(2,642)	(1,205)	(4,711)	(3,063)	(0)	(7,933)
Pumpkinseed	0.0585	1,506	1,462	2,059	0	58	577	20	5,681
	(0.0272)	(1,450)	(1,129)	(1,339)	(0)	(115)	(775)	(40)	(2,405)
Yellow Perch	0.1876	2,122	6,733	3,346	1,971	3,234	615	204	18,226
	(0.0643)	(1,640)	(3,340)	(1,454)	(1,184)	(2,967)	(746)	(252)	(5,175)
TOTAL RELEASED	0.6347	10,964	16,170	12,605	6,379	8,934	5,848	770	61,671
	(0.1601)	(4,341)	(4,835)	(3,465)	(2,170)	(5,632)	(3,328)	(445)	(10,096)
TOTAL CATCH	1.5463	18,109	44,511	31,606	17,142	24,332	11,676	2,879	150,255
	(0.3516)	(5,285)	(10,349)	(6,046)	(4,926)	(11,002)	(4,244)	(1,005)	(18,328)
ANGLER HOURS		6,918	17,470	24,720	17,265	22,893	3,706	4,198	97,171
		(2,713)	(5,543)	(5,737)	(4,120)	(15,978)	(1,447)	(1,486)	(18,643)
ANGLER TRIPS		1,683	4,423	6,368	4,360	5,968	1,126	1,062	24,991
		(671)	(1,439)	(1,506)	(1,078)	(4,402)	(493)	(387)	(5,072)

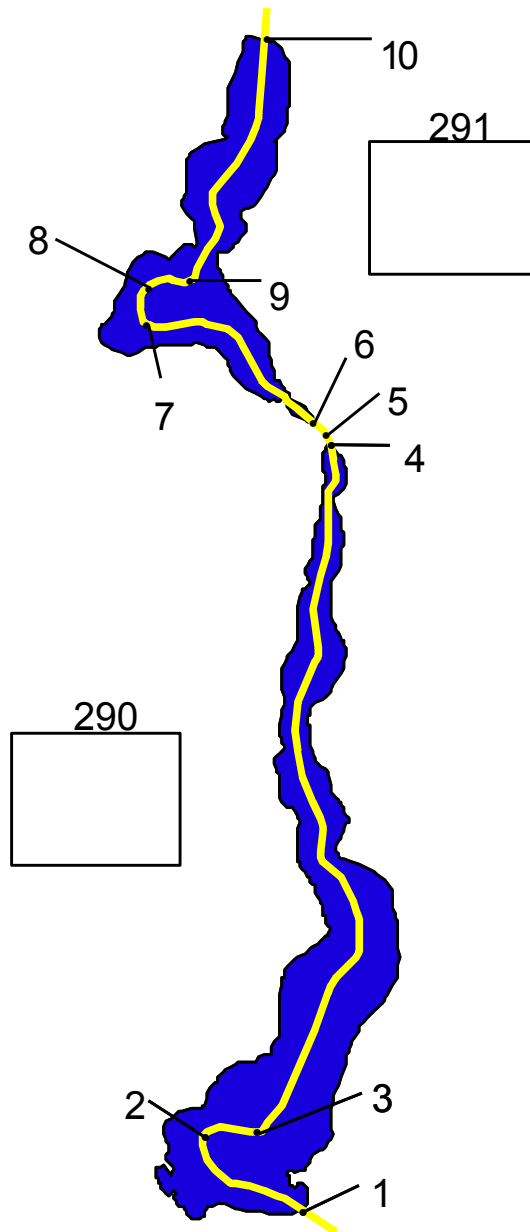
## Survey 14 Lake Leelanau, Leelanau County, Summer, 2002

<b>Waterbody</b>	Lake Leelanau
<b>Year</b>	Summer 2002
<b>County</b>	Leelanau County
<b>Sites</b>	290,291
<b>Survey period</b>	Summer April-September
<b>Survey design</b>	Aerial-roving (aerial counts, roving interviews)
<b>Interview type/mode</b>	roving/boat
<b>Count type/mode</b>	aerial/boat
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Methods**

*Lake Leelanau, summer 2002.* Survey followed an aerial-roving design. All funding was provided through Fisheries Division. One clerk working from a boat collected angler interview data. Lake was divided into North Lake Leelanau and South Lake Leelanau. Counts progressed from North Lake Leelanau to South Lake Leelanau or from South Lake Leelanau to North Lake Leelanau (see flight path – Figure 1). This sequence was randomized. Only fishing boats were counted. Flight time was approximately 12 min. Time of count was randomized to cover daylight times within the sample period. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and one instantaneous count of fishing boats was made per day. One of two shifts was selected each sample day for interviewing (Table 1). Each sample day the clerk was randomly assigned to start at GPS marker 1 and interview anglers while traveling to GPS marker 10, or from GPS marker 10 to GPS marker 1 (Figure 1). Survey period is from April 27 through September 30, 2002. Estimates were provided in Tables 2-4.

Figure 1. Lake Leelanau map with flight path, markers and GPS latitude, longitude coordinates. Marker 5 is the boundary between North Lake Leelanau and South Lake Leelanau.



Marker	Latitude	Longitude	Marker	Latitude	Longitude
1	44°50.20'	85°43.13'	6	44°59.03'	85°42.93'
2	44°51.03'	85°44.67'	7	45°00.12'	85°45.53'
3	44°51.08'	85°43.84'	8	45°00.52'	85°45.54'
4	44°58.77'	85°42.64'	9	45°00.60'	85°44.84'
5 Lake separation	44°58.87'	85°42.72'	10	45°03.30'	85°43.66'

Table 1.–Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Lake Leelanau (Leelanau County), summer 2002.

Month	Shift		Expansion values
	Early	Late	
May 15-31	0600 h – 1430 h	1330 h – 2200 h	17
June	0600 h – 1430 h	1330 h – 2200 h	17
July	0600 h – 1430 h	1300 h – 2130 h	17
August	0630 h – 1500 h	1230 h – 2100 h	16
September	0630 h – 1500 h	1200 h – 2030 h	15
October	0630 h – 1500 h	1030 h – 1900 h	14

Table 2. Estimated harvest, catch per hour, and fishing pressure for South Leelanau 290. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Brook trout	0.0003 (0.0007)	24 (49)	0 (0)	0 (0)	0 (0)	0 (0)	24 (49)
Smallmouth bass	0.0036 (0.0022)	59 (48)	31 (48)	0 (0)	45 (67)	134 (131)	269 (162)
Walleye	0.1011 (0.0278)	124 (74)	1,167 (627)	2,352 (913)	2,641 (1,039)	1,272 (683)	7,556 (1,666)
Yellow Perch	0.0297 (0.0176)	0 (0)	53 (70)	132 (153)	201 (188)	1,831 (1,237)	2,217 (1,263)
Northern pike	0.0014 (0.0013)	30 (44)	30 (60)	44 (62)	0 (0)	0 (0)	104 (98)
Bluegill	0.0010 (0.0013)	0 (0)	17 (35)	0 (0)	0 (0)	60 (87)	77 (94)
Largemouth bass	0.0003 (0.0005)	0 (0)	20 (40)	0 (0)	0 (0)	0 (0)	20 (40)
Rock bass	0.0058 (0.0042)	5 (11)	9 (17)	42 (50)	41 (54)	338 (298)	434 (308)
Common white sucker	0.0003 (0.0006)	0 (0)	22 (44)	0 (0)	0 (0)	0 (0)	22 (44)
<b>TOTAL HARVEST</b>	<b>0.1436 (0.0369)</b>	<b>242 (111)</b>	<b>1,350 (639)</b>	<b>2,569 (929)</b>	<b>2,928 (1,059)</b>	<b>3,635 (1,453)</b>	<b>10,724 (2,125)</b>
<b>RELEASED</b>							
Smallmouth bass	0.0508 (0.0162)	498 (244)	1,457 (713)	432 (299)	342 (234)	1,064 (602)	3,793 (1,037)
Largemouth bass	0.0008 (0.0007)	20 (24)	0 (0)	0 (0)	20 (41)	19 (23)	60 (53)
Walleye	0.3086 (0.0804)	168 (101)	4,202 (2,026)	9,236 (3,074)	5,385 (2,018)	4,065 (2,033)	23,057 (4,666)
Northern pike	0.0285 (0.0104)	215 (131)	420 (277)	550 (351)	239 (169)	708 (490)	2,132 (697)
Common white sucker	0.0019 (0.0017)	0 (0)	90 (109)	40 (57)	14 (27)	0 (0)	144 (126)
Rock bass	0.0144 (0.0064)	15 (22)	206 (186)	323 (249)	184 (158)	348 (277)	1,076 (446)
Bow fin	0.0028 (0.0024)	0 (0)	182 (170)	0 (0)	0 (0)	28 (35)	210 (173)
Bluegill	0.0012 (0.0013)	0 (0)	0 (0)	0 (0)	67 (85)	19 (37)	86 (93)
Yellow Perch	0.0136 (0.0073)	25 (27)	30 (59)	270 (220)	139 (120)	555 (453)	1,018 (522)
<b>TOTAL RELEASED</b>	<b>0.4227 (0.0952)</b>	<b>942 (298)</b>	<b>6,588 (2,184)</b>	<b>10,852 (3,127)</b>	<b>6,390 (2,050)</b>	<b>6,805 (2,241)</b>	<b>31,577 (4,885)</b>
<b>TOTAL CATCH</b>	<b>0.5662 (0.1170)</b>	<b>1,184 (318)</b>	<b>7,938 (2,276)</b>	<b>13,421 (3,262)</b>	<b>9,318 (2,308)</b>	<b>10,440 (2,671)</b>	<b>42,301 (5,327)</b>
<b>ANGLER HOURS</b>		<b>6,764 (2,585)</b>	<b>16,907 (6,498)</b>	<b>22,083 (5,739)</b>	<b>14,440 (4,622)</b>	<b>14,513 (6,824)</b>	<b>74,707 (12,238)</b>
<b>ANGLER TRIPS</b>		<b>2,093 (1,152)</b>	<b>4,562 (1,744)</b>	<b>9,290 (6,424)</b>	<b>3,941 (1,672)</b>	<b>4,532 (2,842)</b>	<b>24,418 (7,518)</b>



Table 3. Estimated harvest, catch per hour, and fishing pressure for North Leelanau 291. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>April-May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>September</b>	<b>Season</b>
<b>HARVEST</b>							
Lake trout	0.0120 (0.0117)	52 (64)	26 (52)	143 (193)	0 (0)	0 (0)	221 (210)
Smallmouth bass	0.0075 (0.0070)	46 (93)	62 (73)	0 (0)	18 (37)	12 (23)	139 (126)
Walleye	0.0735 (0.0358)	0 (0)	631 (440)	452 (340)	220 (173)	51 (61)	1,354 (586)
Yellow Perch	0.0184 (0.0210)	0 (0)	0 (0)	0 (0)	252 (356)	87 (131)	339 (380)
Northern pike	0.0022 (0.0031)	0 (0)	20 (41)	19 (39)	0 (0)	0 (0)	40 (56)
Rock bass	0.0054 (0.0078)	0 (0)	0 (0)	87 (140)	0 (0)	12 (23)	99 (142)
<b>TOTAL HARVEST</b>	<b>0.1189 (0.0488)</b>	<b>99 (113)</b>	<b>740 (451)</b>	<b>701 (417)</b>	<b>490 (398)</b>	<b>162 (148)</b>	<b>2,191 (755)</b>
<b>RELEASED</b>							
Lake trout	0.0119 (0.0180)	0 (0)	71 (143)	148 (295)	0 (0)	0 (0)	219 (328)
Smallmouth bass	0.0863 (0.0465)	237 (269)	830 (661)	273 (255)	148 (150)	103 (108)	1,591 (779)
Largemouth bass	0.0031 (0.0050)	0 (0)	13 (26)	44 (87)	0 (0)	0 (0)	57 (91)
Walleye	0.0061 (0.0098)	0 (0)	25 (37)	87 (175)	0 (0)	0 (0)	112 (178)
Northern pike	0.0046 (0.0047)	31 (62)	24 (35)	0 (0)	31 (46)	0 (0)	86 (85)
Rock bass	0.0219 (0.0192)	0 (0)	99 (118)	204 (296)	101 (122)	0 (0)	404 (342)
Yellow Perch	0.0334 (0.0245)	0 (0)	0 (0)	455 (406)	61 (93)	100 (107)	616 (430)
<b>TOTAL RELEASED</b>	<b>0.1674 (0.0673)</b>	<b>268 (276)</b>	<b>1,062 (688)</b>	<b>1,211 (666)</b>	<b>341 (220)</b>	<b>203 (152)</b>	<b>3,084 (1,032)</b>
<b>TOTAL CATCH</b>	<b>0.2863 (0.0943)</b>	<b>366 (298)</b>	<b>1,802 (823)</b>	<b>1,912 (785)</b>	<b>831 (455)</b>	<b>365 (212)</b>	<b>5,276 (1,279)</b>
<b>ANGLER HOURS</b>		<b>1,830 (1,343)</b>	<b>5,931 (2,946)</b>	<b>6,370 (2,165)</b>	<b>2,568 (1,095)</b>	<b>1,728 (726)</b>	<b>18,428 (4,110)</b>
<b>ANGLER TRIPS</b>		<b>702 (768)</b>	<b>2,279 (2,184)</b>	<b>2,453 (2,959)</b>	<b>802 (638)</b>	<b>658 (590)</b>	<b>6,894 (3,857)</b>

Table 4. Estimated harvest, catch per hour, and fishing pressure for Leelanau Lakes, combined. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Brook trout	0.0003 (0.0005)	24 (49)	0 (0)	0 (0)	0 (0)	0 (0)	24 (49)
Lake trout	0.0024 (0.0023)	52 (64)	26 (52)	143 (193)	0 (0)	0 (0)	221 (210)
Smallmouth bass	0.0044 (0.0023)	106 (105)	93 (87)	0 (0)	64 (76)	146 (133)	408 (205)
Walleye	0.0957 (0.0231)	124 (74)	1,799 (766)	2,804 (974)	2,860 (1,053)	1,323 (685)	8,910 (1,766)
Yellow Perch	0.0274 (0.0147)	0 (0)	53 (70)	132 (153)	453 (403)	1,918 (1,244)	2,556 (1,319)
Northern pike	0.0015 (0.0012)	30 (44)	51 (73)	63 (73)	0 (0)	0 (0)	144 (113)
Bluegill	0.0008 (0.0010)	0 (0)	17 (35)	0 (0)	0 (0)	60 (87)	77 (94)
Largemouth bass	0.0002 (0.0004)	0 (0)	20 (40)	0 (0)	0 (0)	0 (0)	20 (40)
Rock bass	0.0057 (0.0037)	5 (11)	9 (17)	129 (148)	41 (54)	349 (299)	533 (339)
Common white sucker	0.0002 (0.0005)	0 (0)	22 (44)	0 (0)	0 (0)	0 (0)	22 (44)
<b>TOTAL HARVEST</b>	<b>0.1387 (0.0309)</b>	<b>341 (158)</b>	<b>2,090 (782)</b>	<b>3,270 (1,018)</b>	<b>3,418 (1,132)</b>	<b>3,796 (1,460)</b>	<b>12,916 (2,255)</b>
<b>RELEASED</b>							
Lake trout	0.0024 (0.0035)	0 (0)	71 (143)	148 (295)	0 (0)	0 (0)	219 (328)
Smallmouth bass	0.0578 (0.0161)	735 (363)	2,287 (972)	706 (393)	489 (278)	1,167 (612)	5,384 (1,297)
Largemouth bass	0.0013 (0.0011)	20 (24)	13 (26)	44 (87)	20 (41)	19 (23)	116 (105)
Walleye	0.2488 (0.0609)	168 (101)	4,227 (2,027)	9,324 (3,079)	5,385 (2,018)	4,065 (2,033)	23,170 (4,669)
Northern pike	0.0238 (0.0082)	246 (145)	444 (279)	550 (351)	270 (176)	708 (490)	2,218 (702)
Common white sucker	0.0015 (0.0014)	0 (0)	90 (109)	40 (57)	14 (27)	0 (0)	144 (126)
Rock bass	0.0159 (0.0064)	15 (22)	305 (220)	526 (387)	285 (200)	348 (277)	1,479 (562)
Bow fin	0.0023 (0.0019)	0 (0)	182 (170)	0 (0)	0 (0)	28 (35)	210 (173)
Bluegill	0.0009 (0.0010)	0 (0)	0 (0)	0 (0)	67 (85)	19 (37)	86 (93)
Yellow Perch	0.0175 (0.0077)	25 (27)	30 (59)	725 (462)	200 (152)	654 (466)	1,634 (676)
<b>TOTAL RELEASED</b>	<b>0.3722 (0.0744)</b>	<b>1,209 (406)</b>	<b>7,650 (2,290)</b>	<b>12,063 (3,197)</b>	<b>6,731 (2,062)</b>	<b>7,008 (2,246)</b>	<b>34,661 (4,992)</b>
<b>TOTAL CATCH</b>	<b>0.5108 (0.0921)</b>	<b>1,550 (436)</b>	<b>9,740 (2,420)</b>	<b>15,333 (3,355)</b>	<b>10,149 (2,352)</b>	<b>10,805 (2,679)</b>	<b>47,577 (5,478)</b>
<b>ANGLER HOURS</b>		<b>8,595 (2,913)</b>	<b>22,838 (7,135)</b>	<b>28,453 (6,133)</b>	<b>17,008 (4,750)</b>	<b>16,241 (6,863)</b>	<b>93,135 (12,910)</b>
<b>ANGLER TRIPS</b>		<b>2,794 (1,385)</b>	<b>6,841 (2,795)</b>	<b>11,744 (7,073)</b>	<b>4,743 (1,790)</b>	<b>5,190 (2,903)</b>	<b>31,312 (8,449)</b>

## Survey 15 Buck Creek and Coldwater River, Allegan, Barry and Kent, Summer, 2002

<b>Waterbody</b>	Buck Creek and Coldwater River
<b>Year</b>	2002
<b>Site/County</b>	Buck Creek (Allegan, Kent); Coldwater River (Barry, Kent)
<b>Survey period</b>	April 27, 2002 August 31, 2002
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access
<b>Count type/mode</b>	roving
<b>Clerk time</b>	1/2 time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery
<b>Sites</b>	320,330,331

One section on Buck Creek and two sections on Coldwater River were surveyed.

- On Buck Creek the section is from Grand River to Byron Center (84<sup>th</sup> Street). Fishing site code: 320

On Coldwater River the sections are:

- M-43 to Freeport Road Bridge. Fishing site code 330
- Freeport Road Bridge to Whitneyville Ave Bridge (Thornapple River). Fishing site code 331

### Estimation options applied

- Day types with the number of interviews equal to 1 in a month were excluded in the estimation.

### Methods

*Buck Creek, summer 2002* .Survey followed a progressive-roving design. Survey section was from the Grand River (T.6N, R.12W, Sec. 18) to Byron Center Road (84<sup>th</sup> Street) (T.5N, R.12W, Sec. 14 and 23). All funding was provided by Fisheries Division. Survey was done in conjunction with Coldwater River angler survey and clerk worked one-half time on the Buck Creek angler survey. One clerk working from a vehicle collected angler count and interview data. Clerk worked 1 weekend day and 1-2 week days per week on this survey. Two instantaneous counts of anglers' vehicles parked at bridge crossings and similar access points were made per sample day. Each count began from either the Grand River or Byron Center Road and progressed to the opposite end. Starting location was randomized. Time of count was randomized to cover times within the sample period. No holidays were scheduled for sampling. Counting and interviewing were done on the same days. One of two shifts was selected each sample day (Table 1). No predetermined interviewing route was used. Survey period was from April 27 through August 31, 2002. Months were estimated separately.

*Coldwater River, summer 2002* .Survey followed a progressive-roving design. Survey section was from M-43 (T.4N, R.8W, Sec. 5 and 6) to Freeport Ave. bridge (T.5N, R.9W, Sec. 36) and Freeport Ave. bridge to Thornapple River (T.5N, R.10W, Sec. 35). All funding was provided by Fisheries Division. Survey was done in conjunction with the Buck Creek angler survey and clerk worked one-half time on the Coldwater River angler survey. One clerk working from a vehicle collected angler count and interview data. Clerk worked 1 weekend day and 1-2 week days per

week on this survey. Two instantaneous counts of anglers' vehicles parked at bridge crossings and similar access points were made per sample day. Each count began from either M-43 or the Thornapple River and progressed to the opposite end. Starting location was randomized. Time of count was randomized to cover times within the sample period. No holidays were scheduled for sampling. Counting and interviewing were done on the same days. One of two shifts was selected each sample day (Table 1). No predetermined interviewing route was used. Survey period was from April 27 through August 31, 2002. Sections and months were estimated separately.

Table 1. Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Buck Creek (Allegan and Kent counties), and Coldwater River (Barry and Kent counties), summer 2002.

Month	Shift		Expansion values
	Early	Late	
May 8-31	0600 h – 1430 h	1330 h – 2200 h	17
June	0600 h – 1430 h	1330 h – 2200 h	17
July	0600 h – 1430 h	1300 h – 2130 h	17
August	0630 h – 1500 h	1230 h – 2100 h	16

Table 2. Estimated harvest, catch per hour, and fishing pressure for Buck Creek. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	Season
<b>HARVEST</b>						
TOTAL HARVEST	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>RELEASED</b>						
Bluegill	0.7040 (1.7286)	0 (0)	0 (0)	43 (85)	0 (0)	43 (85)
TOTAL RELEASED	0.7040 (1.7286)	0 (0)	0 (0)	43 (85)	0 (0)	43 (85)
TOTAL CATCH	0.7040 (1.7286)	0 (0)	0 (0)	43 (85)	0 (0)	43 (85)
ANGLER HOURS		0 (0)	34 (68)	27 (53)	0 (0)	61 (86)
ANGLER TRIPS		0 (0)	25 (50)	21 (50)	0 (0)	46 (71)

Table 3. Estimated harvest, catch per hour, and fishing pressure for Coldwater River (330). Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	Season
<b>HARVEST</b>						
Brown trout	0.1848 (0.1995)	183 (255)	151 (166)	0 (0)	0 (0)	334 (304)
TOTAL HARVEST	0.1848 (0.1995)	183 (255)	151 (166)	0 (0)	0 (0)	334 (304)
<b>RELEASED</b>						
Brown trout	2.7436 (3.9979)	4,641 (6,624)	233 (197)	83 (141)	0 (0)	4,957 (6,628)
Bluegill	0.0123 (0.0260)	0 (0)	22 (45)	0 (0)	0 (0)	22 (45)
TOTAL RELEASED	2.7559 (4.0008)	4,641 (6,624)	255 (202)	83 (141)	0 (0)	4,979 (6,629)
TOTAL CATCH	2.9407 (4.0482)	4,824 (6,629)	406 (261)	83 (141)	0 (0)	5,313 (6,636)
ANGLER HOURS		1,320 (999)	393 (283)	94 (131)	0 (0)	1,807 (1,046)
ANGLER TRIPS		558 (594)	148 (121)	62 (97)	0 (0)	768 (614)

Table 4. Estimated harvest, catch per hour, and fishing pressure for Coldwater 331. Two

standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>April-May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>Season</b>
<b>HARVEST</b>						
Brown trout	0.0275 (0.0505)	48 (113)	0 (0)	68 (175)	0 (0)	116 (208)
<b>TOTAL HARVEST</b>	<b>0.0275</b> <b>(0.0505)</b>	<b>48</b> <b>(113)</b>	<b>0</b> <b>(0)</b>	<b>68</b> <b>(175)</b>	<b>0</b> <b>(0)</b>	<b>116</b> <b>(208)</b>
<b>RELEASED</b>						
Rainbow trout	0.0098 (0.0188)	41 (78)	0 (0)	0 (0)	0 (0)	41 (78)
Brown trout	0.8575 (0.7495)	2,610 (2,683)	831 (876)	177 (203)	0 (0)	3,618 (2,830)
Smallmouth bass	0.0482 (0.0894)	0 (0)	0 (0)	203 (369)	0 (0)	203 (369)
Largemouth bass	0.0098 (0.0191)	41 (79)	0 (0)	0 (0)	0 (0)	41 (79)
Yellow Perch	0.0196 (0.0273)	83 (111)	0 (0)	0 (0)	0 (0)	83 (111)
<b>TOTAL RELEASED</b>	<b>0.9450</b> <b>(0.7712)</b>	<b>2,776</b> <b>(2,688)</b>	<b>831</b> <b>(876)</b>	<b>381</b> <b>(421)</b>	<b>0</b> <b>(0)</b>	<b>3,988</b> <b>(2,858)</b>
<b>TOTAL CATCH</b>	<b>0.9725</b> <b>(0.7780)</b>	<b>2,824</b> <b>(2,690)</b>	<b>831</b> <b>(876)</b>	<b>448</b> <b>(456)</b>	<b>0</b> <b>(0)</b>	<b>4,104</b> <b>(2,866)</b>
<b>ANGLER HOURS</b>		<b>2,430</b> <b>(1,471)</b>	<b>856</b> <b>(539)</b>	<b>934</b> <b>(507)</b>	<b>0</b> <b>(0)</b>	<b>4,220</b> <b>(1,647)</b>
<b>ANGLER TRIPS</b>		<b>739</b> <b>(541)</b>	<b>223</b> <b>(160)</b>	<b>414</b> <b>(387)</b>	<b>0</b> <b>(0)</b>	<b>1,376</b> <b>(684)</b>

Table 5. Estimated harvest, catch per hour, and fishing pressure for Buck and Coldwater combined. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>April-May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>Season</b>
<b>HARVEST</b>						
Brown trout	0.0739 (0.0650)	231 (279)	151 (166)	68 (175)	0 (0)	450 (369)
<b>TOTAL HARVEST</b>	<b>0.0739</b> <b>(0.0650)</b>	<b>231</b> <b>(279)</b>	<b>151</b> <b>(166)</b>	<b>68</b> <b>(175)</b>	<b>0</b> <b>(0)</b>	<b>450</b> <b>(369)</b>
<b>RELEASED</b>						
Rainbow trout	0.0068 (0.0130)	41 (78)	0 (0)	0 (0)	0 (0)	41 (78)
Brown trout	1.4088 (1.2674)	7,251 (7,147)	1,064 (898)	260 (247)	0 (0)	8,575 (7,207)
Smallmouth bass	0.0334 (0.0616)	0 (0)	0 (0)	203 (369)	0 (0)	203 (369)
Largemouth bass	0.0068 (0.0132)	41 (79)	0 (0)	0 (0)	0 (0)	41 (79)
Bluegill	0.0107 (0.0163)	0 (0)	22 (45)	43 (85)	0 (0)	65 (97)
Yellow Perch	0.0136 (0.0187)	83 (111)	0 (0)	0 (0)	0 (0)	83 (111)
<b>TOTAL RELEASED</b>	<b>1.4801</b> <b>(1.2775)</b>	<b>7,417</b> <b>(7,148)</b>	<b>1,086</b> <b>(899)</b>	<b>506</b> <b>(452)</b>	<b>0</b> <b>(0)</b>	<b>9,009</b> <b>(7,219)</b>
<b>TOTAL CATCH</b>	<b>1.5540</b> <b>(1.2879)</b>	<b>7,648</b> <b>(7,154)</b>	<b>1,237</b> <b>(914)</b>	<b>574</b> <b>(485)</b>	<b>0</b> <b>(0)</b>	<b>9,459</b> <b>(7,228)</b>
<b>ANGLER HOURS</b>		<b>3,750</b> <b>(1,778)</b>	<b>1,283</b> <b>(612)</b>	<b>1,054</b> <b>(527)</b>	<b>0</b> <b>(0)</b>	<b>6,087</b> <b>(1,953)</b>
<b>ANGLER TRIPS</b>		<b>1,297</b> <b>(804)</b>	<b>396</b> <b>(207)</b>	<b>498</b> <b>(402)</b>	<b>0</b> <b>(0)</b>	<b>2,190</b> <b>(922)</b>

## Survey 16 Grand River (Lower) and Rogue River, Kent County, Summer, 2002

<b>Waterbody</b>	Grand and Rogue
<b>Year</b>	2002
<b>County</b>	Kent County
<b>Sites</b>	502, 503, and 504 (need site information)
<b>Survey period</b>	March 1, 2002 to April 26, 2002; September 1, 2002 to November 30, 2002
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access
<b>Count type/mode</b>	roving / shore
<b>Clerk time</b>	1/2 time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

- Sites** 502,503,504
1. **Rogue (Site No. 502):** 10-Mile Road (T.9N.,R.11W.,Sec.32) to Rockford Dam (T.9N.,R.11W.,Sec.36).
  2. **Rogue (Site No. 503):** 10-Mile Road (T.9N.,R.11W.,Sec.36) to West River Drive bridge (T.8N.,R.11W.,Sec.22).
  3. **Lower Grand River (Site No. 504):** 6<sup>th</sup> Street Dam area (located upstream of highway 196 in Grand Rapids).

### Estimation options applied

One complete-trip but no incomplete interview found for weekday in November for shore angling within 502. Variance of catch rate can not be calculated.

### Methods

*Lower Grand River (6<sup>th</sup> Street Dam area)(Site 504) summer 2002.* Survey followed a roving-access design.

**The 6<sup>th</sup> Street Dam area is located upstream of highway 196 in Grand Rapids.** All funding was provided by Fisheries Division. Survey was done with the Rogue River survey and in conjunction with the Buck Creek and Coldwater River angler surveys. One clerk working from a vehicle collected angler count and interview data. Clerk worked 1 weekend day and 1-2 week days per week during survey period. Clerk was assigned to work either both of the Rogue River sections or the 6<sup>th</sup> Street Dam area during a sample day, and selection was made randomly. Two instantaneous counts of individual anglers (shore and wading) were made per sample day. Time of count was randomized to cover times within the sample period. No holidays were scheduled for sampling. Counting and interviewing were done on the same days. One of two shifts was selected each sample day. No predetermined interviewing route was used. Survey periods were from March 1 through April 26, 2002 and from September 1 through November 30, 2002. Months were be estimated separately.

*Rogue River (Site 502, 503), summer 2002 .*Survey followed a progressive-access design. Two sections were surveyed. Survey sections were: Rogue River – 10-Mile Road (T.9N, R.11W, Sec. 32) to Rockford Dam (T.9N, R.11W, Sec. 36); and Rogue River – 10-Mile Road (T.9N, R.11W, Sec.

36) to West River Drive bridge (T.8N, R.11W, Sec. 22). All funding was provided by Fisheries Division. Survey was done with the Lower Grand River survey and in conjunction with the Buck Creek and Coldwater River angler surveys. One clerk working from a vehicle collected angler count and interview data. Clerk worked 1 weekend day and 1-2 week days per week during survey period. Clerk was assigned to work either both of the Rogue River sections or the 6<sup>th</sup> Street Dam area during a sample day, and selection was made randomly. In the 10-Mile to Rockford Dam section individual anglers (shore and wading) were counted. In the 10-Mile to West River Drive bridge section angler vehicles were counted. Two instantaneous counts were made per sample day. At the Rogue River sites, each count began from either the upstream 10-Mile Road or the downstream West River Road and progressed to the opposite end. Starting location was randomized. Time of count was randomized to cover times within the sample period. No holidays were scheduled for sampling. Counting and interviewing were done on the same days. One of two shifts was selected each sample day. No predetermined interviewing route was used. Survey periods were from March 1 through April 26, 2002 and from September 1 through November 30, 2002. Sections and months were be estimated separately.

Table 1–Work shifts and expansion values (referred to as “F” in Lockwood et al. 1999) used to estimate catch and effort, upper Grand River (Ingham and Ionia counties), lower Grand River (Kent County), and Rogue River (Kent County), summer 2002.  
Shift

Month	Shift		Expansion values
	Early	Late	
March	0700 h – 1530 h	1100 h – 1930 h	14
April 1-26	0700 h – 1530 h	1200 h – 2030 h	15
September	0700 h – 1530 h	1200 h – 2030 h	15
October	0700 h – 1530 h	1100 h – 1930 h	14
November	0700 h – 1530 h	1000 h – 1830 h	13

Table 2–Estimated harvest, catch per hour, and fishing pressure for 502, shore. Two standard errors are given in parentheses.

Species	C/H	March	April	September	October	November	Season
<b>HARVEST</b>							
Rainbow trout	0.0760 (0.0377)	350 (253)	1,063 (589)	0 (0)	0 (0)	0 (0)	1,412 (641)
<b>TOTAL HARVEST</b>	<b>0.0760 (0.0377)</b>	<b>350 (253)</b>	<b>1,063 (589)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>1,412 (641)</b>
<b>RELEASED</b>							
Coho salmon	0.0010 (0.0019)	0 (0)	0 (0)	0 (0)	19 (35)	0 (0)	19 (35)
Chinook salmon	0.0045 (0.0057)	0 (0)	0 (0)	0 (0)	77 (105)	6 (11)	83 (105)
Rainbow trout	0.0598 (0.0412)	765 (637)	263 (320)	0 (0)	84 (168)	0 (0)	1,112 (733)
Brown trout	0.0116 (0.0147)	37 (43)	158 (263)	17 (36)	0 (0)	4 (7)	216 (269)
Common white sucker	0.0033 (0.0068)	0 (0)	62 (126)	0 (0)	0 (0)	0 (0)	62 (126)
<b>TOTAL RELEASED</b>	<b>0.0803 (0.0459)</b>	<b>802 (639)</b>	<b>483 (433)</b>	<b>17 (36)</b>	<b>181 (201)</b>	<b>9 (13)</b>	<b>1,492 (798)</b>



TOTAL CATCH	0.1563 (0.0634)	1,152 (687)	1,546 (731)	17 (36)	181 (201)	9 (13)	2,904 (1,024)
ANGLER HOURS		7,441 (2,409)	9,760 (2,798)	419 (313)	781 (487)	182 (132)	18,583 (3,740)
ANGLER TRIPS		2,382 (849)	2,574 (849)	157 (132)	312 (206)	67 (61)	5,491 (1,227)

Table 3—Estimated harvest, catch per hour, and fishing pressure for 503, shore. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>March</b>	<b>April</b>	<b>September</b>	<b>October</b>	<b>November</b>	<b>Season</b>
<b>HARVEST</b>							
Chinook salmon	0.0167 (0.0117)	0 (0)	0 (0)	0 (0)	642 (439)	38 (71)	680 (445)
Rainbow trout	0.0407 (0.0333)	1,287 (1,185)	289 (507)	30 (58)	57 (116)	0 (0)	1,662 (1,296)
<b>TOTAL HARVEST</b>	<b>0.0574</b> <b>(0.0364)</b>	<b>1,287</b> <b>(1,185)</b>	<b>289</b> <b>(507)</b>	<b>30</b> <b>(58)</b>	<b>698</b> <b>(454)</b>	<b>38</b> <b>(71)</b>	<b>2,342</b> <b>(1,370)</b>
<b>RELEASED</b>							
Chinook salmon	0.0540 (0.0397)	0 (0)	0 (0)	44 (52)	2,159 (1,527)	0 (0)	2,203 (1,527)
Rainbow trout	0.0500 (0.0379)	1,276 (1,336)	0 (0)	44 (67)	378 (471)	344 (352)	2,042 (1,461)
Brown trout	0.0590 (0.0786)	374 (538)	1,732 (3,092)	0 (0)	217 (277)	83 (91)	2,407 (3,152)
<b>TOTAL RELEASED</b>	<b>0.1630</b> <b>(0.1014)</b>	<b>1,650</b> <b>(1,440)</b>	<b>1,732</b> <b>(3,092)</b>	<b>89</b> <b>(84)</b>	<b>2,754</b> <b>(1,622)</b>	<b>428</b> <b>(363)</b>	<b>6,653</b> <b>(3,795)</b>
<b>TOTAL CATCH</b>	<b>0.2204</b> <b>(0.1129)</b>	<b>2,938</b> <b>(1,865)</b>	<b>2,021</b> <b>(3,134)</b>	<b>118</b> <b>(102)</b>	<b>3,452</b> <b>(1,684)</b>	<b>466</b> <b>(370)</b>	<b>8,995</b> <b>(4,035)</b>
<b>ANGLER HOURS</b>		21,762 (7,523)	10,248 (6,448)	510 (331)	6,872 (1,844)	1,425 (543)	40,817 (10,098)
<b>ANGLER TRIPS</b>		8,711 (3,207)	3,753 (2,757)	251 (173)	2,169 (656)	527 (247)	15,411 (4,290)

Table 4—Estimated harvest, catch per hour, and fishing pressure for 504, shore. Two standard errors are given in parentheses.

Species	C/H	March	April	September	October	November	Season
<b>HARVEST</b>							
Coho salmon	0.0067 (0.0063)	0 (0)	0 (0)	306 (326)	54 (64)	0 (0)	360 (332)
Chinook salmon	0.0266 (0.0116)	0 (0)	0 (0)	451 (350)	825 (429)	160 (157)	1,436 (576)
Rainbow trout	0.0301 (0.0122)	411 (363)	231 (300)	139 (155)	183 (134)	658 (306)	1,623 (597)
Atlantic salmon	0.0005 (0.0009)	0 (0)	0 (0)	0 (0)	0 (0)	24 (49)	24 (49)
Brown trout	0.0047 (0.0030)	0 (0)	0 (0)	83 (101)	153 (116)	15 (29)	251 (156)
Walleye	0.0003 (0.0006)	0 (0)	0 (0)	0 (0)	16 (31)	0 (0)	16 (31)
Bluegill	0.0033 (0.0050)	0 (0)	133 (254)	44 (91)	0 (0)	0 (0)	177 (270)
Rock bass	0.0008 (0.0017)	0 (0)	0 (0)	44 (91)	0 (0)	0 (0)	44 (91)
Channel catfish	0.0004 (0.0008)	0 (0)	0 (0)	22 (45)	0 (0)	0 (0)	22 (45)
Green Sunfish	0.0012 (0.0020)	0 (0)	0 (0)	67 (105)	0 (0)	0 (0)	67 (105)
<b>TOTAL HARVEST</b>	<b>0.0745 (0.0220)</b>	<b>411 (363)</b>	<b>364 (394)</b>	<b>1,158 (541)</b>	<b>1,231 (469)</b>	<b>857 (348)</b>	<b>4,021 (960)</b>
<b>RELEASED</b>							
Coho salmon	0.0280 (0.0336)	0 (0)	0 (0)	1,389 (1,788)	99 (93)	24 (48)	1,512 (1,791)
Chinook salmon	0.0627 (0.0297)	0 (0)	0 (0)	223 (237)	3,003 (1,466)	157 (124)	3,383 (1,490)
Rainbow trout	0.0397 (0.0219)	129 (148)	214 (245)	139 (181)	886 (988)	775 (412)	2,144 (1,123)
Brown trout	0.0050 (0.0039)	0 (0)	49 (103)	39 (78)	136 (134)	44 (87)	268 (206)
Smallmouth bass	0.0035 (0.0040)	0 (0)	66 (131)	123 (170)	0 (0)	0 (0)	189 (214)
Walleye	0.0105 (0.0081)	173 (254)	49 (101)	139 (240)	159 (204)	49 (97)	569 (428)
Common white sucker	0.0353 (0.0326)	296 (480)	1,590 (1,657)	22 (44)	0 (0)	0 (0)	1,907 (1,726)
Rock bass	0.0008 (0.0016)	0 (0)	0 (0)	44 (88)	0 (0)	0 (0)	44 (88)
Bluegill	0.0037 (0.0071)	0 (0)	199 (382)	0 (0)	0 (0)	0 (0)	199 (382)
<b>TOTAL RELEASED</b>	<b>0.1893 (0.0674)</b>	<b>598 (563)</b>	<b>2,167 (1,729)</b>	<b>2,118 (1,841)</b>	<b>4,284 (1,787)</b>	<b>1,049 (453)</b>	<b>10,216 (3,177)</b>
<b>TOTAL CATCH</b>	<b>0.2639 (0.0767)</b>	<b>1,009 (670)</b>	<b>2,531 (1,773)</b>	<b>3,276 (1,919)</b>	<b>5,515 (1,847)</b>	<b>1,906 (571)</b>	<b>14,237 (3,319)</b>
<b>ANGLER HOURS</b>		<b>11,589 (4,445)</b>	<b>5,888 (2,649)</b>	<b>10,090 (5,197)</b>	<b>17,981 (5,564)</b>	<b>8,411 (1,694)</b>	<b>53,958 (9,360)</b>
<b>ANGLER TRIPS</b>		<b>4,347 (1,769)</b>	<b>2,082 (996)</b>	<b>3,201 (1,868)</b>	<b>5,459 (1,831)</b>	<b>3,220 (744)</b>	<b>18,310 (3,394)</b>

Table 5—Estimated harvest, catch per hour, and fishing pressure of shore angling for two rivers combined. Two standard errors are given in parentheses.

Species	C/H	March	April	September	October	November	Season
<b>HARVEST</b>							
Coho salmon	0.0032 (0.0030)	0 (0)	0 (0)	306 (326)	54 (64)	0 (0)	360 (332)
Chinook salmon	0.0187 (0.0068)	0 (0)	0 (0)	451 (350)	1,466 (614)	199 (172)	2,116 (727)
Rainbow trout	0.0414 (0.0147)	2,048 (1,265)	1,582 (833)	169 (166)	240 (177)	658 (306)	4,698 (1,564)
Atlantic salmon	0.0002 (0.0004)	0 (0)	0 (0)	0 (0)	0 (0)	24 (49)	24 (49)
Brown trout	0.0022 (0.0014)	0 (0)	0 (0)	83 (101)	153 (116)	15 (29)	251 (156)
Walleye	0.0001 (0.0003)	0 (0)	0 (0)	0 (0)	16 (31)	0 (0)	16 (31)
Bluegill	0.0016 (0.0024)	0 (0)	133 (254)	44 (91)	0 (0)	0 (0)	177 (270)
Rock bass	0.0004 (0.0008)	0 (0)	0 (0)	44 (91)	0 (0)	0 (0)	44 (91)
Channel catfish	0.0002 (0.0004)	0 (0)	0 (0)	22 (45)	0 (0)	0 (0)	22 (45)
Green Sunfish	0.0006 (0.0009)	0 (0)	0 (0)	67 (105)	0 (0)	0 (0)	67 (105)
<b>TOTAL HARVEST</b>	<b>0.0686 (0.0180)</b>	<b>2,048 (1,265)</b>	<b>1,715 (871)</b>	<b>1,187 (544)</b>	<b>1,929 (653)</b>	<b>896 (355)</b>	<b>7,776 (1,791)</b>
<b>RELEASED</b>							
Coho salmon	0.0135 (0.0159)	0 (0)	0 (0)	1,389 (1,788)	119 (99)	24 (48)	1,532 (1,792)
Chinook salmon	0.0500 (0.0199)	0 (0)	0 (0)	267 (243)	5,240 (2,119)	162 (125)	5,669 (2,136)
Rainbow trout	0.0467 (0.0185)	2,170 (1,487)	477 (404)	184 (193)	1,348 (1,107)	1,120 (542)	5,298 (1,983)
Brown trout	0.0255 (0.0282)	411 (539)	1,940 (3,105)	56 (86)	353 (308)	131 (126)	2,891 (3,170)
Smallmouth bass	0.0017 (0.0019)	0 (0)	66 (131)	123 (170)	0 (0)	0 (0)	189 (214)
Walleye	0.0050 (0.0038)	173 (254)	49 (101)	139 (240)	159 (204)	49 (97)	569 (428)
Common white sucker	0.0174 (0.0154)	296 (480)	1,651 (1,662)	22 (44)	0 (0)	0 (0)	1,969 (1,730)
Rock bass	0.0004 (0.0008)	0 (0)	0 (0)	44 (88)	0 (0)	0 (0)	44 (88)
Bluegill	0.0018 (0.0034)	0 (0)	199 (382)	0 (0)	0 (0)	0 (0)	199 (382)
<b>TOTAL RELEASED</b>	<b>0.1620 (0.0487)</b>	<b>3,051 (1,673)</b>	<b>4,383 (3,569)</b>	<b>2,224 (1,843)</b>	<b>7,218 (2,421)</b>	<b>1,485 (580)</b>	<b>18,361 (5,013)</b>
<b>TOTAL CATCH</b>	<b>0.2306 (0.0552)</b>	<b>5,099 (2,097)</b>	<b>6,098 (3,674)</b>	<b>3,411 (1,922)</b>	<b>9,148 (2,508)</b>	<b>2,381 (680)</b>	<b>26,136 (5,324)</b>
<b>ANGLER HOURS</b>		<b>40,792 (9,064)</b>	<b>25,896 (7,512)</b>	<b>11,019 (5,217)</b>	<b>25,634 (5,881)</b>	<b>10,018 (1,784)</b>	<b>113,358 (14,268)</b>
<b>ANGLER TRIPS</b>		<b>15,440 (3,759)</b>	<b>8,409 (3,052)</b>	<b>3,609 (1,881)</b>	<b>7,940 (1,956)</b>	<b>3,814 (786)</b>	<b>39,212 (5,606)</b>

## Survey 17 Grand Upper, Ingham and Ionia Counties, Summer, 2002

<b>Waterbody</b>	Grand Upper
<b>Year</b>	2002
<b>County</b>	Ingham, Ionia
<b>Sites</b>	500 and 501
	■ 500 --- Grand Ledge (T.4N, R.4W, Sec. 2 and 3) to Moores Park (T.4N, R.2W, Sec. 21 – downstream of Martin Luther King Jr. Blvd.)
	■ 501 --- Lyons (T.7N, R.5W, Sec. 19) to Portland (T.6N, R.5W, Sec. 28).
<b>Survey period</b>	March 1, 2002 to April 26, 2002; September 1, 2002 to November 30, 2002
<b>Survey design</b>	progressiveaccess (progressivecounts and access interviews)
<b>Interview type/mode</b>	access/shore
<b>Count type/mode</b>	progressive/shore
<b>Clerk time</b>	1/2 time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Estimation options applied

Weekday and weekend days in 500, shore angling in November have been combined in the estimation.

### Methods

*Upper Grand River, summer 2002*. Survey followed a progressive-access design. Two sections were surveyed. Survey sections were: Grand Ledge (T.4N, R.4W, Sec. 2 and 3) to Moores Park (T.4N, R.2W, Sec. 21 – downstream of Martin Luther King Jr. Blvd.), and Lyons (T.7N, R.5W, Sec. 19) to Portland (T.6N, R.5W, Sec. 28). All funding was provided by Fisheries Division. Survey was done in conjunction with the Gull Lake angler survey. One clerk working from a vehicle collected angler count and interview data. Clerk worked 2 weekend days and 3 week days per week during survey period. Only one of the two sections was assigned for counting and interviewing during a sample day and section was chosen randomly. Two instantaneous counts of anglers were made per sample day. All anglers were visible from bridge crossings and access points. Shore and boat anglers were treated as a single mode when counting and interviewing. Each count began from either the upstream or downstream end of a section and progressed to the opposite end. Starting location was randomized. Time of count was randomized to cover times within the sample period. No holidays were scheduled for sampling. Counting and interviewing were done on the same days. One of two shifts was selected each sample day (Table 1). No predetermined interviewing route was used. Survey periods were from March 1 through April 26, 2002 and from September 1 through November 30, 2002. Estimates are given in Tables 2-4.

Table 1. Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, upper Grand River (Ingham and Ionia counties), lower Grand River (Kent County), and Rogue River (Kent County), summer 2002.

Month	Shift		Expansion values
	Early	Late	
March	0700 h – 1530 h	1100 h – 1930 h	14
April 1-26	0700 h – 1530 h	1200 h – 2030 h	15
September	0700 h – 1530 h	1200 h – 2030 h	15
October	0700 h – 1530 h	1100 h – 1930 h	14
November	0700 h – 1530 h	1000 h – 1830 h	13

Table 2. Estimated harvest, catch per hour, and shore fishing pressure for 500. Two standard errors are given in parentheses.

Species	C/H	March	April	September	October	November	Season
<b>HARVEST</b>							
Coho salmon	0.0149 (0.0153)	0 (0)	0 (0)	0 (0)	92 (114)	28 (41)	121 (121)
Rainbow trout	0.0029 (0.0060)	0 (0)	23 (48)	0 (0)	0 (0)	0 (0)	23 (48)
Walleye	0.0179 (0.0184)	0 (0)	0 (0)	0 (0)	121 (137)	25 (50)	146 (145)
Yellow Perch	0.0061 (0.0087)	0 (0)	49 (69)	0 (0)	0 (0)	0 (0)	49 (69)
Black crappie	0.0027 (0.0054)	0 (0)	22 (44)	0 (0)	0 (0)	0 (0)	22 (44)
Bluegill	0.0557 (0.0981)	0 (0)	0 (0)	389 (779)	62 (123)	0 (0)	452 (789)
Channel catfish	0.0022 (0.0045)	0 (0)	18 (36)	0 (0)	0 (0)	0 (0)	18 (36)
<b>TOTAL HARVEST</b>	<b>0.1023 (0.1037)</b>	<b>0 (0)</b>	<b>112 (102)</b>	<b>389 (779)</b>	<b>275 (216)</b>	<b>53 (64)</b>	<b>830 (817)</b>
<b>RELEASED</b>							
Coho salmon	0.0026 (0.0050)	0 (0)	0 (0)	0 (0)	21 (41)	0 (0)	21 (41)
Rainbow trout	0.0015 (0.0031)	0 (0)	0 (0)	0 (0)	0 (0)	12 (25)	12 (25)
Smallmouth bass	0.1705 (0.1163)	179 (340)	236 (246)	347 (441)	341 (316)	279 (557)	1,383 (884)
Largemouth bass	0.0018 (0.0036)	0 (0)	0 (0)	0 (0)	14 (29)	0 (0)	14 (29)
Walleye	0.1438 (0.0854)	126 (165)	514 (466)	93 (187)	400 (346)	33 (65)	1,167 (635)
Rock bass	0.0392 (0.0394)	0 (0)	281 (301)	0 (0)	0 (0)	37 (74)	318 (310)
Bluegill	0.1317	0	0	905	164	0	1,069

	(0.1731)	(0)	(0)	(1,371)	(167)	(0)	(1,381)
TOTAL RELEASED	0.4911	305	1,032	1,346	940	361	3,984
	(0.2494)	(378)	(607)	(1,452)	(500)	(566)	(1,786)
TOTAL CATCH	0.5934	305	1,144	1,735	1,216	414	4,814
	(0.2804)	(378)	(615)	(1,648)	(545)	(570)	(1,965)
ANGLER HOURS		805	1,260	1,963	3,249	836	8,112
		(614)	(908)	(1,183)	(913)	(551)	(1,933)
ANGLER TRIPS		549	438	1,173	1,091	248	3,500
		(484)	(324)	(801)	(347)	(164)	(1,062)

Table 3. Estimated harvest, catch per hour, and shore fishing pressure for 501. Two standard errors are given in parentheses.

Species	C/H	March	April	September	October	November	Season
<b>HARVEST</b>							
Coho salmon	0.0207	0	0	179	80	24	283
	(0.0145)	(0)	(0)	(163)	(98)	(34)	(193)
Chinook salmon	0.0058	0	0	0	66	12	79
	(0.0056)	(0)	(0)	(0)	(71)	(25)	(75)
Rainbow trout	0.0134	71	112	0	0	0	183
	(0.0178)	(83)	(227)	(0)	(0)	(0)	(241)
Walleye	0.0029	0	0	0	33	6	39
	(0.0038)	(0)	(0)	(0)	(49)	(12)	(51)
Black crappie	0.0013	0	18	0	0	0	18
	(0.0027)	(0)	(36)	(0)	(0)	(0)	(36)
Bluegill	0.0110	0	0	151	0	0	151
	(0.0143)	(0)	(0)	(194)	(0)	(0)	(194)
TOTAL HARVEST	0.0551	71	130	329	180	43	753
	(0.0290)	(83)	(229)	(254)	(131)	(44)	(378)
<b>RELEASED</b>							
Coho salmon	0.0034	0	0	11	14	23	47
	(0.0037)	(0)	(0)	(24)	(28)	(34)	(50)
Chinook salmon	0.0103	0	0	11	98	33	141
	(0.0081)	(0)	(0)	(18)	(82)	(68)	(108)
Rainbow trout	0.0070	22	37	6	0	30	96
	(0.0074)	(46)	(64)	(12)	(0)	(61)	(100)
Smallmouth bass	0.0806	0	156	634	217	96	1,102
	(0.0643)	(0)	(186)	(776)	(299)	(133)	(862)
Largemouth bass	0.0006	0	0	8	0	0	8
	(0.0013)	(0)	(0)	(18)	(0)	(0)	(18)
Walleye	0.0632	193	72	31	141	427	864
	(0.0514)	(325)	(143)	(39)	(169)	(565)	(690)
Northern pike	0.0018	0	8	0	0	16	24
	(0.0027)	(0)	(18)	(0)	(0)	(31)	(36)
Common white sucker	0.0026	0	0	0	35	0	35
	(0.0036)	(0)	(0)	(0)	(49)	(0)	(49)
Rock bass	0.0098	0	61	73	0	0	134
	(0.0130)	(0)	(121)	(128)	(0)	(0)	(176)
Carp	0.0194	21	244	0	0	0	265
	(0.0318)	(43)	(430)	(0)	(0)	(0)	(432)
Bluegill	0.0813	0	108	1,004	0	0	1,112
	(0.0553)	(0)	(215)	(703)	(0)	(0)	(735)
Pumpkinseed	0.0102	0	30	110	0	0	140
	(0.0179)	(0)	(61)	(236)	(0)	(0)	(243)
TOTAL RELEASED	0.2903	237	715	1,888	505	625	3,970
	(0.1147)	(331)	(556)	(1,082)	(358)	(590)	(1,437)
TOTAL CATCH	0.3454	308	846	2,217	685	667	4,723
	(0.1216)	(341)	(601)	(1,111)	(381)	(591)	(1,486)
ANGLER HOURS		2,256	3,655	2,865	3,734	1,164	13,674
		(746)	(1,022)	(1,233)	(1,108)	(560)	(2,159)
ANGLER TRIPS		1,192	1,073	742	917	380	4,303

(449) (450) (388) (322) (210) (838)

Table 4. Estimated harvest, catch per hour, and shore fishing pressure for Grand River (Upper). Two standard errors are given in parentheses.

Species	C/H	March	April	September	October	November	Season
<b>HARVEST</b>							
Coho salmon	0.0185 (0.0108)	0 (0)	0 (0)	179 (163)	172 (150)	52 (53)	403 (228)
Chinook salmon	0.0036 (0.0035)	0 (0)	0 (0)	0 (0)	66 (71)	12 (25)	79 (75)
Rainbow trout	0.0095 (0.0114)	71 (83)	135 (232)	0 (0)	0 (0)	0 (0)	206 (246)
Walleye	0.0085 (0.0072)	0 (0)	0 (0)	0 (0)	154 (145)	31 (51)	185 (154)
Yellow Perch	0.0023 (0.0032)	0 (0)	49 (69)	0 (0)	0 (0)	0 (0)	49 (69)
Black crappie	0.0018 (0.0026)	0 (0)	40 (57)	0 (0)	0 (0)	0 (0)	40 (57)
Bluegill	0.0277 (0.0375)	0 (0)	0 (0)	540 (803)	62 (123)	0 (0)	603 (812)
Channel catfish	0.0008 (0.0017)	0 (0)	18 (36)	0 (0)	0 (0)	0 (0)	18 (36)
<b>TOTAL HARVEST</b>	<b>0.0727 (0.0424)</b>	<b>71 (83)</b>	<b>243 (251)</b>	<b>719 (819)</b>	<b>455 (253)</b>	<b>96 (78)</b>	<b>1,583 (900)</b>
<b>RELEASED</b>							
Coho salmon	0.0031 (0.0030)	0 (0)	0 (0)	11 (24)	34 (49)	23 (34)	68 (64)
Chinook salmon	0.0065 (0.0050)	0 (0)	0 (0)	11 (18)	98 (82)	33 (68)	141 (108)
Rainbow trout	0.0050 (0.0048)	22 (46)	37 (64)	6 (12)	0 (0)	43 (66)	108 (103)
Smallmouth bass	0.1141 (0.0587)	179 (340)	392 (308)	981 (892)	559 (435)	374 (573)	2,485 (1,235)
Largemouth bass	0.0010 (0.0016)	0 (0)	0 (0)	8 (18)	14 (29)	0 (0)	23 (34)
Walleye	0.0932 (0.0448)	319 (364)	586 (488)	125 (191)	541 (385)	460 (569)	2,031 (938)
Northern pike	0.0011 (0.0017)	0 (0)	8 (18)	0 (0)	0 (0)	16 (31)	24 (36)
Common white sucker	0.0016 (0.0023)	0 (0)	0 (0)	0 (0)	35 (49)	0 (0)	35 (49)
Rock bass	0.0207 (0.0166)	0 (0)	342 (325)	73 (128)	0 (0)	37 (74)	452 (357)
Carp	0.0122 (0.0199)	21 (43)	244 (430)	0 (0)	0 (0)	0 (0)	265 (432)
Bluegill	0.1001 (0.0731)	0 (0)	108 (215)	1,909 (1,541)	164 (167)	0 (0)	2,180 (1,565)
Pumpkinseed	0.0064 (0.0112)	0 (0)	30 (61)	110 (236)	0 (0)	0 (0)	140 (243)
<b>TOTAL RELEASED</b>	<b>0.3651 (0.1159)</b>	<b>541 (502)</b>	<b>1,747 (823)</b>	<b>3,234 (1,811)</b>	<b>1,445 (615)</b>	<b>986 (818)</b>	<b>7,953 (2,293)</b>
<b>TOTAL CATCH</b>	<b>0.4377 (0.1272)</b>	<b>612 (509)</b>	<b>1,990 (860)</b>	<b>3,953 (1,988)</b>	<b>1,900 (665)</b>	<b>1,081 (821)</b>	<b>9,537 (2,463)</b>
<b>ANGLER HOURS</b>		<b>3,061 (966)</b>	<b>4,915 (1,367)</b>	<b>4,828 (1,708)</b>	<b>6,983 (1,436)</b>	<b>1,999 (786)</b>	<b>21,786 (2,898)</b>
<b>ANGLER TRIPS</b>		<b>1,741 (660)</b>	<b>1,511 (554)</b>	<b>1,915 (891)</b>	<b>2,008 (473)</b>	<b>628 (267)</b>	<b>7,803 (1,353)</b>



## Survey 18 Gull Lake, Kalamazoo and Barry counties, Summer, 2002

<b>Waterbody</b>	Gull
<b>Year</b>	2002
<b>County</b>	Kalamazoo and Barry counties
<b>Sites</b>	340
<b>Survey period</b>	April 27 – August 31
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access/boat
<b>Count type/mode</b>	roving/boat
<b>Clerk time</b>	1/2 time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Methods

*Gull Lake, summer 2002*. Survey followed a progressive-roving design. All funding was provided through Fisheries Division. Survey was done in conjunction with the Upper Grand River angler survey. One clerk working from a boat collected angler count and interview data. Counts began from one of two starting locations: Kellogg Biological Station (approximate middle of east shore) and the country club (approximate middle of west shore). Starting location and direction (clockwise or counter clockwise) from starting location were randomized. Time of count was randomized to cover times within the sample period. One instantaneous count of fishing boats was made per day. Both weekend days and 2 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days. One of 2-3 shifts (depending on month) was selected each sample day (Table 8). All interviewing began at the north end of the lake. Direction of travel, clockwise or counter clockwise, was chose randomly. Survey period was from April 27 through August 31, 2002. Months were estimated separately.

Table 1. Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Gull Lake (Kalamazoo and Barry counties), summer 2002.

Month	Shift			Expansion values
	Early	Middle	Late	
April 27 - May 31	0600 h – 1430 h		1330 h – 2200 h	17
June	0600 h – 1430 h	1000 h – 1830 h	1530 h – 2400 h	19
July	0600 h – 1430 h		1300 h – 2130 h	19
August	0630 h – 1500 h		1230 h – 2100 h	16

Table 2. Estimated harvest, catch per hour, and fishing pressure from Boat angling for Gull Lake. Two standard errors are given in the second row of each species.

Species	C/H	April-May	June	July	August	Season
<b>HARVEST</b>						
Smallmouth bass	0.0119	176	34	37	30	278
	0.0146	317	52	56	61	331
Yellow Perch	0.0044	103	0	0	0	103
	0.0068	155	0	0	0	155
Black crappie	0.0009	0	21	0	0	21
	0.0018	0	43	0	0	43
Bluegill	0.5897	0	8,550	4,017	1,169	13,737
	0.3734	0	6,988	3,251	1,157	7,794
Largemouth bass	0.0320	52	355	50	288	745
	0.0253	105	320	62	431	551
Rock bass	0.0399	0	815	115	0	929
	0.0316	0	668	171	0	689
TOTAL HARVEST	0.6788	331	9,775	4,219	1,487	15,813
	0.3874	368	7,027	3,257	1,236	7,852
<b>RELEASED</b>						
Smallmouth bass	0.1247	851	1,069	710	274	2,905
	0.0728	954	957	572	238	1,487
Largemouth bass	0.2119	597	2,183	1,146	1,011	4,937
	0.1039	449	1,470	827	939	1,982
Northern pike	0.0373	453	371	44	0	868
	0.0335	559	483	68	0	741
Rock bass	0.2541	310	4,019	793	796	5,919
	0.1390	258	2,584	636	748	2,776
Bluegill	0.7704	23	4,040	9,553	4,329	17,945
	0.3727	37	2,961	5,586	3,152	7,064
Yellow Perch	0.0064	34	0	115	0	149
	0.0103	61	0	229	0	237
TOTAL RELEASED	1.4047	2,268	11,682	12,361	6,410	32,722
	0.5241	1,223	4,331	5,716	3,381	8,022
TOTAL CATCH	2.0836	2,600	21,458	16,580	7,897	48,535
	0.7587	1,277	8,255	6,579	3,600	11,225
ANGLER HOURS		3,122	8,196	5,919	6,057	23,294
		1,836	4,660	3,201	2,753	6,551
ANGLER TRIPS		696	1,974	2,023	1,537	6,230
		412	1,160	1,225	937	1,973

## Survey 19 Manistee River, Wexford County, Summer, 2002

<b>Waterbody</b>	Manistee
<b>Year</b>	Summer
<b>County</b>	Wexford County
<b>Sites</b>	320 and 321
<b>Survey period</b>	Summer May-September
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access/boat, shore
<b>Count type/mode</b>	roving/boat, shore
<b>Clerk time</b>	½ time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Estimation options applied

Day types with the number of party (or parties) equal to 1 in a month were excluded in the estimation.

Weekday and weekend days in:

- 321, boat, May
- 321, boat, August
- 321, boat, September
- 321, shore, May
- 321, shore, August
- 321, shore, September

have been combined respectively in the estimation.

The following cases have been excluded in the estimation:

- No complete-trip but one incomplete interview found for weekday in September for BOAT within 321. Variance of catch rate can not be calculated for this case.
- No complete-trip but one incomplete interview found for weekend day in September for BOAT within 321. Variance of catch rate can not be calculated for this case.

### Methods

*Manistee River, summer 2002.* Survey followed a progressive-access design. Two river sections were surveyed. Survey sections were: Highway 131 bridge (T.24N, R.9W, Sec. 9) to Baxter Road bridge (T.24N, R.10W, Sec. 9), and Baxter Road to Harvey Road bridge (T.24N, R.11W, Sec. 28). All funding was provided by Fisheries Division. Survey was done in conjunction with Great Lakes angler surveys. Two clerks collected count and interview data. Clerks worked 1 weekend day and 1-2 week days per week during survey period. Instantaneous counts were made by boat and both sections were counted each sample day. Order of section counts was randomized and one of two orders was selected: Highway 131 to Baxter Road and then Baxter Road to Harvey Road, or Baxter Road to Harvey Road and then Highway 131 to Baxter Road. One clerk counted anglers while the other interviewed anglers as they exited the river. Shore, wading, and boat anglers were interviewed. All anglers, regardless of mode, were pooled for counts and interviews. Time of count was randomized to cover times within the sample period. No holidays

were scheduled for sampling. Counting and interviewing were done on the same days. One of two shifts was selected each sample day (Table 1). No predetermined interviewing route was used. Survey period was from May 14 through September 15, 2002. Sections and months were estimated separately.

Table 1. Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Manistee River (Wexford County), summer 2002.

Month	Shift		Expansion values
	Early	Late	
May 14 - 31	0600 h – 1430 h	1230 h – 2100 h	16
June	0700 h – 1530 h	1330 h – 2200 h	17
July	0700 h – 1530 h	1330 h – 2200 h	17
August	0600 h – 1430 h	1230 h – 2100 h	16
September 1-15	0600 h – 1430 h	1130 h – 2000 h	15

Table 2. Estimated harvest, catch per hour, and fishing pressure for 320. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.2538 (0.5425)	12 (18)	323 (646)	0 (0)	0 (0)	0 (0)	335 (646)
TOTAL HARVEST	0.2538 (0.5425)	12 (18)	323 (646)	0 (0)	0 (0)	0 (0)	335 (646)
<b>RELEASED</b>							
TOTAL RELEASED	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
TOTAL CATCH	0.2538 (0.5425)	12 (18)	323 (646)	0 (0)	0 (0)	0 (0)	335 (646)
ANGLER HOURS		368 (455)	952 (1,127)	0 (0)	0 (0)	0 (0)	1,320 (1,215)
ANGLER TRIPS		102 (127)	892 (2,938)	0 (0)	0 (0)	0 (0)	993 (2,940)

Table 3. Estimated harvest, catch per hour, and fishing pressure for 321. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Rainbow trout	0.0002 (0.0006)	0 (0)	14 (27)	0 (0)	0 (0)	0 (0)	14 (27)
Brown trout	0.0011 (0.0023)	24 (40)	39 (68)	0 (0)	0 (0)	0 (0)	62 (79)
Walleye	0.0074 (0.0148)	34 (58)	33 (67)	116 (225)	245 (395)	0 (0)	428 (463)
TOTAL HARVEST	0.0087 (0.0168)	58 (71)	86 (99)	116 (225)	245 (395)	0 (0)	504 (471)
<b>RELEASED</b>							
Rainbow trout	0.0001 (0.0004)	8 (16)	0 (0)	0 (0)	0 (0)	0 (0)	8 (16)
Brown trout	0.0008	48	0	0	0	0	48

	(0.0020)	(79)	(0)	(0)	(0)	(0)	(79)
Smallmouth bass	0.0056	0	4	37	285	0	326
	(0.0137)	(0)	(7)	(75)	(569)	(0)	(574)
Walleye	0.0001	6	0	0	0	0	6
	(0.0003)	(12)	(0)	(0)	(0)	(0)	(12)
TOTAL RELEASED	0.0067	63	4	37	285	0	389
	(0.0151)	(82)	(7)	(75)	(569)	(0)	(580)
TOTAL CATCH	0.0155	121	89	153	530	0	893
	(0.0290)	(108)	(99)	(237)	(693)	(0)	(747)
ANGLER HOURS		1,495	1,390	51,921	2,893	0	57,699
		(1,337)	(629)	(96,577)	(1,927)	(0)	(96,607)
ANGLER TRIPS		674	1,400	25,891	1,414	0	29,379
		(1,031)	(4,140)	(60,433)	(2,070)	(0)	(60,619)

Table 4. Estimated harvest, catch per hour, and fishing pressure for Manistee River. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Rainbow trout	0.0002	0	14	0	0	0	14
	(0.0006)	(0)	(27)	(0)	(0)	(0)	(27)
Brown trout	0.0011	24	39	0	0	0	62
	(0.0022)	(40)	(68)	(0)	(0)	(0)	(79)
Walleye	0.0129	46	356	116	245	0	763
	(0.0251)	(61)	(649)	(225)	(395)	(0)	(795)
TOTAL HARVEST	0.0142	70	409	116	245	0	839
	(0.0269)	(73)	(654)	(225)	(395)	(0)	(799)
<b>RELEASED</b>							
Rainbow trout	0.0001	8	0	0	0	0	8
	(0.0004)	(16)	(0)	(0)	(0)	(0)	(16)
Brown trout	0.0008	48	0	0	0	0	48
	(0.0019)	(79)	(0)	(0)	(0)	(0)	(79)
Smallmouth bass	0.0055	0	4	37	285	0	326
	(0.0133)	(0)	(7)	(75)	(569)	(0)	(574)
Walleye	0.0001	6	0	0	0	0	6
	(0.0003)	(12)	(0)	(0)	(0)	(0)	(12)
TOTAL RELEASED	0.0066	63	4	37	285	0	389
	(0.0146)	(82)	(7)	(75)	(569)	(0)	(580)
TOTAL CATCH	0.0208	133	412	153	530	0	1,228
	(0.0379)	(110)	(654)	(237)	(693)	(0)	(988)
ANGLER HOURS		1,863	2,342	51,921	2,893	0	59,019
		(1,412)	(1,290)	(96,577)	(1,927)	(0)	(96,615)
ANGLER TRIPS		776	2,292	25,891	1,414	0	30,373
		(1,039)	(5,076)	(60,433)	(2,070)	(0)	(60,690)

## Survey 20 Sucker River, Alger County, Summer, 2002

<b>Waterbody</b>	Sucker River
<b>Year</b>	2002
<b>County</b>	Alger County
<b>Sites</b>	150
<b>Survey period</b>	April 17, 2002 to May 13, 2002
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access
<b>Count type/mode</b>	roving
<b>Clerk time</b>	1/2 time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

*Sucker River, summer 2002*. Survey followed a progressive-access design. River surveyed was in T.49N, R.13W, Sec. 12, 13, 14 and 23. All funding was provided by Fisheries Division. Survey was done in conjunction with Great Lakes angler surveys. One clerk collected count and interview data. Clerk worked 1 weekend day and 1-2 week days per week during survey period. Instantaneous counts of anglers' vehicles were made each sample day. Direction of travel when counting was randomized and the clerk traveled either upstream to downstream, or downstream to upstream. Non-mode specific access party interviews of shore, wading, and boating anglers were collected. Time of count was randomized to cover times within the sample period. No holidays were scheduled for sampling. Counting and interviewing were done on the same days. One of two shifts was selected each sample day (Table 1). No predetermined interviewing route was used. Survey period was from April 17 through May 13, 2002. Estimates were for a single period.

Table 1. Work shifts and expansion values (referred to as "*F*" in Lockwood et al. 1999) used to estimate catch and effort, Sucker River (Alger County), summer 2002.

Month	Shift		Expansion values
	Early	Late	
April 17 – May 13	0800 h – 1630 h	1230 h – 2100 h	13

Table 2. Estimated harvest, catch per hour, and fishing pressure from shore angling for Sucker River. Two standard errors are given in parentheses. Estimated harvest, catch per hour, and fishing pressure for 150. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>April-May</b>	<b>Season</b>
<b>HARVEST</b>			
Rainbow trout	0.1229 (0.0783)	699 (357)	699 (357)
Brook trout	0.0016 (0.0033)	9 (18)	9 (18)
Common white sucker	0.0030 (0.0061)	17 (34)	17 (34)
<b>TOTAL HARVEST</b>	<b>0.1275</b> <b>(0.0796)</b>	<b>725</b> <b>(359)</b>	<b>725</b> <b>(359)</b>
<b>RELEASED</b>			
Rainbow trout	0.0801 (0.0575)	456 (277)	456 (277)
<b>TOTAL RELEASED</b>	<b>0.0801</b> <b>(0.0575)</b>	<b>456</b> <b>(277)</b>	<b>456</b> <b>(277)</b>
<b>TOTAL CATCH</b>	<b>0.2076</b> <b>(0.1123)</b>	<b>1,181</b> <b>(453)</b>	<b>1,181</b> <b>(453)</b>
<b>ANGLER HOURS</b>		<b>5,688</b> <b>(2,170)</b>	<b>5,688</b> <b>(2,170)</b>
<b>ANGLER TRIPS</b>		<b>1,992</b> <b>(806)</b>	<b>1,992</b> <b>(806)</b>

## Survey 21 Muskallonge Lake, Luce County, Summer, 2002

<b>Waterbody</b>	Muskallonge
<b>Year</b>	2002
<b>County</b>	Luce County
<b>Sites</b>	160
<b>Survey period</b>	June 1 to September 30
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access / boat
<b>Count type/mode</b>	roving / boat
<b>Clerk time</b>	1/2 time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Methods

*Muskallonge Lake, summer 2002*. Survey followed a roving-access design. All funding was provided through Fisheries Division. One clerk made instantaneous counts, from the camp ground, of fishing boats on the lake. This clerk was also used on the Sucker River angler survey and at the Grand Marais Great Lakes angler survey. Clerk worked half time at Muskallonge Lake and alternated 2 and 3 days per week on this survey. Counting and interviewing were done from a vehicle. Time of count was randomized to cover times within sample period. Two instantaneous counts of fishing boats were made per day. One weekend day and 1-2 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days. One of two shifts was selected each sample day (Table ). Angling parties were interviewed as they returned to the launch site. Survey period was from May 18 through September 30, 2002. Months were be estimated separately.

Table 1.—Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Muskallonge Lake (Luce County), summer 2002.

Month	Shift		Expansion values
	Early	Late	
May 18-31	0600 h – 1430 h	1230 h – 2100 h	16
June	0600 h – 1430 h	1330 h – 2200 h	17
July	0600 h – 1430 h	1430 h – 2300 h	19
August	0630 h – 1500 h	1330 h – 2200 h	17
September	0630 h – 1500 h	1230 h – 2100 h	16



Table 2.—Estimated harvest, catch per hour, and fishing pressure from boat angling for Muskallunge Lake. Two standard errors are given in parentheses.

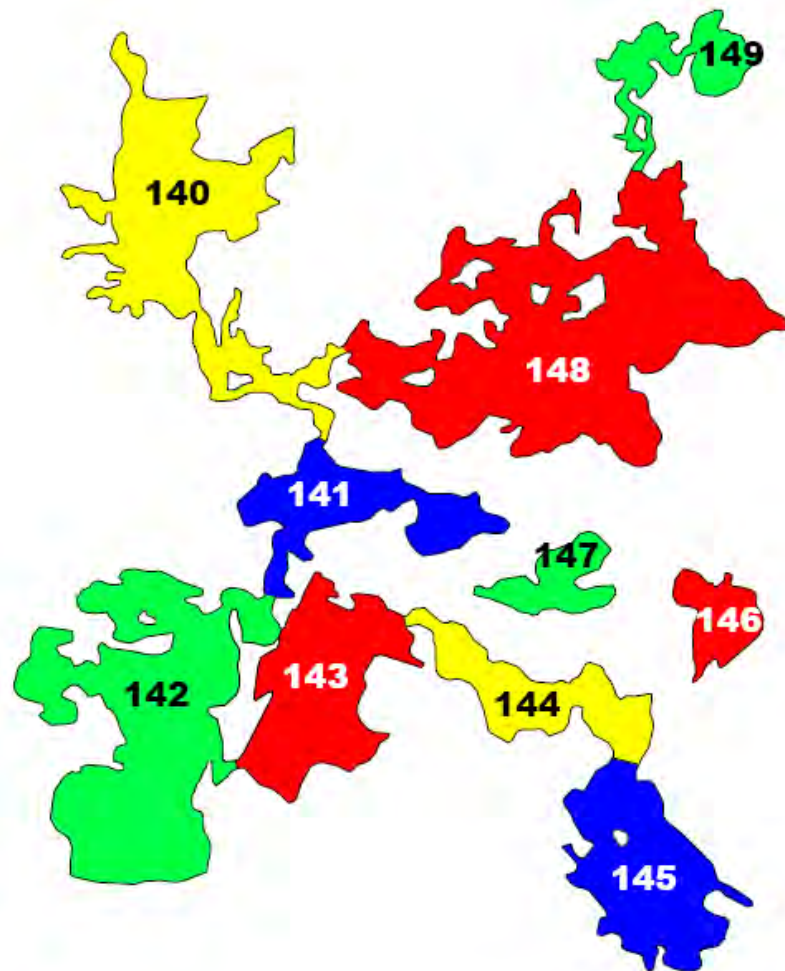
Species	C/H	June	July	August	September	Season
<b>HARVEST</b>						
Smallmouth bass	0.0077 (0.0055)	0 (0)	94 (85)	62 (67)	6 (13)	163 (109)
Walleye	0.0104 (0.0073)	105 (105)	113 (101)	0 (0)	0 (0)	218 (146)
Yellow Perch	0.0492 (0.0324)	0 (0)	148 (141)	646 (552)	237 (296)	1,031 (642)
Northern pike	0.1130 (0.0425)	610 (414)	876 (405)	709 (422)	177 (157)	2,372 (734)
Pumpkinseed	0.0048 (0.0076)	0 (0)	26 (53)	75 (149)	0 (0)	101 (158)
Rock bass	0.0389 (0.0204)	86 (86)	452 (300)	186 (201)	92 (122)	817 (391)
<b>TOTAL HARVEST</b>	<b>0.2241 (0.0703)</b>	<b>801 (436)</b>	<b>1,710 (542)</b>	<b>1,678 (742)</b>	<b>513 (357)</b>	<b>4,703 (1,078)</b>
<b>RELEASED</b>						
Smallmouth bass	0.0248 (0.0355)	24 (24)	434 (732)	62 (77)	0 (0)	520 (736)
Largemouth bass	0.0007 (0.0014)	0 (0)	15 (29)	0 (0)	0 (0)	15 (29)
Walleye	0.0139 (0.0091)	62 (72)	199 (161)	12 (25)	20 (29)	292 (181)
Northern pike	0.3314 (0.1145)	2,620 (1,372)	2,570 (1,057)	1,280 (639)	485 (380)	6,955 (1,885)
Common white sucker	0.0007 (0.0014)	0 (0)	15 (29)	0 (0)	0 (0)	15 (29)
Rock bass	0.1682 (0.0699)	259 (324)	2,086 (980)	1,007 (702)	177 (157)	3,529 (1,258)
Bluegill	0.0030 (0.0036)	0 (0)	0 (0)	50 (70)	13 (27)	63 (75)
Pumpkinseed	0.0077 (0.0074)	0 (0)	0 (0)	162 (151)	0 (0)	162 (151)
Yellow Perch	0.2395 (0.1134)	99 (161)	2,942 (1,830)	1,703 (1,038)	281 (216)	5,025 (2,122)
<b>TOTAL RELEASED</b>	<b>0.7899 (0.2278)</b>	<b>3,064 (1,421)</b>	<b>8,260 (2,448)</b>	<b>4,276 (1,419)</b>	<b>976 (466)</b>	<b>16,576 (3,200)</b>
<b>TOTAL CATCH</b>	<b>1.0140 (0.2703)</b>	<b>3,865 (1,486)</b>	<b>9,970 (2,507)</b>	<b>5,954 (1,601)</b>	<b>1,489 (587)</b>	<b>21,279 (3,377)</b>
<b>ANGLER HOURS</b>		<b>4,945 (2,285)</b>	<b>8,046 (2,695)</b>	<b>6,745 (2,692)</b>	<b>1,249 (685)</b>	<b>20,985 (4,494)</b>
<b>ANGLER TRIPS</b>		<b>1,950 (936)</b>	<b>3,347 (1,140)</b>	<b>3,096 (1,280)</b>	<b>541 (299)</b>	<b>8,934 (1,976)</b>

## **Survey 22 Cisco Thousand Island Chain, Gogebic County, Winter, 2002-2003**

<b>Waterbody</b>	Cisco–Thousand Island Chain
<b>Year</b>	winter, 2002-2003
<b>County</b>	Gogebic
<b>Sites</b>	See Figure 1
<b>Survey period</b>	December 2, 2002 through February 26, 2003
<b>Survey design</b>	roving/roving (roving counts and interviews)
<b>Interview type/mode</b>	roving/open ice, shanty
<b>Count type/mode</b>	roving/ open ice, shanty
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

*Cisco, Thousand Island Chain of Lakes, winter 2002.* Survey followed a progressive-roving design. All funding was provided through Fisheries Division. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and one instantaneous count of open-ice anglers and occupied shanties were made once per day. One of two shifts was selected each sample day (Table 1). Two clerks working from a snowmobile were used to collect angler-creel interview and count data. One clerk was assigned to interview and count anglers on lakes: Cisco, Lindsley and Fishhawk, Thousand Island, and Little and Big African and Record (Figure 1). The other clerk was assigned to lakes: Big, West Bay, East Bay, Mamie Belle, Indian, and Poor (Figure 1). Starting location (lake) and direction of travel with their assigned lakes was randomized each sample day. Survey period for both counts and interviews was from December 2, 2002 through February 26, 2003. Estimates will be by month for each lake sampling unit.

Figure 1. Lake names and codes for the Cisco-Thousand Island Chain of Lakes used during winter 2002 angler survey.



Lake name	Lake code
Cisco	140
Lindsley and Fishawk	141
Big	142
West Bay	143
East Bay	144
Mamie Belle	145
Indian	146
Poor	147
Thousand Island	148
Little and Big African, and Record	149

Table 1. Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Cisco, Thousand Island chain of lakes, winter 2002.

Month	Shift		Expansion values
	Early	Late	
December 2 – 31	0700 h – 1530 h	1100 h – 1930 h	14
January	0700 h – 1530 h	1100 h – 1930 h	14
February 1 – 26	0700 h – 1530 h	1100 h – 1930 h	14

Table 2. Cisco Thousand Island Chain winter 2002-03 open-ice and shanty angling combined for site 140.

Species	C/H	December	January	February	Season
<b>HARVEST</b>					
Yellow perch	0.6727 (1.1797)	47 (93)	2,964 (3,756)	0 (0)	3,011 (3,757)
Northern pike	0.0496 (0.0816)	41 (82)	181 (228)	0 (0)	222 (242)
Black crappie	0.0026 (0.006)	0 (0)	11 (23)	0 (0)	11 (23)
Bluegill	0.0271 (0.0483)	40 (79)	82 (135)	0 (0)	121 (157)
Pumpkinseed	0.0064 (0.015)	0 (0)	29 (57)	0 (0)	29 (57)
TOTAL HARVEST	0.7584 (1.2578)	127 (147)	3,267 (3,766)	0 (0)	3,394 (3,769)
<b>RELEASED</b>					
Largemouth bass	0.0041 (0.0079)	0 (0)	19 (27)	0 (0)	19 (27)
Northern pike	0.0278 (0.0551)	0 (0)	125 (193)	0 (0)	125 (193)
Bluegill	0.0031 (0.0072)	0 (0)	14 (27)	0 (0)	14 (27)
Yellow perch	0.2337 (0.4049)	113 (226)	933 (1,254)	0 (0)	1,046 (1,274)
TOTAL RELEASED	0.2688 (0.4389)	113 (226)	1,090 (1,269)	0 (0)	1,203 (1,289)
TOTAL CATCH	1.0271 (1.5471)	241 (270)	4,357 (3,974)	0 (0)	4,597 (3,983)
ANGLER HOURS		297 (594)	4,179 (5,483)	0 (0)	4,476 (5,515)
ANGLER TRIPS		29 (59)	954 (1,496)	0 (0)	983 (1,497)

Table 3. Cisco Thousand Island winter 2002-03 open-ice and shanty angling combined for site 141.

Species	C/H	December	January	February	Season
<b>HARVEST</b>					
Yellow perch	0.4862 (0.7115)	0 (0)	114 (174)	129 (183)	242 (252)
Northern pike	0.0040 (0.009)	0 (0)	0 (0)	2 (4)	2 (4)
Bluegill	1.3560 (2.0553)	0 (0)	453 (671)	223 (339)	675 (752)
TOTAL HARVEST	1.8462 (2.478)	0 (0)	566 (693)	353 (385)	920 (793)
<b>RELEASED</b>					
Largemouth bass	0.0215 (0.0483)	0 (0)	11 (21)	0 (0)	11 (21)
Northern pike	0.0642 (0.1079)	0 (0)	25 (41)	7 (10)	32 (43)
Bluegill	0.3483 (0.5631)	0 (0)	136 (203)	37 (75)	173 (216)
Yellow perch	0.2656 (0.4712)	0 (0)	80 (160)	52 (104)	132 (191)
TOTAL RELEASED	0.6995 (0.9288)	0 (0)	252 (263)	96 (129)	348 (293)
TOTAL CATCH	2.5457 (3.1199)	0 (0)	819 (742)	450 (406)	1,268 (846)
ANGLER HOURS		0 (0)	167 (203)	331 (470)	498 (512)
ANGLER TRIPS		0 (0)	24 (33)	81 (124)	105 (128)

Table 4. Cisco Thousand Island winter 2002-03 open-ice and shanty angling combined for site 142.

Species	C/H	December	January	February	Season
<b>HARVEST</b>					
Walleye	0.0568 (0.059)	0 (0)	82 (84)	16 (23)	97 (87)
Yellow perch	0.0010 (0.0021)	0 (0)	2 (3)	0 (0)	2 (3)
Rock bass	0.0046 (0.0095)	0 (0)	0 (0)	8 (16)	8 (16)
TOTAL HARVEST	0.0623 (0.0613)	0 (0)	83 (84)	24 (28)	107 (89)
<b>RELEASED</b>					
Walleye	0.0589 (0.0519)	6 (11)	68 (62)	27 (33)	101 (71)
Northern pike	0.0266 (0.0305)	14 (29)	32 (36)	0 (0)	46 (47)
Muskellunge	0.0010 (0.002)	0 (0)	2 (3)	0 (0)	2 (3)
TOTAL RELEASED	0.0865 (0.0674)	20 (31)	101 (72)	27 (33)	148 (85)
TOTAL CATCH	0.1488 (0.1064)	20 (31)	185 (111)	51 (43)	255 (123)

ANGLER HOURS	361 (453)	988 (683)	368 (390)	1,717 (907)
ANGLER TRIPS	61 (82)	117 (84)	101 (113)	279 (163)

Table 5. Cisco Thousand Island winter 2002-03 open-ice and shanty angling combined for site 143.

Species	C/H	December	January	February	Season
<b>HARVEST</b>					
Walleye	0.0459 (0.0672)	0 (0)	11 (17)	4 (7)	14 (18)
TOTAL HARVEST	0.0459 (0.0672)	0 (0)	11 (17)	4 (7)	14 (18)
<b>RELEASED</b>					
Walleye	0.1688 (0.1946)	4 (8)	27 (39)	22 (28)	52 (49)
Northern pike	0.0992 (0.113)	3 (5)	5 (11)	23 (25)	31 (28)
Muskellunge	0.020 (0.0345)	0 (0)	0 (0)	6 (10)	6 (10)
TOTAL RELEASED	0.2879 (0.2683)	7 (10)	32 (41)	51 (39)	89 (57)
TOTAL CATCH	0.3339 (0.2975)	7 (10)	42 (44)	54 (40)	103 (60)
ANGLER HOURS		49 (98)	88 (118)	173 (142)	310 (209)
ANGLER TRIPS		7 (15)	27 (36)	23 (33)	56 (51)

Table 6. Cisco Thousand Island winter 2002-03 open-ice and shanty angling combined for site 144.

Species	C/H	December	January	February	Season
<b>HARVEST</b>					
Walleye	0.0885	66	2	19	87
Yellow perch	0.1526	99	0	52	151
Northern pike	0.0051	0	0	5	5
TOTAL HARVEST	0.2462	165	2	77	243
<b>RELEASED</b>					
Walleye	0.1047	52	4	48	104
Northern pike	0.0857	27	15	43	85
Yellow perch	0.0437	23	0	20	43
TOTAL RELEASED	0.2341	101	20	110	231
TOTAL CATCH	0.4802	266	22	187	475
ANGLER HOURS		386	70	533	989
ANGLER TRIPS		84	11	96	191

Table 7. Cisco Thousand Island winter 2002-03 open-ice and shanty angling combined for site 145.

Species	C/H	December	January	February	Season
<b>HARVEST</b>					
Walleye		–	11	0	–
Yellow perch		–	18	45	–
Rock bass		–	0	4	–
TOTAL HARVEST		–	29	49	–
<b>RELEASED</b>					
Walleye		–	9	0	–
Northern pike		–	74	25	–
Muskellunge		–	0	4	–
Bluegill		–	0	8	–
Yellow perch		–	2	0	–
TOTAL RELEASED		–	85	37	–
TOTAL CATCH		–	114	86	–
ANGLER HOURS		–	429	63	–
ANGLER TRIPS		–	62	12	–

Table 8. Cisco Thousand Island winter 2002-03 open-ice and shanty angling combined for site 148.

Species	C/H	December	January	February	Season
<b>HARVEST</b>					
Bluegill	5.3583 (6.9772)	0 (0)	2,487 (2,518)	34 (58)	2,521 (2,519)
TOTAL HARVEST	5.3583 (6.9772)	0 (0)	2,487 (2,518)	34 (58)	2,521 (2,519)
<b>RELEASED</b>					
Bluegill	3.0119 (4.2701)	0 (0)	1,390 (1,623)	27 (54)	1,417 (1,624)
TOTAL RELEASED	3.0119 (4.2701)	0 (0)	1,390 (1,623)	27 (54)	1,417 (1,624)
TOTAL CATCH	8.3702 (9.4562)	0 (0)	3,877 (2,996)	61 (79)	3,938 (2,997)
ANGLER HOURS		0 (0)	416 (386)	54 (75)	470 (393)
ANGLER TRIPS		0 (0)	95 (106)	8 (13)	103 (107)

Table 9. Estimated harvest, catch per hour, and fishing pressure for Cisco Thousand Island. Two standard errors are given in parentheses.

Species	C/H	December	January	February	Season
<b>HARVEST</b>					
Walleye	0.0264 (0.0193)	105 (73)	123 (94)	39 (31)	266 (123)
Yellow Perch	0.3458 (0.4222)	155 (126)	3,106 (3,760)	225 (209)	3,486 (3,768)
Northern pike	0.0231 (0.0272)	40 (74)	184 (228)	8 (9)	233 (240)
Black crappie	0.0011 (0.0024)	0 (0)	11 (23)	0 (0)	11 (23)
Bluegill	0.3157 (0.3146)	36 (71)	2,891 (2,583)	256 (344)	3,183 (2,607)
Pumpkinseed	0.0028 (0.0059)	0 (0)	29 (57)	0 (0)	29 (57)
Rock bass	0.0012 (0.0019)	0 (0)	0 (0)	12 (18)	12 (18)
Green Sunfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.7162 (0.6104)</b>	<b>336 (178)</b>	<b>6,343 (4,569)</b>	<b>541 (404)</b>	<b>7,220 (4,590)</b>
<b>RELEASED</b>					
Largemouth bass	0.0029 (0.0038)	0 (0)	29 (34)	0 (0)	29 (34)
Walleye	0.0360 (0.0242)	145 (81)	122 (80)	96 (66)	363 (131)
Northern pike	0.0570 (0.0418)	193 (117)	283 (231)	99 (64)	575 (267)
Muskellunge	0.0012 (0.0014)	1 (2)	2 (3)	10 (12)	13 (13)
Bluegill	0.1555 (0.1841)	0 (0)	1,495 (1,626)	73 (93)	1,568 (1,629)
Yellow Perch	0.1227 (0.1453)	129 (206)	1,036 (1,265)	72 (109)	1,237 (1,286)
<b>TOTAL RELEASED</b>	<b>0.3754 (0.2978)</b>	<b>469 (250)</b>	<b>2,967 (2,075)</b>	<b>350 (170)</b>	<b>3,785 (2,097)</b>
<b>TOTAL CATCH</b>	<b>1.0916 (0.7965)</b>	<b>805 (307)</b>	<b>9,310 (5,018)</b>	<b>891 (439)</b>	<b>11,006 (5,047)</b>
<b>ANGLER HOURS</b>		<b>2,139 (1,057)</b>	<b>6,405 (5,570)</b>	<b>1,538 (780)</b>	<b>10,082 (5,723)</b>



## Survey 23 Muskegon Lake, Muskegon County, Winter, 2003

<b>Waterbody</b>	Muskegon
<b>Year</b>	Winter, 2003
<b>County</b>	Muskegon
<b>Sites</b>	310
<b>Survey period</b>	January 4 to March 23
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access/open ice, shanty
<b>Count type/mode</b>	roving/open ice and shanty
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a roving-access (roving counts and access interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the water body and direction of travel were randomized for both counting and interviewing (Figure 1). Roving counts of open ice and shanty anglers were made once per day. Survey period for both counts and interviews was January 4 to March 23. Months were estimated separately. Estimates are given in Table 2.

Figure 1.—Muskegon Lake map used for winter 2002 counts and interviews with markers.

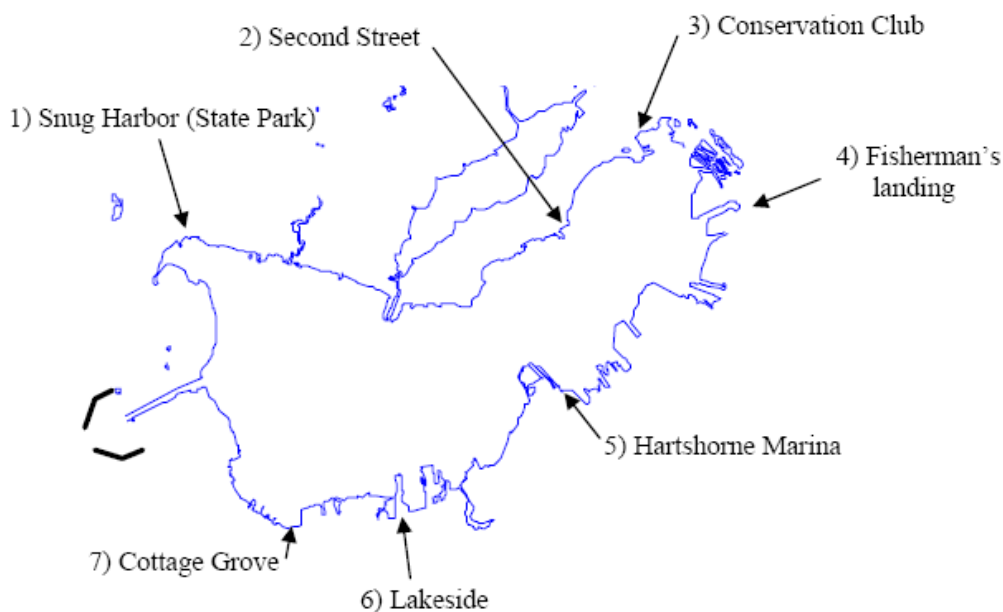


Table 1. Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Muskegon Lake, winter 2002.

Month	Shift	
	Early	Late
January 4 – 31	0700 h – 1530 h	1100 h – 1930 h
February	0700 h – 1530 h	1100 h – 1930 h
March	0700 h – 1530 h	1100 h – 1930 h

	Year	Month	F
1	2003	1	13
2	2003	2	13
3	2003	3	13

Table 2. Total estimated harvest, catch per hour, and fishing pressure for Muskegon Lake. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>Season</b>
<b>HARVEST</b>					
Walleye	0.0036 (0.0036)	115 (140)	98 (197)	76 (150)	289 (284)
Yellow Perch	0.6120 (0.1940)	9,037 (4,806)	29,184 (9,456)	11,138 (5,923)	49,359 (12,149)
	0.0002 (0.0004)	15 (31)	0 (0)	0 (0)	15 (31)
Northern pike	0.0146 (0.0085)	272 (320)	290 (310)	613 (467)	1,175 (645)
Black crappie	0.0009 (0.0012)	69 (98)	0 (0)	0 (0)	69 (98)
Bluegill	0.4903 (0.2256)	5,498 (4,319)	6,670 (5,817)	27,372 (14,705)	39,540 (16,393)
Pumpkinseed	0.0177 (0.0171)	398 (505)	0 (0)	1,029 (1,254)	1,427 (1,351)
Rock bass	0.0248 (0.0305)	229 (319)	1,771 (2,407)	0 (0)	2,000 (2,428)
<b>TOTAL HARVEST</b>	<b>1.1640 (0.3454)</b>	<b>15,634 (6,499)</b>	<b>38,013 (11,366)</b>	<b>40,228 (15,910)</b>	<b>93,875 (20,605)</b>
<b>RELEASED</b>					
Smallmouth bass	0.0008 (0.0012)	19 (38)	44 (88)	0 (0)	64 (96)
Largemouth bass	0.0010 (0.0014)	77 (115)	0 (0)	0 (0)	77 (115)
Northern pike	0.0309 (0.0172)	431 (443)	955 (683)	1,109 (1,011)	2,495 (1,298)
White bass	0.0018 (0.0022)	0 (0)	148 (171)	0 (0)	148 (171)
Rock bass	0.0029 (0.0040)	188 (306)	44 (88)	0 (0)	232 (318)
Bluegill	0.3158 (0.1599)	2,250 (1,545)	6,964 (6,676)	16,250 (9,667)	25,465 (11,849)
Pumpkinseed	0.0077 (0.0096)	414 (637)	0 (0)	210 (422)	624 (764)
Yellow Perch	0.2404 (0.0901)	5,379 (3,663)	9,855 (4,072)	4,156 (2,786)	19,391 (6,145)
<b>TOTAL RELEASED</b>	<b>0.6013 (0.2054)</b>	<b>8,759 (4,064)</b>	<b>18,010 (7,852)</b>	<b>21,726 (10,120)</b>	<b>48,495 (13,438)</b>
<b>TOTAL CATCH</b>	<b>1.7653 (0.4661)</b>	<b>24,394 (7,665)</b>	<b>56,023 (13,815)</b>	<b>61,953 (18,856)</b>	<b>142,370 (24,600)</b>
<b>ANGLER HOURS</b>		<b>20,695 (9,478)</b>	<b>38,993 (10,807)</b>	<b>20,960 (7,253)</b>	<b>80,648 (16,101)</b>
<b>ANGLER TRIPS</b>		<b>5,532 (2,475)</b>	<b>9,781 (2,835)</b>	<b>4,914 (1,749)</b>	<b>20,227 (4,150)</b>

## Survey 24 Lake Leelanau, Leelanau County, Winter, 2003

<b>Waterbody</b>	Lake Leelanau
<b>Year</b>	2003
<b>County</b>	Leelanau County
<b>Sites</b>	290, 291
<b>Survey period</b>	Winter, January-March
<b>Survey design</b>	Roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	roving /open ice, shanty
<b>Count type/mode</b>	roving/open ice and shanty
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

*Lake Leelanau, winter 2002.* Survey followed a progressive-roving design. All funding was provided through Fisheries Division. One clerk working from a snowmobile collected angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. Lake was divided into two sections -- North Lake Leelanau and South Lake Leelanau (Figure 1). Either North Lake Leelanau or South Lake Leelanau was sampled each day. Starting location within a section and direction of travel were randomized for both counting and interviewing. Instantaneous counts of open-ice anglers and occupied shanties were made once per day. Survey period for both counts and interviews was December 15, 2002 through March 31, 2003. were estimated separately. Estimates are given in Tables 2-6.

Figure 1.—Lake Leelanau map with flight path, markers and GPS latitude-longitude coordinates. Marker 5 is the boundary between North Lake Leelanau and South Lake Leelanau.

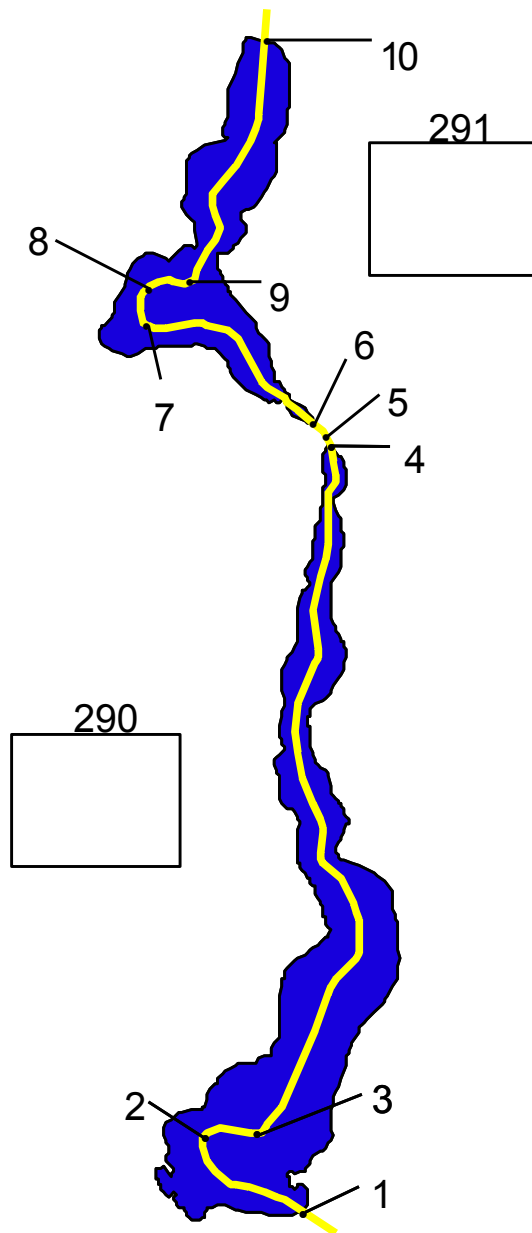


Table 1.—Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Lake Leelanau, winter 2002.

Month	Shift	
	Early	Late
December 15 – 31	0700 h – 1530 h	1100 h – 1930 h
January	0700 h – 1530 h	1100 h – 1930 h
February	0700 h – 1530 h	1100 h – 1930 h
March	0700 h – 1530 h	1100 h – 1930 h

	Year	Month	F
1	2003	1	13
2	2003	2	13
3	2003	3	13

Table 2. Estimated harvest, catch per hour, and fishing pressure for 290. Two standard errors are given in parentheses.

Species	C/H	January	February	March	Season
<b>HARVEST</b>					
Walleye	0.0362 (0.0280)	20 (38)	91 (92)	207 (186)	318 (211)
Yellow Perch	0.1544 (0.1482)	313 (381)	153 (162)	889 (1,109)	1,355 (1,184)
Northern pike	0.0005 (0.0010)	0 (0)	0 (0)	4 (8)	4 (8)
<b>TOTAL HARVEST</b>	<b>0.1911 (0.1567)</b>	<b>333 (383)</b>	<b>244 (186)</b>	<b>1,100 (1,125)</b>	<b>1,677 (1,203)</b>
<b>RELEASED</b>					
Walleye	0.0440 (0.0343)	43 (66)	178 (176)	165 (178)	386 (259)
Northern pike	0.0029 (0.0048)	20 (39)	0 (0)	6 (10)	25 (41)
Muskellunge	0.0067 (0.0136)	58 (117)	0 (0)	0 (0)	58 (117)
<b>TOTAL RELEASED</b>	<b>0.0535 (0.0390)</b>	<b>121 (140)</b>	<b>178 (176)</b>	<b>170 (178)</b>	<b>469 (287)</b>
<b>TOTAL CATCH</b>	<b>0.2446 (0.1712)</b>	<b>454 (407)</b>	<b>422 (256)</b>	<b>1,270 (1,139)</b>	<b>2,146 (1,236)</b>
<b>ANGLER HOURS</b>		<b>2,622 (1,593)</b>	<b>2,392 (804)</b>	<b>3,761 (2,999)</b>	<b>8,774 (3,490)</b>
<b>ANGLER TRIPS</b>		<b>832 (534)</b>	<b>698 (320)</b>	<b>1,565 (1,619)</b>	<b>3,095 (1,734)</b>

Table 3. Estimated harvest, catch per hour, and fishing pressure for 291. Two standard errors are given in parentheses.

Species	C/H	January	February	March	Season
<b>HARVEST</b>					
Lake trout	0.0251 (0.0258)	0 (0)	120 (104)	87 (173)	206 (202)
Cisco	0.0094 (0.0191)	0 (0)	78 (155)	0 (0)	78 (155)
Walleye	0.0207 (0.0210)	0 (0)	154 (161)	16 (32)	170 (165)
Yellow Perch	0.0310 (0.0431)	0 (0)	36 (60)	218 (340)	254 (345)

Northern pike	0.0018 (0.0035)	0 (0)	14 (29)	0 (0)	14 (29)
<b>TOTAL HARVEST</b>	<b>0.0880</b> <b>(0.0623)</b>	<b>0</b> <b>(0)</b>	<b>402</b> <b>(256)</b>	<b>321</b> <b>(383)</b>	<b>723</b> <b>(461)</b>
<b>RELEASED</b>					
Northern pike	0.0021 (0.0043)	0 (0)	0 (0)	17 (35)	17 (35)
Yellow Perch	0.0051 (0.0101)	42 (82)	0 (0)	0 (0)	42 (82)
<b>TOTAL RELEASED</b>	<b>0.0072</b> <b>(0.0111)</b>	<b>42</b> <b>(82)</b>	<b>0</b> <b>(0)</b>	<b>17</b> <b>(35)</b>	<b>59</b> <b>(89)</b>
<b>TOTAL CATCH</b>	<b>0.0953</b> <b>(0.0642)</b>	<b>42</b> <b>(82)</b>	<b>402</b> <b>(256)</b>	<b>338</b> <b>(385)</b>	<b>782</b> <b>(469)</b>
<b>ANGLER HOURS</b>		<b>1,922</b> <b>(1,107)</b>	<b>4,094</b> <b>(1,538)</b>	<b>2,193</b> <b>(1,652)</b>	<b>8,209</b> <b>(2,514)</b>
<b>ANGLER TRIPS</b>		<b>651</b> <b>(422)</b>	<b>1,261</b> <b>(726)</b>	<b>773</b> <b>(654)</b>	<b>2,686</b> <b>(1,064)</b>

Table 4. Estimated harvest, catch per hour, and fishing pressure for open ice, two sites combined. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>Season</b>
<b>HARVEST</b>					
Lake trout	0.0134 (0.0170)	0 (0)	80 (93)	0 (0)	80 (93)
Walleye	0.0122 (0.0157)	0 (0)	19 (38)	54 (77)	73 (86)
Yellow Perch	0.1229 (0.1718)	0 (0)	0 (0)	735 (958)	735 (958)
Northern pike	0.0007 (0.0014)	0 (0)	0 (0)	4 (8)	4 (8)
<b>TOTAL HARVEST</b>	<b>0.1493</b> <b>(0.1784)</b>	<b>0</b> <b>(0)</b>	<b>99</b> <b>(101)</b>	<b>793</b> <b>(961)</b>	<b>892</b> <b>(966)</b>
<b>RELEASED</b>					
Walleye	0.0094 (0.0129)	14 (30)	0 (0)	42 (65)	56 (72)
Northern pike	0.0009 (0.0018)	0 (0)	0 (0)	6 (10)	6 (10)
<b>TOTAL RELEASED</b>	<b>0.0104</b> <b>(0.0132)</b>	<b>14</b> <b>(30)</b>	<b>0</b> <b>(0)</b>	<b>48</b> <b>(66)</b>	<b>62</b> <b>(73)</b>
<b>TOTAL CATCH</b>	<b>0.1596</b> <b>(0.1811)</b>	<b>14</b> <b>(30)</b>	<b>99</b> <b>(101)</b>	<b>841</b> <b>(963)</b>	<b>954</b> <b>(969)</b>
<b>ANGLER HOURS</b>		<b>1,062</b> <b>(940)</b>	<b>1,980</b> <b>(976)</b>	<b>2,938</b> <b>(2,711)</b>	<b>5,980</b> <b>(3,031)</b>
<b>ANGLER TRIPS</b>		<b>379</b> <b>(386)</b>	<b>730</b> <b>(429)</b>	<b>1,462</b> <b>(1,616)</b>	<b>2,572</b> <b>(1,716)</b>

Table 5. Estimated harvest, catch per hour, and fishing pressure for shanty, two sites combined. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>Season</b>
<b>HARVEST</b>					
Lake trout	0.0115 (0.0166)	0 (0)	39 (46)	87 (173)	126 (179)
Cisco	0.0070 (0.0142)	0 (0)	78 (155)	0 (0)	78 (155)
Walleye	0.0377 (0.0253)	20 (38)	226 (182)	169 (172)	415 (253)
Yellow Perch	0.0795 (0.0740)	313 (381)	189 (172)	372 (655)	874 (777)

Northern pike	0.0013 (0.0026)	0 (0)	14 (29)	0 (0)	14 (29)
<b>TOTAL HARVEST</b>	<b>0.1370</b> <b>(0.0862)</b>	<b>333</b> <b>(383)</b>	<b>546</b> <b>(300)</b>	<b>628</b> <b>(699)</b>	<b>1,507</b> <b>(851)</b>
<b>RELEASED</b>					
Walleye	0.0299 (0.0241)	29 (59)	178 (176)	122 (166)	329 (248)
Northern pike	0.0033 (0.0048)	20 (39)	0 (0)	17 (35)	37 (52)
Muskellunge	0.0053 (0.0107)	58 (117)	0 (0)	0 (0)	58 (117)
Yellow Perch	0.0038 (0.0075)	42 (82)	0 (0)	0 (0)	42 (82)
<b>TOTAL RELEASED</b>	<b>0.0424</b> <b>(0.0290)</b>	<b>149</b> <b>(159)</b>	<b>178</b> <b>(176)</b>	<b>140</b> <b>(169)</b>	<b>467</b> <b>(291)</b>
<b>TOTAL CATCH</b>	<b>0.1794</b> <b>(0.0957)</b>	<b>482</b> <b>(415)</b>	<b>724</b> <b>(347)</b>	<b>768</b> <b>(719)</b>	<b>1,974</b> <b>(900)</b>
<b>ANGLER HOURS</b>		<b>3,482</b> <b>(1,697)</b>	<b>4,506</b> <b>(1,435)</b>	<b>3,015</b> <b>(2,092)</b>	<b>11,004</b> <b>(3,052)</b>
<b>ANGLER TRIPS</b>		<b>1,104</b> <b>(560)</b>	<b>1,229</b> <b>(668)</b>	<b>876</b> <b>(659)</b>	<b>3,209</b> <b>(1,093)</b>

Table 6. Estimated harvest, catch per hour, and fishing pressure for Leelanau Lakes. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>Season</b>
<b>HARVEST</b>					
Lake trout	0.0121 (0.0123)	0 (0)	120 (104)	87 (173)	206 (202)
Cisco	0.0046 (0.0092)	0 (0)	78 (155)	0 (0)	78 (155)
Walleye	0.0287 (0.0174)	20 (38)	245 (186)	224 (189)	488 (268)
Yellow Perch	0.0947 (0.0765)	313 (381)	189 (172)	1,107 (1,160)	1,609 (1,233)
Northern pike	0.0011 (0.0018)	0 (0)	14 (29)	4 (8)	19 (30)
<b>TOTAL HARVEST</b>	<b>0.1413</b> <b>(0.0838)</b>	<b>333</b> <b>(383)</b>	<b>646</b> <b>(316)</b>	<b>1,421</b> <b>(1,188)</b>	<b>2,400</b> <b>(1,288)</b>
<b>RELEASED</b>					
Walleye	0.0227 (0.0163)	43 (66)	178 (176)	165 (178)	386 (259)
Northern pike	0.0025 (0.0032)	20 (39)	0 (0)	23 (36)	42 (53)
Muskellunge	0.0034 (0.0069)	58 (117)	0 (0)	0 (0)	58 (117)
Yellow Perch	0.0025 (0.0049)	42 (82)	0 (0)	0 (0)	42 (82)
<b>TOTAL RELEASED</b>	<b>0.0311</b> <b>(0.0194)</b>	<b>163</b> <b>(162)</b>	<b>178</b> <b>(176)</b>	<b>187</b> <b>(182)</b>	<b>529</b> <b>(300)</b>
<b>TOTAL CATCH</b>	<b>0.1724</b> <b>(0.0893)</b>	<b>496</b> <b>(416)</b>	<b>824</b> <b>(362)</b>	<b>1,609</b> <b>(1,202)</b>	<b>2,929</b> <b>(1,322)</b>
<b>ANGLER HOURS</b>		<b>4,544</b> <b>(1,940)</b>	<b>6,486</b> <b>(1,735)</b>	<b>5,953</b> <b>(3,424)</b>	<b>16,983</b> <b>(4,302)</b>
<b>ANGLER TRIPS</b>		<b>1,483</b> <b>(680)</b>	<b>1,959</b> <b>(794)</b>	<b>2,339</b> <b>(1,746)</b>	<b>5,781</b> <b>(2,035)</b>



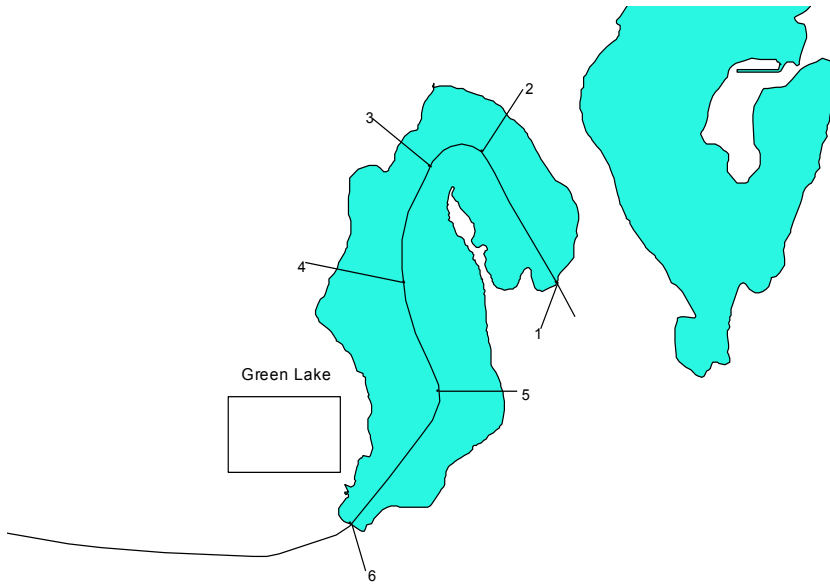
## Survey 25 Green Lake, Traverse County, Summer, 2003

<b>Waterbody</b>	Green Lake
<b>Year</b>	Summer, 2003
<b>County</b>	Traverse County
<b>Sites</b>	292
<b>Survey period</b>	April 23 to September 30
<b>Survey design</b>	Aerial-roving (aerial counts, roving interviews)
<b>Interview type/mode</b>	roving/boat
<b>Count type/mode</b>	aerial/boat
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Methods**

*Green Lakes, summer 2003.* Survey followed an aerial-roving design. All funding was provided through Fisheries Division. Counts progressed along a flight path from Crystal Lake to Green Lake or from Green Lake to Crystal Lake (Figure 1). Flight took approximately 19 min to complete. This sequence was randomized. Time of count was randomized to cover sample period. Only fishing boats were counted. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and one instantaneous count of fishing boats was made per day. One of two shifts was selected each sample day for interviewing (Table 1). One clerk was assigned to interview anglers on Green Lake. Starting location (GPS Marker) and direction of travel with their assigned lakes was randomized each sample day. Survey period is from April 20 through September 30. Estimates are given in Table 2.

Figure 1. Green Lake map with flight path, markers and GPS latitude-longitude coordinates.



Marker	Latitude	Longitude
1	44.61263°N	85.76460°W
2	44.62583°N	85.77542°W
3	44.62428°N	85.78291°W
4	44.61265°N	85.78680°W
5	44.60178°N	85.78169°W
6	44.58844°N	85.79457°W

Table 1.–Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Green lake, summer 2003.

Month	Shift		Expansion values
	Early	Late	
April 20 – May 31	0600 h – 1430 h	1330 h – 2200 h	17
June	0600 h – 1430 h	1330 h – 2200 h	17
July	0600 h – 1430 h	1300 h – 2130 h	17
August	0630 h – 1500 h	1230 h – 2100 h	16
September	0630 h – 1500 h	1200 h – 2030 h	15

Table 2. Estimated boat angling harvest, catch per hour, and fishing pressure for Green Lake. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Lake trout	0.0004 (0.0005)	0 (0)	9 (12)	0 (0)	0 (0)	0 (0)	9 (12)
Smallmouth bass	0.0198 (0.0081)	64 (60)	155 (97)	114 (86)	94 (87)	41 (56)	469 (176)
Yellow Perch	0.1232 (0.0393)	2 (5)	1,050 (473)	1,099 (536)	611 (316)	157 (196)	2,920 (806)
Northern pike	0.0123 (0.0064)	109 (116)	97 (61)	73 (57)	12 (25)	0 (0)	291 (145)
Bluegill	0.1916 (0.0664)	29 (43)	804 (318)	1,137 (595)	1,173 (578)	1,397 (1,076)	4,541 (1,396)
Largemouth bass	0.0066 (0.0034)	9 (13)	51 (40)	53 (47)	18 (22)	26 (38)	157 (76)
Pumpkinseed	0.0135 (0.0116)	5 (11)	5 (7)	44 (49)	70 (84)	197 (252)	320 (271)
Rock bass	0.0975 (0.0310)	236 (199)	761 (284)	719 (374)	379 (301)	216 (227)	2,311 (634)
Green Sunfish	0.0005 (0.0008)	0 (0)	3 (6)	9 (18)	0 (0)	0 (0)	12 (19)
<b>TOTAL HARVEST</b>	<b>0.4655 (0.1056)</b>	<b>455 (242)</b>	<b>2,934 (648)</b>	<b>3,248 (893)</b>	<b>2,359 (735)</b>	<b>2,034 (1,147)</b>	<b>11,030 (1,769)</b>
<b>RELEASED</b>							
Smallmouth bass	0.1657 (0.0520)	723 (504)	610 (246)	488 (279)	1,436 (755)	672 (401)	3,928 (1,060)
Largemouth bass	0.0820 (0.0271)	374 (316)	336 (154)	252 (147)	301 (153)	681 (384)	1,943 (562)
Northern pike	0.0351 (0.0125)	179 (138)	417 (191)	149 (102)	36 (38)	50 (49)	831 (264)
Common white sucker	0.0006 (0.0009)	0 (0)	14 (20)	0 (0)	0 (0)	0 (0)	14 (20)
Rock bass	0.1532 (0.0456)	226 (175)	1,145 (364)	1,005 (472)	536 (263)	718 (610)	3,630 (910)
Bowfin	0.0040 (0.0026)	10 (19)	44 (42)	41 (37)	0 (0)	0 (0)	95 (59)
Bluegill	0.6544 (0.1833)	105 (147)	995 (376)	5,224 (2,328)	6,836 (2,298)	2,347 (1,345)	15,507 (3,560)
Pumpkinseed	0.0169 (0.0196)	0 (0)	11 (21)	18 (27)	14 (21)	357 (458)	399 (459)
Yellow Perch	0.1363 (0.0479)	0 (0)	680 (307)	816 (466)	1,058 (436)	677 (721)	3,231 (1,010)

TOTAL RELEASED	1.2482 (0.2627)	1,616 (652)	4,253 (701)	7,993 (2,443)	10,217 (2,477)	5,501 (1,794)	29,578 (4,030)
TOTAL CATCH	1.7136 (0.3317)	2,071 (696)	7,186 (954)	11,241 (2,601)	12,576 (2,584)	7,534 (2,130)	40,608 (4,402)
ANGLER HOURS		3,145 (1,957)	5,477 (1,098)	7,161 (2,508)	5,230 (1,320)	2,684 (1,175)	23,697 (3,801)
ANGLER TRIPS		1,005 (622)	1,631 (581)	2,691 (1,002)	1,786 (1,048)	830 (388)	7,943 (1,726)

## Survey 26 Bond Falls, Ontanagon County, Summer, 2003

<b>Waterbody</b>	Bond Falls
<b>Year</b>	2003
<b>County</b>	Ontanagon
<b>Sites</b>	161,162,163
<b>Survey period</b>	May 8, 2003 to October 15, 2003
<b>Survey design</b>	progressive-roving
<b>Interview type/mode</b>	roving / boat
<b>Count type/mode</b>	progressive, boat
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Estimation options applied**

Days in 161, boat and September are combined.

### **Notes**

*Bond Falls Flowage, summer 2003.* Survey followed a progressive-roving design. All funding was provided through Fisheries Division. One clerk working from a boat collected angler count and interview data (Figure 1). Counts began from 1 of 3 GPS markers. Starting location and direction (clockwise or counter clockwise) from starting location were randomized. Time of count was randomized to cover times within the sample period. One instantaneous count of fishing boats was made per day. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days. One of two shifts was selected each sample day for interviewing (Table 1). All 3 lake sections were sampled each scheduled day. Direction of travel, clockwise or counter clockwise, was chose randomly. Survey period was from May 8 through October 15, 2003.

Figure 1.—Bond Falls Flowage count and interview grids used during 2003 summer angler survey.

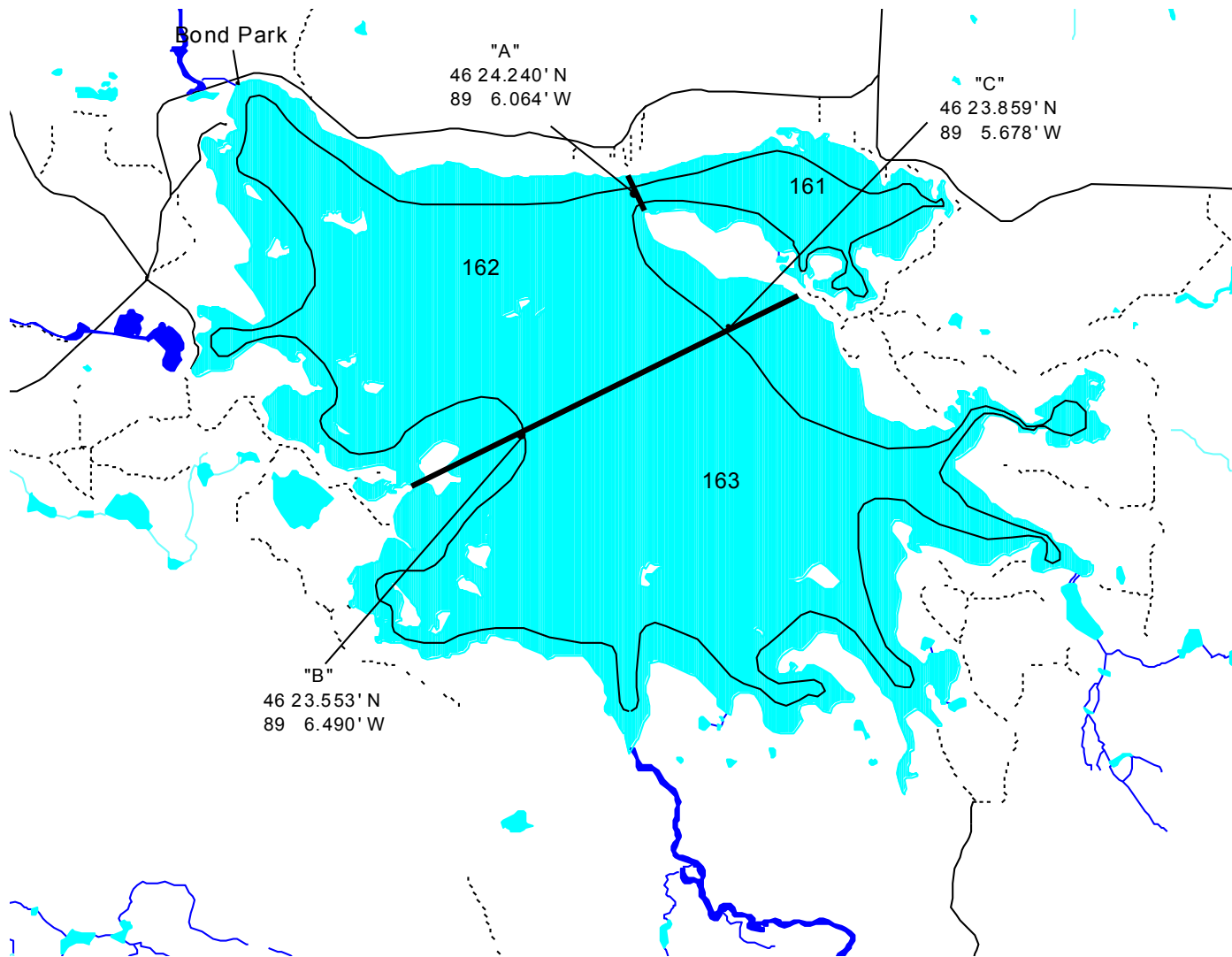


Table 1. Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Bond Falls Flowage, summer 2003.

Month	Shift		Expansion values
	Early	Late	
May 8 – 31	0600 h – 1430 h	1330 h – 2200 h	17
June	0600 h – 1430 h	1330 h – 2200 h	17
July	0600 h – 1430 h	1300 h – 2130 h	17
August	0630 h – 1500 h	1230 h – 2100 h	16
September	0630 h – 1500 h	1200 h – 2030 h	15
October 1 – 15	0630 h – 1500 h	1030 h – 1900 h	14

Table 2. Estimated boat angling harvest, catch per hour, and fishing pressure for Bond Falls Flowage. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	October	Season
<b>HARVEST</b>								
Smallmouth bass	0.0225 (0.0126)	21 (29)	267 (227)	48 (40)	77 (63)	59 (78)	0 (0)	472 (253)
Walleye	0.0453 (0.0154)	308 (194)	31 (34)	164 (94)	373 (174)	74 (63)	0 (0)	950 (287)
Yellow Perch	0.0276 (0.0145)	3 (5)	95 (119)	128 (100)	315 (235)	38 (76)	0 (0)	579 (292)
Northern pike	0.0053 (0.0034)	73 (62)	7 (10)	5 (8)	25 (28)	2 (4)	0 (0)	112 (70)
Muskellunge	0.0005 (0.0010)	0 (0)	0 (0)	0 (0)	0 (0)	10 (21)	0 (0)	10 (21)
Black crappie	0.0091 (0.0080)	0 (0)	25 (49)	157 (158)	5 (11)	4 (8)	0 (0)	191 (166)
Bluegill	0.0023 (0.0032)	0 (0)	0 (0)	17 (22)	31 (63)	0 (0)	0 (0)	48 (66)
Largemouth bass	0.0008 (0.0017)	0 (0)	18 (36)	0 (0)	0 (0)	0 (0)	0 (0)	18 (36)
Pumpkinseed	0.0003 (0.0007)	0 (0)	0 (0)	0 (0)	7 (14)	0 (0)	0 (0)	7 (14)
Rock bass	0.0383 (0.0249)	15 (30)	386 (344)	239 (299)	163 (221)	0 (0)	0 (0)	803 (507)
Green Sunfish	0.0004 (0.0009)	0 (0)	9 (19)	0 (0)	0 (0)	0 (0)	0 (0)	9 (19)
<b>TOTAL HARVEST</b>	<b>0.1525 (0.0420)</b>	<b>420 (208)</b>	<b>838 (436)</b>	<b>758 (368)</b>	<b>997 (378)</b>	<b>187 (128)</b>	<b>0 (0)</b>	<b>3,200 (727)</b>
<b>RELEASED</b>								
Smallmouth bass	0.0564 (0.0284)	83 (91)	779 (536)	74 (52)	129 (113)	119 (104)	0 (0)	1,185 (568)
Walleye	0.1281 (0.1111)	393 (425)	145 (139)	293 (200)	445 (276)	1,414 (2,225)	0 (0)	2,690 (2,295)
Northern pike	0.0766 (0.0283)	602 (379)	350 (252)	306 (198)	226 (176)	125 (112)	0 (0)	1,609 (538)
Muskellunge	0.0001 (0.0002)	0 (0)	0 (0)	2 (3)	0 (0)	0 (0)	0 (0)	2 (3)
Rock bass	0.0174 (0.0095)	41 (44)	162 (147)	62 (59)	48 (56)	52 (78)	0 (0)	365 (190)
Bluegill	0.0003 (0.0004)	0 (0)	0 (0)	4 (8)	0 (0)	2 (3)	0 (0)	6 (9)
Yellow Perch	0.0189 (0.0181)	0 (0)	6 (12)	115 (153)	266 (340)	10 (21)	0 (0)	397 (374)

TOTAL RELEASED	0.2978	1,119	1,441	856	1,113	1,721	0	6,252
	(0.1260)	(579)	(626)	(330)	(488)	(2,231)	(0)	(2,460)
TOTAL CATCH	0.4503	1,539	2,280	1,615	2,110	1,908	0	9,452
	(0.1409)	(615)	(763)	(494)	(618)	(2,235)	(0)	(2,565)
ANGLER HOURS		5,048	5,118	3,492	5,203	1,862	268	20,991
		(2,104)	(1,318)	(1,185)	(1,511)	(785)	(443)	(3,266)
ANGLER TRIPS		1,445	1,937	980	1,555	682	81	6,679
		(660)	(658)	(349)	(559)	(308)	(135)	(1,190)



## Survey 27 Manistiques Lakes, Mackinac and Luce Counties, Summer, 2003

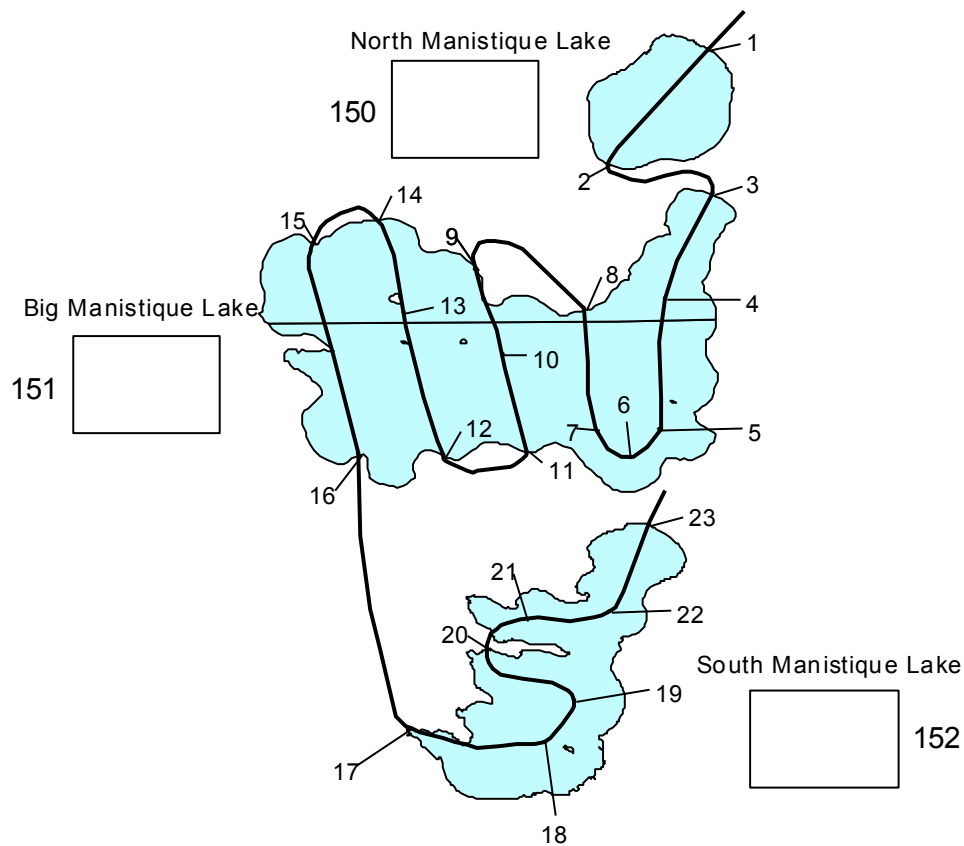
<b>Waterbody</b>	Manistiques
<b>Year</b>	Summer, 2003
<b>County</b>	Mackinac and Luce
<b>Sites</b>	150,151,152
<b>Survey period</b>	May 15 to October 15
<b>Survey design</b>	Aerial-roving (aerial counts, roving interviews)
<b>Interview type/mode</b>	roving/boat
<b>Count type/mode</b>	aerial/boat
<b>Clerk time</b>	1.5
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

*Manistique lakes, summer 2003.* Survey followed an aerial-roving design. All funding was provided through Fisheries Division. Lakes consist of North, Big and South Manistique lake units. Counts were conducted by air flights for all three lake units. Counts progressed from North Manistique Lake to South Manistique Lake or from South Manistique Lake to North Manistique Lake (see flight path – Figure 1). This sequence was randomized. Only fishing boats were counted. Flight time was approximately 17 min. Time of count was randomized to cover daylight times within the sample period. Both weekend days and 3 randomly selected weekdays were selected for counting (for all three lake units) and interviewing for South and Big Manistique lakes during each week of the survey season. One weekend day and 2 weekdays were randomly selected for interviewing for North Manistique Lake. No holidays were sampled. One of two shifts was selected each sample day for interviewing (Table 1). Counting and interviewing of South and Big Manistique lakes were done on the same days, and one instantaneous count of fishing boats was made per day. One clerk working from a boat collected angler interview data for South or Big Manistique Lake. Each sample day one clerk was randomly assigned to one lake unit: South or Big Manistique Lake (North Manistique Lake was scheduled separately) (Figure 1). Starting location (GPS Marker) and direction of travel within the assigned lake was randomized each sample day. Another clerk collected interview data for North Manistique Lake in conjunction with Great Lake creel survey. Survey period is from May 8 through Oct. 15. Estimates will be by month for each lake sampling unit. Estimates are given in Tables 2-6.

Figure 1. Manistique lake map with flight path, markers and GPS latitude-longitude coordinates used during summer 2003 angler survey.

**North, Big, and South  
Manistique Lakes**  
Date \_\_\_\_\_  
Count time \_\_\_\_\_



Marker	Latitude	Longitude	Marker	Latitude	Longitude
1	46.29826°N	85.72318°W	13	46.24675°N	85.81025°W
2	46.27573°N	85.75184°W	14	46.26507°N	85.81756°W
3	46.26972°N	85.72218°W	15	46.26044°N	85.83568°W
4	46.24910°N	85.73583°W	16	46.21878°N	85.82295°W
5	46.22357°N	85.73731°W	17	46.16479°N	85.80901°W
6	46.22964°N	85.76630°W	18	46.16196°N	85.77076°W
7	46.22364°N	85.75542°W	19	46.17020°N	85.76226°W
8	46.24733°N	85.75889°W	20	46.18036°N	85.78676°W
9	46.25511°N	85.78970°W	21	46.18611°N	85.77577°W
10	46.23839°N	85.78221°W	22	46.18764°N	85.75160°W

11	46.21930°N	85.77548°W	23	46.20462°N	85.74061°W
12	46.21846°N	85.79896°W			

Table 1. Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Manistique Lakes , summer 2003.

Month	Shift		Expansion values
	Early	Late	
May 8 – 31	0600 h – 1430 h	1330 h – 2200 h	17
June	0600 h – 1430 h	1330 h – 2200 h	17
July	0600 h – 1430 h	1300 h – 2130 h	17
August	0630 h – 1500 h	1230 h – 2100 h	16
September	0630 h – 1500 h	1200 h – 2030 h	15
October	0630 h – 1500 h	1030 h – 1900 h	14

Table 2. Estimated boat angling harvest, catch per hour, and fishing pressure for North Manistique Lake 150. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	October	Season
<b>HARVEST</b>								
Smallmouth bass	(0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Walleye	0.0334 (0.0324)	7 (14)	87 (80)	181 (288)	0 (0)	42 (41)	0 (0)	318 (302)
Yellow Perch	0.5628 (0.2245)	12 (24)	609 (379)	1,669 (1,327)	2,229 (1,084)	836 (590)	0 (0)	5,355 (1,852)
Northern pike	5,355 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bluegill	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Largemouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pumpkinseed	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0.0004 (0.0007)	0 (0)	0 (0)	0 (0)	0 (0)	3 (7)	0 (0)	3 (7)
Common white sucker	3 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.5966 (0.2301)</b>	<b>19 (27)</b>	<b>697 (387)</b>	<b>1,850 (1,358)</b>	<b>2,229 (1,084)</b>	<b>882 (592)</b>	<b>0 (0)</b>	<b>5,677 (1,877)</b>
<b>RELEASED</b>								
Released Smallmouth bass	0.0091 (0.0092)	0 (0)	12 (24)	12 (24)	45 (71)	17 (34)	0 (0)	87 (86)
Released Largemouth bass	87 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Released Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Released Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Released Muskellunge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Released Common white sucker	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Released Rock bass	0.0643 (0.0642)	0 (0)	346 (365)	267 (474)	0 (0)	0 (0)	0 (0)	612 (598)
Released Carp	612 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Released Bluegill	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Released Pumpkinseed	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Released Yellow Perch	2.6353 (0.9821)	26 (41)	2,361 (1,604)	6,272 (3,958)	11,589 (5,512)	3,092 (2,356)	1,736 (2,889)	25,075 (7,907)
<b>TOTAL RELEASED</b>	<b>2.7088 (0.9920)</b>	<b>26 (41)</b>	<b>2,719 (1,645)</b>	<b>6,550 (3,986)</b>	<b>11,634 (5,513)</b>	<b>3,109 (2,356)</b>	<b>1,736 (2,889)</b>	<b>25,774 (7,930)</b>
<b>TOTAL CATCH</b>	<b>3.3054 (1.0791)</b>	<b>45(49)</b>	<b>3,415(1,690)</b>	<b>8,400(4,211)</b>	<b>13,863(5,618)</b>	<b>3,991(2,430)</b>	<b>1,736(2,889)</b>	<b>31,451 (8,149)</b>
<b>ANGLER HOURS</b>		<b>798(535)</b>	<b>2,102(799)</b>	<b>2,987(1,272)</b>	<b>2,355(833)</b>	<b>940(455)</b>	<b>334(356)</b>	<b>9,515</b>

							(1,890)
ANGLER TRIPS	282 (218)	935 (694)	1,584 (1,142)	1,266 (1,253)	399 (213)	191 (261)	4,656 (1,875)

Table 3. Estimated boat angling harvest, catch per hour, and fishing pressure for Big Manistique Lake 151. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	October	Season
<b>HARVEST</b>								
Smallmouth bass	0.0063 (0.0041)	0 (0)	92 (151)	160 (153)	183 (216)	30 (61)	27 (40)	493 (313)
Walleye	0.0175 (0.0069)	337 (246)	802 (379)	175 (217)	64 (77)	0 (0)	0 (0)	1,378 (507)
Yellow Perch	0.7808 (0.2496)	0 (0)	312 (246)	2,450 (1,256)	22,036 (7,741)	23,288 (13,386)	13,477 (8,087)	61,563 (17,497)
Northern pike	0.0084 (0.0051)	81 (89)	267 (253)	279 (278)	37 (53)	0 (0)	0 (0)	664 (390)
Bluegill	664 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Largemouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pumpkinseed	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Common white sucker	0.0004 (0.0009)	0 (0)	0 (0)	35 (71)	0 (0)	0 (0)	0 (0)	35 (71)
<b>TOTAL HARVEST</b>	<b>0.8134 (0.2520)</b>	<b>418 (262)</b>	<b>1,472 (539)</b>	<b>3,099 (1,315)</b>	<b>22,321 (7,744)</b>	<b>23,318 (13,386)</b>	<b>13,504 (8,087)</b>	<b>64,133 (17,511)</b>
<b>RELEASED</b>								
Released Smallmouth bass	0.0164 (0.0096)	30 (46)	485 (440)	334 (408)	443 (418)	0 (0)	0 (0)	1,293 (732)
Released Largemouth bass	0.0004 (0.0008)	0 (0)	0 (0)	32 (64)	0 (0)	0 (0)	0 (0)	32 (64)
Released Walleye	0.0192 (0.0127)	36 (72)	199 (222)	29 (59)	0 (0)	1,189 (944)	61 (101)	1,515 (980)
Released Northern pike	0.0145 (0.0073)	234 (187)	441 (292)	325 (391)	98 (153)	43 (61)	0 (0)	1,141 (548)
Released Muskellunge	1,141 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Released Common white sucker	0.0004 (0.0009)	0 (0)	0 (0)	0 (0)	35 (70)	0 (0)	0 (0)	35 (70)
Released Rock bass	0.0018 (0.0036)	0 (0)	0 (0)	0 (0)	140 (280)	0 (0)	0 (0)	140 (280)
Released Carp	0.0004	0 (0)	0 (0)	29 (59)	0 (0)	0 (0)	0 (0)	29 (59)

Released Bluegill	(0.0007) 0.0021 (0.0027)	0 (0)	0 (0)	0 (0)	168 (212)	0 (0)	0 (0)	168 (212)
Released Pumpkinseed	0.0002 (0.0003)	0 (0)	0 (0)	0 (0)	0 (0)	13 (26)	0 (0)	13 (26)
Released Yellow Perch	0.3098 (0.0983)	0 (0)	486 (364)	4,227 (1,889)	13,214 (5,004)	4,333 (2,915)	2,168 (3,179)	24,427 (6,881)
TOTAL RELEASED	0.3652 (0.1038)	300 (206)	1,611 (679)	4,977 (1,975)	14,098 (5,036)	5,578 (3,065)	2,229 (3,181)	28,793 (7,020)
TOTAL CATCH	1.1785 (0.2950)	718(333)	3,083(867)	8,076(2,373)	36,419(9,238)	28,896(13,732)	15,734(8,691)	92,926 (18,866)
ANGLER HOURS		5,037(2,355)	17,362(3,746)	21,372(6,789)	21,393(5,973)	9,948(5,324)	3,737(1,898)	78,849 (11,545)
ANGLER TRIPS		1,604 (1,000)	4,852 (1,289)	8,307 (3,183)	8,437 (2,452)	3,311 (1,941)	1,170 (658)	27,680 (4,796)

Table 4. Estimated boat angling harvest, catch per hour, and fishing pressure for South Manistique Lake 152. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	October	Season
HARVEST								
Smallmouth bass	0.0009 (0.0017)	0 (0)	0 (0)	98 (196)	0 (0)	10 (21)	0 (0)	108 (197)
Walleye	0.0427 (0.0128)	1,028 (664)	1,393 (618)	1,732 (856)	507 (342)	132 (122)	108 (136)	4,900 (1,306)
Yellow Perch	0.0755 (0.0275)	2,277 (1,990)	2,554 (1,486)	2,442 (1,230)	552 (406)	173 (299)	667 (781)	8,664 (2,923)
Northern pike	0.0084 (0.0045)	207 (226)	292 (276)	311 (302)	127 (159)	26 (38)	0 (0)	963 (495)
Bluegill	0.1415 (0.0410)	301 (466)	4,637 (2,059)	7,498 (3,092)	2,942 (1,692)	457 (368)	388 (422)	16,223 (4,146)
Largemouth bass	0.0024 (0.0022)	0 (0)	0 (0)	114 (185)	96 (144)	23 (33)	44 (65)	276 (246)
Pumpkinseed	0.0152 (0.0095)	0 (0)	395 (328)	969 (953)	350 (334)	29 (58)	0 (0)	1,742 (1,064)
Rock bass	0.0042 (0.0029)	0 (0)	380 (278)	101 (181)	0 (0)	0 (0)	0 (0)	480 (332)
Common white sucker	480 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
TOTAL HARVEST	0.2909 (0.0616)	3,813 (2,161)	9,650 (2,663)	13,263 (3,593)	4,574 (1,817)	850 (496)	1,207 (900)	33,356 (5,388)

RELEASED								
Released Smallmouth bass	0.0160 (0.0069)	90 (121)	466 (387)	387 (466)	618 (361)	242 (199)	31 (61)	1,835 (745)
Released Largemouth bass	0.0388 (0.0146)	513 (867)	736 (641)	908 (630)	1,393 (754)	755 (491)	150 (270)	4,454 (1,563)
Released Walleye	0.0594 (0.0194)	593 (496)	3,810 (1,695)	1,144 (809)	712 (423)	557 (367)	0 (0)	6,817 (2,022)
Released Northern pike	0.1567 (0.0404)	3,532 (2,077)	5,408 (2,032)	5,352 (2,366)	2,704 (1,045)	955 (560)	20 (41)	17,971 (3,931)
Released Muskellunge	0.0004 (0.0006)	0 (0)	44 (63)	0 (0)	0 (0)	0 (0)	0 (0)	44 (63)
Released Common white sucker	44 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Released Rock bass	0.0160 (0.0126)	0 (0)	1,079 (1,295)	552 (568)	149 (182)	52 (70)	0 (0)	1,832 (1,428)
Released Carp	1,832 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Released Bluegill	0.5059 (0.1409)	409 (463)	13,919 (6,821)	24,036 (10,578)	17,882 (6,201)	1,547 (867)	220 (440)	58,012 (14,073)
Released Pumpkinseed	0.0249 (0.0166)	0 (0)	455 (910)	1,255 (1,414)	1,140 (802)	0 (0)	0 (0)	2,850 (1,863)
Released Yellow Perch	0.2846 (0.0739)	1,598 (1,146)	5,399 (2,330)	15,692 (5,756)	8,317 (3,331)	1,558 (936)	73 (110)	32,637 (7,201)
TOTAL RELEASED	1.1027 (0.2095)	6,734 (2,618)	31,317 (7,876)	49,324 (12,418)	32,916 (7,225)	5,666 (1,536)	494 (533)	126,452 (16,671)
TOTAL CATCH	1.3936 (0.2442)	10,547(3,395)	40,967(8,314)	62,587(12,927)	37,490(7,450)	6,516(1,614)	1,701(1,046)	159,808 (17,520)
ANGLER HOURS		11,621(6,262)	30,655(7,087)	36,967(10,112)	25,109(6,584)	8,583(3,107)	1,742(1,109)	114,677 (15,682)
ANGLER TRIPS		5,246 (4,329)	10,746 (5,888)	17,098 (7,293)	10,134 (6,040)	4,583 (2,829)	836 (583)	48,643 (12,305)

Table 5. Estimated boat angling harvest, catch per hour, and fishing pressure for all three Manistiquies Lakes. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	October	Season
HARVEST								
Smallmouth bass	0.0030 (0.0018)	0 (0)	92 (151)	258 (248)	183 (216)	41 (64)	27 (40)	601 (370)
Walleye	0.0325 (0.0077)	1,372 (709)	2,282 (729)	2,088 (928)	571 (351)	174 (129)	108 (136)	6,596 (1,433)
Yellow Perch	0.3723	2,289 (1,990)	3,475 (1,553)	6,560 (2,203)	24,817 (7,827)	24,297 (13,402)	14,144 (8,125)	75,582

	(0.0949)							(17,836)
Northern pike	0.0080 (0.0032)	287 (243)	559 (374)	590 (410)	165 (168)	26 (38)	0 (0)	1,627 (630)
Bluegill	0.0799 (0.0218)	301 (466)	4,637 (2,059)	7,498 (3,092)	2,942 (1,692)	457 (368)	388 (422)	16,223 (4,146)
Largemouth bass	0.0014 (0.0012)	0 (0)	0 (0)	114 (185)	96 (144)	23 (33)	44 (65)	276 (246)
Pumpkinseed	0.0086 (0.0053)	0 (0)	395 (328)	969 (953)	350 (334)	29 (58)	0 (0)	1,742 (1,064)
Rock bass	0.0024 (0.0017)	0 (0)	380 (278)	101 (181)	0 (0)	3 (7)	0 (0)	484 (332)
Common white sucker	0.0002 (0.0003)	0 (0)	0 (0)	35 (71)	0 (0)	0 (0)	0 (0)	35 (71)
TOTAL HARVEST	0.5081 (0.1031)	4,250 (2,177)	11,819 (2,744)	18,212 (4,060)	29,124 (8,028)	25,050 (13,408)	14,711 (8,137)	103,166 (18,417)
RELEASED								
Released Smallmouth bass	0.0158 (0.0054)	121 (130)	963 (586)	734 (620)	1,107 (557)	259 (202)	31 (61)	3,214 (1,048)
Released Largemouth bass	0.0221 (0.0080)	513 (867)	736 (641)	940 (634)	1,393 (754)	755 (491)	150 (270)	4,487 (1,564)
Released Walleye	0.0410 (0.0117)	629 (502)	4,009 (1,709)	1,173 (811)	712 (423)	1,746 (1,013)	61 (101)	8,331 (2,247)
Released Northern pike	0.0941 (0.0215)	3,766 (2,086)	5,849 (2,053)	5,677 (2,399)	2,802 (1,056)	998 (563)	20 (41)	19,112 (3,969)
Released Muskellunge	0.0002 (0.0003)	0 (0)	44 (63)	0 (0)	0 (0)	0 (0)	0 (0)	44 (63)
Released Common white sucker	0.0002 (0.0003)	0 (0)	0 (0)	0 (0)	35 (70)	0 (0)	0 (0)	35 (70)
Released Rock bass	0.0127 (0.0078)	0 (0)	1,425 (1,346)	818 (740)	289 (334)	52 (70)	0 (0)	2,584 (1,573)
Released Carp	0.0001 (0.0003)	0 (0)	0 (0)	29 (59)	0 (0)	0 (0)	0 (0)	29 (59)
Released Bluegill	0.2865 (0.0746)	409 (463)	13,919 (6,821)	24,036 (10,578)	18,050 (6,205)	1,547 (867)	220 (440)	58,180 (14,074)
Released Pumpkinseed	0.0141 (0.0093)	0 (0)	455 (910)	1,255 (1,414)	1,140 (802)	13 (26)	0 (0)	2,863 (1,863)
Released Yellow Perch	0.4045 (0.0738)	1,624 (1,147)	8,246 (2,852)	26,190 (7,236)	33,119 (8,156)	8,983 (3,863)	3,978 (4,297)	82,139 (12,717)
TOTAL RELEASED	0.8915 (0.1298)	7,060 (2,627)	35,646 (8,074)	60,851 (13,191)	58,648 (10,390)	14,353 (4,160)	4,460 (4,330)	181,019 (19,751)



TOTAL CATCH	1.3996 (0.1894)	11,310(3,412)	47,466(8,528)	79,063(13,802)	87,772(13,130)	39,403(14,039)	19,171(9,218)	284,185 (27,006)
ANGLER HOURS		17,456(6,711)	50,119(8,056)	61,325(12,245)	48,856(8,928)	19,471(6,182)	5,814(2,227)	203,041 (19,565)
ANGLER TRIPS		7,132 (4,448)	16,533 (6,067)	26,989 (8,039)	19,837 (6,638)	8,292 (3,437)	2,197 (917)	80,979 (13,339)

## Survey 28 Crockery Creek, Half Moon Lake, Lime Lake, and Marjella (Clear) Lake, Summer, 2003

<b>Waterbody</b>	Crockery, Half, Lime, Clear
<b>Year</b>	2003
<b>Sites/County</b>	Crockery Creek (Muskegon), Half Moon Lake (Muskegon), Lime Lake (Kent), Marjella (Clear) Lake (Kent) (600, 650, 651, 652)
<b>Survey period</b>	May 1 to August 31
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access / boat and shore
<b>Count type/mode</b>	roving / boat and shore
<b>Clerk time</b>	full
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Estimation options applied

- Day types with the number of interviews equal to 1 in a month were excluded in the estimation.
- Day types with the number of party (or parties) equal to 1 in a month were excluded in the estimation.

-- Weekday and weekend days in the following cases:

600, May, boat; 600, June, boat; 600, July, boat; 600, August, boat; 600, May, shore; 600, June, shore; 600, July, shore; 600, August, shore; 650, May, boat; 650, June, boat; 650, July, boat; 650, August, boat; 650, May, shore; 650, June, shore; 650, July, shore; 650, August, shore; 652, May, boat; 652, June, boat; 652, July, boat; 652, August, boat; 652, May, shore; 652, June, shore; 652, July, shore; 652, August, shore; have been combined in the estimation.

Table 1. Work shifts used to estimate catch and effort, May 1 to August 31, Summer, 2003

	<b>Year</b>	<b>Month</b>	<b>F</b>
1	2003	5	15
2	2003	6	15
3	2003	7	15
4	2003	8	15

Table 2. Estimated harvest, catch per hour, and fishing pressure for BOAT, Crockery Creek. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	Season
<b>HARVEST</b>						
TOTAL HARVEST	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>RELEASED</b>						
TOTAL RELEASED	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
TOTAL CATCH	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
ANGLER HOURS		0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
ANGLER TRIPS		0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 3. Estimated harvest, catch per hour, and fishing pressure for BOAT, Lime Lake. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	Season
<b>HARVEST</b>						
Rainbow trout	0.0209 (0.0251)	0 (0)	39 (56)	121 (175)	0 (0)	160 (184)
Yellow Perch	0.0060 (0.0091)	0 (0)	0 (0)	30 (60)	16 (31)	46 (68)
Northern pike	0.0021 (0.0042)	0 (0)	0 (0)	0 (0)	16 (32)	16 (32)
Black crappie	0.0083 (0.0137)	0 (0)	0 (0)	0 (0)	63 (102)	63 (102)
Bluegill	0.3025 (0.2069)	0 (0)	327 (356)	545 (592)	1,434 (1,191)	2,307 (1,377)
Largemouth bass	0.0079 (0.0162)	0 (0)	0 (0)	61 (122)	0 (0)	61 (122)
TOTAL HARVEST	0.3478 (0.2173)	0 (0)	366 (361)	757 (632)	1,528 (1,197)	2,652 (1,401)
<b>RELEASED</b>						
Rainbow trout	0.0267 (0.0411)	0 (0)	173 (300)	30 (60)	0 (0)	204 (306)
Largemouth bass	0.0132 (0.0149)	0 (0)	39 (77)	30 (61)	32 (46)	100 (108)
Bluegill	0.3875 (0.2912)	0 (0)	173 (173)	576 (561)	2,206 (1,901)	2,955 (1,989)
TOTAL RELEASED	0.4274 (0.3003)	0 (0)	385 (355)	636 (567)	2,237 (1,901)	3,259 (2,016)
TOTAL CATCH	0.7752 (0.4129)	0 (0)	751 (506)	1,394 (849)	3,766 (2,247)	5,911 (2,454)
ANGLER HOURS		0 (0)	2,813 (1,469)	3,166 (1,845)	1,647 (952)	7,625 (2,543)
ANGLER TRIPS		0 (0)	1,060 (568)	1,363 (815)	662 (404)	3,085 (1,073)

Table 4. Estimated harvest, catch per hour, and fishing pressure for BOAT, Half-Moon Lake. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	Season
<b>HARVEST</b>						
Rainbow trout	0.0091 (0.0131)	0 (0)	24 (46)	0 (0)	29 (58)	53 (74)

Black crappie	0.0512 (0.0458)	0 (0)	176 (179)	123 (175)	0 (0)	298 (250)
Bluegill	1.0321 (0.5683)	0 (0)	3,640 (2,185)	1,927 (1,536)	450 (486)	6,017 (2,714)
Largemouth bass	0.0096 (0.0141)	0 (0)	29 (59)	27 (55)	0 (0)	56 (80)
<b>TOTAL HARVEST</b>	<b>1.1021</b> <b>(0.5831)</b>	<b>0</b> <b>(0)</b>	<b>3,869</b> <b>(2,193)</b>	<b>2,077</b> <b>(1,547)</b>	<b>479</b> <b>(490)</b>	<b>6,425</b> <b>(2,728)</b>
<b>RELEASED</b>						
Rainbow trout	0.0083 (0.0130)	0 (0)	48 (74)	0 (0)	0 (0)	48 (74)
Largemouth bass	0.0335 (0.0303)	0 (0)	123 (146)	41 (67)	32 (41)	195 (165)
Bluegill	0.5147 (0.2916)	0 (0)	1,399 (869)	322 (377)	1,280 (1,046)	3,001 (1,411)
<b>TOTAL RELEASED</b>	<b>0.5565</b> <b>(0.3007)</b>	<b>0</b> <b>(0)</b>	<b>1,570</b> <b>(884)</b>	<b>363</b> <b>(383)</b>	<b>1,312</b> <b>(1,047)</b>	<b>3,244</b> <b>(1,423)</b>
<b>TOTAL CATCH</b>	<b>1.6585</b> <b>(0.7434)</b>	<b>0</b> <b>(0)</b>	<b>5,438</b> <b>(2,365)</b>	<b>2,440</b> <b>(1,593)</b>	<b>1,791</b> <b>(1,156)</b>	<b>9,669</b> <b>(3,077)</b>
<b>ANGLER HOURS</b>		<b>0</b> <b>(0)</b>	<b>3,477</b> <b>(1,382)</b>	<b>1,253</b> <b>(893)</b>	<b>1,101</b> <b>(824)</b>	<b>5,830</b> <b>(1,841)</b>
<b>ANGLER TRIPS</b>		<b>0</b> <b>(0)</b>	<b>1,326</b> <b>(573)</b>	<b>475</b> <b>(361)</b>	<b>472</b> <b>(356)</b>	<b>2,273</b> <b>(765)</b>

Table 5. Estimated harvest, catch per hour, and fishing pressure for BOAT, Clear Lake. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>Season</b>
<b>HARVEST</b>						
Rock bass	0.0348 (0.0725)	0 (0)	0 (0)	36 (73)	0 (0)	36 (73)
<b>TOTAL HARVEST</b>	<b>0.0348</b> <b>(0.0725)</b>	<b>0</b> <b>(0)</b>	<b>0</b> <b>(0)</b>	<b>36</b> <b>(73)</b>	<b>0</b> <b>(0)</b>	<b>36</b> <b>(73)</b>
<b>RELEASED</b>						
Rainbow trout	0.0369 (0.0781)	0 (0)	38 (78)	0 (0)	0 (0)	38 (78)
Largemouth bass	0.1781 (0.2002)	0 (0)	76 (113)	108 (144)	0 (0)	184 (183)
Bluegill	1.1697 (1.1032)	0 (0)	1,031 (872)	180 (375)	0 (0)	1,211 (949)
<b>TOTAL RELEASED</b>	<b>1.3846</b> <b>(1.1854)</b>	<b>0</b> <b>(0)</b>	<b>1,145</b> <b>(883)</b>	<b>288</b> <b>(402)</b>	<b>0</b> <b>(0)</b>	<b>1,433</b> <b>(970)</b>
<b>TOTAL CATCH</b>	<b>1.4194</b> <b>(1.1987)</b>	<b>0</b> <b>(0)</b>	<b>1,145</b> <b>(883)</b>	<b>324</b> <b>(408)</b>	<b>0</b> <b>(0)</b>	<b>1,469</b> <b>(973)</b>
<b>ANGLER HOURS</b>		<b>0</b> <b>(0)</b>	<b>477</b> <b>(355)</b>	<b>558</b> <b>(411)</b>	<b>0</b> <b>(0)</b>	<b>1,035</b> <b>(543)</b>
<b>ANGLER TRIPS</b>		<b>0</b> <b>(0)</b>	<b>267</b> <b>(203)</b>	<b>216</b> <b>(164)</b>	<b>0</b> <b>(0)</b>	<b>483</b> <b>(261)</b>

Table 6. Estimated harvest, catch per hour, and fishing pressure for SHORE, Crockery Creek. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>Season</b>
<b>HARVEST</b>						
Rainbow trout	0.0654 (0.1009)	109 (152)	0 (0)	0 (0)	0 (0)	109 (152)
Brown trout	0.0113 (0.0232)	0 (0)	19 (37)	0 (0)	0 (0)	19 (37)
Common white sucker	0.0319	16	37	0	0	53

	(0.0538)	(31)	(77)	(0)	(0)	(83)
TOTAL HARVEST	0.1086	124	56	0	0	181
	(0.1275)	(156)	(85)	(0)	(0)	(177)
RELEASED						
Brown trout	0.0113	0	19	0	0	19
	(0.0242)	(0)	(38)	(0)	(0)	(38)
Common white sucker	0.0093	16	0	0	0	16
	(0.0196)	(31)	(0)	(0)	(0)	(31)
TOTAL RELEASED	0.0206	16	19	0	0	34
	(0.0325)	(31)	(38)	(0)	(0)	(49)
TOTAL CATCH	0.1292	140	75	0	0	215
	(0.1385)	(159)	(93)	(0)	(0)	(184)
ANGLER HOURS		708	722	0	235	1,664
		(866)	(601)	(0)	(202)	(1,074)
ANGLER TRIPS		296	263	0	153	711
		(372)	(228)	(0)	(134)	(457)

Table 7. Estimated harvest, catch per hour, and fishing pressure for SHORE, Lime Lake. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	Season
HARVEST						
Yellow Perch	0.1053	0	26	0	0	26
	(0.2258)	(0)	(50)	(0)	(0)	(50)
Bluegill	0.1053	0	26	0	0	26
	(0.2258)	(0)	(50)	(0)	(0)	(50)
TOTAL HARVEST	0.2105	0	52	0	0	52
	(0.3467)	(0)	(71)	(0)	(0)	(71)
RELEASED						
TOTAL RELEASED	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)
TOTAL CATCH	0.2105	0	52	0	0	52
	(0.3467)	(0)	(71)	(0)	(0)	(71)
ANGLER HOURS		0	245	0	0	245
		(0)	(223)	(0)	(0)	(223)
ANGLER TRIPS		0	207	0	0	207
		(0)	(190)	(0)	(0)	(190)

Table 8. Estimated harvest, catch per hour, and fishing pressure for SHORE, Half-Moon Lake. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	Season
HARVEST						
Bluegill	0.2745	0	74	0	0	74
	(0.6321)	(0)	(148)	(0)	(0)	(148)
TOTAL HARVEST	0.2745	0	74	0	0	74
	(0.6321)	(0)	(148)	(0)	(0)	(148)
RELEASED						
Largemouth bass	0.1222	0	0	33	0	33
	(0.2814)	(0)	(0)	(66)	(0)	(66)
Bluegill	0.1830	0	49	0	0	49
	(0.4214)	(0)	(99)	(0)	(0)	(99)
TOTAL RELEASED	0.3052	0	49	33	0	82
	(0.5613)	(0)	(99)	(66)	(0)	(119)
TOTAL CATCH	0.5797	0	124	33	0	157
	(0.9658)	(0)	(178)	(66)	(0)	(190)
ANGLER HOURS		0	105	165	0	270
		(0)	(210)	(225)	(0)	(308)
ANGLER TRIPS		0	49	71	0	121

(0) (103) (99) (0) (143)

Table 9. Estimated harvest, catch per hour, and fishing pressure for SHORE, Clear Lake. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	Season
<b>HARVEST</b>						
Largemouth bass	0.0644 (0.1455)	0 (0)	0 (0)	23 (46)	0 (0)	23 (46)
<b>TOTAL HARVEST</b>	<b>0.0644</b> <b>(0.1455)</b>	<b>0</b> <b>(0)</b>	<b>0</b> <b>(0)</b>	<b>23</b> <b>(46)</b>	<b>0</b> <b>(0)</b>	<b>23</b> <b>(46)</b>
<b>RELEASED</b>						
<b>TOTAL RELEASED</b>	<b>0</b> <b>(0)</b>	<b>0</b> <b>(0)</b>	<b>0</b> <b>(0)</b>	<b>0</b> <b>(0)</b>	<b>0</b> <b>(0)</b>	<b>0</b> <b>(0)</b>
<b>TOTAL CATCH</b>	<b>0.0644</b> <b>(0.1455)</b>	<b>0</b> <b>(0)</b>	<b>0</b> <b>(0)</b>	<b>23</b> <b>(46)</b>	<b>0</b> <b>(0)</b>	<b>23</b> <b>(46)</b>
<b>ANGLER HOURS</b>		0 (0)	82 (164)	279 (372)	0 (0)	361 (406)
<b>ANGLER TRIPS</b>		0 (0)	40 (81)	140 (191)	0 (0)	179 (208)

Table 10. Estimated harvest, catch per hour, and fishing pressure from boat and shore for Crocker Creek. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	Season
<b>HARVEST</b>						
Rainbow trout	0.0654 (0.1009)	109 (152)	0 (0)	0 (0)	0 (0)	109 (152)
Brown trout	0.0113 (0.0232)	0 (0)	19 (37)	0 (0)	0 (0)	19 (37)
Common white sucker	0.0319 (0.0538)	16 (31)	37 (77)	0 (0)	0 (0)	53 (83)
<b>TOTAL HARVEST</b>	<b>0.1086</b> <b>(0.1275)</b>	<b>124</b> <b>(156)</b>	<b>56</b> <b>(85)</b>	<b>0</b> <b>(0)</b>	<b>0</b> <b>(0)</b>	<b>181</b> <b>(177)</b>
<b>RELEASED</b>						
Brown trout	0.0113 (0.0242)	0 (0)	19 (38)	0 (0)	0 (0)	19 (38)
Common white sucker	0.0093 (0.0196)	16 (31)	0 (0)	0 (0)	0 (0)	16 (31)
<b>TOTAL RELEASED</b>	<b>0.0206</b> <b>(0.0325)</b>	<b>16</b> <b>(31)</b>	<b>19</b> <b>(38)</b>	<b>0</b> <b>(0)</b>	<b>0</b> <b>(0)</b>	<b>34</b> <b>(49)</b>
<b>TOTAL CATCH</b>	<b>0.1292</b> <b>(0.1385)</b>	<b>140</b> <b>(159)</b>	<b>75</b> <b>(93)</b>	<b>0</b> <b>(0)</b>	<b>0</b> <b>(0)</b>	<b>215</b> <b>(184)</b>
<b>ANGLER HOURS</b>		708 (866)	722 (601)	0 (0)	235 (202)	1,664 (1,074)
<b>ANGLER TRIPS</b>		296 (372)	263 (228)	0 (0)	153 (134)	711 (457)

Table 11. Estimated harvest, catch per hour, and fishing pressure from boat and shore for Lime Lake. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	Season
<b>HARVEST</b>						
Rainbow trout	0.0203 (0.0243)	0 (0)	39 (56)	121 (175)	0 (0)	160 (184)
Yellow Perch	0.0091 (0.0111)	0 (0)	26 (50)	30 (60)	16 (31)	72 (84)
Northern pike	0.0020	0	0	0	16	16

	(0.0041)	(0)	(0)	(0)	(32)	(32)
Black crappie	0.0080	0	0	0	63	63
	(0.0132)	(0)	(0)	(0)	(102)	(102)
Bluegill	0.2964	0	353	545	1,434	2,332
	(0.1998)	(0)	(360)	(592)	(1,191)	(1,378)
Largemouth bass	0.0077	0	0	61	0	61
	(0.0157)	(0)	(0)	(122)	(0)	(122)
<b>TOTAL HARVEST</b>	<b>0.3435</b>	<b>0</b>	<b>418</b>	<b>757</b>	<b>1,528</b>	<b>2,703</b>
	(0.2102)	(0)	(368)	(632)	(1,197)	(1,402)
<b>RELEASED</b>						
Rainbow trout	0.0259	0	173	30	0	204
	(0.0398)	(0)	(300)	(60)	(0)	(306)
Largemouth bass	0.0127	0	39	30	32	100
	(0.0144)	(0)	(77)	(61)	(46)	(108)
Bluegill	0.3754	0	173	576	2,206	2,955
	(0.2806)	(0)	(173)	(561)	(1,901)	(1,989)
<b>TOTAL RELEASED</b>	<b>0.4141</b>	<b>0</b>	<b>385</b>	<b>636</b>	<b>2,237</b>	<b>3,259</b>
	(0.2892)	(0)	(355)	(567)	(1,901)	(2,016)
<b>TOTAL CATCH</b>	<b>0.7576</b>	<b>0</b>	<b>803</b>	<b>1,394</b>	<b>3,766</b>	<b>5,962</b>
	(0.3971)	(0)	(511)	(849)	(2,247)	(2,455)
<b>ANGLER HOURS</b>		<b>0</b>	<b>3,058</b>	<b>3,166</b>	<b>1,647</b>	<b>7,870</b>
		(0)	(1,486)	(1,845)	(952)	(2,553)
<b>ANGLER TRIPS</b>		<b>0</b>	<b>1,266</b>	<b>1,363</b>	<b>662</b>	<b>3,291</b>
		(0)	(599)	(815)	(404)	(1,089)

Table 12. Estimated harvest, catch per hour, and fishing pressure from boat and shore for Half-Moon Lake. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>Season</b>
<b>HARVEST</b>						
Rainbow trout	0.0087	0	24	0	29	53
	(0.0125)	(0)	(46)	(0)	(58)	(74)
Black crappie	0.0489	0	176	123	0	298
	(0.0436)	(0)	(179)	(175)	(0)	(250)
Bluegill	0.9986	0	3,714	1,927	450	6,091
	(0.5403)	(0)	(2,190)	(1,536)	(486)	(2,718)
Largemouth bass	0.0092	0	29	27	0	56
	(0.0135)	(0)	(59)	(55)	(0)	(80)
<b>TOTAL HARVEST</b>	<b>1.0654</b>	<b>0</b>	<b>3,943</b>	<b>2,077</b>	<b>479</b>	<b>6,499</b>
	(0.5539)	(0)	(2,198)	(1,547)	(490)	(2,732)
<b>RELEASED</b>						
Rainbow trout	0.0079	0	48	0	0	48
	(0.0124)	(0)	(74)	(0)	(0)	(74)
Largemouth bass	0.0374	0	123	74	32	228
	(0.0314)	(0)	(146)	(94)	(41)	(178)
Bluegill	0.5000	0	1,448	322	1,280	3,050
	(0.2778)	(0)	(875)	(377)	(1,046)	(1,415)
<b>TOTAL RELEASED</b>	<b>0.5454</b>	<b>0</b>	<b>1,619</b>	<b>396</b>	<b>1,312</b>	<b>3,327</b>
	(0.2875)	(0)	(890)	(389)	(1,047)	(1,428)
<b>TOTAL CATCH</b>	<b>1.6108</b>	<b>0</b>	<b>5,562</b>	<b>2,473</b>	<b>1,791</b>	<b>9,826</b>
	(0.7059)	(0)	(2,372)	(1,595)	(1,156)	(3,083)
<b>ANGLER HOURS</b>		<b>0</b>	<b>3,582</b>	<b>1,418</b>	<b>1,101</b>	<b>6,100</b>
		(0)	(1,398)	(921)	(824)	(1,866)
<b>ANGLER TRIPS</b>		<b>0</b>	<b>1,375</b>	<b>546</b>	<b>472</b>	<b>2,393</b>
		(0)	(582)	(375)	(356)	(778)

Table 13. Estimated harvest, catch per hour, and fishing pressure from boat and shore for Clear Lake. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	Season
<b>HARVEST</b>						
Largemouth bass	0.0167 (0.0336)	0 (0)	0 (0)	23 (46)	0 (0)	23 (46)
Rock bass	0.0258 (0.0535)	0 (0)	0 (0)	36 (73)	0 (0)	36 (73)
<b>TOTAL HARVEST</b>	<b>0.0424 (0.0648)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>59 (86)</b>	<b>0 (0)</b>	<b>59 (86)</b>
<b>RELEASED</b>						
Rainbow trout	0.0273 (0.0577)	0 (0)	38 (78)	0 (0)	0 (0)	38 (78)
Largemouth bass	0.1321 (0.1462)	0 (0)	76 (113)	108 (144)	0 (0)	184 (183)
Bluegill	0.8674 (0.7999)	0 (0)	1,031 (872)	180 (375)	0 (0)	1,211 (949)
<b>TOTAL RELEASED</b>	<b>1.0268 (0.8553)</b>	<b>0 (0)</b>	<b>1,145 (883)</b>	<b>288 (402)</b>	<b>0 (0)</b>	<b>1,433 (970)</b>
<b>TOTAL CATCH</b>	<b>1.0692 (0.8696)</b>	<b>0 (0)</b>	<b>1,145 (883)</b>	<b>347 (411)</b>	<b>0 (0)</b>	<b>1,493 (974)</b>
<b>ANGLER HOURS</b>		<b>0 (0)</b>	<b>559 (390)</b>	<b>837 (555)</b>	<b>0 (0)</b>	<b>1,396 (678)</b>
<b>ANGLER TRIPS</b>		<b>0 (0)</b>	<b>307 (219)</b>	<b>356 (252)</b>	<b>0 (0)</b>	<b>663 (334)</b>

Table 14. Estimated harvest, catch per hour, and fishing pressure from boat and shore for Crockery, Half, Lime, Clear Lakes combined. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	Season
<b>HARVEST</b>						
Rainbow trout	0.0189 (0.0152)	109 (152)	63 (73)	121 (175)	29 (58)	322 (250)
Brown trout	0.0011 (0.0022)	0 (0)	19 (37)	0 (0)	0 (0)	19 (37)
Yellow Perch	0.0042 (0.0050)	0 (0)	26 (50)	30 (60)	16 (31)	72 (84)
Northern pike	0.0009 (0.0019)	0 (0)	0 (0)	0 (0)	16 (32)	16 (32)
Black crappie	0.0212 (0.0164)	0 (0)	176 (179)	123 (175)	63 (102)	361 (270)
Bluegill	0.4946 (0.2045)	0 (0)	4,068 (2,219)	2,473 (1,646)	1,883 (1,287)	8,424 (3,048)
Largemouth bass	0.0082 (0.0091)	0 (0)	29 (59)	111 (141)	0 (0)	140 (153)
Rock bass	0.0021 (0.0043)	0 (0)	0 (0)	36 (73)	0 (0)	36 (73)
Common white sucker	0.0031 (0.0049)	16 (31)	37 (77)	0 (0)	0 (0)	53 (83)
<b>TOTAL HARVEST</b>	<b>0.5544 (0.2120)</b>	<b>124 (156)</b>	<b>4,417 (2,231)</b>	<b>2,894 (1,673)</b>	<b>2,007 (1,293)</b>	<b>9,442 (3,077)</b>
<b>RELEASED</b>						
Rainbow trout	0.0170 (0.0194)	0 (0)	260 (319)	30 (60)	0 (0)	290 (325)
Brown trout	0.0011 (0.0023)	0 (0)	19 (38)	0 (0)	0 (0)	19 (38)
Largemouth bass	0.0301 (0.0174)	0 (0)	238 (200)	212 (182)	63 (62)	513 (278)
Common white sucker	0.0009 (0.0018)	16 (31)	0 (0)	0 (0)	0 (0)	16 (31)
Bluegill	0.4237	0	2,652	1,077	3,486	7,216



	(0.1756)	(0)	(1,247)	(773)	(2,170)	(2,619)
TOTAL RELEASED	0.4729	16	3,168	1,320	3,550	8,053
	(0.1823)	(31)	(1,303)	(797)	(2,171)	(2,654)
TOTAL CATCH	1.0273	140	7,585	4,214	5,557	17,496
	(0.3150)	(159)	(2,583)	(1,853)	(2,526)	(4,064)
ANGLER HOURS		708	7,920	5,420	2,982	17,031
		(866)	(2,163)	(2,135)	(1,275)	(3,408)
ANGLER TRIPS		296	3,211	2,265	1,286	7,058
		(372)	(893)	(932)	(555)	(1,453)

## Survey 29 Grand River (Lower) and Rogue River, Kent County, Summer, 2003

<b>Waterbody</b>	Grand Rogue
<b>Year</b>	2003
<b>County</b>	Kent
<b>Sites</b>	502, 503, 504
<b>Survey period</b>	March 1, 2003 to April 30, 2003; September 1, 2003 to November 30, 2003
<b>Survey design</b>	roving-access
<b>Interview type/mode</b>	access / boat, shore
<b>Count type/mode</b>	roving / boat, shore
<b>Clerk time</b>	full
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Methods

*Lower Grand River (6th Street Dam area) summer 2003.* Survey followed a roving-access design. 6th Street Dam area is located upstream of highway 196 in Grand Rapids. All funding was provided by Fisheries Division. Survey was done with the Rogue River survey. One clerk working from a vehicle collected angler count and interview data. Clerk worked 1 weekend day and 1-2 weekdays per week during survey period. Clerk was assigned to work either both of the Rogue River sections or the 6th Street Dam area during a sample day, and selection was made randomly. Two instantaneous counts of individual anglers (shore and wading) were made per sample day. Time of count was randomized to cover times within the sample period. No holidays were scheduled for sampling. Counting and interviewing were done on the same days. One of two shifts was selected each sample day (Table 1). No predetermined interviewing route was used. Survey periods were from March 1 through April 30, 2003 and from September 1 through November 30, 2003. Months will be estimated separately.

*Rogue River, summer 2003.* Survey followed a progressive-access design. Two sections were surveyed. Survey sections were: Rogue River – 10-Mile Road (T.9N.,R.11W.,Sec.32) to Rockford Dam (T.9N.,R.11W.,Sec.36); and Rogue River – 10-Mile Road (T.9N.,R.11W.,Sec.36) to West River Drive bridge (T.8N.,R.11W.,Sec.22). All funding was provided by Fisheries Division. Survey was done with the Lower Grand River survey. One clerk working from a vehicle collected angler count and interview data. Clerk worked 1 weekend day and 1-2 weekdays per week during survey period. Clerk was assigned to work either both of the Rogue River sections or the 6th Street Dam area during a sample day, and selection was made randomly. In the 10-Mile to Rockford Dam section individual anglers (shore and wading) were counted. In the 10-Mile to West River Drive bridge section angler vehicles were counted. Two instantaneous counts were made per sample day. At the Rogue River sites, each count began from either the upstream 10-Mile Road or the downstream West River Road and progressed to the opposite end. Starting location was randomized. Time of count was randomized to cover times within the sample period. No holidays were scheduled for sampling. Counting and interviewing were done on the same days. One of two shifts was selected each sample day (Table 1). No predetermined interviewing route was used. Survey periods were from March 1 through April 30, 2003 and from September 1 through November 30, 2003. Months were estimated separately.

Table 1.–Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Lower Grand and Rogue rivers, summer 2003.

Month	Shift		Expansion values
	Early	Late	
March	0630 h – 1500 h	1100 h – 2130 h	16
April	0600 h – 1430 h	1230 h – 2100 h	16
September	0600 h – 1430 h	1200 h – 2030 h	16
October	0700 h – 1530 h	1100 h – 1930 h	13

Table 2.–Estimated harvest, catch per hour, and fishing pressure for 502. Two standard errors are given in parentheses.

Species	C/H	March	April	May	September	October	November	Season
<b>HARVEST</b>								
Chinook salmon	0.0068 (0.0093)	0 (0)	0 (0)	0 (0)	43 (72)	20 (45)	0 (0)	63 (85)
Rainbow trout	0.0453 (0.0456)	30 (62)	388 (405)	0 (0)	0 (0)	0 (0)	0 (0)	419 (410)
<b>TOTAL HARVEST</b>	<b>0.0521 (0.0469)</b>	<b>30 (62)</b>	<b>388 (405)</b>	<b>0 (0)</b>	<b>43 (72)</b>	<b>20 (45)</b>	<b>0 (0)</b>	<b>482 (418)</b>
<b>RELEASED</b>								
Chinook salmon	0.0033 (0.0071)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	31 (66)	31 (66)
Rainbow trout	0.0645 (0.0464)	121 (164)	342 (317)	31 (33)	0 (0)	102 (187)	0 (0)	597 (405)
Brown trout	0.0276 (0.0259)	91 (177)	0 (0)	10 (19)	0 (0)	61 (112)	93 (97)	255 (232)
Common white sucker	0.0022 (0.0044)	0 (0)	0 (0)	21 (40)	0 (0)	0 (0)	0 (0)	21 (40)
<b>TOTAL RELEASED</b>	<b>0.0977 (0.0561)</b>	<b>212 (242)</b>	<b>342 (317)</b>	<b>62 (56)</b>	<b>0 (0)</b>	<b>163 (218)</b>	<b>124 (117)</b>	<b>903 (473)</b>
<b>TOTAL CATCH</b>	<b>0.1498 (0.0769)</b>	<b>242 (249)</b>	<b>731 (515)</b>	<b>62 (56)</b>	<b>43 (72)</b>	<b>184 (223)</b>	<b>124 (117)</b>	<b>1,385 (631)</b>
<b>ANGLER HOURS</b>		2,576 (1,589)	4,044 (1,345)	826 (413)	312 (236)	878 (328)	607 (277)	9,242 (2,178)
<b>ANGLER TRIPS</b>		1,212 (770)	1,507 (658)	465 (293)	113 (104)	376 (198)	266 (138)	3,939 (1,086)

Table 3.–Estimated harvest, catch per hour, and fishing pressure for 503. Two standard errors are given in parentheses.

Species	C/H	March	April	May	September	October	November	Season
<b>HARVEST</b>								
Chinook salmon	0.0074 (0.0065)	0 (0)	0 (0)	0 (0)	79 (110)	193 (205)	0 (0)	272 (233)
Rainbow trout	0.0347 (0.0170)	34 (69)	674 (453)	234 (239)	79 (115)	0 (0)	262 (215)	1,283 (572)
Brown trout	0.0014 (0.0020)	0 (0)	0 (0)	0 (0)	29 (58)	0 (0)	23 (44)	51 (73)

Rock bass	0.0032 (0.0048)	0 (0)	0 (0)	0 (0)	119 (176)	0 (0)	0 (0)	119 (176)
Common white sucker	0.0009 (0.0018)	0 (0)	0 (0)	33 (67)	0 (0)	0 (0)	0 (0)	33 (67)
<b>TOTAL HARVEST</b>	<b>0.0475 (0.0201)</b>	<b>34 (69)</b>	<b>674 (453)</b>	<b>266 (248)</b>	<b>306 (245)</b>	<b>193 (205)</b>	<b>285 (220)</b>	<b>1,758 (650)</b>
<b>RELEASED</b>								
Coho salmon	0.0015 (0.0030)	0 (0)	0 (0)	0 (0)	0 (0)	55 (111)	0 (0)	55 (111)
Chinook salmon	0.0324 (0.0223)	0 (0)	0 (0)	0 (0)	0 (0)	1,117 (769)	82 (174)	1,198 (789)
Rainbow trout	0.0410 (0.0221)	68 (95)	768 (558)	220 (241)	79 (161)	55 (111)	330 (390)	1,520 (754)
Brown trout	0.0255 (0.0232)	220 (455)	0 (0)	369 (494)	267 (486)	0 (0)	90 (112)	946 (837)
<b>TOTAL RELEASED</b>	<b>0.1004 (0.0427)</b>	<b>288 (465)</b>	<b>768 (558)</b>	<b>589 (550)</b>	<b>346 (512)</b>	<b>1,226 (785)</b>	<b>501 (441)</b>	<b>3,719 (1,380)</b>
<b>TOTAL CATCH</b>	<b>0.1479 (0.0513)</b>	<b>322 (470)</b>	<b>1,442 (719)</b>	<b>856 (603)</b>	<b>652 (567)</b>	<b>1,419 (812)</b>	<b>786 (493)</b>	<b>5,477 (1,525)</b>
<b>ANGLER HOURS</b>		<b>6,408 (4,682)</b>	<b>14,620 (4,782)</b>	<b>3,914 (2,038)</b>	<b>4,279 (1,997)</b>	<b>4,919 (2,134)</b>	<b>2,890 (1,185)</b>	<b>37,030 (7,674)</b>
<b>ANGLER TRIPS</b>		<b>3,155 (2,752)</b>	<b>4,449 (1,471)</b>	<b>1,828 (1,024)</b>	<b>1,909 (916)</b>	<b>2,037 (991)</b>	<b>1,017 (473)</b>	<b>14,395 (3,582)</b>

Table 4.–Estimated harvest, catch per hour, and fishing pressure for 504. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>March</b>	<b>April</b>	<b>May</b>	<b>September</b>	<b>October</b>	<b>November</b>	<b>Season</b>
<b>HARVEST</b>								
Coho salmon	0.0112 (0.0085)	0 (0)	0 (0)	0 (0)	430 (394)	131 (127)	0 (0)	561 (414)
Chinook salmon	0.0269 (0.0116)	0 (0)	0 (0)	0 (0)	604 (421)	729 (334)	16 (32)	1,349 (539)
Rainbow trout	0.0726 (0.0236)	1,008 (660)	397 (288)	0 (0)	35 (68)	666 (334)	1,536 (641)	3,642 (1,023)
Brown trout	0.0044 (0.0036)	0 (0)	0 (0)	0 (0)	83 (119)	100 (101)	40 (78)	222 (175)
Lake trout	0.0003 (0.0006)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	16 (31)	16 (31)
Walleye	0.0159 (0.0096)	261 (306)	0 (0)	0 (0)	83 (115)	159 (165)	296 (282)	798 (462)
Channel catfish	0.0010 (0.0019)	0 (0)	0 (0)	0 (0)	48 (96)	0 (0)	0 (0)	48 (96)
<b>TOTAL HARVEST</b>	<b>0.1323 (0.0342)</b>	<b>1,269 (728)</b>	<b>397 (288)</b>	<b>0 (0)</b>	<b>1,282 (612)</b>	<b>1,784 (526)</b>	<b>1,904 (706)</b>	<b>6,636 (1,328)</b>
<b>RELEASED</b>								
Coho salmon	0.0074 (0.0091)	0 (0)	0 (0)	0 (0)	373 (452)	0 (0)	0 (0)	373 (452)
Chinook salmon	0.0084 (0.0070)	0 (0)	0 (0)	0 (0)	69 (141)	271 (267)	80 (162)	421 (342)
Rainbow trout	0.0942 (0.0364)	1,758 (1,168)	718 (500)	0 (0)	96 (184)	473 (329)	1,679 (985)	4,724 (1,651)
Brown trout	0.0056 (0.0065)	55 (111)	0 (0)	0 (0)	143 (287)	28 (56)	56 (86)	283 (324)
Lake trout	0.0003 (0.0006)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	16 (31)	16 (31)
Smallmouth bass	0.0093 (0.0070)	0 (0)	386 (320)	0 (0)	48 (97)	0 (0)	32 (65)	466 (341)
Walleye	0.0034 (0.0048)	0 (0)	0 (0)	0 (0)	0 (0)	152 (237)	16 (32)	168 (239)

TOTAL RELEASED	0.1286 (0.0420)	1,814 (1,173)	1,104 (594)	0 (0)	730 (591)	925 (488)	1,879 (1,005)	6,451 (1,824)
TOTAL CATCH	0.2610 (0.0620)	3,083 (1,380)	1,500 (660)	0 (0)	2,011 (851)	2,709 (718)	3,783 (1,228)	13,087 (2,256)
ANGLER HOURS		13,832 (6,077)	6,464 (2,332)	0 (0)	10,748 (4,169)	10,861 (2,272)	8,245 (1,528)	50,150 (8,200)
ANGLER TRIPS		5,081 (2,321)	1,924 (752)	0 (0)	4,318 (1,830)	3,727 (782)	2,774 (648)	17,824 (3,215)

Table 5.—Estimated harvest, catch per hour, and fishing pressure for Grand (Lower) and Rogue Rivers. Two standard errors are given in parentheses.

Species	C/H	March	April	May	September	October	November	Season
<b>HARVEST</b>								
Coho salmon	0.0058 (0.0044)	0 (0)	0 (0)	0 (0)	430 (394)	131 (127)	0 (0)	561 (414)
Chinook salmon	0.0175 (0.0065)	0 (0)	0 (0)	0 (0)	726 (441)	942 (395)	16 (32)	1,684 (593)
Rainbow trout	0.0554 (0.0145)	1,073 (667)	1,459 (673)	234 (239)	114 (134)	666 (334)	1,798 (676)	5,344 (1,241)
Brown trout	0.0028 (0.0020)	0 (0)	0 (0)	0 (0)	111 (133)	100 (101)	63 (90)	274 (190)
Lake trout	0.0002 (0.0003)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	16 (31)	16 (31)
Walleye	0.0083 (0.0049)	261 (306)	0 (0)	0 (0)	83 (115)	159 (165)	296 (282)	798 (462)
Rock bass	0.0012 (0.0018)	0 (0)	0 (0)	0 (0)	119 (176)	0 (0)	0 (0)	119 (176)
Channel catfish	0.0005 (0.0010)	0 (0)	0 (0)	0 (0)	48 (96)	0 (0)	0 (0)	48 (96)
Common white sucker	0.0003 (0.0007)	0 (0)	0 (0)	33 (67)	0 (0)	0 (0)	0 (0)	33 (67)
<b>TOTAL HARVEST</b>	<b>0.0921 (0.0193)</b>	<b>1,334 (734)</b>	<b>1,459 (673)</b>	<b>266 (248)</b>	<b>1,630 (663)</b>	<b>1,998 (567)</b>	<b>2,189 (740)</b>	<b>8,876 (1,536)</b>
<b>RELEASED</b>								
Coho salmon	0.0044 (0.0049)	0 (0)	0 (0)	0 (0)	373 (452)	55 (111)	0 (0)	428 (466)
Chinook salmon	0.0171 (0.0092)	0 (0)	0 (0)	0 (0)	69 (141)	1,388 (814)	193 (247)	1,650 (862)
Rainbow trout	0.0709 (0.0210)	1,948 (1,183)	1,828 (814)	251 (243)	175 (244)	630 (394)	2,009 (1,059)	6,841 (1,860)
Brown trout	0.0154 (0.0098)	366 (501)	0 (0)	380 (495)	410 (564)	89 (125)	239 (171)	1,484 (927)
Lake trout	0.0002 (0.0003)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	16 (31)	16 (31)
Smallmouth bass	0.0048 (0.0036)	0 (0)	386 (320)	0 (0)	48 (97)	0 (0)	32 (65)	466 (341)
Walleye	0.0017 (0.0025)	0 (0)	0 (0)	0 (0)	0 (0)	152 (237)	16 (32)	168 (239)
Common white sucker	0.0002 (0.0004)	0 (0)	0 (0)	21 (40)	0 (0)	0 (0)	0 (0)	21 (40)
<b>TOTAL RELEASED</b>	<b>0.1148 (0.0278)</b>	<b>2,314 (1,285)</b>	<b>2,214 (874)</b>	<b>651 (553)</b>	<b>1,075 (782)</b>	<b>2,315 (950)</b>	<b>2,505 (1,104)</b>	<b>11,073 (2,335)</b>
<b>TOTAL CATCH</b>	<b>0.2069 (0.0380)</b>	<b>3,647 (1,479)</b>	<b>3,673 (1,103)</b>	<b>917 (606)</b>	<b>2,706 (1,025)</b>	<b>4,313 (1,106)</b>	<b>4,693 (1,329)</b>	<b>19,949 (2,795)</b>
<b>ANGLER HOURS</b>		<b>22,816 (7,834)</b>	<b>25,129 (5,488)</b>	<b>4,739 (2,079)</b>	<b>15,339 (4,629)</b>	<b>16,657 (3,134)</b>	<b>11,742 (1,954)</b>	<b>96,423 (11,440)</b>
<b>ANGLER TRIPS</b>		<b>9,449</b>	<b>7,879</b>	<b>2,293</b>	<b>6,340</b>	<b>6,140</b>	<b>4,058</b>	<b>36,159</b>

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(3,682) (1,778) (1,065) (2,049) (1,278) (814) (4,934)

## Survey 30 Grand River Upper, Ingham and Ionia Counties, Summer, 2003

<b>Waterbody</b>	Grand River Upper
<b>Year</b>	2003
<b>County</b>	Ingham, Ionia
<b>Sites</b>	500, 501
<b>Survey period</b>	Summer March-November
<b>Survey design</b>	progressiveaccess (progressivecounts and access interviews)
<b>Interview type/mode</b>	access / shore
<b>Count type/mode</b>	roving / shore, boat (only a few)
<b>Clerk time</b>	full
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Methods

*Upper Grand River, summer 2003.* Survey followed a progressive-access design. Two sections were surveyed. Survey sections were: Grand Ledge (T.4N.,R.4W.,Sec. 2 and 3) to Moores Park (T.4N.,R.2W.,Sec.21 – downstream of Martin Luther King Jr. Blvd.), and Lyons (T.7N.,R.5W.,Sec.19) to Portland (T.6N.,R.5W.,Sec.28). All funding was provided by Fisheries Division. One clerk working from a vehicle collected angler count and interview data. Clerk worked 2 weekend days and 3 week days per week during survey period. Only one of the two sections was assigned for counting and interviewing during a sample day and section was chosen randomly. Two instantaneous counts of anglers were made per sample day. All anglers were visible from bridge crossings and access points. Shore and boat anglers were treated as a single mode when counting and interviewing. Each count began from either the upstream or downstream end of a section and progressed to the opposite end. Starting location was randomized. Time of count was randomized to cover times within the sample period. No holidays were scheduled for sampling. Counting and interviewing were done on the same days. One of two shifts was selected each sample day (Table 1). No predetermined interviewing route was used. Survey periods were from March 1 through April 30, 2003 and from September 1 through November 30, 2003. Sections and months were estimated separately.

Table 1.–Work shifts and expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort, Upper Grand River, summer 2003.

Month	Shift		Expansion values
	Early	Late	
March	0630 h – 1500 h	1100 h – 2130 h	16
April	0600 h – 1430 h	1230 h – 2100 h	16
September	0600 h – 1430 h	1200 h – 2030 h	16
October	0700 h – 1530 h	1100 h – 1930 h	13

Table 2.—Estimated harvest, catch per hour, and fishing pressure from shore for 500. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>March</b>	<b>April</b>	<b>September</b>	<b>October</b>	<b>November</b>	<b>Season</b>
<b>HARVEST</b>							
Chinook salmon	0.0068 (0.0121)	0 (0)	0 (0)	0 (0)	53 (94)	0 (0)	53 (94)
Walleye	0.0084 (0.0118)	0 (0)	0 (0)	48 (85)	18 (32)	0 (0)	65 (91)
Bluegill	0.1581 (0.1385)	485 (595)	38 (76)	707 (856)	0 (0)	0 (0)	1,230 (1,045)
Channel catfish	0.0156 (0.0230)	81 (160)	40 (77)	0 (0)	0 (0)	0 (0)	121 (177)
<b>TOTAL HARVEST</b>	<b>0.1888 (0.1430)</b>	<b>566 (616)</b>	<b>79 (108)</b>	<b>754 (860)</b>	<b>70 (99)</b>	<b>0 (0)</b>	<b>1,469 (1,068)</b>
<b>RELEASED</b>							
Coho salmon	0.0262 (0.0466)	179 (358)	0 (0)	0 (0)	25 (42)	0 (0)	204 (360)
Rainbow trout	0.0686 (0.0758)	0 (0)	500 (575)	0 (0)	34 (67)	0 (0)	534 (579)
Smallmouth bass	0.0993 (0.0848)	324 (503)	210 (294)	85 (130)	154 (229)	0 (0)	772 (639)
Walleye	0.0371 (0.0498)	283 (382)	6 (11)	0 (0)	0 (0)	0 (0)	289 (383)
Northern pike	0.0061 (0.0127)	0 (0)	0 (0)	48 (98)	0 (0)	0 (0)	48 (98)
Rock bass	0.0072 (0.0106)	0 (0)	20 (40)	36 (71)	0 (0)	0 (0)	56 (82)
Channel catfish	0.0292 (0.0354)	162 (255)	0 (0)	65 (92)	0 (0)	0 (0)	227 (271)
Bluegill	0.3552 (0.2387)	1,198 (1,067)	0 (0)	1,566 (1,403)	0 (0)	0 (0)	2,764 (1,762)
<b>TOTAL RELEASED</b>	<b>0.6288 (0.2958)</b>	<b>2,145 (1,315)</b>	<b>735 (647)</b>	<b>1,799 (1,417)</b>	<b>213 (243)</b>	<b>0 (0)</b>	<b>4,893 (2,053)</b>
<b>TOTAL CATCH</b>	<b>0.8176 (0.3445)</b>	<b>2,712 (1,453)</b>	<b>814 (656)</b>	<b>2,554 (1,658)</b>	<b>283 (262)</b>	<b>0 (0)</b>	<b>6,362 (2,314)</b>
<b>ANGLER HOURS</b>		<b>1,534 (732)</b>	<b>1,224 (876)</b>	<b>1,843 (684)</b>	<b>2,934 (965)</b>	<b>246 (193)</b>	<b>7,782 (1,655)</b>
<b>ANGLER TRIPS</b>		<b>773 (380)</b>	<b>638 (611)</b>	<b>1,062 (466)</b>	<b>731 (337)</b>	<b>121 (115)</b>	<b>3,325 (929)</b>



Table 3.—Estimated harvest, catch per hour, and fishing pressure from shore for 501. Two standard errors are given in parentheses.

Species	C/H	March	April	September	October	November	Season
<b>HARVEST</b>							
Coho salmon	0.0087 (0.0094)	0 (0)	0 (0)	11 (18)	78 (93)	0 (0)	89 (95)
Chinook salmon	0.0170 (0.0129)	0 (0)	0 (0)	16 (30)	158 (125)	0 (0)	174 (128)
Rainbow trout	0.0040 (0.0066)	0 (0)	9 (19)	0 (0)	32 (64)	0 (0)	41 (67)
Smallmouth bass	0.0224 (0.0285)	0 (0)	0 (0)	0 (0)	206 (286)	23 (41)	228 (289)
Walleye	0.0122 (0.0130)	0 (0)	0 (0)	64 (98)	39 (77)	23 (41)	125 (132)
Bluegill	0.0113 (0.0228)	0 (0)	0 (0)	0 (0)	116 (232)	0 (0)	116 (232)
Carp	0.0104 (0.0132)	0 (0)	0 (0)	91 (130)	15 (31)	0 (0)	106 (134)
Channel catfish	0.0047 (0.0071)	0 (0)	0 (0)	16 (33)	32 (64)	0 (0)	48 (72)
<b>TOTAL HARVEST</b>	<b>0.0908 (0.0468)</b>	<b>0 (0)</b>	<b>9 (19)</b>	<b>198 (170)</b>	<b>675 (418)</b>	<b>45 (58)</b>	<b>927 (455)</b>
<b>RELEASED</b>							
Coho salmon	0.0137 (0.0162)	0 (0)	0 (0)	60 (100)	79 (130)	0 (0)	139 (164)
Chinook salmon	0.0124 (0.0147)	0 (0)	0 (0)	0 (0)	126 (149)	0 (0)	126 (149)
Rainbow trout	0.0158 (0.0165)	0 (0)	145 (164)	16 (31)	0 (0)	0 (0)	161 (167)
Smallmouth bass	0.1459 (0.1065)	38 (41)	258 (213)	475 (466)	450 (786)	270 (496)	1,491 (1,062)
Walleye	0.0252 (0.0170)	0 (0)	115 (111)	111 (110)	32 (64)	0 (0)	257 (168)
Common white sucker	0.0475 (0.0420)	0 (0)	391 (405)	95 (121)	0 (0)	0 (0)	485 (423)
Redhorse	0.0021 (0.0039)	0 (0)	22 (40)	0 (0)	0 (0)	0 (0)	22 (40)
Rock bass	0.0045 (0.0090)	0 (0)	0 (0)	46 (92)	0 (0)	0 (0)	46 (92)
Channel catfish	0.0110 (0.0140)	0 (0)	0 (0)	112 (142)	0 (0)	0 (0)	112 (142)
Carp	0.0061 (0.0088)	0 (0)	0 (0)	0 (0)	62 (89)	0 (0)	62 (89)
Bluegill	0.0323 (0.0473)	0 (0)	0 (0)	330 (480)	0 (0)	0 (0)	330 (480)
<b>TOTAL RELEASED</b>	<b>0.3165 (0.1363)</b>	<b>38 (41)</b>	<b>930 (500)</b>	<b>1,244 (717)</b>	<b>749 (818)</b>	<b>270 (496)</b>	<b>3,233 (1,296)</b>
<b>TOTAL CATCH</b>	<b>0.4073 (0.1489)</b>	<b>38 (41)</b>	<b>940 (500)</b>	<b>1,442 (737)</b>	<b>1,424 (919)</b>	<b>315 (499)</b>	<b>4,160 (1,374)</b>
<b>ANGLER HOURS</b>		<b>1,033 (444)</b>	<b>2,368 (766)</b>	<b>2,067 (864)</b>	<b>4,098 (934)</b>	<b>647 (409)</b>	<b>10,214 (1,603)</b>
<b>ANGLER TRIPS</b>		<b>424 (215)</b>	<b>649 (237)</b>	<b>683 (334)</b>	<b>1,352 (348)</b>	<b>284 (197)</b>	<b>3,392 (611)</b>

Table 4.—Estimated harvest, catch per hour, and fishing pressure from shore for Grand River (Upper). Two standard errors are given in parentheses.

Species	C/H	March	April	September	October	November	Season
<b>HARVEST</b>							
Coho salmon	0.0049 (0.0053)	0 (0)	0 (0)	11 (18)	78 (93)	0 (0)	89 (95)
Chinook salmon	0.0126 (0.0090)	0 (0)	0 (0)	16 (30)	210 (156)	0 (0)	226 (159)
Rainbow trout	0.0023 (0.0037)	0 (0)	9 (19)	0 (0)	32 (64)	0 (0)	41 (67)
Smallmouth bass	0.0127 (0.0161)	0 (0)	0 (0)	0 (0)	206 (286)	23 (41)	228 (289)
Walleye	0.0106 (0.0090)	0 (0)	0 (0)	111 (130)	56 (84)	23 (41)	190 (160)
Bluegill	0.0748 (0.0603)	485 (595)	38 (76)	707 (856)	116 (232)	0 (0)	1,346 (1,071)
Carp	0.0059 (0.0075)	0 (0)	0 (0)	91 (130)	15 (31)	0 (0)	106 (134)
Channel catfish	0.0094 (0.0107)	81 (160)	40 (77)	16 (33)	32 (64)	0 (0)	169 (191)
<b>TOTAL HARVEST</b>	<b>0.1332 (0.0667)</b>	<b>566 (616)</b>	<b>88 (110)</b>	<b>952 (877)</b>	<b>745 (430)</b>	<b>45 (58)</b>	<b>2,396 (1,161)</b>
<b>RELEASED</b>							
Coho salmon	0.0191 (0.0221)	179 (358)	0 (0)	60 (100)	104 (137)	0 (0)	343 (396)
Chinook salmon	0.0070 (0.0083)	0 (0)	0 (0)	0 (0)	126 (149)	0 (0)	126 (149)
Rainbow trout	0.0386 (0.0339)	0 (0)	645 (598)	16 (31)	34 (67)	0 (0)	695 (603)
Smallmouth bass	0.1258 (0.0707)	362 (504)	467 (363)	560 (484)	604 (819)	270 (496)	2,263 (1,240)
Walleye	0.0304 (0.0236)	283 (382)	121 (111)	111 (110)	32 (64)	0 (0)	546 (418)
Northern pike	0.0026 (0.0055)	0 (0)	0 (0)	48 (98)	0 (0)	0 (0)	48 (98)
Common white sucker	0.0270 (0.0237)	0 (0)	391 (405)	95 (121)	0 (0)	0 (0)	485 (423)
Redhorse	0.0012 (0.0022)	0 (0)	22 (40)	0 (0)	0 (0)	0 (0)	22 (40)
Rock bass	0.0056 (0.0069)	0 (0)	20 (40)	81 (116)	0 (0)	0 (0)	102 (123)
Channel catfish	0.0188 (0.0172)	162 (255)	0 (0)	177 (169)	0 (0)	0 (0)	339 (306)
Carp	0.0035 (0.0050)	0 (0)	0 (0)	0 (0)	62 (89)	0 (0)	62 (89)
Bluegill	0.1720 (0.1039)	1,198 (1,067)	0 (0)	1,896 (1,483)	0 (0)	0 (0)	3,094 (1,827)
<b>TOTAL RELEASED</b>	<b>0.4516 (0.1468)</b>	<b>2,184 (1,316)</b>	<b>1,666 (818)</b>	<b>3,044 (1,588)</b>	<b>963 (853)</b>	<b>270 (496)</b>	<b>8,126 (2,428)</b>
<b>TOTAL CATCH</b>	<b>0.5847 (0.1673)</b>	<b>2,750 (1,453)</b>	<b>1,754 (825)</b>	<b>3,996 (1,814)</b>	<b>1,707 (956)</b>	<b>315 (499)</b>	<b>10,522 (2,692)</b>
<b>ANGLER HOURS</b>		<b>2,567 (856)</b>	<b>3,592 (1,163)</b>	<b>3,910 (1,102)</b>	<b>7,033 (1,343)</b>	<b>893 (452)</b>	<b>17,996 (2,304)</b>
<b>ANGLER TRIPS</b>		<b>1,197 (436)</b>	<b>1,287 (656)</b>	<b>1,744 (574)</b>	<b>2,083 (485)</b>	<b>406 (228)</b>	<b>6,717 (1,112)</b>

## Survey 31 Manistee River, Wexford County, Summer, 2003

<b>Waterbody</b>	Manistee River
<b>Year</b>	2003
<b>County</b>	Wexford
<b>Sites</b>	510, 511
<b>Survey period</b>	May 17, 2003 to August 31, 2003
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access / boat, shore
<b>Count type/mode</b>	roving / boat, shore
<b>Clerk time</b>	1/2
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Methods

*Manistee River, Summer 2003.* Survey followed a progressive-access design. One river section was surveyed. Survey section was: Hodenpyl Dam (N44.36362, W085.82061) T23N, R13W, Sec. 25. to Red Bridge (N44.28379, W085.86059) T22N, R13W, Sec. 23. All funding was provided by Fisheries Division. Survey was done in conjunction with Great Lakes angler surveys. Two clerks collected count and interview data. Clerks worked 1 weekend day and 1-2 week days per week during survey period. Instantaneous counts were made by kayak in the survey section each sample day. The section count always started at Hodenpyl Dam and went down to Red Bridge. The count generally took about 2 ½ to 3 ½ hours to complete, depending on the number of anglers that were interviewed during the count. While one clerk counted (and interviewed ) anglers, the other clerk interviewed anglers as they exited the river. Shore wading and boat anglers were interviewed. All anglers, regardless of mode were pooled for counts and interviews. Time of count was randomized to cover times within the sample period. No holidays were scheduled for sampling. Counting and interviewing were done on the same days. One of two shifts was selected each sample day. No predetermined interviewing route was used. Survey period was from May 17 through Aug 31, 2003. Months were estimated separately.

Table 1. Work shifts and expansion values (referred to as “F” in Lockwood et al. 1999) used to estimate catch and effort, Manistee River, summer 2003.

Month	Shift		Expansion values
	Early	Late	
May 17 – 31	0600 h – 1430 h	1230 h – 2100 h	16
June	0600 h – 1430 h	1330 h – 2200 h	17
July	0600 h – 1430 h	1300 h – 2130 h	17
August	0600 h – 1430 h	1230 h – 2100 h	16

Table 2. Estimated harvest, catch per hour, and fishing pressure for Manistee River. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>Season</b>
<b>HARVEST</b>						
Rainbow trout	0.0173 (0.0118)	10 (17)	78 (84)	53 (56)	332 (295)	473 (312)
Brown trout	0.0098 (0.0055)	5 (10)	45 (39)	32 (45)	184 (131)	266 (144)
Smallmouth bass	0.0041 (0.0039)	32 (64)	15 (22)	16 (33)	49 (73)	112 (104)
Walleye	0.0103 (0.0115)	0 (0)	15 (22)	0 (0)	266 (310)	281 (311)
Yellow Perch	0.0041 (0.0047)	0 (0)	9 (19)	64 (98)	39 (77)	112 (126)
Bluegill	0.0111 (0.0136)	0 (0)	185 (285)	0 (0)	116 (232)	301 (367)
Rock bass	0.0039 (0.0049)	0 (0)	0 (0)	91 (130)	15 (31)	106 (134)
Channel catfish	0.0018 (0.0026)	0 (0)	0 (0)	16 (33)	32 (64)	48 (72)
<b>TOTAL HARVEST</b>	<b>0.0623</b> <b>(0.0252)</b>	<b>47</b> <b>(67)</b>	<b>347</b> <b>(302)</b>	<b>272</b> <b>(184)</b>	<b>1,032</b> <b>(519)</b>	<b>1,699</b> <b>(632)</b>
<b>RELEASED</b>						
Rainbow trout	0.0950 (0.0447)	131 (136)	1,439 (912)	831 (667)	189 (131)	2,590 (1,146)
Brown trout	0.0503 (0.0333)	101 (113)	939 (826)	239 (254)	94 (133)	1,373 (882)
Smallmouth bass	0.0065 (0.0058)	9 (17)	6 (13)	15 (29)	148 (152)	178 (157)
Largemouth bass	0.0059 (0.0062)	0 (0)	145 (164)	16 (31)	0 (0)	161 (167)
Common white sucker	0.0465 (0.0353)	86 (85)	258 (213)	475 (466)	450 (786)	1,268 (942)
Rock bass	0.0094 (0.0064)	0 (0)	115 (111)	111 (110)	32 (64)	257 (168)
Carp	0.0004 (0.0008)	11 (22)	0 (0)	0 (0)	0 (0)	11 (22)
Bluegill	0.0200 (0.0164)	0 (0)	391 (405)	95 (121)	60 (120)	545 (439)
Yellow Perch	0.0008 (0.0015)	0 (0)	22 (40)	0 (0)	0 (0)	22 (40)
<b>TOTAL RELEASED</b>	<b>0.2349</b> <b>(0.0760)</b>	<b>338</b> <b>(198)</b>	<b>3,315</b> <b>(1,329)</b>	<b>1,780</b> <b>(869)</b>	<b>973</b> <b>(834)</b>	<b>6,406</b> <b>(1,804)</b>
<b>TOTAL CATCH</b>	<b>0.2972</b> <b>(0.0846)</b>	<b>385</b> <b>(209)</b>	<b>3,662</b> <b>(1,362)</b>	<b>2,052</b> <b>(888)</b>	<b>2,005</b> <b>(982)</b>	<b>8,104</b> <b>(1,912)</b>
<b>ANGLER HOURS</b>		<b>3,858</b> <b>(2,273)</b>	<b>8,765</b> <b>(2,188)</b>	<b>7,208</b> <b>(2,367)</b>	<b>7,436</b> <b>(1,812)</b>	<b>27,267</b> <b>(4,341)</b>
<b>ANGLER TRIPS</b>		<b>1,663</b> <b>(1,360)</b>	<b>2,265</b> <b>(678)</b>	<b>1,930</b> <b>(625)</b>	<b>2,501</b> <b>(644)</b>	<b>8,361</b> <b>(1,765)</b>

## Survey 32 Green Lake, Grand Traverse County, Winter, 2004

<b>Waterbody</b>	Green Lake
<b>Year</b>	Winter, 2004
<b>County</b>	Grand Traverse
<b>Sites</b>	292
<b>Survey period</b>	January 11 to March 21
<b>Survey design</b>	progressive-roving (progressive counts and interviews)
<b>Interview type/mode</b>	roving/open ice and shanty
<b>Count type/mode</b>	progressive/open ice and shanty
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a progressive-roving (progressive counts and interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of three shifts was selected each sample day. The third shift extended to 11:30PM to survey a night smelt fishery. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing (Figure 1). progressive counts of open ice and shanty anglers were made once per day. Survey period for both counts and interviews was January 11 to March 21. Months were estimated separately. Estimates are given in Tables 2-4.

Figure 1. Green Lake map used for winter 2004 counts and interviews with markers.

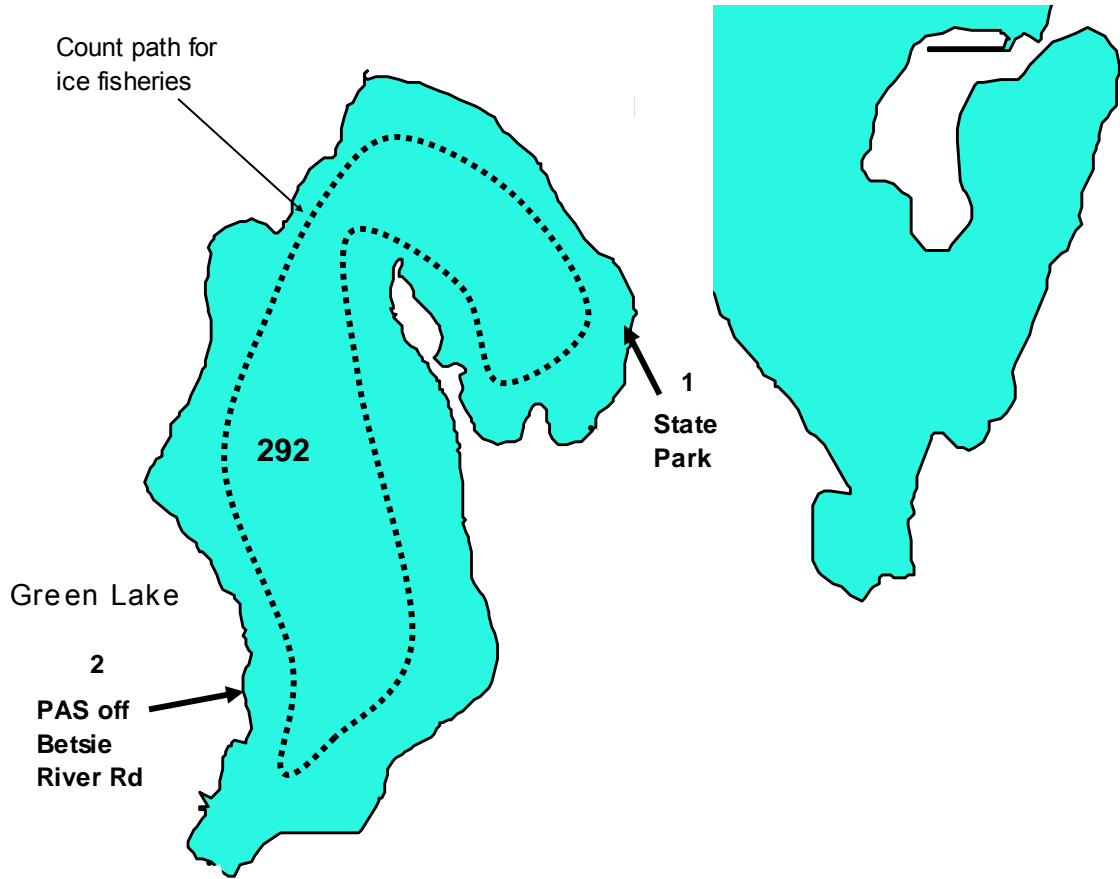


Table 1. Expansion values (F) used to estimate catch and effort at Green Lake, January 11 to March 21, Winter, 2004

	Year	Month	F
1	2004	1	13
2	2004	2	13
3	2004	3	13
4	2003	12	13

Table 2. Estimated harvest, catch per hour, and fishing pressure for open ice. Two standard errors are given in parentheses. Smelt are removed from the table and the hours of the survey were from 7:00 am to 7:30 pm. Two standard errors are given in parentheses

Species	C/H	January	February	March	Season
<b>HARVEST</b>					
Cisco	0.0007 (0.0015)	0 (0)	5 (9)	0 (0)	5 (9)
Yellow Perch	0.1631 (0.1117)	171 (214)	709 (562)	116 (119)	995 (613)
Northern pike	0.0223 (0.0141)	82 (68)	51 (33)	2 (5)	136 (76)
<b>TOTAL HARVEST</b>	<b>0.1861 (0.1155)</b>	<b>253 (224)</b>	<b>765 (563)</b>	<b>118 (119)</b>	<b>1,136 (618)</b>
<b>RELEASED</b>					
Lake trout	0.0023 (0.0034)	0 (0)	0 (0)	14 (20)	14 (20)
Northern pike	0.0052 (0.0083)	24 (49)	7 (8)	0 (0)	31 (50)
Yellow Perch	0.1728 (0.1275)	323 (376)	577 (564)	155 (213)	1,054 (711)
<b>TOTAL RELEASED</b>	<b>0.1803 (0.1287)</b>	<b>347 (380)</b>	<b>584 (564)</b>	<b>169 (214)</b>	<b>1,100 (713)</b>
<b>TOTAL CATCH</b>	<b>0.3663 (0.1895)</b>	<b>600 (441)</b>	<b>1,349 (797)</b>	<b>287 (245)</b>	<b>2,236 (943)</b>
<b>ANGLER HOURS</b>		<b>1,714 (995)</b>	<b>3,444 (1,311)</b>	<b>946 (794)</b>	<b>6,104 (1,828)</b>
<b>ANGLER TRIPS</b>		<b>511 (299)</b>	<b>689 (277)</b>	<b>202 (204)</b>	<b>1,403 (456)</b>

Table 3. Estimated harvest, catch per hour, and fishing pressure for shanty. Two standard errors are given in parentheses. Smelt are removed from the table and the hours of the survey were from 7:00 am to 7:30 pm. Two standard errors are given in parentheses

Species	C/H	January	February	March	Season
<b>HARVEST</b>					
Cisco	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	0.0856 (0.0635)	875 (680)	167 (130)	0 (0)	1,042 (692)
Northern pike	0.0074 (0.0070)	68 (71)	23 (37)	0 (0)	91 (80)
<b>TOTAL HARVEST</b>	<b>0.0930 (0.0650)</b>	<b>942 (683)</b>	<b>190 (135)</b>	<b>0 (0)</b>	<b>1,132 (696)</b>
<b>RELEASED</b>					
Lake trout	0.0019 (0.0030)	0 (0)	7 (13)	17 (33)	23 (36)
Northern pike	0.0005 (0.0011)	0 (0)	7 (13)	0 (0)	7 (13)
Yellow Perch	0.0853 (0.0565)	857 (579)	158 (134)	23 (46)	1,038 (596)
<b>TOTAL RELEASED</b>	<b>0.0877</b>	<b>857</b>	<b>171</b>	<b>40</b>	<b>1,068</b>

	(0.0570)	(579)	(135)	(57)	(597)
TOTAL CATCH	0.1807	1,799	361	40	2,200
	(0.0962)	(896)	(191)	(57)	(918)
ANGLER HOURS		7,053	4,742	380	12,175
		(3,302)	(2,225)	(619)	(4,029)
ANGLER TRIPS		2,028	2,214	136	4,378
		(993)	(1,197)	(242)	(1,574)

Table 4. Estimated harvest, catch per hour, and fishing pressure for Green Lake. Two standard errors are given in parentheses. Smelt are removed from the table and the hours of the survey were from 7:00 am to 7:30 pm. Two standard errors are given in parentheses

<b>Species</b>	<b>C/H</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>Season</b>
<b>HARVEST</b>					
Cisco	0.0002	0	5	0	5
	(0.0005)	(0)	(9)	(0)	(9)
Yellow Perch	0.1114	1,046	875	116	2,037
	(0.0573)	(712)	(577)	(119)	(924)
Northern pike	0.0124	150	74	2	226
	(0.0067)	(98)	(49)	(5)	(110)
TOTAL HARVEST	0.1241	1,195	954	118	2,268
	(0.0591)	(719)	(579)	(119)	(931)
<b>RELEASED</b>					
Lake trout	0.0020	0	7	31	37
	(0.0023)	(0)	(13)	(39)	(41)
Northern pike	0.0021	24	14	0	38
	(0.0028)	(49)	(16)	(0)	(51)
Yellow Perch	0.1145	1,179	736	178	2,093
	(0.0578)	(691)	(580)	(218)	(928)
TOTAL RELEASED	0.1186	1,204	756	209	2,168
	(0.0584)	(693)	(580)	(222)	(930)
TOTAL CATCH	0.2427	2,399	1,710	327	4,436
	(0.0929)	(998)	(820)	(252)	(1,316)
ANGLER HOURS		8,767	8,185	1,326	18,279
		(3,448)	(2,582)	(1,007)	(4,424)
ANGLER TRIPS		2,540	2,903	338	5,781
		(1,037)	(1,228)	(317)	(1,638)



## **Survey 33 Crystal Lake, Benzie County, Winter, 2004**

<b>Waterbody</b>	Crystal Lake
<b>Year</b>	2004
<b>County</b>	Benzie
<b>Sites</b>	293
<b>Survey period</b>	Winter, January-March
<b>Survey design</b>	Roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	roving/open ice and shanty
<b>Count type/mode</b>	progressive/open ice and shanty
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Notes**

Survey followed a roving-roving (roving counts and interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of three shifts was selected each sample day. The third shift extended to 11:30PM to survey a night smelt fishery. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. progressive counts of open ice and shanty anglers were made once per day. Survey period for both counts and interviews was Winter, January-March. Months were estimated separately.

Figure 1.—Crystal Lake map with markers used as starting points for interviewing and counting, as well as count path for both day-time fishery and night smelt fishery for winter 2003-2004 creel survey. Site code is 293.

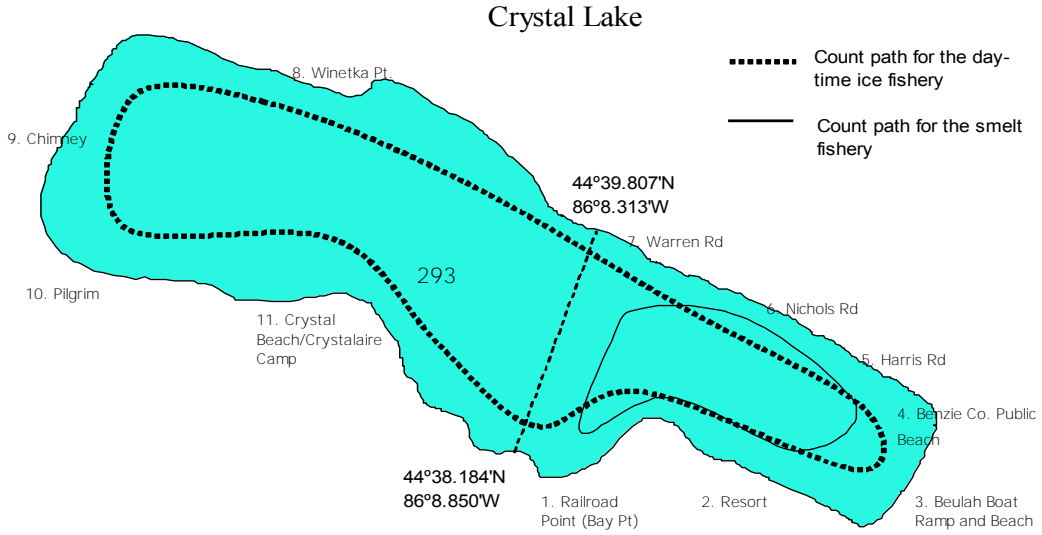


Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort at Crystal, Winter, January-March, 2004

	Year	Month	F
1	2004	1	13
2	2004	2	13
3	2004	3	13

Table 2. Estimated harvest, catch per hour, and fishing pressure for open ice. Two standard errors are given in parentheses.

Species	C/H	January	February	March	Season
<b>HARVEST</b>					
Rainbow trout	0.0024 (0.0028)	0 (0)	3 (6)	36 (44)	39 (44)
Lake trout	0.1018 (0.0442)	301 (248)	1,002 (439)	331 (162)	1,634 (529)
Cisco	0.0004 (0.0008)	0 (0)	0 (0)	6 (13)	6 (13)
Lake whitefish	0.0067 (0.0045)	0 (0)	51 (42)	56 (49)	107 (65)
Yellow Perch	0.5665 (0.2429)	207 (283)	4,913 (2,365)	3,976 (1,614)	9,095 (2,878)
Common white sucker	0.0328 (0.0228)	0 (0)	42 (72)	485 (325)	527 (333)
Rainbow smelt	0.0480 (0.0585)	0 (0)	639 (874)	131 (263)	770 (913)
<b>TOTAL HARVEST</b>	<b>0.7586 (0.2917)</b>	<b>507 (376)</b>	<b>6,650 (2,561)</b>	<b>5,021 (1,677)</b>	<b>12,179 (3,084)</b>
<b>RELEASED</b>					
Rainbow trout	0.0006 (0.0012)	0 (0)	0 (0)	9 (19)	9 (19)
Lake trout	0.0049 (0.0038)	24 (28)	55 (48)	0 (0)	79 (56)
Common white sucker	0.0038 (0.0071)	0 (0)	0 (0)	61 (113)	61 (113)
Yellow Perch	0.2051 (0.0943)	139 (171)	1,728 (943)	1,426 (682)	3,293 (1,177)
<b>TOTAL RELEASED</b>	<b>0.2144 (0.0964)</b>	<b>164 (174)</b>	<b>1,782 (945)</b>	<b>1,497 (692)</b>	<b>3,443 (1,184)</b>
<b>TOTAL CATCH</b>	<b>0.9730 (0.3487)</b>	<b>671 (414)</b>	<b>8,432 (2,730)</b>	<b>6,518 (1,814)</b>	<b>15,621 (3,303)</b>
<b>ANGLER HOURS</b>		<b>1,014 (773)</b>	<b>10,957 (4,270)</b>	<b>4,083 (1,655)</b>	<b>16,054 (4,645)</b>
<b>ANGLER TRIPS</b>		<b>253 (188)</b>	<b>2,636 (1,096)</b>	<b>1,123 (427)</b>	<b>4,012 (1,191)</b>

Table 3. Estimated harvest, catch per hour, and fishing pressure for shanty. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>Season</b>
<b>HARVEST</b>					
Rainbow trout	0.0004 (0.0004)	0 (0)	0 (0)	9 (10)	9 (10)
Brown trout	0.0005 (0.0009)	11 (22)	0 (0)	0 (0)	11 (22)
Lake trout	0.0766 (0.0262)	440 (313)	1,148 (355)	216 (124)	1,804 (489)
Cisco	0.0006 (0.0012)	0 (0)	14 (29)	0 (0)	14 (29)
Lake whitefish	0.0118 (0.0069)	35 (45)	181 (114)	63 (92)	279 (153)
Yellow Perch	0.5590 (0.1857)	2,431 (1,696)	7,646 (2,458)	3,087 (1,640)	13,164 (3,407)
Common white sucker	0.0034 (0.0030)	0 (0)	28 (49)	52 (47)	80 (68)
Rainbow smelt	0.0001 (0.0003)	0 (0)	3 (7)	0 (0)	3 (7)
<b>TOTAL HARVEST</b>	<b>0.6524 (0.1997)</b>	<b>2,916 (1,725)</b>	<b>9,021 (2,486)</b>	<b>3,427 (1,648)</b>	<b>15,364 (3,446)</b>
<b>RELEASED</b>					
Lake trout	0.0009 (0.0012)	16 (27)	6 (11)	0 (0)	21 (29)
Common white sucker	0.0053 (0.0084)	0 (0)	0 (0)	124 (196)	124 (196)
Yellow Perch	0.2474 (0.1002)	1,646 (1,452)	2,719 (1,101)	1,462 (883)	5,827 (2,025)
<b>TOTAL RELEASED</b>	<b>0.2536 (0.1013)</b>	<b>1,662 (1,452)</b>	<b>2,725 (1,101)</b>	<b>1,585 (904)</b>	<b>5,972 (2,035)</b>
<b>TOTAL CATCH</b>	<b>0.9060 (0.2539)</b>	<b>4,578 (2,255)</b>	<b>11,746 (2,719)</b>	<b>5,013 (1,879)</b>	<b>21,336 (4,002)</b>
<b>ANGLER HOURS</b>		<b>4,008 (2,476)</b>	<b>16,515 (4,030)</b>	<b>3,027 (1,298)</b>	<b>23,550 (4,905)</b>
<b>ANGLER TRIPS</b>		<b>913 (566)</b>	<b>3,967 (1,016)</b>	<b>717 (320)</b>	<b>5,597 (1,207)</b>

Table 4. Crystal Lake winter 2004 combined open ice and shanty angler survey catch and effort estimates. Does not include the evening smelt fishery. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>Season</b>
<b>HARVEST</b>					
Rainbow trout	0.0012 (0.0012)	0 (0)	3 (6)	45 (45)	48 (45)
Brown trout	0.0003 (0.0005)	11 (22)	0 (0)	0 (0)	11 (22)
Lake trout	0.0868 (0.0235)	740 (399)	2,151 (564)	547 (204)	3,438 (721)
Cisco	0.0005 (0.0008)	0 (0)	14 (29)	6 (13)	21 (31)
Lake whitefish	0.0097 (0.0045)	35 (45)	231 (121)	119 (104)	386 (166)
Yellow Perch	0.5621 (0.1479)	2,637 (1,719)	12,560 (3,411)	7,063 (2,301)	22,260 (4,459)
Common white sucker	0.0153 (0.0090)	0 (0)	70 (88)	537 (329)	607 (340)
Rainbow smelt	0.0195 (0.0233)	0 (0)	642 (874)	131 (263)	773 (913)
<b>TOTAL HARVEST</b>	<b>0.6954 (0.1664)</b>	<b>3,423 (1,766)</b>	<b>15,671 (3,569)</b>	<b>8,448 (2,351)</b>	<b>27,543 (4,624)</b>
<b>RELEASED</b>					
Rainbow trout	0.0002 (0.0005)	0 (0)	0 (0)	9 (19)	9 (19)
Lake trout	0.0025 (0.0016)	40 (39)	60 (50)	0 (0)	100 (63)
Common white sucker	0.0047 (0.0058)	0 (0)	0 (0)	185 (226)	185 (226)
Yellow Perch	0.2303 (0.0710)	1,786 (1,462)	4,447 (1,450)	2,888 (1,116)	9,120 (2,342)
<b>TOTAL RELEASED</b>	<b>0.2377 (0.0719)</b>	<b>1,826 (1,463)</b>	<b>4,507 (1,451)</b>	<b>3,082 (1,138)</b>	<b>9,415 (2,354)</b>
<b>TOTAL CATCH</b>	<b>0.9332 (0.2062)</b>	<b>5,249 (2,293)</b>	<b>20,178 (3,853)</b>	<b>11,531 (2,612)</b>	<b>36,958 (5,189)</b>
<b>ANGLER HOURS</b>		<b>5,022 (2,594)</b>	<b>27,472 (5,872)</b>	<b>7,110 (2,103)</b>	<b>39,604 (6,755)</b>
<b>ANGLER TRIPS</b>		<b>1,166 (596)</b>	<b>6,603 (1,495)</b>	<b>1,840 (534)</b>	<b>9,609 (1,696)</b>

## Survey 34 Manistique Lakes, Luce County, Winter, 2003-2004

<b>Waterbody</b>	Manistique Lakes
<b>Year</b>	Winter, 2003-2004
<b>County</b>	Luce
<b>Sites</b>	150,151,152
<b>Survey period</b>	December 27 to March 28
<b>Interview type/mode</b>	Roving / open ice, shanty
<b>Count type/mode</b>	Roving / open ice, shanty
<b>Clerk time</b>	Full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Estimation options applied**

Day types with the number of party (or parties) equal to 1 in a month were excluded in the estimation.

Figure 1.—Manistique Lake map with markers used as starting points for interviewing and counting, as well as count path for winter 2003-2004 angler survey.

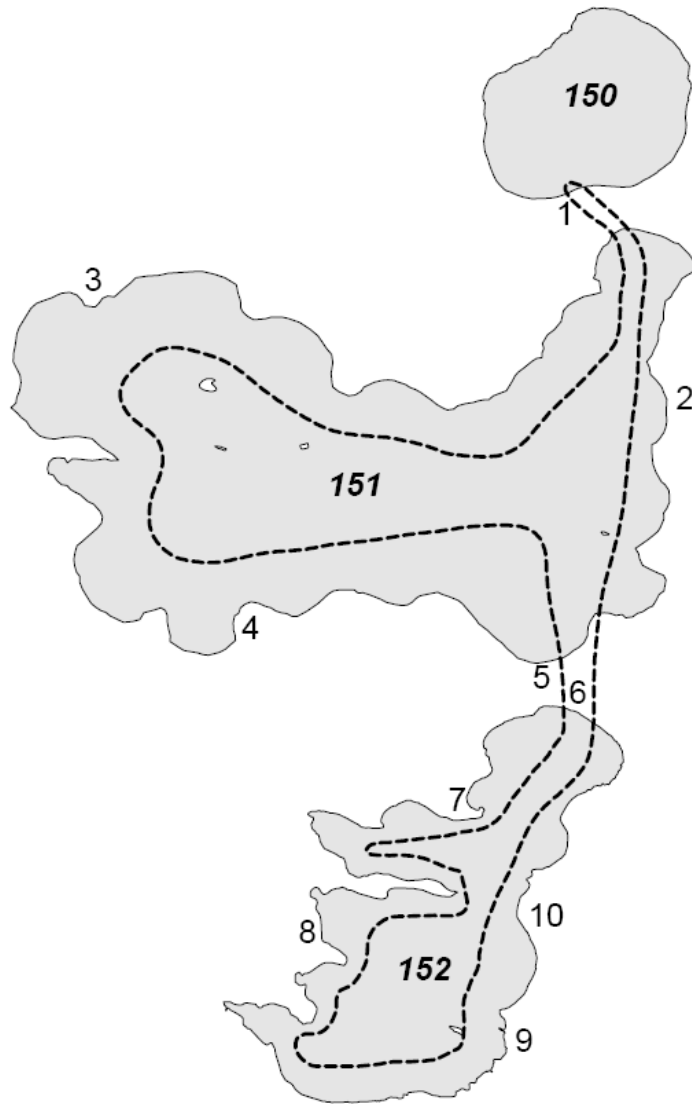


Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch and effort at Manistique, December 27 to March 28, Winter, 2003-2004

	Year	Month	F
1	2004	1	13
2	2004	2	13
3	2004	3	13
4	2003	12	13

Table 2. Estimated harvest, catch per hour, and fishing pressure for 150. Two standard errors are given in parentheses.

Species	C/H	December-January	February	March	Season
<b>HARVEST</b>					
Walleye	0.0151 (0.0311)	17 (33)	0 (0)	0 (0)	17 (33)
Yellow Perch	1.7372 (1.3391)	1,120 (852)	436 (417)	354 (707)	1,910 (1,183)
TOTAL HARVEST	1.7523 (1.3436)	1,137 (852)	436 (417)	354 (707)	1,926 (1,183)
<b>RELEASED</b>					
Released Yellow Perch	0.5219 (0.6048)	541 (607)	32 (65)	0 (0)	574 (611)
TOTAL RELEASED	0.5219 (0.6048)	541 (607)	32 (65)	0 (0)	574 (611)
TOTAL CATCH	2.2742 (1.5987)	1,678(1,047)	469(422)	354(707)	2,500 (1,332)
ANGLER HOURS		642(360)	416(344)	42(83)	1,099 (504)
ANGLER TRIPS		228 (169)	110 (106)	22 (46)	361 (205)

Table 3. Estimated harvest, catch per hour, and fishing pressure for 151. Two standard errors are given in parentheses.

Species	C/H	December-January	February	March	Season
<b>HARVEST</b>					
Walleye	0.0071 (0.0071)	13 (18)	29 (35)	0 (0)	42 (39)
Yellow Perch	1.1706 (0.7577)	653 (434)	4,737 (3,494)	1,534 (1,525)	6,924 (3,837)
Northern pike	0.0375 (0.0279)	62 (74)	159 (127)	0 (0)	222 (147)
TOTAL HARVEST	1.2152 (0.7659)	728 (440)	4,925 (3,496)	1,534 (1,525)	7,188 (3,840)
<b>RELEASED</b>					
Released Walleye	0.0145 (0.0196)	82 (112)	4 (7)	0 (0)	86 (112)
Released Yellow Perch	0.0385 (0.0473)	14 (27)	166 (255)	48 (80)	228 (269)
TOTAL RELEASED	0.0530 (0.0524)	96 (115)	170 (255)	48 (80)	314 (291)
TOTAL CATCH	1.2682 (0.7771)	824(455)	5,096(3,506)	1,582(1,527)	7,501 (3,851)
ANGLER HOURS		1,825(703)	3,128(1,697)	962(737)	5,915 (1,979)
ANGLER TRIPS		582 (287)	1,440 (896)	562 (467)	2,583 (1,051)

Table 4. Estimated harvest, catch per hour, and fishing pressure for 152. Two standard



errors are given in parentheses.

Species	C/H	December-January	February	March	Season
<b>HARVEST</b>					
Rainbow trout	0.0021 (0.0025)	0 (0)	40 (47)	0 (0)	40 (47)
Cisco	0.0020 (0.0040)	37 (74)	0 (0)	0 (0)	37 (74)
Walleye	0.0484 (0.0239)	709 (387)	172 (107)	26 (47)	908 (405)
Yellow Perch	0.2930 (0.1558)	4,121 (2,575)	1,261 (721)	107 (99)	5,490 (2,676)
Northern pike	0.0129 (0.0075)	170 (114)	62 (60)	9 (16)	241 (130)
Bluegill	0.0180 (0.0209)	0 (0)	0 (0)	336 (385)	336 (385)
Pumpkinseed	0.0010 (0.0014)	0 (0)	0 (0)	18 (27)	18 (27)
<b>TOTAL HARVEST</b>	<b>0.3774 (0.1666)</b>	<b>5,038 (2,608)</b>	<b>1,534 (733)</b>	<b>498 (402)</b>	<b>7,070 (2,739)</b>
<b>RELEASED</b>					
Released Smallmouth bass	0.0014 (0.0019)	0 (0)	26 (35)	0 (0)	26 (35)
Released Largemouth bass	0.0023 (0.0037)	0 (0)	8 (15)	36 (67)	44 (68)
Released Walleye	0.1229 (0.0496)	1,375 (637)	591 (354)	336 (311)	2,302 (792)
Released Northern pike	0.0764 (0.0286)	920 (360)	446 (247)	66 (70)	1,432 (442)
Released Pumpkinseed	0.0019 (0.0039)	0 (0)	0 (0)	36 (72)	36 (72)
Released Yellow Perch	0.1042 (0.0926)	1,625 (1,671)	244 (166)	83 (135)	1,952 (1,684)
<b>TOTAL RELEASED</b>	<b>0.3091 (0.1214)</b>	<b>3,920 (1,824)</b>	<b>1,314 (464)</b>	<b>557 (360)</b>	<b>5,791 (1,916)</b>
<b>TOTAL CATCH</b>	<b>0.6866 (0.2301)</b>	<b>8,959(3,182)</b>	<b>2,848(868)</b>	<b>1,054(539)</b>	<b>12,861 (3,342)</b>
<b>ANGLER HOURS</b>		<b>11,714(3,083)</b>	<b>5,576(2,179)</b>	<b>1,444(1,213)</b>	<b>18,733 (3,965)</b>
<b>ANGLER TRIPS</b>		<b>3,519 (1,396)</b>	<b>1,687 (651)</b>	<b>712 (604)</b>	<b>5,918 (1,655)</b>

Table 5. Total estimated harvest, catch per hour, and fishing pressure for three lakes. Two standard errors are given in parentheses.

Species	C/H	December-January	February	March	Season
<b>HARVEST</b>					
Rainbow trout	0.0015 (0.0018)	0 (0)	40 (47)	0 (0)	40 (47)
Cisco	0.0014 (0.0029)	37 (74)	0 (0)	0 (0)	37 (74)
Walleye	0.0375 (0.0171)	739 (389)	201 (112)	26 (47)	966 (408)
Yellow Perch	0.5563 (0.2107)	5,894 (2,747)	6,434 (3,592)	1,995 (1,684)	14,323 (4,825)
Northern pike	0.0180 (0.0082)	233 (136)	221 (141)	9 (16)	463 (197)
Bluegill	0.0131 (0.0151)	0 (0)	0 (0)	336 (385)	336 (385)
Pumpkinseed	0.0007 (0.0011)	0 (0)	0 (0)	18 (27)	18 (27)

TOTAL HARVEST	0.6286 (0.2180)	6,903 (2,779)	6,896 (3,597)	2,386 (1,728)	16,184 (4,863)
<b>RELEASED</b>					
Released Smallmouth bass	0.0010 (0.0014)	0 (0)	26 (35)	0 (0)	26 (35)
Released Largemouth bass	0.0017 (0.0027)	0 (0)	8 (15)	36 (67)	44 (68)
Released Walleye	0.0927 (0.0350)	1,457 (647)	595 (354)	336 (311)	2,388 (800)
Released Northern pike	0.0556 (0.0197)	920 (360)	446 (247)	66 (70)	1,432 (442)
Released Pumpkinseed	0.0014 (0.0028)	0 (0)	0 (0)	36 (72)	36 (72)
Released Yellow Perch	0.1069 (0.0728)	2,180 (1,778)	443 (312)	131 (157)	2,753 (1,812)
TOTAL RELEASED	0.2594 (0.0908)	4,557 (1,926)	1,517 (533)	604 (369)	6,679 (2,032)
TOTAL CATCH	0.8880 (0.2560)	11,460(3,381)	8,413(3,636)	2,990(1,767)	22,863 (5,270)
ANGLER HOURS		14,180(3,183)	9,120(2,783)	2,447(1,422)	25,747 (4,460)
ANGLER TRIPS		4,329 (1,435)	3,237 (1,113)	1,296 (765)	8,862 (1,971)

## Survey 35 Grand Lake, Alpena County, Summer, 2004

<b>Waterbody</b>	Grand Lake
<b>Year</b>	summer 2004
<b>County</b>	Alpena
<b>Sites</b>	540
<b>Survey period</b>	April 24 – October 13
<b>Survey design</b>	Roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	roving/boat
<b>Count type/mode</b>	progressive/boat
<b>Clerk time</b>	1.5 (one full time interview clerk, ½ count clerk)
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a roving-roving (roving counts and interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect interview data. Another clerk made counts for both Grand Lake and Long Lake. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerks followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. progressive counts of boat anglers were made once per day. Survey period for both counts and interviews was Summer April-October. Months were estimated separately.

Figure 1.—Grand Lake map with markers used as starting points for interviewing and counting, as well as count path used during summer 2004 angler survey.

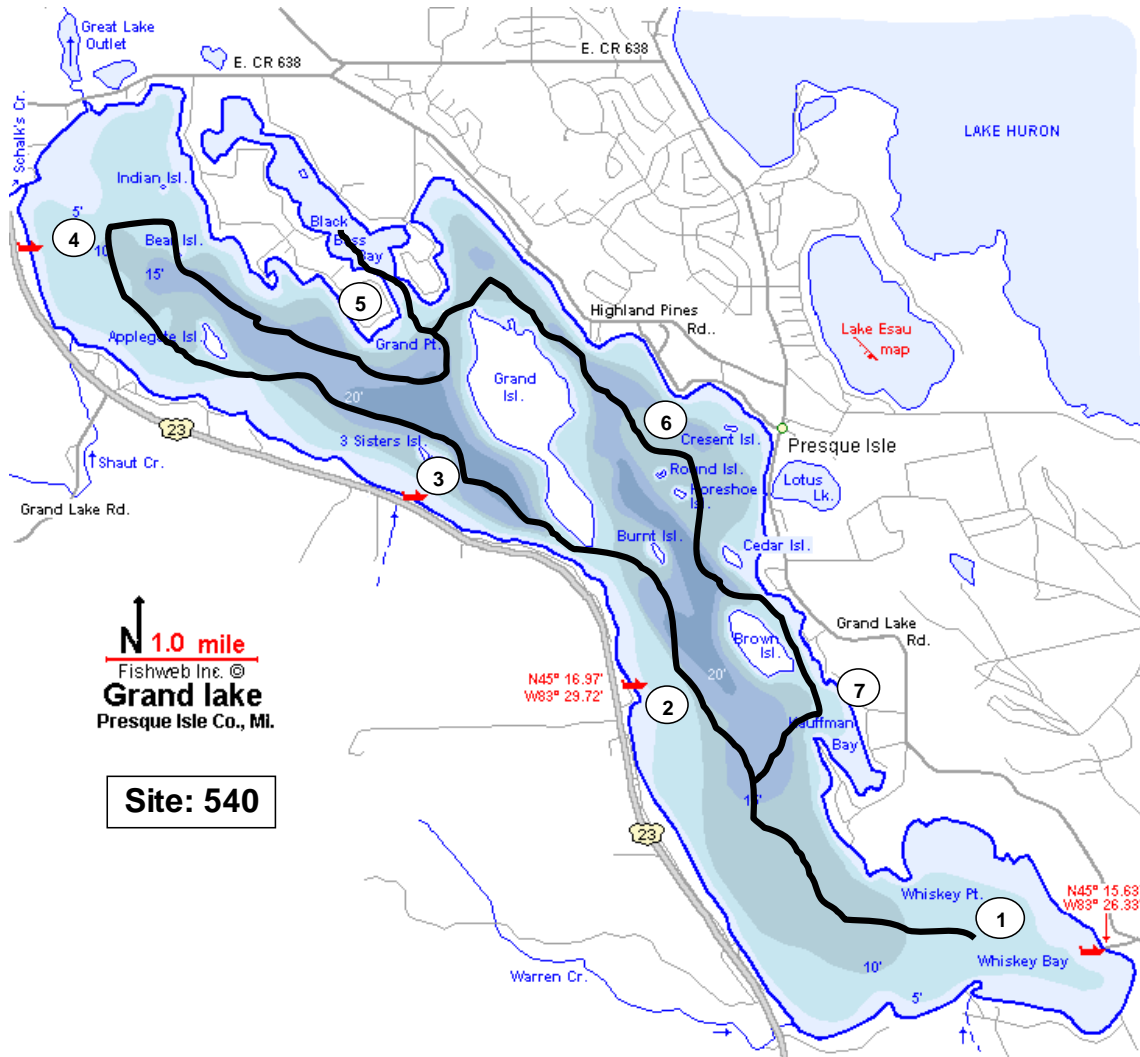


Table 1. Expansion values (referred to as “F” in Lockwood et al. 1999) to estimate catch and effort at Grand Lake, Summer April-October, summer 2004

	Year	Month	F
1	2004	4	16
2	2004	5	16
3	2004	6	16
4	2004	7	16
5	2004	8	15
6	2004	9	14
7	2004	10	13

Table 2 Estimated harvest, catch per hour, and fishing pressure of boat angling for Grand Lake. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September-October	Season
<b>HARVEST</b>							
Smallmouth bass	0.0304 (0.0144)	27 (42)	107 (112)	63 (75)	132 (110)	277 (196)	606 (265)
Walleye	0.0137 (0.0089)	10 (19)	107 (112)	59 (62)	5 (10)	93 (110)	273 (170)
Yellow Perch	0.1382 (0.0566)	0 (0)	217 (317)	881 (561)	859 (519)	797 (582)	2,754 (1,011)
Northern pike	0.0025 (0.0033)	0 (0)	6 (13)	28 (56)	15 (30)	0 (0)	50 (65)
Bluegill	0.0014 (0.0015)	0 (0)	0 (0)	0 (0)	19 (23)	10 (20)	28 (30)
Pumpkinseed	0.0021 (0.0023)	0 (0)	0 (0)	9 (19)	10 (20)	22 (35)	41 (44)
Rock bass	0.0247 (0.0165)	0 (0)	49 (67)	63 (86)	192 (206)	187 (215)	492 (317)
<b>TOTAL HARVEST</b>	<b>0.2130 (0.0677)</b>	<b>37 (46)</b>	<b>486 (361)</b>	<b>1,103 (579)</b>	<b>1,232 (570)</b>	<b>1,386 (661)</b>	<b>4,245 (1,109)</b>
<b>RELEASED</b>							
Smallmouth bass	0.1472 (0.0548)	72 (91)	1,265 (797)	277 (176)	463 (240)	856 (422)	2,933 (954)
Largemouth bass	0.0003 (0.0007)	0 (0)	6 (13)	0 (0)	0 (0)	0 (0)	6 (13)
Walleye	0.0068 (0.0057)	0 (0)	48 (73)	60 (71)	9 (17)	20 (39)	137 (110)
Northern pike	0.0012 (0.0014)	0 (0)	0 (0)	0 (0)	0 (0)	24 (28)	24 (28)
Common white sucker	0.0025 (0.0036)	0 (0)	0 (0)	49 (70)	0 (0)	0 (0)	49 (70)
Rock bass	0.0288 (0.0151)	0 (0)	47 (67)	143 (163)	182 (162)	202 (150)	573 (283)
	0.0039 (0.0048)	0 (0)	32 (64)	0 (0)	13 (26)	32 (64)	77 (94)
Gar	0.0009 (0.0015)	0 (0)	4 (7)	14 (28)	0 (0)	0 (0)	18 (29)
Bluegill	0.0030 (0.0043)	0 (0)	0 (0)	60 (85)	0 (0)	0 (0)	60 (85)
Pumpkinseed	0.0084 (0.0071)	0 (0)	0 (0)	29 (34)	69 (99)	68 (89)	167 (137)
Yellow Perch	0.8425 (0.2844)	4 (9)	34 (34)	5,268 (2,404)	9,233 (3,946)	2,251 (1,221)	16,790 (4,779)
<b>TOTAL RELEASED</b>	<b>1.0455 (0.3100)</b>	<b>76 (92)</b>	<b>1,436 (806)</b>	<b>5,900 (2,420)</b>	<b>9,970 (3,958)</b>	<b>3,452 (1,306)</b>	<b>20,834 (4,887)</b>
<b>TOTAL CATCH</b>	<b>1.2584 (0.3396)</b>	<b>113 (103)</b>	<b>1,922 (883)</b>	<b>7,004 (2,488)</b>	<b>11,202 (3,999)</b>	<b>4,838 (1,464)</b>	<b>25,079 (5,011)</b>
<b>ANGLER HOURS</b>		<b>853 (797)</b>	<b>3,440 (1,146)</b>	<b>6,181 (2,538)</b>	<b>5,985 (1,759)</b>	<b>3,469 (1,261)</b>	<b>19,928 (3,615)</b>
<b>ANGLER TRIPS</b>		<b>252 (255)</b>	<b>847 (374)</b>	<b>2,181 (1,068)</b>	<b>1,829 (1,052)</b>	<b>978 (581)</b>	<b>6,087 (1,671)</b>

## Survey 36 Long Lake, Alpena County, Summer, 2004

<b>Waterbody</b>	Long Lake
<b>Year</b>	Summer 2004
<b>County</b>	Alpena
<b>Sites</b>	541
<b>Survey period</b>	April 24 – October 13
<b>Survey design</b>	progressive -roving
<b>Interview type/mode</b>	roving
<b>Count type/mode</b>	progressive
<b>Clerk time</b>	1.5
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a progressive-roving (roving counts and interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler interview data. Another clerk made counts for both Grand Lake and Long Lake. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerks followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. aerial, progressive counts of boat anglers were made once per day. Survey period for both counts and interviews was Summer April-October. Months were estimated separately.

Figure 1.—Long Lake map with markers used as starting points for interviewing and counting, as well as count path used during summer 2004 angler survey.

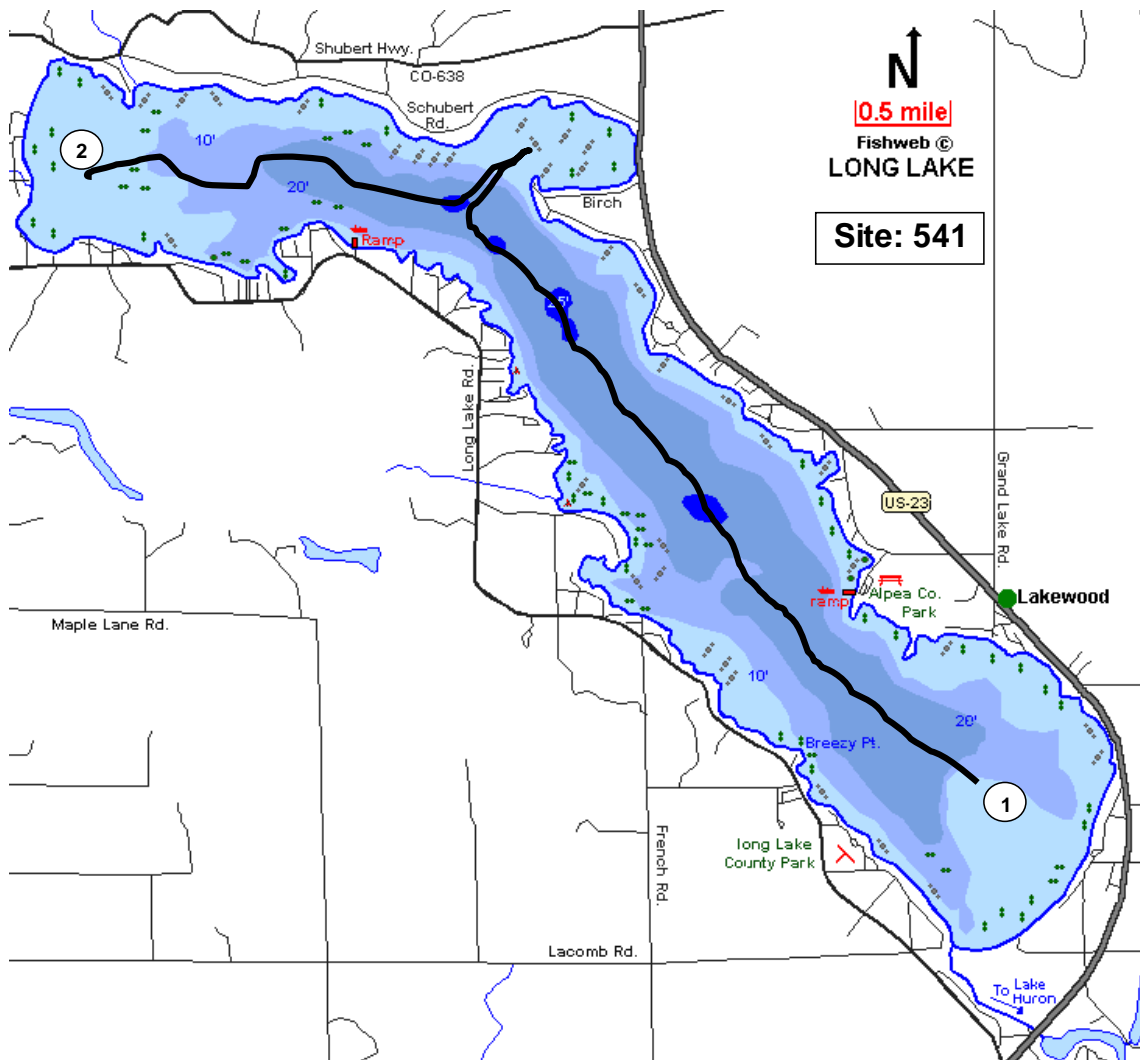


Table 1. Expansion values (referred to as “F” in Lockwood et al. 1999) to estimate catch and effort at Long Lake, Summer April-October, Summer 2004

	Year	Month	F
1	2004	4	16
2	2004	5	16
3	2004	6	16
4	2004	7	16
5	2004	8	15
6	2004	9	14
7	2004	10	13

Table 2. Estimated boat angling harvest, catch per hour, and fishing pressure for Long Lake . Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September-October	Season
<b>HARVEST</b>							
Smallmouth bass	0.0566 (0.0219)	102 (197)	462 (260)	267 (198)	382 (238)	483 (292)	1,696 (536)
Walleye	0.0086 (0.0052)	0 (0)	29 (43)	94 (96)	51 (58)	82 (81)	257 (145)
Yellow Perch	0.1179 (0.0529)	0 (0)	0 (0)	650 (498)	1,380 (943)	1,500 (871)	3,530 (1,377)
Northern pike	0.0048 (0.0034)	0 (0)	5 (11)	60 (62)	24 (37)	54 (65)	143 (97)
Bluegill	0.0007 (0.0013)	0 (0)	0 (0)	0 (0)	0 (0)	20 (40)	20 (40)
Largemouth bass	0.0002 (0.0003) 0.0008 (0.0015)	0 (0) 0 (0)	0 (0) 0 (0)	5 (9) 0 (0)	0 (0) 0 (0)	0 (0) 22 (45)	5 (9) 22 (45)
<b>TOTAL HARVEST</b>	<b>0.1894 (0.0651)</b>	<b>102 (197)</b>	<b>496 (263)</b>	<b>1,075 (548)</b>	<b>1,838 (975)</b>	<b>2,161 (926)</b>	<b>5,673 (1,489)</b>
<b>RELEASED</b>							
Smallmouth bass	0.1918 (0.0696)	684 (823)	755 (408)	1,586 (854)	1,394 (889)	1,327 (599)	5,745 (1,650)
Walleye	0.0047 (0.0050)	67 (133)	0 (0)	37 (44)	0 (0)	36 (43)	140 (147)
Northern pike	0.0201 (0.0087)	47 (72)	74 (76)	164 (119)	97 (79)	221 (136)	602 (223)
Bowfin	0.0003 (0.0006)	0 (0)	10 (19)	0 (0)	0 (0)	0 (0)	10 (19)
Rock bass	0.0047 (0.0054) 0.0004 (0.0008)	0 (0) 0 (0)	0 (0) 0 (0)	25 (50) 12 (25)	92 (143) 0 (0)	22 (45) 0 (0)	139 (158) 12 (25)
Bluegill	0.0101 (0.0095)	0 (0)	0 (0)	6 (12)	96 (113)	200 (254)	302 (278)
Pumpkinseed	0.0022 (0.0024)	0 (0)	0 (0)	34 (53)	20 (41)	10 (20)	65 (70)
Yellow Perch	0.3015 (0.1318)	0 (0)	14 (29)	3,386 (2,487)	3,514 (2,044)	2,115 (1,103)	9,029 (3,403)
<b>TOTAL RELEASED</b>	<b>0.5357 (0.1739)</b>	<b>797 (837)</b>	<b>853 (417)</b>	<b>5,250 (2,634)</b>	<b>5,212 (2,238)</b>	<b>3,931 (1,290)</b>	<b>16,045 (3,806)</b>
<b>TOTAL CATCH</b>	<b>0.7251 (0.2109)</b>	<b>899 (859)</b>	<b>1,349 (493)</b>	<b>6,325 (2,690)</b>	<b>7,050 (2,442)</b>	<b>6,093 (1,588)</b>	<b>21,717 (4,086)</b>
<b>ANGLER HOURS</b>		<b>3,589 (4,458)</b>	<b>4,277 (1,173)</b>	<b>8,650 (2,943)</b>	<b>8,561 (3,322)</b>	<b>4,874 (1,780)</b>	<b>29,950 (6,642)</b>
<b>ANGLER TRIPS</b>		<b>2,051 (2,625)</b>	<b>2,444 (1,018)</b>	<b>4,943 (2,168)</b>	<b>4,892 (2,327)</b>	<b>2,785 (1,286)</b>	<b>17,114 (4,438)</b>



## Survey 37 Peavy Pond, Iron County, Summer, 2004

<b>Waterbody</b>	Peavy Pond
<b>Year</b>	Summer 2004
<b>County</b>	Iron County
<b>Sites</b>	410
<b>Survey period</b>	May 8 - October 31
<b>Survey design</b>	progressive-roving
<b>Interview type/mode</b>	roving
<b>Count type/mode</b>	progressive
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a progressive-roving design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. progressive counts of boat anglers were made once per day. Survey period for both counts and interviews was May 8 - October 31. Months were estimated separately. Estimates are given in table 2.

Figure 1. Peavy Pond map with markers used as starting points for interviewing and counting, as well as count path used during summer 2004 angler survey.

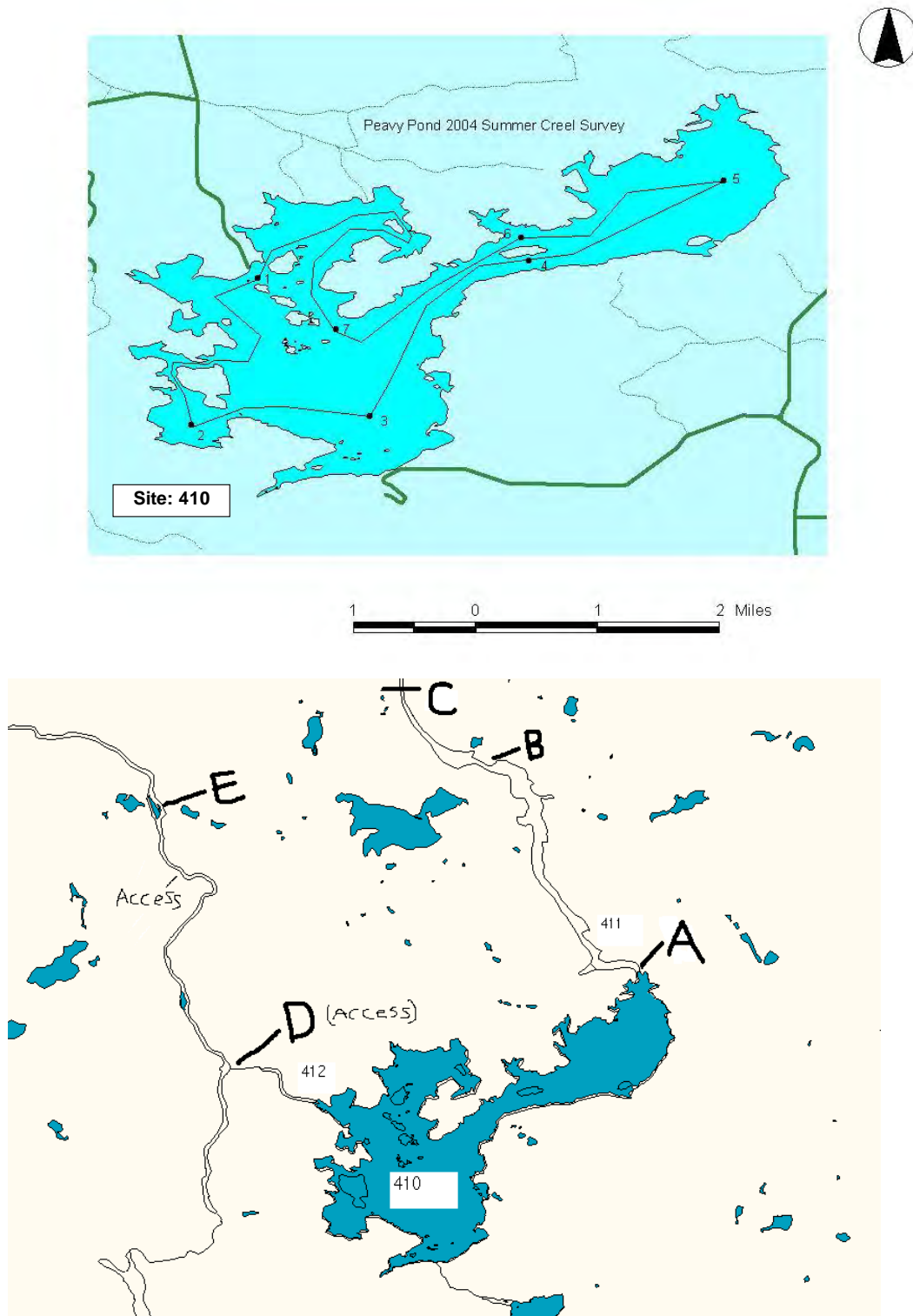


Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch and effort at Peavy Pond, May 8 - October 31, Summer 2004

	Year	Month	F
1	2004	5	17
2	2004	6	17
3	2004	7	17
4	2004	8	16
5	2004	9	15
6	2004	10	14

Table 2 – Estimated harvest, catch per hour, and fishing pressure from boat angling for Peavy Pond. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	October	Season
<b>HARVEST</b>								
Smallmouth bass	0.0113 (0.0049)	8 (15)	83 (60)	57 (48)	54 (47)	42 (44)	12 (16)	255 (103)
Walleye	0.0298 (0.0096)	107 (96)	126 (67)	168 (91)	162 (90)	89 (61)	18 (20)	670 (185)
Yellow Perch	0.1554 (0.0501)	140 (158)	270 (147)	925 (418)	1,168 (730)	787 (369)	212 (164)	3,501 (958)
Northern pike	0.0178 (0.0071)	84 (83)	84 (54)	95 (60)	78 (75)	46 (38)	15 (15)	402 (144)
Black crappie	0.0132 (0.0076)	152 (147)	89 (62)	26 (23)	12 (14)	0 (0)	18 (32)	297 (165)
Bluegill	0.0169 (0.0172)	49 (58)	290 (375)	7 (13)	6 (13)	27 (33)	2 (3)	380 (381)
Largemouth bass	0.0005 (0.0010)	0 (0)	0 (0)	0 (0)	0 (0)	11 (22)	0 (0)	11 (22)
Pumpkinseed	0.0003 (0.0005)	0 (0)	0 (0)	0 (0)	0 (0)	6 (12)	0 (0)	6 (12)
Rock bass	0.0199 (0.0098)	15 (24)	113 (70)	79 (69)	146 (162)	75 (74)	20 (20)	449 (206)
<b>TOTAL HARVEST</b>	<b>0.2651 (0.0663)</b>	<b>554 (258)</b>	<b>1,056 (426)</b>	<b>1,357 (441)</b>	<b>1,626 (759)</b>	<b>1,083 (388)</b>	<b>297 (171)</b>	<b>5,972 (1,095)</b>
<b>RELEASED</b>								
Smallmouth bass	0.0468 (0.0158)	23 (37)	245 (152)	141 (77)	166 (96)	446 (231)	33 (36)	1,054 (307)
Largemouth bass	0.0005 (0.0005)	3 (6)	3 (5)	0 (0)	3 (5)	0 (0)	3 (6)	11 (11)
Walleye	0.0898 (0.0348)	61 (59)	248 (178)	485 (228)	471 (236)	724 (591)	34 (49)	2,023 (703)
Northern pike	0.1214 (0.0351)	244 (231)	596 (316)	676 (298)	584 (295)	602 (284)	34 (32)	2,736 (641)
Muskellunge	0.0005 (0.0007)	7 (14)	0 (0)	2 (5)	1 (2)	0 (0)	0 (0)	10 (15)
Common white sucker	0.0002 (0.0004)	0 (0)	3 (7)	2 (4)	0 (0)	0 (0)	0 (0)	6 (8)
Rock bass	0.0384 (0.0150)	15 (31)	305 (199)	247 (141)	166 (114)	114 (132)	18 (27)	865 (303)
Bluegill	0.0033 (0.0033)	45 (68)	3 (7)	0 (0)	9 (18)	17 (24)	0 (0)	74 (74)
Pumpkinseed	0.0002 (0.0004)	0 (0)	0 (0)	0 (0)	0 (0)	4 (8)	0 (0)	4 (8)
Yellow Perch	0.0580 (0.0220)	20 (27)	254 (226)	246 (142)	376 (254)	398 (244)	13 (19)	1,307 (443)
<b>TOTAL RELEASED</b>	<b>0.3592 (0.0792)</b>	<b>418 (254)</b>	<b>1,658 (496)</b>	<b>1,800 (432)</b>	<b>1,777 (480)</b>	<b>2,304 (749)</b>	<b>135 (77)</b>	<b>8,091 (1,138)</b>
<b>TOTAL CATCH</b>	<b>0.6242 (0.1272)</b>	<b>971 (362)</b>	<b>2,713 (654)</b>	<b>3,157 (617)</b>	<b>3,403 (898)</b>	<b>3,387 (844)</b>	<b>431 (188)</b>	<b>14,063 (1,579)</b>

ANGLER HOURS	4,174	4,211	4,867	4,215	4,011	1,050	22,527
	(2,855)	(1,182)	(1,084)	(1,527)	(1,159)	(516)	(3,829)
ANGLER TRIPS	689	824	1,064	1,021	926	247	4,770
	(525)	(298)	(387)	(662)	(351)	(129)	(1,045)

## Survey 38 Escanaba River, Marquette County, Summer, 2004

<b>Waterbody</b>	Escanaba River
<b>Year</b>	2004
<b>County</b>	Marquette
<b>Sites</b>	430, 431
<b>Survey period</b>	April 10 - October 31
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access / boat, shore
<b>Count type/mode</b>	roving / boat, shore
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a roving-access (roving counts and access interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. Escanaba River was divided into 2 sections: 430, 431. Each section was sampled per day. Starting location within a section and direction of travel were randomized for both counting and interviewing. roving counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was April 10 - October 31. Months were estimated separately.

### Interview and Count Site (see the map)

#### Site No.: 430

Burnt Camp (T40N, R23W, Sec. 6), Delta County  
Karas Lodge (T41N, R23W, Sec. 8), Delta County  
Boney Falls Dam (T41N, R24W, Sec. 2), Delta County

#### Site No.: 431

Swimming Hole (T43N, R24W, Sec. 29), Marquette County  
Sawmill (T43N, R25W, Sec. 11), Marquette County  
Highbanks (T44N, R25W, Sec. 21), Marquette County  
Gwinn (T45N, R25W, Sec. 21), Marquette County

ESCANABA RIVER 2004 SUMMER CREEL SURVEY



Table 1–Work shifts used to estimate catch and effort at Escanaba River, April 10 - October 31, 2004

	Year	Month	F
1	2004	4	15
2	2004	5	16
3	2004	6	16
4	2004	7	16
5	2004	8	16
6	2004	9	15
7	2004	10	13

Table 2– Estimated harvest, catch per hour, and fishing pressure for boat. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	Aug.	Sept.	Oct.	Season
<b>HARVEST</b>									
Rainbow trout	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Brown trout	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Brook trout	0.0142 (0.0308)	0 (0)	20 (40)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	20 (40)
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.0142 (0.0308)</b>	<b>0 (0)</b>	<b>20 (40)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>20 (40)</b>
<b>RELEASED</b>									
Rainbow trout	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Brown trout	0.0284 (0.0606)	0 (0)	40 (78)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	40 (78)
Smallmouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL RELEASED</b>	<b>0.0284 (0.0606)</b>	<b>0 (0)</b>	<b>40 (78)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>40 (78)</b>
<b>TOTAL CATCH</b>	<b>0.0426 (0.0723)</b>	<b>0 (0)</b>	<b>60 (88)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>60 (88)</b>
<b>ANGLER HOURS</b>		0 (0)	898 (1,037)	513 (651)	0 (0)	0 (0)	0 (0)	0 (0)	1,411 (1,224)
<b>ANGLER TRIPS</b>		0 (0)	168 (199)	82 (104)	0 (0)	0 (0)	0 (0)	0 (0)	250 (225)

Table 3– Estimated harvest, catch per hour, and fishing pressure for shore. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	Aug.	Sept.	Oct.	Season
<b>HARVEST</b>									
Rainbow trout	0.0064 (0.0103)	0 (0)	2 (5)	0 (0)	0 (0)	4 (9)	19 (40)	0 (0)	26 (41)
Brown trout	0.0135 (0.0206)	0 (0)	0 (0)	8 (16)	0 (0)	8 (11)	39 (79)	0 (0)	55 (82)
Brook trout	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.0199 (0.0235)</b>	<b>0 (0)</b>	<b>2 (5)</b>	<b>8 (16)</b>	<b>0 (0)</b>	<b>13 (14)</b>	<b>58 (89)</b>	<b>0 (0)</b>	<b>81 (91)</b>
<b>RELEASED</b>									
Rainbow trout	0.0432 (0.0375)	0 (0)	5 (10)	70 (113)	42 (52)	39 (55)	19 (35)	0 (0)	175 (141)

Brown trout	0.0988	0	0	264	54	25	58	0	401
	(0.1016)	(0)	(0)	(372)	(58)	(50)	(88)	(0)	(390)
Smallmouth bass	0.0115	0	0	0	30	16	0	0	47
	(0.0179)	(0)	(0)	(0)	(62)	(34)	(0)	(0)	(71)
TOTAL RELEASED	0.1535	0	5	334	126	81	77	0	623
	(0.1155)	(0)	(10)	(389)	(99)	(82)	(95)	(0)	(421)
TOTAL CATCH	0.1735	0	7	341	126	94	135	0	704
	(0.1207)	(0)	(11)	(390)	(99)	(83)	(130)	(0)	(431)
ANGLER HOURS		135	771	1,120	975	787	234	34	4,057
		(189)	(594)	(696)	(730)	(591)	(209)	(68)	(1,344)
ANGLER TRIPS		49	260	307	270	233	78	11	1,208
		(69)	(210)	(197)	(205)	(221)	(71)	(22)	(429)

Table 4– Estimated harvest, catch per hour, and fishing pressure for Escanaba River. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	Aug.	Sept.	Oct.	Season
HARVEST									
Rainbow trout	0.0047	0	2	0	0	4	19	0	26
	(0.0076)	(0)	(5)	(0)	(0)	(9)	(40)	(0)	(41)
Brown trout	0.0100	0	0	8	0	8	39	0	55
	(0.0153)	(0)	(0)	(16)	(0)	(11)	(79)	(0)	(82)
Brook trout	0.0037	0	20	0	0	0	0	0	20
	(0.0074)	(0)	(40)	(0)	(0)	(0)	(0)	(0)	(40)
Walleye	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
TOTAL HARVEST	0.0185	0	22	8	0	13	58	0	101
	(0.0192)	(0)	(40)	(16)	(0)	(14)	(89)	(0)	(100)
RELEASED									
Rainbow trout	0.0321	0	5	70	42	39	19	0	175
	(0.0278)	(0)	(10)	(113)	(52)	(55)	(35)	(0)	(141)
Brown trout	0.0807	0	40	264	54	25	58	0	441
	(0.0776)	(0)	(78)	(372)	(58)	(50)	(88)	(0)	(398)
Smallmouth bass	0.0085	0	0	0	30	16	0	0	47
	(0.0133)	(0)	(0)	(0)	(62)	(34)	(0)	(0)	(71)
TOTAL RELEASED	0.1213	0	45	334	126	81	77	0	663
	(0.0881)	(0)	(79)	(389)	(99)	(82)	(95)	(0)	(428)
TOTAL CATCH	0.1397	0	67	341	126	94	135	0	764
	(0.0928)	(0)	(88)	(390)	(99)	(83)	(130)	(0)	(440)
ANGLER HOURS		135	1,668	1,633	975	787	234	34	5,468
		(189)	(1,195)	(953)	(730)	(591)	(209)	(68)	(1,817)
ANGLER TRIPS		49	429	389	270	233	78	11	1,458
		(69)	(290)	(223)	(205)	(221)	(71)	(22)	(484)



## Survey 39 Grand River (Lower) and Rogue River, Kent County, Summer, 2004

**Waterbody** Grand River (Lower) and Rogue River  
**Year** Summer, 2004  
**County** Kent  
**Sites** 502,503,504

### **Work Shifts:**

**I** – morning and **II** – afternoon.

### **Please note additional access sites from May through August for Grand River section March, April, September, October, November:**

1. Rogue (Site No. 502): 10-Mile Road (T.9N.,R.11W.,Sec.32) to Rockford Dam (T.9N.,R.11W.,Sec.36).
2. Rogue (Site No. 503): 10-Mile Road (T.9N.,R.11W.,Sec.36) to West River Drive bridge (T.8N.,R.11W.,Sec.22).
3. Lower Grand River (Site No. 504): 6<sup>th</sup> Street Dam area (located upstream of highway 196 in Grand Rapids).

### **May, June, July, and August:**

#### Rogue River sites:

1. Rogue (Site No. 502): 10-Mile Road (T.9N.,R.11W.,Sec.32) to Rockford Dam (T.9N.,R.11W.,Sec.36).
2. Rogue (Site No. 503): 10-Mile Road (T.9N.,R.11W.,Sec.36) to West River Drive bridge (T.8N.,R.11W.,Sec.22).

#### Grand River (Site No. 504) sites

1. Knapp St. (07N 10W Sec. 7)
2. West River Dr. (08N 11W Sec. 23)
3. 6<sup>th</sup> Street Dam area (located upstream of highway 196 in Grand Rapids).
4. Riverside Park (07N 11W Sec. 06)
5. Johnson Park (06N 12W Sec. 06)

**Survey design** progressive-access (progressive counts and access interviews)  
**Interview type/mode** access/boat, shore, and pier/dock  
**Count type/mode** progressive/boat, shore and pier/dock  
**Clerk time** full time  
**Survey purpose** Characterize general effort and catch aspects of the fishery

### **Estimation options applied**

Weekday and weekend days in site: 504, boat, July have been combined in the estimation.

One boat interview (ID 401) at 504 in May has been excluded (this is the only interview collected for boat in May at 504. Calculation can not performed for this case).

### Notes

Survey followed a progressive-access (progressive counts and access interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. Grand River (Lower) and Rogue River was divided into 2 sections: Rogue River (502, 503), Grand River (504). Each section was sampled per day. Starting location within a section and direction of travel were randomized for both counting and interviewing. progressive counts of boat, shore and pier/dock anglers were made once per day. Survey period for both counts and interviews was March 1 to November 30. Months were estimated separately. Estimates are given in Table 2.

Table 1. Work shifts used to estimate catch and effort at Grand (Lower) and Rogue Rivers, March 1 to November 30, Summer, 2004

	Year	Month	F
1	2004	3	13
2	2004	4	15
3	2004	5	15
4	2004	9	15
5	2004	10	13
6	2004	11	12
7	2004	6	16
8	2004	7	16
9	2004	8	15

Table 2. Estimated harvest, catch per hour, and fishing pressure for Grand (Lower) and Rogue Rivers. Two standard errors are given in parentheses.

Species	C/H	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Season
HARVEST											
Coho salmon	0.0006	0	0	0	0	0	44	9	21	0	75
	(0.0007)	(0)	(0)	(0)	(0)	(0)	(62)	(17)	(43)	(0)	(77)
Chinook salmon	0.0177	0	0	0	0	0	238	651	1,154	0	2,044
	(0.0057)	(0)	(0)	(0)	(0)	(0)	(334)	(317)	(428)	(0)	(629)
Rainbow trout	0.0371	1,486	405	40	0	138	0	44	981	1,178	4,273
	(0.0122)	(1,068)	(473)	(53)	(0)	(202)	(0)	(48)	(357)	(542)	(1,353)
Brown trout	0.0020	0	0	0	18	34	162	21	0	0	234
	(0.0014)	(0)	(0)	(0)	(39)	(52)	(145)	(29)	(0)	(0)	(161)
Smallmouth bass	0.0015	0	0	0	0	0	150	0	21	0	171
	(0.0027)	(0)	(0)	(0)	(0)	(0)	(307)	(0)	(43)	(0)	(310)
Walleye	0.0077	0	0	0	0	69	310	303	86	122	889
	(0.0054)	(0)	(0)	(0)	(0)	(137)	(382)	(430)	(85)	(176)	(623)
Yellow Perch	0	0	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
White bass	0.0006	0	0	0	0	69	0	0	0	0	69
	(0.0012)	(0)	(0)	(0)	(0)	(137)	(0)	(0)	(0)	(0)	(137)
Longnose Gar	0	0	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)

Northern pike	0.0004	0	0	0	0	0	0	0	0	41	41
	(0.0007)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(82)	(82)
Redhorse	0	0	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Black crappie	0.0024	0	0	0	0	276	0	0	0	0	276
	(0.0048)	(0)	(0)	(0)	(0)	(557)	(0)	(0)	(0)	(0)	(557)
Bluegill	0.0609	0	0	0	6,229	789	0	0	0	0	7,019
	(0.0507)	(0)	(0)	(0)	(5,612)	(1,520)	(0)	(0)	(0)	(0)	(5,814)
Rock bass	0.0358	0	0	0	4,006	118	0	0	0	0	4,123
	(0.0374)	(0)	(0)	(0)	(4,281)	(246)	(0)	(0)	(0)	(0)	(4,288)
Carp	0.0017	0	0	201	0	0	0	0	0	0	201
	(0.0042)	(0)	(0)	(487)	(0)	(0)	(0)	(0)	(0)	(0)	(487)
Channel catfish	0.0013	0	0	0	0	0	150	0	0	0	150
	(0.0027)	(0)	(0)	(0)	(0)	(0)	(307)	(0)	(0)	(0)	(307)
Common white sucker	0.0008	96	0	0	0	0	0	0	0	0	96
	(0.0018)	(201)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(201)
White crappie	0.0027	0	0	0	172	138	0	0	0	0	310
	(0.0033)	(0)	(0)	(0)	(252)	(279)	(0)	(0)	(0)	(0)	(375)
Other	0.0006	0	0	0	0	65	0	0	0	0	65
	(0.0011)	(0)	(0)	(0)	(0)	(131)	(0)	(0)	(0)	(0)	(131)
TOTAL HARVEST	0.1739	1,582	405	241	10,425	1,697	1,054	1,027	2,263	1,340	20,035
	(0.0666)	(1,087)	(473)	(490)	(7,063)	(1,690)	(686)	(538)	(567)	(576)	(7,470)
RELEASED											
Coho salmon	0.0015	0	0	0	0	0	0	151	21	0	173
	(0.0021)	(0)	(0)	(0)	(0)	(0)	(0)	(233)	(43)	(0)	(237)
Chinook salmon	0.0161	0	0	0	0	0	177	499	1,181	0	1,857
	(0.0087)	(0)	(0)	(0)	(0)	(0)	(380)	(707)	(574)	(0)	(987)
Rainbow trout	0.0720	1,573	4,087	80	0	44	129	101	1,490	787	8,290
	(0.0418)	(1,577)	(4,280)	(86)	(0)	(56)	(150)	(141)	(1,214)	(607)	(4,765)
Brown trout	0.0358	489	2,138	205	285	68	211	123	571	32	4,121
	(0.0169)	(617)	(1,600)	(158)	(268)	(101)	(154)	(129)	(750)	(46)	(1,912)
Lake trout	0.0004	0	0	0	0	0	0	0	45	0	45
	(0.0008)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(91)	(0)	(91)
Smallmouth bass	0.0160	0	183	521	180	545	289	129	0	0	1,847
	(0.0091)	(0)	(414)	(700)	(225)	(386)	(414)	(205)	(0)	(0)	(1,037)
Largemouth bass	0	0	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Walleye	0.0015	0	0	101	0	0	44	0	23	0	168
	(0.0024)	(0)	(0)	(259)	(0)	(0)	(96)	(0)	(46)	(0)	(280)
Northern pike	0.0003	0	0	0	18	0	0	12	0	0	30
	(0.0003)	(0)	(0)	(0)	(30)	(0)	(0)	(24)	(0)	(0)	(39)
Common white sucker	0.0002	0	0	0	27	0	0	0	0	0	27
	(0.0005)	(0)	(0)	(0)	(59)	(0)	(0)	(0)	(0)	(0)	(59)
Redhorse	0.0320	0	1,727	55	0	1,088	671	96	44	0	3,681
	(0.0242)	(0)	(2,072)	(89)	(0)	(1,506)	(1,027)	(226)	(63)	(0)	(2,771)
Rock bass	0.0233	0	0	338	2,000	324	19	0	0	0	2,681
	(0.0207)	(0)	(0)	(525)	(2,284)	(370)	(39)	(0)	(0)	(0)	(2,373)
Carp	0.0465	191	0	1,033	280	1,369	1,723	353	321	81	5,352
	(0.0291)	(292)	(0)	(2,067)	(285)	(1,049)	(2,222)	(495)	(503)	(158)	(3,316)
Freshwater drum	0.0035	0	0	0	0	207	194	0	0	0	401
	(0.0040)	(0)	(0)	(0)	(0)	(321)	(334)	(0)	(0)	(0)	(463)
Sturgeon	0.0007	0	0	0	86	0	0	0	0	0	86
	(0.0015)	(0)	(0)	(0)	(171)	(0)	(0)	(0)	(0)	(0)	(171)

Gizzard shad	0.0039	0	0	80	27	346	0	0	0	0	453
	(0.0064)	(0)	(0)	(177)	(50)	(714)	(0)	(0)	(0)	(0)	(737)
Gar	0.0076	0	0	880	0	0	0	0	0	0	880
	(0.0140)	(0)	(0)	(1,610)	(0)	(0)	(0)	(0)	(0)	(0)	(1,610)
Bluegill	0.0346	0	0	0	3,716	272	0	0	0	0	3,988
	(0.0309)	(0)	(0)	(0)	(3,524)	(414)	(0)	(0)	(0)	(0)	(3,548)
Pumpkinseed	0.0002	0	0	18	0	0	0	0	0	0	18
	(0.0003)	(0)	(0)	(34)	(0)	(0)	(0)	(0)	(0)	(0)	(34)
Green Sunfish	0.0020	0	0	0	226	0	0	0	0	0	226
	(0.0031)	(0)	(0)	(0)	(351)	(0)	(0)	(0)	(0)	(0)	(351)
Yellow Perch	0.0009	0	100	0	0	0	0	0	0	0	100
	(0.0021)	(0)	(244)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(244)
TOTAL	0.2989	2,253	8,234	3,310	6,847	4,264	3,456	1,463	3,697	900	34,425
RELEASED	(0.0766)	(1,718)	(5,040)	(2,788)	(4,243)	(2,110)	(2,545)	(964)	(1,623)	(629)	(8,308)
TOTAL CATCH	0.4728	3,835	8,639	3,551	17,272	5,960	4,510	2,490	5,961	2,241	54,459
	(0.1053)	(2,033)	(5,062)	(2,830)	(8,239)	(2,704)	(2,635)	(1,104)	(1,719)	(853)	(11,172)
ANGLER		15,789	17,014	6,917	8,503	13,666	15,101	10,393	19,720	8,087	115,190
HOURS		(5,046)	(4,225)	(2,299)	(2,949)	(3,797)	(3,537)	(2,807)	(2,281)	(1,524)	(9,981)
ANGLER TRIPS		5,698	6,267	2,418	3,080	5,156	4,883	3,316	6,136	2,713	39,667
		(2,189)	(1,692)	(1,198)	(1,302)	(1,558)	(1,465)	(994)	(886)	(585)	(4,180)

## Survey 40 Grand Upper, Ingham and Ionia Counties, Summer, 2004

<b>Waterbody</b>	Grand Upper
<b>Year</b>	Summer, 2004
<b>County</b>	Ingham, Ionia
<b>Sites</b>	500, 501
<b>Survey period</b>	March 1 to November 30
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access/boat and shore
<b>Count type/mode</b>	roving/boat and shore
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Interview and Count Sites:**

**Ledge-Moores (Site 500):** Grand Ledge (T.4N.,R.4W.,Sec.2and3) to Moores Park (T.4N.,R.2W.,Sec.21 – downstream of Martin Luther King Jr. Blvd.).

**Lyons-Portland (Site 501):** Lyons (T.7N.,R.5W.,Sec.19) to Portland (T.6N.,R.5W.,Sec.28).

### **Estimation options applied**

Day types with the number of party (or parties) equal to 1 in a month were excluded in the estimation.

Weekday and weekend days in site:

500, July, boat; 500, August, boat; 500, October, boat; 500, November, boat; 501, July, boat; 501, August, boat; 501, October, boat; 501, November, boat  
have been combined in the estimation.

### **Notes**

Survey followed a roving-access (roving counts and access interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. Grand Upper was divided into 2 sections: 500, 501. Each section was sampled per day. Starting location within a section and direction of travel were randomized for both counting and interviewing. roving counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was March 1 to November 30. Months were estimated separately. Estimates are given in Tables 2-6.

Table 1. Work shifts used to estimate catch and effort at Grand Upper, March 1 to November 30, Summer, 2004

	Year	Month	F
1	2004	3	13
2	2004	4	15
3	2004	5	15
4	2004	9	15
5	2004	10	13
6	2004	11	12
7	2004	6	16
8	2004	7	16
9	2004	8	15

Table 2. Estimated harvest, catch per hour, and fishing pressure for boat. Two standard errors are given in parentheses.

Species	C/H	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Season
<b>HARVEST</b>											
Coho salmon	0.0034	0	0	0	0	0	0	0	60	0	60
	(0.0063)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(111)	(0)	(111)
Smallmouth bass	0.0029	0	0	0	0	0	28	23	0	0	52
	(0.0043)	(0)	(0)	(0)	(0)	(0)	(56)	(49)	(0)	(0)	(74)
Walleye	0.0206	0	0	0	0	172	169	23	0	0	364
	(0.0207)	(0)	(0)	(0)	(0)	(240)	(256)	(50)	(0)	(0)	(354)
Black crappie	0.0292	0	0	0	0	0	423	93	0	0	516
	(0.0499)	(0)	(0)	(0)	(0)	(0)	(850)	(192)	(0)	(0)	(871)
Bluegill	0.1963	0	0	0	1,084	1,118	986	280	0	0	3,468
	(0.1787)	(0)	(0)	(0)	(2,034)	(1,619)	(1,439)	(583)	(0)	(0)	(3,028)
Largemouth bass	0.0164	0	0	0	289	0	0	0	0	0	289
	(0.0310)	(0)	(0)	(0)	(542)	(0)	(0)	(0)	(0)	(0)	(542)
Rock bass	0.0158	0	0	0	0	279	0	0	0	0	279
	(0.0291)	(0)	(0)	(0)	(0)	(510)	(0)	(0)	(0)	(0)	(510)
<b>TOTAL HARVEST</b>	<b>0.2846</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,373</b>	<b>1,569</b>	<b>1,606</b>	<b>420</b>	<b>60</b>	<b>0</b>	<b>5,029</b>
	(0.1985)	(0)	(0)	(0)	(2,105)	(1,714)	(1,692)	(618)	(111)	(0)	(3,260)
<b>RELEASED</b>											
Smallmouth bass	0.5076	0	0	320	803	3,871	3,578	397	0	0	8,969
	(0.3379)	(0)	(0)	(606)	(1,198)	(4,528)	(2,750)	(661)	(0)	(0)	(5,506)
Largemouth bass	0.1322	0	0	176	626	258	1,042	233	0	0	2,336
	(0.0918)	(0)	(0)	(336)	(662)	(379)	(1,175)	(439)	(0)	(0)	(1,506)
Walleye	0.0350	0	0	0	0	516	56	47	0	0	619
	(0.0442)	(0)	(0)	(0)	(0)	(754)	(80)	(100)	(0)	(0)	(765)
Common white sucker	0.0096	0	0	0	0	0	169	0	0	0	169
	(0.0193)	(0)	(0)	(0)	(0)	(0)	(339)	(0)	(0)	(0)	(339)
Rock bass	0.1781	0	0	0	0	2,753	394	0	0	0	3,147
	(0.1643)	(0)	(0)	(0)	(0)	(2,739)	(514)	(0)	(0)	(0)	(2,787)
Carp	0.0146	0	0	0	0	258	0	0	0	0	258
	(0.0221)	(0)	(0)	(0)	(0)	(385)	(0)	(0)	(0)	(0)	(385)
Bluegill	0.2565	0	0	0	650	2,409	1,380	93	0	0	4,533
	(0.1990)	(0)	(0)	(0)	(1,058)	(2,647)	(1,689)	(155)	(0)	(0)	(3,317)
<b>TOTAL RELEASED</b>	<b>1.1336</b>	<b>0</b>	<b>0</b>	<b>497</b>	<b>2,079</b>	<b>10,065</b>	<b>6,620</b>	<b>770</b>	<b>0</b>	<b>0</b>	<b>20,032</b>
	(0.5025)	(0)	(0)	(693)	(1,730)	(5,990)	(3,491)	(815)	(0)	(0)	(7,225)
<b>TOTAL CATCH</b>	<b>1.4182</b>	<b>0</b>	<b>0</b>	<b>497</b>	<b>3,452</b>	<b>11,635</b>	<b>8,226</b>	<b>1,190</b>	<b>60</b>	<b>0</b>	<b>25,060</b>
	(0.5786)	(0)	(0)	(693)	(2,725)	(6,230)	(3,879)	(1,023)	(111)	(0)	(7,926)
<b>ANGLER</b>		<b>104</b>	<b>0</b>	<b>825</b>	<b>3,245</b>	<b>6,637</b>	<b>5,367</b>	<b>980</b>	<b>513</b>	<b>0</b>	<b>17,671</b>

HOURS	(93)	(0)	(1,549)	(2,282)	(2,593)	(2,434)	(587)	(367)	(0)	(4,554)
ANGLER TRIPS	26	0	128	896	1,483	1,183	187	181	0	4,085
	(30)	(0)	(242)	(642)	(655)	(565)	(127)	(155)	(0)	(1,122)

Table 3. Estimated harvest, catch per hour, and fishing pressure for shore. Two standard errors are given in parentheses.

Species	C/H	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Season
<b>HARVEST</b>											
Coho salmon	0.0013	0	0	0	0	0	0	0	59	0	59
	(0.0026)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(122)	(0)	(122)
Chinook salmon	0.0038	0	0	0	0	0	0	0	177	0	177
	(0.0037)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(169)	(0)	(169)
Rainbow trout	0.0027	0	99	0	0	0	0	0	0	28	127
	(0.0032)	(0)	(140)	(0)	(0)	(0)	(0)	(0)	(0)	(49)	(148)
Smallmouth bass	0.0060	0	0	41	9	0	0	197	30	0	278
	(0.0084)	(0)	(0)	(65)	(18)	(0)	(0)	(380)	(59)	(0)	(390)
Walleye	0.0350	0	0	435	120	163	198	621	30	60	1,625
	(0.0235)	(0)	(0)	(641)	(126)	(258)	(250)	(778)	(58)	(79)	(1,082)
Redhorse	0.0150	0	608	0	28	0	0	0	59	0	696
	(0.0159)	(0)	(726)	(0)	(58)	(0)	(0)	(0)	(117)	(0)	(738)
Black crappie	0.0048	0	0	0	0	0	225	0	0	0	225
	(0.0100)	(0)	(0)	(0)	(0)	(0)	(463)	(0)	(0)	(0)	(463)
Bluegill	0.1618	0	0	0	2,101	262	3,954	995	207	0	7,519
	(0.1091)	(0)	(0)	(0)	(1,825)	(525)	(4,433)	(1,363)	(425)	(0)	(5,029)
Rock bass	0.0078	0	100	41	138	0	52	0	30	0	361
	(0.0061)	(0)	(138)	(83)	(197)	(0)	(105)	(0)	(58)	(0)	(281)
Carp	0.0028	0	0	69	19	44	0	0	0	0	131
	(0.0033)	(0)	(0)	(118)	(39)	(87)	(0)	(0)	(0)	(0)	(152)
Channel catfish	0.0605	0	0	21	139	939	784	929	0	0	2,812
	(0.0501)	(0)	(0)	(41)	(166)	(1,359)	(766)	(1,702)	(0)	(0)	(2,315)
Common white sucker	0.0008	0	0	0	38	0	0	0	0	0	38
	(0.0017)	(0)	(0)	(0)	(79)	(0)	(0)	(0)	(0)	(0)	(79)
<b>TOTAL</b>	<b>0.3023</b>	<b>0</b>	<b>807</b>	<b>607</b>	<b>2,593</b>	<b>1,407</b>	<b>5,213</b>	<b>2,743</b>	<b>590</b>	<b>88</b>	<b>14,047</b>
	(0.1261)	(0)	(752)	(662)	(1,850)	(1,482)	(4,530)	(2,346)	(498)	(93)	(5,736)
<b>RELEASED</b>											
Coho salmon	0.0043	0	0	0	0	0	0	0	199	0	199
	(0.0052)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(240)	(0)	(240)
Smallmouth bass	0.1546	35	4,059	7	126	479	703	1,250	388	136	7,183
	(0.1048)	(51)	(4,534)	(14)	(139)	(511)	(780)	(1,328)	(346)	(170)	(4,833)
Largemouth bass	0.0067	0	0	0	65	0	156	66	22	0	309
	(0.0066)	(0)	(0)	(0)	(130)	(0)	(238)	(132)	(46)	(0)	(305)
Walleye	0.0326	0	570	0	9	427	0	137	373	0	1,517
	(0.0193)	(0)	(733)	(0)	(19)	(341)	(0)	(185)	(319)	(0)	(889)
Muskellunge	0.0014	0	0	0	0	0	0	66	0	0	66
	(0.0028)	(0)	(0)	(0)	(0)	(0)	(0)	(130)	(0)	(0)	(130)
Common white sucker	0.0064	0	19	0	124	0	155	0	0	0	298
	(0.0060)	(0)	(37)	(0)	(151)	(0)	(231)	(0)	(0)	(0)	(278)
Redhorse	0.0061	0	57	0	0	0	0	197	30	0	284
	(0.0068)	(0)	(82)	(0)	(0)	(0)	(0)	(299)	(59)	(0)	(315)
Rock bass	0.0626	23	50	0	2,437	204	0	142	22	28	2,907
	(0.0400)	(51)	(102)	(0)	(1,802)	(273)	(0)	(220)	(46)	(61)	(1,841)
Carp	0.0076	0	0	34	123	117	52	0	0	28	354

	(0.0068)(0)	(0)	(69)	(142)	(245)	(103)	(0)	(0)	(61)	(315)
Bluegill	0.3198 0	1,670 0	4,832 4,574	2,420 1,061	41 264	14,862				
	(0.1917)(0)	(3,495)(0)	(4,344)(6,029)	(2,612)(1,804)	(83)(525)	(8,820)				
Green Sunfish	0.0048 0	0 0	0 0	225 0	0 0	225				
	(0.0098)(0)	(0)(0)	(0)(0)	(456)(0)	(0)(0)	(456)				
Yellow Perch	0.0014 0	0 0	0 63	0 0	0 0	63				
	(0.0027)(0)	(0)(0)	(0)(124)	(0)(0)	(0)(0)	(124)				
TOTAL	0.6082 58	6,424 41	7,715 5,865	3,711 2,920	1,076 456	28,267				
RELEASED	(0.2275)(72)	(5,773)(70)	(4,711)(6,073)	(2,786)(2,286)	(541)(558)	(10,296)				
TOTAL CATCH	0.9105 58	7,231 648	10,308 7,272	8,924 5,662	1,666 544	42,314				
	(0.2652)(72)	(5,821)(665)	(5,061)(6,251)	(5,318)(3,276)	(736)(566)	(11,786)				
ANGLER HOURS	2,175	5,646 1,248	6,347 7,862	8,303 6,308	6,928 1,657	46,473				
	(700)	(1,678)(672)	(1,467)(1,645)	(1,966)(1,310)	(1,087)(562)	(3,962)				
ANGLER TRIPS	1,009	2,293 611	2,206 2,475	2,966 2,552	2,601 837	17,550				
	(625)	(959)(355)	(679)(818)	(908)(728)	(691)(332)	(2,124)				

Table 4. Estimated harvest, catch per hour, and fishing pressure for 500. Two standard errors are given in parentheses.

Species	C/H	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Season
<b>HARVEST</b>											
Coho salmon	0.0030 0	0 0	0 0	0 0	0 0	0 0	0 0	60 0	0 60	0 60	
	(0.0055)(0)	(0)(0)	(0)(0)	(0)(0)	(0)(0)	(0)(0)	(0)(0)	(111)(0)	(0)(111)	(0)(111)	
Walleye	0.0606 0	0 435	120 124	198 357	0 0	1,234					
	(0.0494)(0)	(0)(641)	(126)(247)	(250)(659)	(0)(0)	(992)					
Bluegill	0.3332 0	0 0	1,782 262	3,804 929	0 0	6,777					
	(0.2490)(0)	(0)(0)	(1,791)(525)	(4,422)(1,358)	(0)(0)	(4,988)					
Rock bass	0.0127 0	100 0	138 21	0 0	0 0	259					
	(0.0121)(0)	(138)(0)	(197)(42)	(0)(0)	(0)(0)	(244)					
Carp	0.0021 0	0 0	0 44	0 0	0 0	44					
	(0.0043)(0)	(0)(0)	(0)(87)	(0)(0)	(0)(0)	(87)					
Channel catfish	0.0903 0	0 0	111 118	680 929	0 0	1,838					
	(0.0925)(0)	(0)(0)	(156)(143)	(736)(1,702)	(0)(0)	(1,866)					
TOTAL HARVEST	0.5020 0	100 435	2,150 568	4,682 2,216	60 0	10,211					
	(0.2745)(0)	(138)(641)	(1,813)(605)	(4,490)(2,274)	(111)(0)	(5,425)					
<b>RELEASED</b>											
Coho salmon	0.0062 0	0 0	0 0	0 0	0 0	125 0	125	0	125	0	
	(0.0106)(0)	(0)(0)	(0)(0)	(0)(0)	(0)(0)	(215)(0)	(215)	(0)	(215)	(0)	
Smallmouth bass	0.2307 0	4,040 0	79 148	316 0	41 68	4,692					
	(0.2274)(0)	(4,534)(0)	(121)(358)	(560)(0)	(84)(135)	(4,586)					
Largemouth bass	0.0032 0	0 0	65 0	0 0	0 0	65					
	(0.0064)(0)	(0)(0)	(130)(0)	(0)(0)	(0)(0)	(130)					
Walleye	0.0540 0	551 0	0 310	0 71	166 0	1,099					
	(0.0410)(0)	(732)(0)	(0)(0)	(258)(0)	(132)(0)	(821)					
Common white sucker	0.0051 0	0 0	23 0	80 0	0 0	103					
	(0.0088)(0)	(0)(0)	(45)(0)	(173)(0)	(0)(0)	(179)					
Rock bass	0.0513 0	50 0	993 0	0 0	0 0	1,043					
	(0.0589)(0)	(102)(0)	(1,186)(0)	(0)(0)	(0)(0)	(1,190)					
Carp	0.0023 0	0 0	46 0	0 0	0 0	46					
	(0.0051)(0)	(0)(0)	(104)(0)	(0)(0)	(0)(0)	(104)					
Bluegill	0.2929 0	1,670 0	747 787	1,521 929	41 264	5,959					
	(0.2285)(0)	(3,495)(0)	(783)(638)	(2,075)(1,783)	(83)(525)	(4,583)					
TOTAL RELEASED	0.6456 0	6,311 0	1,953 1,245	1,917 1,001	374 332	13,133					
	(0.3375)(0)	(5,772)(0)	(1,436)(775)	(2,156)(1,788)	(337)(542)	(6,651)					



TOTAL CATCH	1.1476	0	6,411	435	4,104	1,812	6,599	3,217	434	332	23,344
	(0.4475)	(0)	(5,773)	(641)	(2,313)	(984)	(4,981)	(2,893)	(354)	(542)	(8,582)
ANGLER HOURS	528	2,829	450	3,605	2,303	2,729	2,844	4,166	889	20,342	
	(298)	(957)	(226)	(991)	(1,138)	(1,277)	(943)	(968)	(434)	(2,642)	
ANGLER TRIPS	388	1,302	212	1,338	920	1,130	1,335	1,799	518	8,942	
	(469)	(785)	(153)	(546)	(591)	(606)	(613)	(664)	(281)	(1,665)	

Table 5. Estimated harvest, catch per hour, and fishing pressure for 501. Two standard errors are given in parentheses.

Species	C/H	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Season
<b>HARVEST</b>											
Coho salmon	0.0013	0	0	0	0	0	0	0	59	0	59
	(0.0028)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(122)	(0)	(122)
Chinook salmon	0.0040	0	0	0	0	0	0	0	177	0	177
	(0.0039)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(169)	(0)	(169)
Rainbow trout	0.0029	0	99	0	0	0	0	0	0	28	127
	(0.0034)	(0)	(140)	(0)	(0)	(0)	(0)	(0)	(0)	(49)	(148)
Smallmouth bass	0.0075	0	0	41	9	0	28	221	30	0	329
	(0.0091)	(0)	(0)	(65)	(18)	(0)	(56)	(383)	(59)	(0)	(397)
Walleye	0.0173	0	0	0	0	211	169	287	30	60	756
	(0.0129)	(0)	(0)	(0)	(0)	(251)	(256)	(417)	(58)	(79)	(558)
Redhorse	0.0159	0	608	0	28	0	0	0	59	0	696
	(0.0170)	(0)	(726)	(0)	(58)	(0)	(0)	(0)	(117)	(0)	(738)
Black crappie	0.0169	0	0	0	0	0	647	93	0	0	741
	(0.0226)	(0)	(0)	(0)	(0)	(0)	(968)	(192)	(0)	(0)	(986)
Bluegill	0.0961	0	0	0	1,404	1,118	1,136	346	207	0	4,210
	(0.0717)	(0)	(0)	(0)	(2,063)	(1,619)	(1,472)	(597)	(425)	(0)	(3,095)
Largemouth bass	0.0066	0	0	0	289	0	0	0	0	0	289
	(0.0124)	(0)	(0)	(0)	(542)	(0)	(0)	(0)	(0)	(0)	(542)
Rock bass	0.0087	0	0	41	0	258	52	0	30	0	381
	(0.0121)	(0)	(0)	(83)	(0)	(508)	(105)	(0)	(58)	(0)	(529)
Carp	0.0020	0	0	69	19	0	0	0	0	0	88
	(0.0028)	(0)	(0)	(118)	(39)	(0)	(0)	(0)	(0)	(0)	(124)
Channel catfish	0.0222	0	0	21	28	821	104	0	0	0	975
	(0.0314)	(0)	(0)	(41)	(55)	(1,351)	(209)	(0)	(0)	(0)	(1,369)
Common white sucker	0.0009	0	0	0	38	0	0	0	0	0	38
	(0.0018)	(0)	(0)	(0)	(79)	(0)	(0)	(0)	(0)	(0)	(79)
<b>TOTAL HARVEST</b>	<b>0.2024</b>	<b>0</b>	<b>707</b>	<b>172</b>	<b>1,816</b>	<b>2,409</b>	<b>2,137</b>	<b>946</b>	<b>590</b>	<b>88</b>	<b>8,864</b>
	<b>(0.0893)</b>	<b>(0)</b>	<b>(740)</b>	<b>(163)</b>	<b>(2,137)</b>	<b>(2,184)</b>	<b>(1,796)</b>	<b>(844)</b>	<b>(498)</b>	<b>(93)</b>	<b>(3,755)</b>
<b>RELEASED</b>											
Coho salmon	0.0017	0	0	0	0	0	0	0	74	0	74
	(0.0024)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(106)	(0)	(106)
Smallmouth bass	0.2616	35	19	327	850	4,202	3,965	1,647	347	68	11,460
	(0.1344)	(51)	(40)	(607)	(1,200)	(4,543)	(2,804)	(1,484)	(335)	(104)	(5,713)
Largemouth bass	0.0589	0	0	176	626	258	1,199	299	22	0	2,580
	(0.0357)	(0)	(0)	(336)	(662)	(379)	(1,199)	(459)	(46)	(0)	(1,531)
Walleye	0.0237	0	19	0	9	633	56	112	207	0	1,037
	(0.0193)	(0)	(39)	(0)	(19)	(786)	(80)	(165)	(220)	(0)	(838)
Muskellunge	0.0015	0	0	0	0	0	0	66	0	0	66
	(0.0030)	(0)	(0)	(0)	(0)	(0)	(0)	(130)	(0)	(0)	(130)
Common white sucker	0.0083	0	19	0	101	0	244	0	0	0	364

	(0.0092)(0)	(37)	(0)	(144)	(0)	(372)	(0)	(0)	(0)	(400)	
Redhorse	0.0065	0	57	0	0	0	0	197	30	0	284
	(0.0072)(0)	(82)	(0)	(0)	(0)	(0)	(299)	(59)	(0)	(315)	
Rock bass	0.1144	23	0	0	1,443	2,957	394	142	22	28	5,011
	(0.0726)(51)	(0)	(0)	(1,357)	(2,753)	(514)	(220)	(46)	(61)	(3,121)	
Carp	0.0129	0	0	34	77	375	52	0	0	28	566
	(0.0112)(0)	(0)	(69)	(97)	(456)	(103)	(0)	(0)	(61)	(486)	
Bluegill	0.3067	0	0	0	4,735	6,197	2,279	225	0	0	13,436
	(0.1918)(0)	(0)	(0)	(4,402)	(6,554)	(2,318)	(316)	(0)	(0)	(8,234)	
Green Sunfish	0.0051	0	0	0	0	0	225	0	0	0	225
	(0.0104)(0)	(0)	(0)	(0)	(0)	(456)	(0)	(0)	(0)	(456)	
Yellow Perch	0.0014	0	0	0	0	63	0	0	0	0	63
	(0.0028)(0)	(0)	(0)	(0)	(124)	(0)	(0)	(0)	(0)	(124)	
TOTAL RELEASED	0.8028	58	113	538	7,841	14,686	8,414	2,689	702	124	35,165
	(0.2633)(72)	(106)	(697)	(4,809)	(8,494)	(3,911)	(1,641)	(424)	(134)	(10,676)	
TOTAL CATCH	1.0052	58	821	710	9,657	17,095	10,551	3,635	1,292	212	44,030
	(0.2868)(72)	(747)	(716)	(5,262)	(8,771)	(4,304)	(1,846)	(654)	(163)	(11,317)	
ANGLER HOURS		1,752	2,817	1,623	5,986	12,196	10,941	4,443	3,275	768	43,801
	(640)	(1,379)	(1,673)	(2,526)	(2,852)	(2,856)	(1,083)	(615)	(357)	(5,428)	
ANGLER TRIPS		647	991	527	1,764	3,039	3,019	1,403	982	319	12,692
	(415)	(550)	(402)	(758)	(866)	(881)	(412)	(247)	(176)	(1,731)	

Table 6. Estimated harvest, catch per hour, and fishing pressure for Grand River (Upper). Two standard errors are given in parentheses.

Species	C/H	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Season
HARVEST											
Coho salmon	0.0019	0	0	0	0	0	0	0	119	0	119
	(0.0026)(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(165)	(0)	(165)
Chinook salmon	0.0028	0	0	0	0	0	0	0	177	0	177
	(0.0027)(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(169)	(0)	(169)
Rainbow trout	0.0020	0	99	0	0	0	0	0	0	28	127
	(0.0023)(0)	(140)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(49)	(148)
Smallmouth bass	0.0051	0	0	41	9	0	28	221	30	0	329
	(0.0062)(0)	(0)	(65)	(18)	(0)	(56)	(383)	(59)	(0)	(397)	
Walleye	0.0310	0	0	435	120	335	367	644	30	60	1,990
	(0.0180)(0)	(0)	(641)	(126)	(352)	(358)	(780)	(58)	(79)	(1,139)	
Redhorse	0.0108	0	608	0	28	0	0	0	59	0	696
	(0.0116)(0)	(726)	(0)	(58)	(0)	(0)	(0)	(117)	(0)	(738)	
Black crappie	0.0115	0	0	0	0	0	647	93	0	0	741
	(0.0154)(0)	(0)	(0)	(0)	(0)	(968)	(192)	(0)	(0)	(986)	
Bluegill	0.1713	0	0	0	3,185	1,380	4,940	1,275	207	0	10,987
	(0.0929)(0)	(0)	(0)	(2,733)	(1,702)	(4,660)	(1,483)	(425)	(0)	(5,870)	
Largemouth bass	0.0045	0	0	0	289	0	0	0	0	0	289
	(0.0085)(0)	(0)	(0)	(542)	(0)	(0)	(0)	(0)	(0)	(542)	
Rock bass	0.0100	0	100	41	138	279	52	0	30	0	640
	(0.0091)(0)	(138)	(83)	(197)	(510)	(105)	(0)	(58)	(0)	(582)	
Carp	0.0020	0	0	69	19	44	0	0	0	0	131
	(0.0024)(0)	(0)	(118)	(39)	(87)	(0)	(0)	(0)	(0)	(152)	
Channel catfish	0.0438	0	0	21	139	939	784	929	0	0	2,812
	(0.0363)(0)	(0)	(41)	(166)	(1,359)	(766)	(1,702)	(0)	(0)	(2,315)	
Common white sucker	0.0006	0	0	0	38	0	0	0	0	0	38
	(0.0012)(0)	(0)	(0)	(79)	(0)	(0)	(0)	(0)	(0)	(79)	
TOTAL HARVEST	0.2974	0	807	607	3,966	2,977	6,818	3,163	650	88	19,076

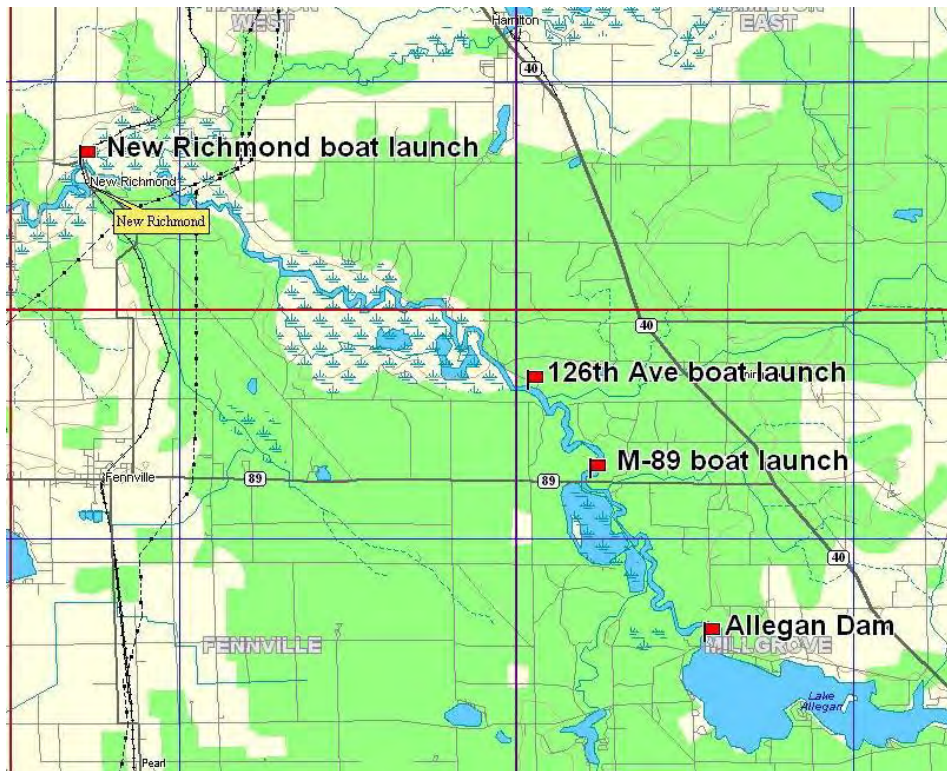
	(0.1066)(0)	(752)	(662)	(2,803)	(2,266)	(4,836)	(2,426)	(510)	(93)	(6,598)
RELEASED										
Coho salmon	0.0031 0	0	0	0	0	0	0	199	0	199
	(0.0037)(0)	(0)	(0)	(0)	(0)	(0)	(0)	(240)	(0)	(240)
Smallmouth bass	0.2518 35	4,059	327	929	4,350	4,281	1,647	388	136	16,152
	(0.1166)(51)	(4,534)	(607)	(1,206)	(4,557)	(2,859)	(1,484)	(346)	(170)	(7,326)
Largemouth bass	0.0412 0	0	176	691	258	1,199	299	22	0	2,645
	(0.0243)(0)	(0)	(336)	(674)	(379)	(1,199)	(459)	(46)	(0)	(1,537)
Walleye	0.0333 0	570	0	9	943	56	184	373	0	2,136
	(0.0186)(0)	(733)	(0)	(19)	(827)	(80)	(211)	(319)	(0)	(1,173)
Muskellunge	0.0010 0	0	0	0	0	0	66	0	0	66
	(0.0020)(0)	(0)	(0)	(0)	(0)	(0)	(130)	(0)	(0)	(130)
Common white sucker	0.0073 0	19	0	124	0	324	0	0	0	467
	(0.0069)(0)	(37)	(0)	(151)	(0)	(410)	(0)	(0)	(0)	(438)
Redhorse	0.0044 0	57	0	0	0	0	197	30	0	284
	(0.0049)(0)	(82)	(0)	(0)	(0)	(0)	(299)	(59)	(0)	(315)
Rock bass	0.0944 23	50	0	2,437	2,957	394	142	22	28	6,054
	(0.0528)(51)	(102)	(0)	(1,802)	(2,753)	(514)	(220)	(46)	(61)	(3,340)
Carp	0.0095 0	0	34	123	375	52	0	0	28	613
	(0.0078)(0)	(0)	(69)	(142)	(456)	(103)	(0)	(0)	(61)	(497)
Bluegill	0.3024 0	1,670	0	5,482	6,983	3,801	1,154	41	264	19,395
	(0.1496)(0)	(3,495)	(0)	(4,471)	(6,585)	(3,111)	(1,811)	(83)	(525)	(9,423)
Green Sunfish	0.0035 0	0	0	0	0	225	0	0	0	225
	(0.0071)(0)	(0)	(0)	(0)	(0)	(456)	(0)	(0)	(0)	(456)
Yellow Perch	0.0010 0	0	0	0	63	0	0	0	0	63
	(0.0019)(0)	(0)	(0)	(0)	(124)	(0)	(0)	(0)	(0)	(124)
TOTAL RELEASED	0.7530 58	6,424	538	9,794	15,930	10,332	3,690	1,076	456	48,298
	(0.2085)(72)	(5,773)	(697)	(5,019)	(8,530)	(4,466)	(2,427)	(541)	(558)	(12,578)
TOTAL CATCH	1.0504 58	7,231	1,145	13,760	18,907	17,150	6,852	1,726	544	67,374
	(0.2425)(72)	(5,821)	(961)	(5,748)	(8,826)	(6,583)	(3,432)	(744)	(566)	(14,203)
ANGLER HOURS	2,279	5,646	2,073	9,592	14,499	13,670	7,288	7,441	1,657	64,143
	(706)	(1,678)	(1,688)	(2,713)	(3,071)	(3,129)	(1,436)	(1,147)	(562)	(6,036)
ANGLER TRIPS	1,035	2,293	739	3,102	3,959	4,150	2,738	2,782	837	21,635
	(626)	(959)	(430)	(934)	(1,048)	(1,069)	(739)	(709)	(332)	(2,402)

## Survey 41 Kalamazoo River, Allegan County, Summer, 2004

**Waterbody** Kalamazoo River  
**Year** Summer, 2004  
**County** Allegan  
**Survey Season:** April 1 through October 31, 2004

### Interview and Count Site (see the map): 610

1. Allegan Dam
2. M-89 Access site
3. 126th Avenue access
4. New Richmond Access site



Survey period

<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access/boat and shore
<b>Count type/mode</b>	roving/boat and shore
<b>Clerk time</b>	1/2 time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Estimation options applied

Weekday and weekend days in site: 610, mode: May 1 have been combined in the estimation.

## Notes

Survey followed a roving-access (roving counts and access interviews) design. All funding was provided through Fisheries Division. One clerk worked 1/2 time to collect angler-creel data. One weekend day and 1 or 2 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. roving counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was April 1 to October 31. Months were estimated separately. Estimates are given in Tables 2-4.

Table 1. Work shifts used to estimate catch and effort at Kalamazoo River, April 1 to October 31, Summer, 2004

	Year	Month	F
1	2004	4	14
2	2004	5	15
3	2004	6	16
4	2004	7	17
5	2004	8	16
6	2004	9	15
7	2004	10	14

Table 2. Estimated harvest, catch per hour, and fishing pressure for boat. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	Aug.	Sept.	Oct.	Season
<b>HARVEST</b>									
Coho salmon	0.0024 (0.0028)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	23 (51)	46 (63)	69 (81)
Chinook salmon	0.0118 (0.0082)	0 (0)	0 (0)	0 (0)	0 (0)	53 (106)	23 (51)	271 (206)	347 (237)
Rainbow trout	0.0070 (0.0065)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	12 (25)	194 (188)	206 (190)
Brown trout	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Smallmouth bass	0.0024 (0.0052)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	70 (152)	0 (0)	70 (152)
Walleye	0.0041 (0.0052)	0 (0)	0 (0)	0 (0)	32 (66)	76 (133)	12 (24)	0 (0)	120 (151)
Black crappie	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bluegill	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Channel catfish	0.0441 (0.0292)	42 (91)	390 (397)	0 (0)	420 (427)	426 (594)	0 (0)	20 (41)	1,298 (838)
Freshwater drum	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Other	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.0716 (0.0330)</b>	<b>42 (91)</b>	<b>390 (397)</b>	<b>0 (0)</b>	<b>452 (432)</b>	<b>554 (618)</b>	<b>141 (172)</b>	<b>531 (289)</b>	<b>2,110 (920)</b>
<b>RELEASED</b>									
Coho salmon	0	0	0	0	0	0	0	0	0

	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Chinook salmon	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Rainbow trout	0.0017	0	0	0	0	0	0	51	51
	(0.0035)	(0)	(0)	(0)	(0)	(0)	(0)	(102)	(102)
Brown trout	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Smallmouth bass	0.0486	68	0	159	726	276	163	41	1,432
	(0.0297)	(127)	(0)	(299)	(721)	(254)	(156)	(62)	(847)
Largemouth bass	0.0017	0	0	0	0	37	12	0	49
	(0.0021)	(0)	(0)	(0)	(0)	(55)	(25)	(0)	(61)
Walleye	0.0159	34	167	0	32	169	46	20	469
	(0.0188)	(63)	(457)	(0)	(68)	(280)	(56)	(43)	(549)
Rock bass	0.0121	0	0	183	0	0	175	0	357
	(0.0174)	(0)	(0)	(474)	(0)	(0)	(191)	(0)	(511)
bowr	0.0011	0	0	0	32	0	0	0	32
	(0.0022)	(0)	(0)	(0)	(65)	(0)	(0)	(0)	(65)
Bluegill	0.0061	0	0	0	29	79	70	0	179
	(0.0068)	(0)	(0)	(0)	(63)	(148)	(114)	(0)	(198)
TOTAL RELEASED	0.0872	101	167	342	820	561	466	112	2,569
	(0.0414)	(142)	(457)	(560)	(730)	(410)	(279)	(127)	(1,157)
TOTAL CATCH	0.1589	144	557	342	1,272	1,115	607	643	4,679
	(0.0555)	(168)	(605)	(560)	(848)	(742)	(327)	(315)	(1,478)
ANGLER HOURS		2,849	1,198	3,993	4,894	3,763	4,935	7,822	29,454
		(1,808)	(1,000)	(1,622)	(1,448)	(1,716)	(1,676)	(2,172)	(4,412)
ANGLER TRIPS		637	312	993	1,135	861	862	1,407	6,207
		(437)	(461)	(531)	(397)	(421)	(407)	(478)	(1,190)

Table 3. Estimated harvest, catch per hour, and fishing pressure for shore. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	Aug.	Sept.	Oct.	Season
<b>HARVEST</b>									
Coho salmon	0.0137	0	0	0	0	0	306	323	629
	(0.0075)	(0)	(0)	(0)	(0)	(0)	(220)	(252)	(334)
Chinook salmon	0.0159	0	0	0	0	0	67	662	729
	(0.0072)	(0)	(0)	(0)	(0)	(0)	(79)	(304)	(315)
Rainbow trout	0.0278	345	56	74	33	271	41	454	1,274
	(0.0111)	(278)	(64)	(81)	(45)	(233)	(55)	(286)	(479)
Brown trout	0.0027	0	0	0	0	45	17	62	124
	(0.0025)	(0)	(0)	(0)	(0)	(65)	(34)	(89)	(115)
Smallmouth bass	0.0016	0	12	59	0	0	0	0	72
	(0.0019)	(0)	(25)	(84)	(0)	(0)	(0)	(0)	(88)
Walleye	0.0237	0	12	135	285	280	203	169	1,085
	(0.0114)	(0)	(26)	(140)	(251)	(257)	(207)	(241)	(500)
Black crappie	0.0070	0	150	149	0	23	0	0	322
	(0.0074)	(0)	(284)	(177)	(0)	(48)	(0)	(0)	(337)
Bluegill	0.1368	0	567	2,932	784	1,542	450	0	6,274
	(0.0697)	(0)	(900)	(2,147)	(1,066)	(1,441)	(900)	(0)	(3,073)
Rock bass	0.0131	0	300	281	0	22	0	0	603
	(0.0145)	(0)	(613)	(235)	(0)	(44)	(0)	(0)	(658)
Channel catfish	0.0133	0	236	200	17	113	21	23	610
	(0.0088)	(0)	(313)	(179)	(30)	(150)	(43)	(43)	(397)
Freshwater drum	0.0010	0	0	30	17	0	0	0	46
	(0.0014)	(0)	(0)	(58)	(30)	(0)	(0)	(0)	(66)
Other	0.0005	0	12	12	0	0	0	0	24
	(0.0007)	(0)	(24)	(20)	(0)	(0)	(0)	(0)	(32)
TOTAL HARVEST	0.2571	345	1,346	3,871	1,136	2,296	1,104	1,694	11,792
	(0.0804)	(278)	(1,171)	(2,183)	(1,097)	(1,493)	(955)	(553)	(3,296)
<b>RELEASED</b>									
Coho salmon	0.0004	0	0	0	0	0	17	0	17

	(0.0007)	(0)	(0)	(0)	(0)	(0)	(33)	(0)	(33)
Chinook salmon	0.0039	0	0	0	0	0	34	146	181
	(0.0046)	(0)	(0)	(0)	(0)	(0)	(69)	(199)	(210)
Rainbow trout	0.0093	281	38	0	0	23	0	85	426
	(0.0067)	(272)	(77)	(0)	(0)	(46)	(0)	(100)	(304)
Brown trout	0.0010	0	0	0	0	44	0	0	44
	(0.0020)	(0)	(0)	(0)	(0)	(90)	(0)	(0)	(90)
Smallmouth bass	0.0370	89	98	611	489	303	107	0	1,698
	(0.0167)	(141)	(148)	(567)	(289)	(250)	(135)	(0)	(726)
Largemouth bass	0.0021	0	31	0	64	0	0	0	95
	(0.0020)	(0)	(46)	(0)	(78)	(0)	(0)	(0)	(91)
Walleye	0.0341	62	86	198	514	485	34	185	1,563
	(0.0144)	(94)	(138)	(153)	(380)	(369)	(67)	(230)	(624)
Rock bass	0.0042	0	25	119	17	0	0	31	191
	(0.0056)	(0)	(49)	(239)	(34)	(0)	(0)	(62)	(254)
bowr	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Bluegill	0.0496	0	87	636	797	753	0	0	2,273
	(0.0297)	(0)	(124)	(694)	(666)	(902)	(0)	(0)	(1,324)
TOTAL RELEASED	0.1414	432	364	1,565	1,880	1,607	192	447	6,487
	(0.0421)	(321)	(258)	(940)	(824)	(1,011)	(169)	(326)	(1,700)
TOTAL CATCH	0.3986	777	1,710	5,436	3,016	3,904	1,296	2,140	18,279
	(0.0984)	(424)	(1,199)	(2,377)	(1,372)	(1,803)	(970)	(642)	(3,709)
ANGLER HOURS		6,099	4,344	5,771	4,982	7,055	5,146	12,467	45,863
		(3,059)	(2,687)	(2,192)	(1,439)	(1,886)	(2,658)	(2,737)	(6,447)
ANGLER TRIPS		1,845	1,522	1,582	1,444	2,078	1,338	3,076	12,885
		(1,007)	(1,014)	(646)	(519)	(650)	(744)	(794)	(2,082)

Table 4. Estimated harvest, catch per hour, and fishing pressure for Kalamazoo River. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	Aug.	Sept.	Oct.	Season
<b>HARVEST</b>									
Coho salmon	0.0093	0	0	0	0	0	329	369	699
	(0.0047)	(0)	(0)	(0)	(0)	(0)	(225)	(260)	(344)
Chinook salmon	0.0143	0	0	0	0	53	91	933	1,076
	(0.0054)	(0)	(0)	(0)	(0)	(106)	(94)	(368)	(394)
Rainbow trout	0.0196	345	56	74	33	271	52	648	1,480
	(0.0071)	(278)	(64)	(81)	(45)	(233)	(61)	(342)	(515)
Brown trout	0.0016	0	0	0	0	45	17	62	124
	(0.0015)	(0)	(0)	(0)	(0)	(65)	(34)	(89)	(115)
Smallmouth bass	0.0019	0	12	59	0	0	70	0	142
	(0.0023)	(0)	(25)	(84)	(0)	(0)	(152)	(0)	(176)
Walleye	0.0160	0	12	135	318	356	214	169	1,205
	(0.0071)	(0)	(26)	(140)	(260)	(290)	(209)	(241)	(523)
Black crappie	0.0043	0	150	149	0	23	0	0	322
	(0.0045)	(0)	(284)	(177)	(0)	(48)	(0)	(0)	(337)
Bluegill	0.0833	0	567	2,932	784	1,542	450	0	6,274
	(0.0417)	(0)	(900)	(2,147)	(1,066)	(1,441)	(900)	(0)	(3,073)
Rock bass	0.0080	0	300	281	0	22	0	0	603
	(0.0088)	(0)	(613)	(235)	(0)	(44)	(0)	(0)	(658)
Channel catfish	0.0253	42	626	200	436	539	21	43	1,908
	(0.0126)	(91)	(505)	(179)	(428)	(613)	(43)	(59)	(927)
Freshwater drum	0.0006	0	0	30	17	0	0	0	46
	(0.0009)	(0)	(0)	(58)	(30)	(0)	(0)	(0)	(66)
Other	0.0003	0	12	12	0	0	0	0	24
	(0.0004)	(0)	(24)	(20)	(0)	(0)	(0)	(0)	(32)
TOTAL HARVEST	0.1846	387	1,736	3,871	1,588	2,850	1,245	2,225	13,902
	(0.0493)	(292)	(1,236)	(2,183)	(1,179)	(1,616)	(971)	(624)	(3,422)
<b>RELEASED</b>									
Coho salmon	0.0002	0	0	0	0	0	17	0	17

	(0.0004)	(0)	(0)	(0)	(0)	(0)	(33)	(0)	(33)
Chinook salmon	0.0024	0	0	0	0	0	34	146	181
	(0.0028)	(0)	(0)	(0)	(0)	(0)	(69)	(199)	(210)
Rainbow trout	0.0063	281	38	0	0	23	0	136	477
	(0.0043)	(272)	(77)	(0)	(0)	(46)	(0)	(143)	(320)
Brown trout	0.0006	0	0	0	0	44	0	0	44
	(0.0012)	(0)	(0)	(0)	(0)	(90)	(0)	(0)	(90)
Smallmouth bass	0.0416	157	98	770	1,215	579	270	41	3,130
	(0.0154)	(190)	(148)	(641)	(777)	(356)	(206)	(62)	(1,116)
Largemouth bass	0.0019	0	31	0	64	37	12	0	144
	(0.0015)	(0)	(46)	(0)	(78)	(55)	(25)	(0)	(109)
Walleye	0.0270	96	253	198	546	654	80	205	2,033
	(0.0114)	(113)	(478)	(153)	(386)	(464)	(88)	(234)	(831)
Rock bass	0.0073	0	25	301	17	0	175	31	548
	(0.0076)	(0)	(49)	(531)	(34)	(0)	(191)	(62)	(571)
bowr	0.0004	0	0	0	32	0	0	0	32
	(0.0009)	(0)	(0)	(0)	(65)	(0)	(0)	(0)	(65)
Bluegill	0.0325	0	87	636	826	832	70	0	2,451
	(0.0181)	(0)	(124)	(694)	(669)	(914)	(114)	(0)	(1,339)
TOTAL RELEASED	0.1202	534	531	1,906	2,700	2,168	658	559	9,056
	(0.0300)	(351)	(525)	(1,094)	(1,101)	(1,091)	(326)	(350)	(2,056)
TOTAL CATCH	0.3048	921	2,267	5,778	4,288	5,018	1,902	2,784	22,958
	(0.0617)	(456)	(1,343)	(2,442)	(1,613)	(1,949)	(1,024)	(715)	(3,992)
ANGLER HOURS		8,948	5,542	9,764	9,876	10,818	10,081	20,289	75,317
		(3,553)	(2,867)	(2,726)	(2,041)	(2,549)	(3,143)	(3,494)	(7,812)
ANGLER TRIPS		2,482	1,835	2,575	2,579	2,939	2,200	4,483	19,092
		(1,098)	(1,114)	(836)	(653)	(775)	(848)	(927)	(2,398)



## Survey 42 Tahquamenon River, Luce County, Summer, 2004

<b>Waterbody</b>	Tahquamenon River
<b>Year</b>	Summer, 2004
<b>County</b>	Luce
<b>Sites</b>	440,441,442
<b>Survey period</b>	May 1 to September 30
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access/boat, shore
<b>Count type/mode</b>	roving/boat and shore
<b>Clerk time</b>	1/2 time (Survey was done in conjunction with Great Lakes angler surveys)
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Interview and Count Sites (see the map)**

**Lower Section (440):** Boat launch at mouth (N46.55507, W085.03122) to 5.5 miles upstream from launch (N46.55770, W085.11425; First cabin upstream of resort).

**Middle Section (441):** 5.5 miles upstream from launch (N46.55770, W085.11425) to 14.9 miles upstream from launch (N46.60035, W085.19902. Base of pool at riverbend campground).

**Upper Section (442):** 15.8 miles upstream from launch (N46.60425, W085.20624. Base of lower falls at north side of the island).

442

440

441



**Estimation options applied**

Day types with the number of party (or parties) equal to 1 in a month were excluded in the estimation.

**Notes**

Survey followed a roving-access (roving counts and access interviews) design. All funding was provided through Fisheries Division. One clerk worked 1/2 time to collect angler-creel data on the river. One weekend day and 1 or 2 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. Tahquamenon River was divided into 3 sections: 440,441,442. Two sections was sampled per day. Starting location within a section and direction of travel were randomized for both counting and interviewing. roving counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was May 1 to September 30. Months were estimated separately.

Table 1. Work shifts used to estimate catch and effort at Tahquamenon River, May 1 to September 30, Summer, 2004

	<b>Year</b>	<b>Month</b>	<b>F</b>
1	2004	5	16
2	2004	6	16
3	2004	7	16
4	2004	8	16
5	2004	9	15

Table 2. Estimated harvest, catch per hour, and fishing pressure for Tahquamenon River. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Smallmouth bass	0.0005 (0.0011)	0 (0)	9 (18)	0 (0)	0 (0)	0 (0)	9 (18)
Walleye	0.0720 (0.0558)	285 (242)	661 (845)	288 (262)	0 (0)	9 (17)	1,242 (918)
Yellow Perch	0.1035 (0.0999)	73 (145)	0 (0)	0 (0)	790 (1,246)	922 (1,106)	1,785 (1,673)
Rock bass	0.0033 (0.0067)	0 (0)	0 (0)	57 (114)	0 (0)	0 (0)	57 (114)
Common white sucker	0.0025 (0.0050)	43 (85)	0 (0)	0 (0)	0 (0)	0 (0)	43 (85)
<b>TOTAL HARVEST</b>	<b>0.1818 (0.1188)</b>	<b>400 (295)</b>	<b>670 (846)</b>	<b>345 (286)</b>	<b>790 (1,246)</b>	<b>931 (1,106)</b>	<b>3,136 (1,914)</b>
<b>RELEASED</b>							
Rainbow trout	0.0031 (0.0062)	53 (107)	0 (0)	0 (0)	0 (0)	0 (0)	53 (107)
Smallmouth bass	0.0307 (0.0245)	211 (269)	49 (73)	160 (248)	96 (151)	14 (20)	530 (404)
Walleye	0.0224 (0.0192)	23 (46)	221 (281)	69 (118)	16 (31)	57 (74)	386 (319)
Northern pike	0.0394 (0.0225)	75 (112)	129 (201)	125 (112)	80 (99)	270 (226)	679 (355)
Muskellunge	0.0089 (0.0091)	83 (122)	6 (11)	31 (62)	0 (0)	34 (67)	153 (153)
Common white sucker	0.0145 (0.0173)	179 (274)	0 (0)	47 (93)	24 (48)	0 (0)	250 (293)
Rock bass	0.0225 (0.0168)	0 (0)	28 (50)	220 (197)	141 (187)	0 (0)	388 (276)
Carp	0.0140 (0.0282)	0 (0)	0 (0)	242 (484)	0 (0)	0 (0)	242 (484)
Bluegill	0.0070 (0.0141)	0 (0)	0 (0)	121 (242)	0 (0)	0 (0)	121 (242)
Yellow Perch	0.0335 (0.0392)	67 (134)	45 (90)	47 (93)	110 (138)	310 (620)	578 (662)
<b>TOTAL RELEASED</b>	<b>0.1959 (0.0808)</b>	<b>692 (454)</b>	<b>478 (368)</b>	<b>1,060 (664)</b>	<b>466 (300)</b>	<b>685 (668)</b>	<b>3,381 (1,148)</b>
<b>TOTAL CATCH</b>	<b>0.3777 (0.1566)</b>	<b>1,092 (542)</b>	<b>1,147 (922)</b>	<b>1,405 (723)</b>	<b>1,256 (1,282)</b>	<b>1,616 (1,292)</b>	<b>6,517 (2,232)</b>
<b>ANGLER HOURS</b>		<b>3,232 (1,816)</b>	<b>2,866 (1,737)</b>	<b>5,557 (2,194)</b>	<b>2,830 (1,316)</b>	<b>2,769 (1,841)</b>	<b>17,253 (4,031)</b>
<b>ANGLER TRIPS</b>		<b>1,397 (799)</b>	<b>1,033 (794)</b>	<b>1,962 (982)</b>	<b>1,382 (762)</b>	<b>1,112 (887)</b>	<b>6,887 (1,897)</b>

## 2004 Little Manistee River Summer, Creel Survey

### **Survey Season:**

June 1 through August 31, 2004

### **Work Shifts:** See the schedules attached

June     Shift I 6:00 AM - 2:30 PM  
          Shift II 1:00 PM - 9:30 PM

July      Shift I 6:00 AM - 2:30 PM  
          Shift II 1:00 PM - 9:30 PM

August   Shift I 6:00 AM - 2:30 PM  
          Shift II 12:00 PM - 8:30 PM

### **Interview and Count Sites**

A (Site# 520) - Driftwood Valley Campground (T20N, R14W, Sec. 16) to Nine Mile Bridge

B (Site# 521) - Nine Mile Bridge (T21N, R15W, Sec. 34) to Little Manistee Weir

C (Site# 522) - Little Manistee Weir (T21N, R16W, Sec. 25) to Mouth of River (, T21N, R16W, Sec. 20)

### **Interviewing and Counting procedures**

In-completed-trip interviews were collected while counting. To reduce potential biases in estimating angling effort from the counts, conduct each interview as quickly as possible.

### **General instructions**

- Interview anglers as they are actively fishing (in-completed interview) or finish their trip (completed interviews).
- One angler per interview record. Record harvest or catch-release information by species on the interview form.
- Ask the start time of their fishing trip. The length of their fishing trip is the time they started fishing until the time they were interviewed. It is very important to record these **Start Time** and **End Time** (= interview time) on the interview form.
- Minimum fishing time, prior to being interviewed, is 30 minutes. An angler that has fished less than 30 minutes should not be interviewed and no form would be filled out.
- Ideally, you need to make at least one complete path within one section during a shift.
- Try to gather interviews for all fishing modes (boat and shore).
  
- For each section, one count form will be filled out for each fishing mode and each scheduled count.
- When the count is of shore anglers (including wading anglers), the count is of individual anglers. When the count is of a mode that may include more than one

angler (e.g., boat), only that unit is counted. For example, five boats may be counted. While each boat may have two anglers – the count is five.

Table 1. Little Manistee River summer 2004 shore angling estimates for site 520.

Species	C/H	June	July	August	Season
<b>HARVEST</b>					
Chinook salmon	0.0466 (0.0602)	0 (0)	0 (0)	144 (162)	144 (162)
TOTAL HARVEST	0.0466 (0.0602)	0 (0)	0 (0)	144 (162)	144 (162)
<b>RELEASED</b>					
Brown trout	0.0073 (0.0153)	0 (0)	0 (0)	23 (45)	23 (45)
TOTAL RELEASED	0.0073 (0.0153)	0 (0)	0 (0)	23 (45)	23 (45)
TOTAL CATCH	0.0539 (0.0642)	0 (0)	0 (0)	166 (168)	166 (168)
ANGLER HOURS		85 (171)	640 (779)	2,355 (1,753)	3,080 (1,925)
ANGLER TRIPS		31 (72)	233 (342)	856 (1,077)	1,120 (1,133)

Table 2. Little Manistee River summer 2004 shore angling estimates for site 521.

Species	C/H	June	July	August	Season
<b>HARVEST</b>					
Chinook salmon	0.0278 (0.0286)	23 (47)	59 (84)	121 (164)	204 (190)
Brook trout	0.0255 (0.0522)	0 (0)	0 (0)	187 (374)	187 (374)
TOTAL HARVEST	0.0533 (0.0616)	23 (47)	59 (84)	308 (408)	391 (419)
<b>RELEASED</b>					
Chinook salmon	0.0100 (0.0181)	0 (0)	0 (0)	73 (128)	73 (128)
Rainbow trout	0.0766 (0.1566)	0 (0)	0 (0)	561 (1,122)	561 (1,122)
Brown trout	0.0153 (0.0313)	0 (0)	0 (0)	112 (224)	112 (224)
TOTAL RELEASED	0.1019 (0.1631)	0 (0)	0 (0)	746 (1,151)	746 (1,151)
TOTAL CATCH	0.1553 (0.1799)	23 (47)	59 (84)	1,054 (1,221)	1,137 (1,225)
ANGLER HOURS		467 (422)	3,104 (1,572)	3,750 (2,656)	7,321 (3,115)
ANGLER TRIPS		150 (207)	788 (718)	1,200 (1,554)	2,138 (1,725)

Table 3. Little Manistee River summer 2004 shore angling estimates for site 522.

Species	C/H	June	July	August	Season
<b>HARVEST</b>					

Chinook salmon	0.0289 (0.0252)	0 (0)	79 (144)	214 (196)	293 (244)
TOTAL HARVEST	0.0289 (0.0252)	0 (0)	79 (144)	214 (196)	293 (244)
<b>RELEASED</b>					
Chinook salmon	0.0116 (0.0092)	0 (0)	29 (35)	89 (81)	118 (88)
Rainbow trout	0.0783 (0.0995)	364 (486)	430 (860)	0 (0)	794 (988)
Brown trout	0.0120 (0.0102)	122 (98)	0 (0)	0 (0)	122 (98)
TOTAL RELEASED	0.1019 (0.1018)	486 (496)	459 (861)	89 (81)	1,034 (997)
TOTAL CATCH	0.1308 (0.1068)	486 (496)	538 (873)	304 (212)	1,328 (1,027)
ANGLER HOURS		869 (362)	4,528 (2,452)	4,752 (947)	10,149 (2,653)
ANGLER TRIPS		348 (451)	1,811 (2,405)	1,188 (922)	3,347 (2,615)

Table 4. Little Manistee River summer 2004 shore angling estimates for all sites combined.

Species	C/H	June	July	August	Season
<b>HARVEST</b>					
Chinook salmon	0.0312 (0.0183)	23 (47)	138 (167)	479 (303)	640 (349)
Brook trout	0.0091 (0.0183)	0 (0)	0 (0)	187 (374)	187 (374)
TOTAL HARVEST	0.0403 (0.0264)	23 (47)	138 (167)	666 (481)	827 (512)
<b>RELEASED</b>					
Chinook salmon	0.0093 (0.0079)	0 (0)	29 (35)	163 (152)	191 (156)
Rainbow trout	0.0659 (0.0742)	364 (486)	430 (860)	561 (1,122)	1,355 (1,495)
Brown trout	0.0125 (0.0124)	122 (98)	0 (0)	135 (229)	257 (249)
TOTAL RELEASED	0.0877 (0.0766)	486 (496)	459 (861)	858 (1,155)	1,803 (1,524)
TOTAL CATCH	0.1280 (0.0831)	509 (498)	597 (877)	1,524 (1,251)	2,630 (1,607)
ANGLER HOURS		1,422 (582)	8,272 (3,014)	10,857 (3,320)	20,551 (4,522)
ANGLER TRIPS		528 (501)	2,832 (2,533)	3,244 (2,104)	6,605 (3,331)

## Survey 43 Grand Lake, Alpena County, Winter, 2004-2005

<b>Waterbody</b>	Grand Lake
<b>Year</b>	2004-2005
<b>County</b>	Alpena County
<b>Sites</b>	540
<b>Survey period</b>	12/17/2004 to 3/26/2005
<b>Survey design</b>	Roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	Roving / open ice, shanty
<b>Count type/mode</b>	Roving / open ice, shanty
<b>Clerk time</b>	1.5 (one full time interview clerk, ½ count clerk)
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a progressive-roving design. All funding was provided through Fisheries Division. One clerk worked full time to collect interview data. Another clerk made counts for both Grand Lake and Long Lake. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. progressive counts of open ice and shanty anglers were made once per day. Survey period for both counts and interviews was 12/17/2004 to 3/26/2005. Months were estimated separately. Estimates are given in tables 2-4.

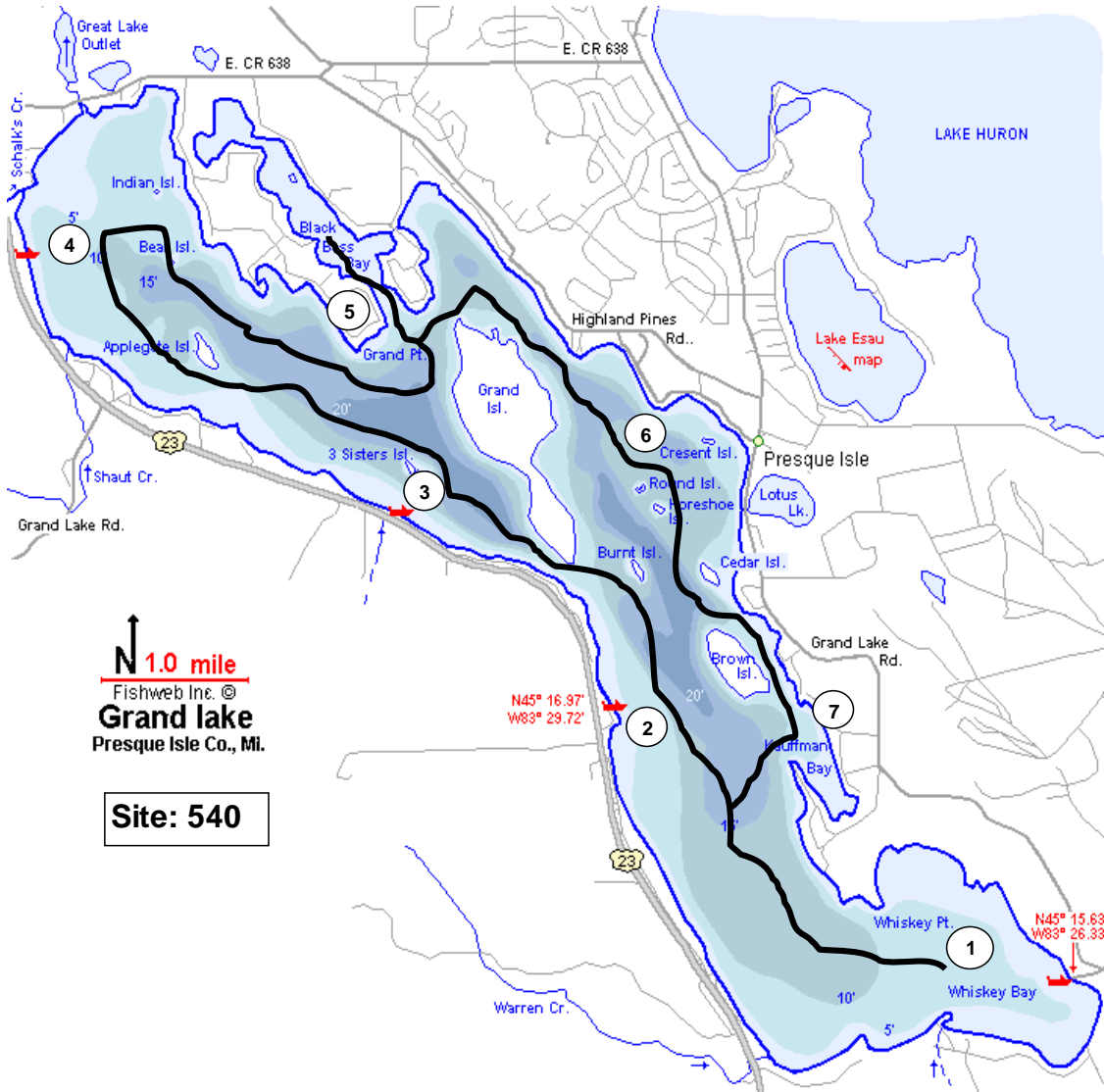




Table 1. Expansion values (referred to as “F” in Lockwood et al. 1999) to estimate catch and effort at Grand Lake, 12/17/2004 to 3/26/2005, 2004-2005

	Year	Month	F
1	2005	1	13
2	2005	2	13
3	2005	3	13
4	2004	12	13

Table 2. Estimated harvest, catch per hour, and fishing pressure for open ice. Two standard errors are given in parentheses.

Species	C/H	December	January	February	March	Season
<b>HARVEST</b>						
Walleye	0.0037 (0.0055)	0 (0)	0 (0)	15 (22)	0 (0)	15 (22)
Yellow Perch	0.5589 (0.3018)	564 (442)	565 (415)	939 (769)	194 (157)	2,262 (992)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.5626 (0.3026)</b>	<b>564 (442)</b>	<b>565 (415)</b>	<b>954 (769)</b>	<b>194 (157)</b>	<b>2,277 (992)</b>
<b>RELEASED</b>						
Cisco	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Smallmouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0.0005 (0.0010)	0 (0)	0 (0)	0 (0)	2 (4)	2 (4)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Other	0.0013 (0.0026)	0 (0)	0 (0)	5 (10)	0 (0)	5 (10)
Yellow Perch	1.2477 (0.6670)	2,129 (1,520)	888 (828)	1,471 (1,243)	561 (459)	5,050 (2,180)
<b>TOTAL RELEASED</b>	<b>1.2494 (0.6674)</b>	<b>2,129 (1,520)</b>	<b>888 (828)</b>	<b>1,476 (1,243)</b>	<b>563 (459)</b>	<b>5,057 (2,180)</b>
<b>TOTAL CATCH</b>	<b>1.8120 (0.8226)</b>	<b>2,693 (1,583)</b>	<b>1,453 (926)</b>	<b>2,430 (1,462)</b>	<b>757 (485)</b>	<b>7,334 (2,395)</b>
<b>ANGLER HOURS</b>		429 (245)	827 (496)	2,015 (1,086)	776 (379)	4,048 (1,277)
<b>ANGLER TRIPS</b>		132 (130)	254 (227)	620 (488)	239 (193)	1,245 (586)

Table 3. Estimated harvest, catch per hour, and fishing pressure for shanty. Two standard errors are given in parentheses.

Species	C/H	December	January	February	March	Season
<b>HARVEST</b>						
Walleye	0.0061 (0.0083)	0 (0)	53 (70)	3 (6)	0 (0)	55 (70)
Yellow Perch	0.4431 (0.3025)	414 (616)	1,843 (1,592)	1,709 (768)	68 (70)	4,035 (1,873)
Northern pike	0.0011 (0.0018)	0 (0)	2 (4)	8 (15)	0 (0)	10 (16)
<b>TOTAL HARVEST</b>	<b>0.4502 (0.3053)</b>	<b>414 (616)</b>	<b>1,898 (1,594)</b>	<b>1,719 (768)</b>	<b>68 (70)</b>	<b>4,100 (1,875)</b>
<b>RELEASED</b>						
Cisco	0.0013 (0.0028)	0 (0)	12 (25)	0 (0)	0 (0)	12 (25)

Smallmouth bass	0.0022 (0.0032)	0 (0)	2 (5)	17 (27)	0 (0)	20 (27)
Walleye	0.0027 (0.0032)	0 (0)	10 (20)	7 (11)	7 (14)	24 (27)
Northern pike	0.0013 (0.0023)	0 (0)	2 (4)	10 (20)	0 (0)	12 (20)
Rock bass	0.0019 (0.0040)	0 (0)	0 (0)	0 (0)	18 (35)	18 (35)
Other	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	1.0930 (0.7296)	1,563 (2,250)	5,209 (3,562)	2,921 (1,210)	260 (310)	9,953 (4,395)
<b>TOTAL RELEASED</b>	<b>1.1025</b> <b>(0.7332)</b>	<b>1,563</b> <b>(2,250)</b>	<b>5,236</b> <b>(3,562)</b>	<b>2,956</b> <b>(1,211)</b>	<b>285</b> <b>(313)</b>	<b>10,039</b> <b>(4,395)</b>
<b>TOTAL CATCH</b>	<b>1.5527</b> <b>(0.9379)</b>	<b>1,977</b> <b>(2,333)</b>	<b>7,134</b> <b>(3,902)</b>	<b>4,675</b> <b>(1,434)</b>	<b>353</b> <b>(320)</b>	<b>14,139</b> <b>(4,778)</b>
<b>ANGLER HOURS</b>		<b>583</b> <b>(819)</b>	<b>5,102</b> <b>(4,348)</b>	<b>2,920</b> <b>(1,012)</b>	<b>501</b> <b>(429)</b>	<b>9,106</b> <b>(4,559)</b>
<b>ANGLER TRIPS</b>		<b>194</b> <b>(273)</b>	<b>1,423</b> <b>(1,203)</b>	<b>762</b> <b>(325)</b>	<b>134</b> <b>(121)</b>	<b>2,514</b> <b>(1,282)</b>

Table 4. Estimated harvest, catch per hour, and fishing pressure for Grand Lake. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>December</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>Season</b>
<b>HARVEST</b>						
Walleye	0.0054 (0.0059)	0 (0)	53 (70)	18 (23)	0 (0)	70 (74)
Yellow Perch	0.4787 (0.2359)	978 (758)	2,408 (1,645)	2,648 (1,087)	262 (172)	6,297 (2,119)
Northern pike	0.0007 (0.0012)	0 (0)	2 (4)	8 (15)	0 (0)	10 (16)
<b>TOTAL HARVEST</b>	<b>0.4848</b> <b>(0.2376)</b>	<b>978</b> <b>(758)</b>	<b>2,463</b> <b>(1,647)</b>	<b>2,673</b> <b>(1,087)</b>	<b>262</b> <b>(172)</b>	<b>6,377</b> <b>(2,121)</b>
<b>RELEASED</b>						
Cisco	0.0009 (0.0019)	0 (0)	12 (25)	0 (0)	0 (0)	12 (25)
Smallmouth bass	0.0015 (0.0021)	0 (0)	2 (5)	17 (27)	0 (0)	20 (27)
Walleye	0.0019 (0.0021)	0 (0)	10 (20)	7 (11)	7 (14)	24 (27)
Northern pike	0.0011 (0.0016)	0 (0)	2 (4)	10 (20)	2 (4)	14 (21)
Rock bass	0.0013 (0.0027)	0 (0)	0 (0)	0 (0)	18 (35)	18 (35)
Other	0.0004 (0.0008)	0 (0)	0 (0)	5 (10)	0 (0)	5 (10)
Yellow Perch	1.1406 (0.5546)	3,692 (2,716)	6,097 (3,657)	4,392 (1,735)	822 (554)	15,003 (4,906)
<b>TOTAL RELEASED</b>	<b>1.1477</b> <b>(0.5566)</b>	<b>3,692</b> <b>(2,716)</b>	<b>6,124</b> <b>(3,657)</b>	<b>4,432</b> <b>(1,736)</b>	<b>848</b> <b>(555)</b>	<b>15,096</b> <b>(4,906)</b>
<b>TOTAL CATCH</b>	<b>1.6325</b> <b>(0.7144)</b>	<b>4,670</b> <b>(2,820)</b>	<b>8,587</b> <b>(4,011)</b>	<b>7,105</b> <b>(2,048)</b>	<b>1,111</b> <b>(581)</b>	<b>21,473</b> <b>(5,345)</b>
<b>ANGLER HOURS</b>		<b>1,012</b> <b>(855)</b>	<b>5,929</b> <b>(4,376)</b>	<b>4,935</b> <b>(1,484)</b>	<b>1,277</b> <b>(573)</b>	<b>13,154</b> <b>(4,734)</b>
<b>ANGLER TRIPS</b>		<b>326</b> <b>(302)</b>	<b>1,678</b> <b>(1,225)</b>	<b>1,382</b> <b>(586)</b>	<b>373</b> <b>(227)</b>	<b>3,759</b> <b>(1,409)</b>

## Survey 44 Long Lake, Alpena County, Winter, 2004-2005

<b>Waterbody</b>	Long Lake
<b>Year</b>	Winter, 2004-2005
<b>County</b>	Alpena
<b>Sites</b>	541 (Figure 1)
<b>Survey period</b>	December 17 to March 26
<b>Survey design</b>	Roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	roving/open ice, shanty
<b>Count type/mode</b>	progressive /open ice and shanty
<b>Clerk time</b>	1.5 (one full time interview clerk, ½ count clerk)
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a design. All funding was provided through Fisheries Division. One clerk worked to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. counts of anglers were made once per day. Survey period for both counts and interviews was . Months were estimated separately. Estimates are given in Tables 2-4.

Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch and effort at Long Lake, December 17 to March 26, Winter, 2004-2005

	<b>Year</b>	<b>Month</b>	<b>F</b>
1	5	1	13
2	5	2	13
3	5	3	13
4	4	12	13

Table 2. Estimated harvest, catch per hour, and fishing pressure for open ice. Two standard errors are given in parentheses.

Species	C/H	December	January	February	March	Season
<b>HARVEST</b>						
Walleye	0.0208 (0.0428)	0 (0)	19 (39)	0 (0)	0 (0)	19 (39)
Yellow Perch	0.0044 (0.0090)	0 (0)	0 (0)	4 (8)	0 (0)	4 (8)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.0252 (0.0442)</b>	<b>0 (0)</b>	<b>19 (39)</b>	<b>4 (8)</b>	<b>0 (0)</b>	<b>23 (40)</b>
<b>RELEASED</b>						
Smallmouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0.0060 (0.0123)	0 (0)	0 (0)	0 (0)	6 (11)	6 (11)
Yellow Perch	0.0110 (0.0226)	0 (0)	0 (0)	10 (20)	0 (0)	10 (20)
<b>TOTAL RELEASED</b>	<b>0.0170 (0.0263)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>10 (20)</b>	<b>6 (11)</b>	<b>16 (23)</b>
<b>TOTAL CATCH</b>	<b>0.0422 (0.0534)</b>	<b>0 (0)</b>	<b>19 (39)</b>	<b>14 (22)</b>	<b>6 (11)</b>	<b>39 (46)</b>
<b>ANGLER HOURS</b>		72 (98)	336 (239)	452 (355)	72 (104)	931 (451)
<b>ANGLER TRIPS</b>		48 (65)	224 (159)	301 (236)	48 (70)	621 (301)

Table 3. Estimated harvest, catch per hour, and fishing pressure for shanty. Two standard errors are given in parentheses.

Species	C/H	December	January	February	March	Season
<b>HARVEST</b>						
Walleye	0.0072 (0.0079)	0 (0)	7 (13)	23 (28)	0 (0)	29 (31)
Yellow Perch	0.3132 (0.1720)	119 (174)	957 (584)	174 (135)	25 (42)	1,274 (626)
Northern pike	0.0063 (0.0080)	0 (0)	7 (13)	19 (29)	0 (0)	25 (32)
<b>TOTAL HARVEST</b>	<b>0.3267 (0.1739)</b>	<b>119 (174)</b>	<b>970 (585)</b>	<b>215 (141)</b>	<b>25 (42)</b>	<b>1,329 (628)</b>
<b>RELEASED</b>						
Smallmouth bass	0.0138 (0.0199)	0 (0)	7 (13)	3 (5)	47 (78)	56 (80)
Walleye	0.0011 (0.0021)	0 (0)	4 (9)	0 (0)	0 (0)	4 (9)
Northern pike	0.0097 (0.0102)	0 (0)	0 (0)	29 (35)	10 (21)	39 (40)
Yellow Perch	0.5496 (0.3128)	0 (0)	1,785 (1,103)	451 (318)	0 (0)	2,236 (1,148)
<b>TOTAL RELEASED</b>	<b>0.5741 (0.3162)</b>	<b>0 (0)</b>	<b>1,796 (1,103)</b>	<b>483 (320)</b>	<b>57 (81)</b>	<b>2,336 (1,152)</b>
<b>TOTAL CATCH</b>	<b>0.9008 (0.3909)</b>	<b>119 (174)</b>	<b>2,766 (1,249)</b>	<b>698 (349)</b>	<b>82 (91)</b>	<b>3,665 (1,311)</b>
<b>ANGLER HOURS</b>		536 (449)	1,887 (657)	1,357 (536)	289 (277)	4,069 (999)
<b>ANGLER TRIPS</b>		358 (299)	1,258 (438)	905 (358)	192 (184)	2,712 (666)

Table 4. Estimated harvest, catch per hour, and fishing pressure for Long Lake. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>December</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>Season</b>
<b>HARVEST</b>						
Walleye	0.0097 (0.0102)	0 (0)	26 (41)	23 (28)	0 (0)	49 (50)
Yellow Perch	0.2557 (0.1372)	119 (174)	957 (584)	178 (135)	25 (42)	1,278 (626)
Northern pike	0.0051 (0.0065)	0 (0)	7 (13)	19 (29)	0 (0)	25 (32)
<b>TOTAL HARVEST</b>	<b>0.2705 (0.1390)</b>	<b>119 (174)</b>	<b>989 (586)</b>	<b>219 (141)</b>	<b>25 (42)</b>	<b>1,353 (629)</b>
<b>RELEASED</b>						
Smallmouth bass	0.0112 (0.0161)	0 (0)	7 (13)	3 (5)	47 (78)	56 (80)
Walleye	0.0009 (0.0017)	0 (0)	4 (9)	0 (0)	0 (0)	4 (9)
Northern pike	0.0090 (0.0086)	0 (0)	0 (0)	29 (35)	16 (24)	45 (42)
Yellow Perch	0.4493 (0.2499)	0 (0)	1,785 (1,103)	461 (319)	0 (0)	2,246 (1,148)
<b>TOTAL RELEASED</b>	<b>0.4704 (0.2524)</b>	<b>0 (0)</b>	<b>1,796 (1,103)</b>	<b>493 (321)</b>	<b>63 (82)</b>	<b>2,352 (1,152)</b>
<b>TOTAL CATCH</b>	<b>0.7409 (0.3086)</b>	<b>119 (174)</b>	<b>2,785 (1,249)</b>	<b>712 (350)</b>	<b>87 (92)</b>	<b>3,704 (1,312)</b>
<b>ANGLER HOURS</b>		<b>608 (459)</b>	<b>2,223 (699)</b>	<b>1,809 (643)</b>	<b>360 (296)</b>	<b>5,000 (1,096)</b>
<b>ANGLER TRIPS</b>		<b>405 (306)</b>	<b>1,482 (466)</b>	<b>1,206 (429)</b>	<b>240 (197)</b>	<b>3,333 (731)</b>

## Survey 45 Peavy Pond, Iron County, Winter, 2004-2005

<b>Waterbody</b>	Peavy Pond
<b>Year</b>	Winter, 2004-2005
<b>County</b>	Iron
<b>Sites</b>	410
<b>Survey period</b>	December 16-February 28
<b>Survey design</b>	progressive-roving (roving counts and interviews)
<b>Interview type/mode</b>	roving
<b>Count type/mode</b>	progressive
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a progressive-roving (roving counts and interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. progressive counts of open ice and shanty anglers were made once per day. Survey period for both counts and interviews was December 16-February 28. Months were estimated separately. Estimates are given in tables 2-4.

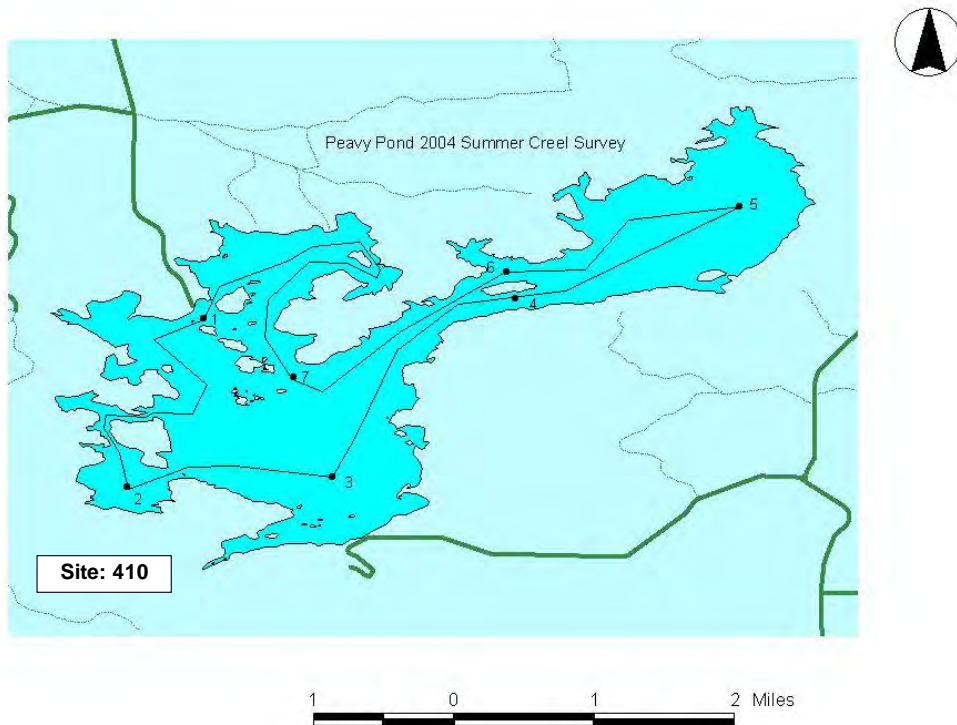


Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch and effort at Peavy Pond, December 16-February 28, Winter, 2004-2005

	<b>Year</b>	<b>Month</b>	<b>F</b>
1	2005	1	13
2	2005	2	13
3	2005	3	13
4	2004	12	13

Table 2—Estimated harvest, catch per hour, and fishing pressure for open ice. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>December</b>	<b>January</b>	<b>February</b>	<b>Season</b>
<b>HARVEST</b>					
Walleye	0.0301 (0.0210)	32 (32)	34 (33)	37 (31)	103 (55)
Yellow Perch	0.0373 (0.0319)	16 (25)	66 (70)	45 (56)	127 (93)
Northern pike	0.0222 (0.0183)	30 (36)	25 (32)	21 (22)	76 (53)
<b>TOTAL HARVEST</b>	<b>0.0896</b> <b>(0.0531)</b>	<b>78</b> <b>(54)</b>	<b>125</b> <b>(84)</b>	<b>103</b> <b>(68)</b>	<b>306</b> <b>(120)</b>
<b>RELEASED</b>					
Walleye	0.0202 (0.0149)	8 (14)	23 (23)	37 (31)	69 (41)
Northern pike	0.0725 (0.0707)	86 (144)	85 (145)	75 (65)	247 (215)
Yellow Perch	0.0006 (0.0011)	0 (0)	2 (4)	0 (0)	2 (4)
<b>TOTAL RELEASED</b>	<b>0.0933</b> <b>(0.0763)</b>	<b>95</b> <b>(145)</b>	<b>110</b> <b>(147)</b>	<b>113</b> <b>(72)</b>	<b>318</b> <b>(219)</b>
<b>TOTAL CATCH</b>	<b>0.1829</b> <b>(0.1091)</b>	<b>172</b> <b>(155)</b>	<b>235</b> <b>(169)</b>	<b>216</b> <b>(98)</b>	<b>624</b> <b>(250)</b>
<b>ANGLER HOURS</b>		<b>1,135</b> <b>(1,086)</b>	<b>948</b> <b>(739)</b>	<b>1,327</b> <b>(742)</b>	<b>3,410</b> <b>(1,509)</b>
<b>ANGLER TRIPS</b>		<b>222</b> <b>(215)</b>	<b>219</b> <b>(191)</b>	<b>284</b> <b>(180)</b>	<b>725</b> <b>(339)</b>

Table 3—Estimated harvest, catch per hour, and fishing pressure for shanty. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>December</b>	<b>January</b>	<b>February</b>	<b>Season</b>
<b>HARVEST</b>					
Walleye	0.0345 (0.0546)	0 (0)	14 (23)	4 (8)	18 (24)
Yellow Perch	0.0077 (0.0166)	0 (0)	4 (8)	0 (0)	4 (8)
<b>TOTAL HARVEST</b>	<b>0.0422</b> <b>(0.0599)</b>	<b>0</b> <b>(0)</b>	<b>17</b> <b>(24)</b>	<b>4</b> <b>(8)</b>	<b>22</b> <b>(25)</b>
<b>RELEASED</b>					
Walleye	0.0092 (0.0198)	0 (0)	5 (9)	0 (0)	5 (9)
Northern pike	0.0625 (0.1036)	0 (0)	5 (8)	27 (46)	32 (46)
Yellow Perch	0.0403 (0.0867)	0 (0)	0 (0)	21 (41)	21 (41)
<b>TOTAL RELEASED</b>	<b>0.1120</b> <b>(0.1516)</b>	<b>0</b> <b>(0)</b>	<b>10</b> <b>(12)</b>	<b>48</b> <b>(62)</b>	<b>57</b> <b>(63)</b>
<b>TOTAL CATCH</b>	<b>0.1542</b> <b>(0.1803)</b>	<b>0</b> <b>(0)</b>	<b>27</b> <b>(27)</b>	<b>52</b> <b>(62)</b>	<b>79</b> <b>(68)</b>
<b>ANGLER HOURS</b>		<b>0</b> <b>(0)</b>	<b>288</b> <b>(252)</b>	<b>222</b> <b>(316)</b>	<b>511</b> <b>(404)</b>
<b>ANGLER TRIPS</b>		<b>0</b> <b>(0)</b>	<b>70</b> <b>(64)</b>	<b>57</b> <b>(83)</b>	<b>128</b> <b>(105)</b>

Table 4—Estimated harvest, catch per hour, and fishing pressure for Peavy Pond . Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>December</b>	<b>January</b>	<b>February</b>	<b>Season</b>
<b>HARVEST</b>					



Walleye	0.0307	32	47	41	120
	(0.0197)	(32)	(40)	(32)	(60)
Yellow Perch	0.0334	16	70	45	131
	(0.0273)	(25)	(70)	(56)	(93)
Northern pike	0.0193	30	25	21	76
	(0.0155)	(36)	(32)	(22)	(53)
<b>TOTAL HARVEST</b>	<b>0.0834</b>	<b>78</b>	<b>143</b>	<b>107</b>	<b>327</b>
	<b>(0.0457)</b>	<b>(54)</b>	<b>(87)</b>	<b>(68)</b>	<b>(123)</b>
<b>RELEASED</b>					
Walleye	0.0187	8	28	37	73
	(0.0130)	(14)	(25)	(31)	(42)
Northern pike	0.0712	86	90	103	279
	(0.0628)	(144)	(145)	(79)	(220)
Yellow Perch	0.0057	0	2	21	22
	(0.0108)	(0)	(4)	(41)	(41)
<b>TOTAL RELEASED</b>	<b>0.0957</b>	<b>95</b>	<b>120</b>	<b>161</b>	<b>375</b>
	<b>(0.0694)</b>	<b>(145)</b>	<b>(148)</b>	<b>(94)</b>	<b>(227)</b>
<b>TOTAL CATCH</b>	<b>0.1791</b>	<b>172</b>	<b>262</b>	<b>268</b>	<b>702</b>
	<b>(0.0972)</b>	<b>(155)</b>	<b>(171)</b>	<b>(116)</b>	<b>(259)</b>
<b>ANGLER HOURS</b>		<b>1,135</b>	<b>1,236</b>	<b>1,549</b>	<b>3,920</b>
		<b>(1,086)</b>	<b>(780)</b>	<b>(807)</b>	<b>(1,562)</b>
<b>ANGLER TRIPS</b>		<b>222</b>	<b>290</b>	<b>341</b>	<b>853</b>
		<b>(215)</b>	<b>(201)</b>	<b>(198)</b>	<b>(355)</b>

## Survey 46 Black Lake, Cheboygan County, Summer, 2005

<b>Waterbody</b>	Black Lake
<b>Year</b>	Summer 2005
<b>County</b>	Cheboygan
<b>Sites</b>	544, 545
<b>Survey period</b>	April 30 - October 20
<b>Survey design</b>	Aerial-roving (aerial counts, roving interviews)
<b>Interview type/mode</b>	roving/boat
<b>Count type/mode</b>	aerial/boat
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed an aerial-roving (aerial counts, roving interviews) design. All funding was provided through Fisheries Division. Counts progressed along a predefined flight path (Figure 1) from Marker 1 to Marker 10 or from Marker 1 to Marker 1. This sequence was randomized. Time of count was randomized to cover sample period. Only fishing boats were counted. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and one instantaneous count of fishing boats was made per day. One of two shifts was selected each sample day for interviewing. One clerk worked full time to collect angler interview data. Starting location within a section and direction of travel were randomized for interviewing (Figure 2). Survey period for both counts and interviews was April 30 - October 20. Months were estimated separately. Estimates are given in table 2.

# Black Lake

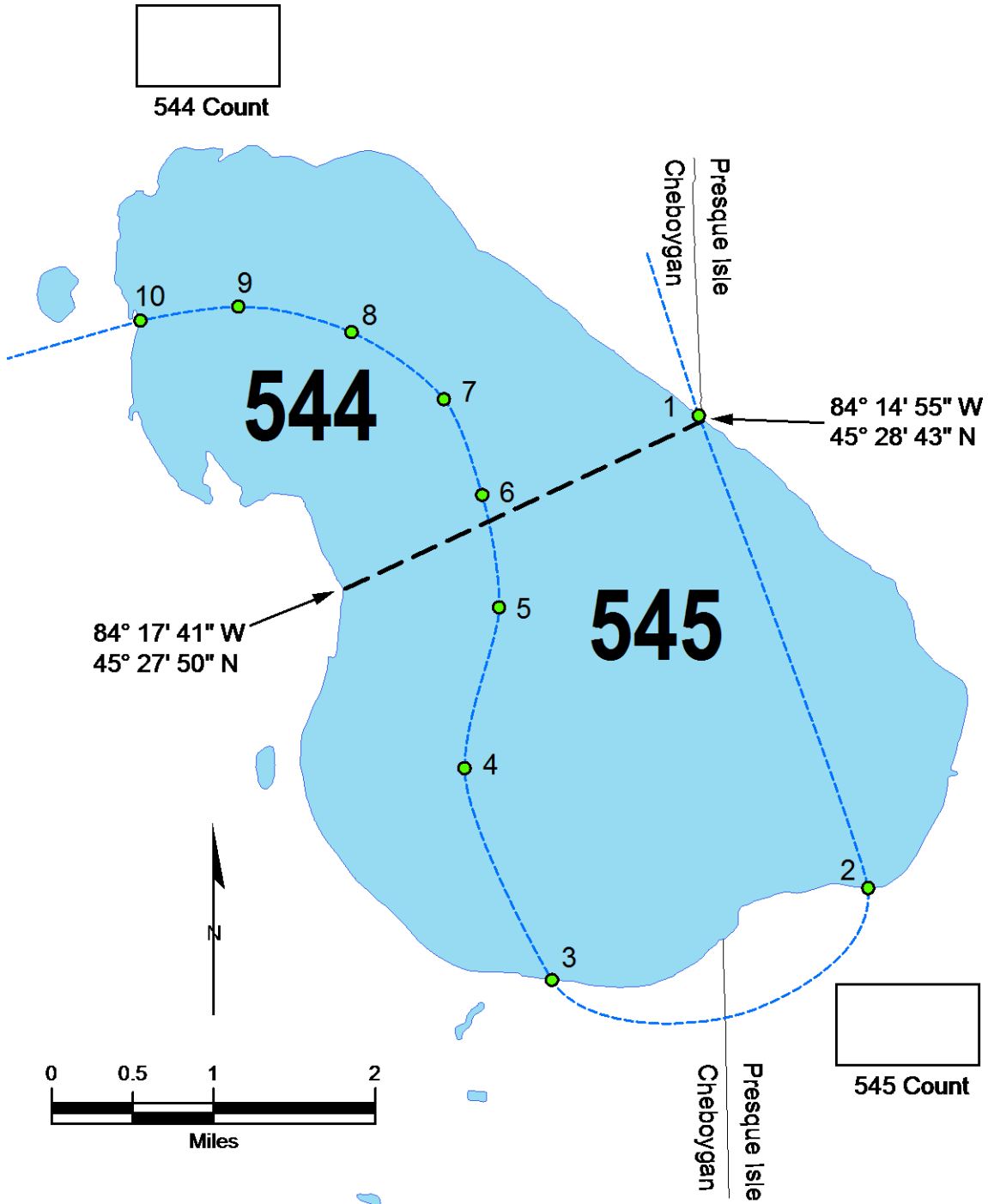


Figure 1.— Count flight path used for the Black Lake angler survey. Grids 544 and 545 are separated by a heavy dashed line between the coordinates (84° 17' 41" W by 45° 27' 50" N the west side) and (84° 14' 55" W by 45° 28' 43" Non the east side). Use this line to separate anglers fishing in each grid.

Figure 2.– Creel clerk interview path for the Black Lake angler survey

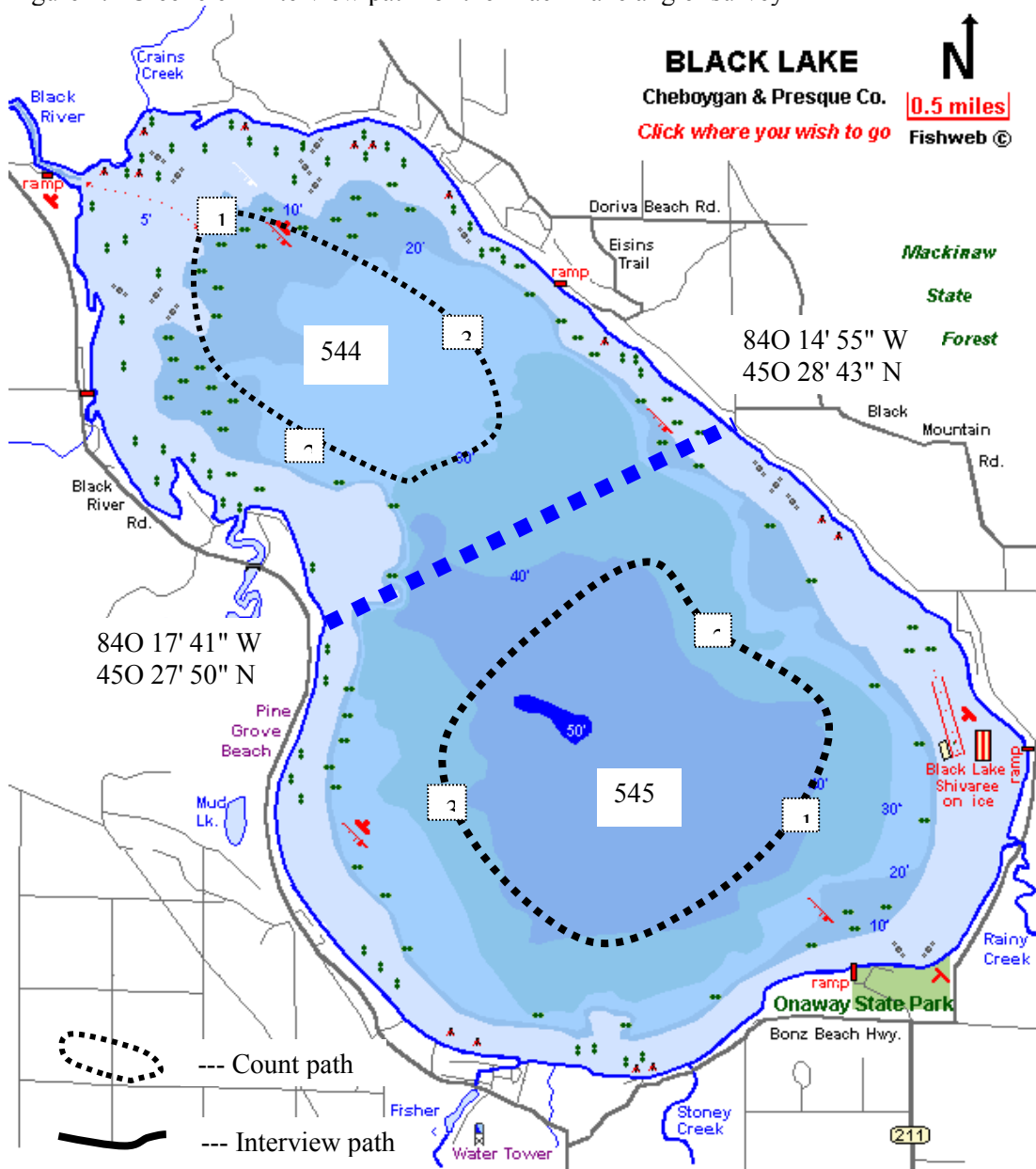


Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch and effort at Black Lake, April 30 - October 20, Summer 2005

	Year	Month	F
1	2005	5	15
2	2005	6	16
3	2005	7	16
4	2005	8	15
5	2005	9	13
6	2005	10	12
7	2005	4	14

Table 2. Estimated boat angling harvest, catch per hour, and fishing pressure for Black Lake. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	October	Season
<b>HARVEST</b>								
Smallmouth bass	0.0059 (0.0036)	0 (0)	58 (61)	109 (114)	54 (76)	43 (46)	0 (0)	263 (157)
Walleye	0.0367 (0.0122)	104 (91)	510 (268)	747 (386)	227 (157)	37 (32)	0 (0)	1,625 (505)
Yellow Perch	0.2288 (0.0823)	0 (0)	1,921 (1,337)	1,915 (1,341)	4,705 (2,647)	800 (846)	794 (715)	10,135 (3,438)
Northern pike	0.0075 (0.0042)	81 (85)	105 (121)	54 (65)	82 (84)	10 (19)	0 (0)	331 (183)
Bluegill	0.0087 (0.0072)	0 (0)	237 (290)	47 (74)	82 (98)	17 (35)	0 (0)	384 (317)
Pumpkinseed	0.0137 (0.0154)	0 (0)	584 (679)	22 (45)	0 (0)	0 (0)	0 (0)	606 (680)
Rock bass	0.0055 (0.0048)	0 (0)	128 (149)	113 (147)	4 (9)	0 (0)	0 (0)	245 (210)
<b>TOTAL HARVEST</b>	<b>0.3068 (0.0885)</b>	<b>185 (125)</b>	<b>3,542 (1,564)</b>	<b>3,008 (1,412)</b>	<b>5,155 (2,656)</b>	<b>906 (848)</b>	<b>794 (715)</b>	<b>13,590 (3,569)</b>
<b>RELEASED</b>								
Smallmouth bass	0.0379 (0.0140)	0 (0)	224 (197)	736 (473)	175 (118)	533 (263)	12 (20)	1,680 (588)
Largemouth bass	0.0003 (0.0005)	0 (0)	0 (0)	0 (0)	14 (22)	0 (0)	0 (0)	14 (22)
Walleye	0.0088 (0.0056)	108 (126)	0 (0)	105 (105)	137 (162)	39 (79)	0 (0)	389 (244)
Northern pike	0.0317 (0.0143)	53 (43)	114 (96)	658 (503)	393 (311)	128 (92)	58 (64)	1,403 (611)
Muskellunge	0.0001 (0.0001)	3 (6)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (6)
Rock bass	0.0147 (0.0126)	0 (0)	112 (225)	438 (495)	51 (77)	4 (8)	46 (68)	652 (554)
Gar	0.0017 (0.0025)	0 (0)	0 (0)	45 (91)	31 (61)	0 (0)	0 (0)	76 (109)
Bluegill	0.0029 (0.0034)	0 (0)	0 (0)	128 (152)	0 (0)	0 (0)	0 (0)	128 (152)
Pumpkinseed	0.0374 (0.0289)	0 (0)	10 (21)	1,123 (1,171)	517 (480)	8 (15)	0 (0)	1,658 (1,266)
Yellow Perch	0.5457 (0.1568)	11 (21)	2,620 (1,630)	5,193 (2,090)	10,548 (5,101)	3,490 (2,049)	2,311 (1,616)	24,173 (6,314)
<b>TOTAL RELEASED</b>	<b>0.6812 (0.1684)</b>	<b>175 (135)</b>	<b>3,081 (1,661)</b>	<b>8,426 (2,551)</b>	<b>11,865 (5,138)</b>	<b>4,202 (2,070)</b>	<b>2,427 (1,619)</b>	<b>30,177 (6,526)</b>
<b>TOTAL CATCH</b>	<b>0.9880 (0.2053)</b>	<b>360 (184)</b>	<b>6,623 (2,281)</b>	<b>11,434 (2,916)</b>	<b>17,020 (5,784)</b>	<b>5,109 (2,237)</b>	<b>3,221 (1,770)</b>	<b>43,766 (7,438)</b>
<b>ANGLER HOURS</b>		<b>4,952 (1,833)</b>	<b>8,002 (1,719)</b>	<b>15,401 (3,597)</b>	<b>10,009 (2,598)</b>	<b>4,099 (1,086)</b>	<b>1,836 (951)</b>	<b>44,298 (5,300)</b>
<b>ANGLER TRIPS</b>		<b>1,674 (681)</b>	<b>2,969 (870)</b>	<b>5,729 (1,744)</b>	<b>4,200 (1,467)</b>	<b>1,352 (438)</b>	<b>610 (372)</b>	<b>16,535 (2,597)</b>

## Survey 47 Lake Gogebic, Gogebic County, Summer, 2005

<b>Waterbody</b>	Lake Gogebic
<b>Year</b>	2005
<b>County</b>	Gogebic
<b>Sites</b>	120,121
<b>Survey period</b>	May 15 – September 30
<b>Survey design</b>	Aerial-roving (aerial counts, roving interviews)
<b>Interview type/mode</b>	roving/boat
<b>Count type/mode</b>	aerial/boat
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed an aerial-roving (aerial counts, roving interviews) design. All funding was provided through Fisheries Division. Counts progressed along a predefined flight path from Marker 1 to Marker 8 or from Marker 8 to Marker 1 (Figure 1). This sequence was randomized. Time of count was randomized to cover sample period. Only fishing boats were counted. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and one instantaneous count of fishing boats was made per day. One of two shifts was selected each sample day for interviewing. One clerk worked to collect angler interview data. Starting location within a section and direction of travel were randomized for interviewing (Figure 2). Survey period for both counts and interviews was May-September. Months were estimated separately. Estimates are given in table 2.

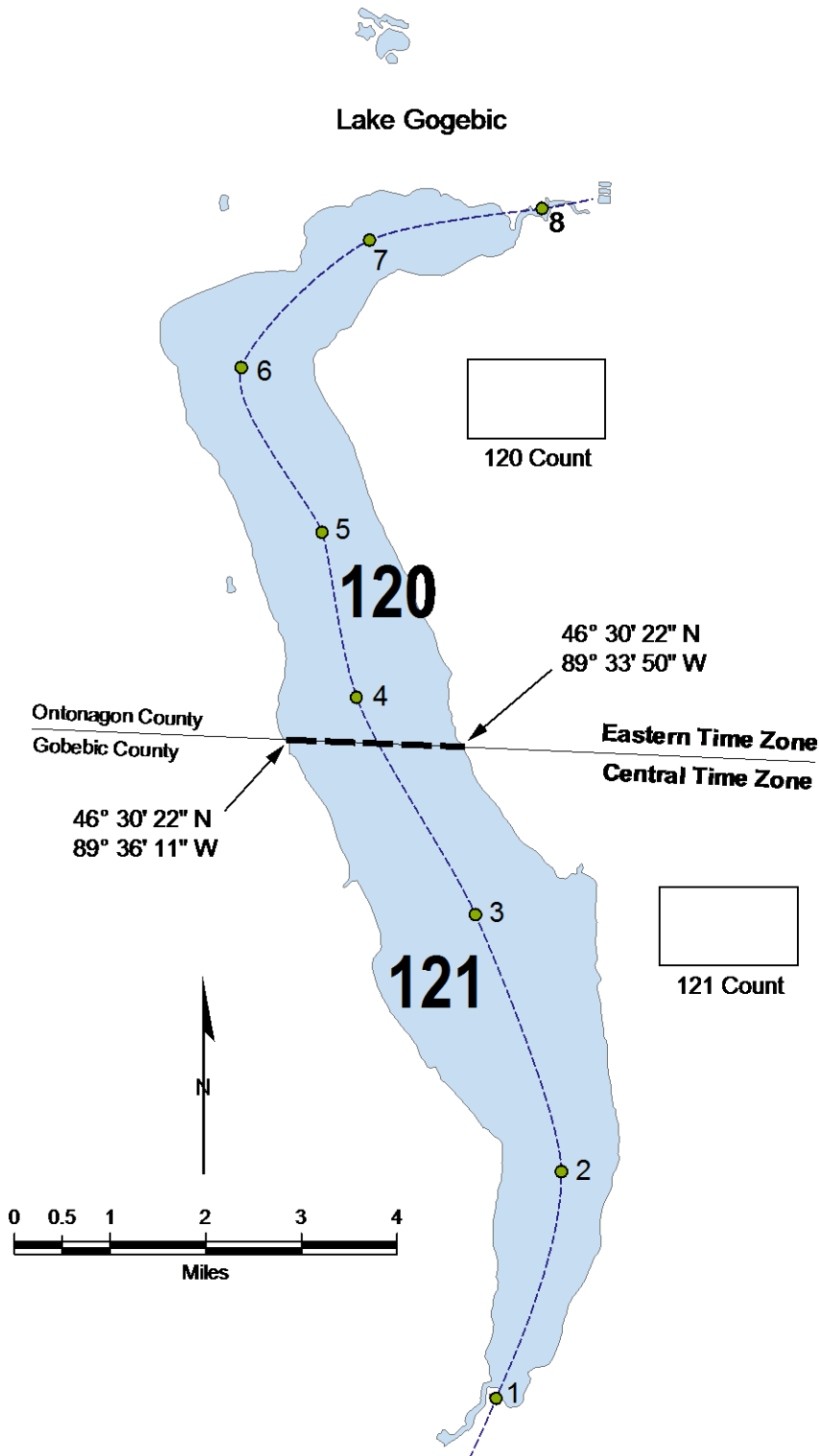


Figure 1.– Count form used for the Lake Gogebic angler survey. Grids 120 and 120 are separated by a heavy dashed line between the coordinates ( $46^{\circ} 30' 22'' \text{ N}$  by  $89^{\circ} 36' 11'' \text{ W}$  on the west side) and ( $46^{\circ} 30' 22'' \text{ N}$  by  $89^{\circ} 33' 50'' \text{ W}$  on the east side). Use this line to separate anglers fishing in each grid.

Figure 2.— Creel clerk interview path for the Lake Gogebic angler survey

Table 1. Expansion values (referred to as “F” in Lockwood et al. 1999) to estimate catch and effort at Lake Gogebic, Summer May-September, 2005

	Year	Month	F
1	2005	5	15
2	2005	6	16
3	2005	7	16
4	2005	8	15
5	2005	9	13

Table 2. Estimated boat angling harvest, catch per hour, and fishing pressure for Lake Gogebic. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Smallmouth bass	0.0114 (0.0047)	87 (103)	466 (299)	104 (87)	318 (247)	178 (176)	1,152 (447)
Walleye	0.0479 (0.0129)	374 (241)	965 (444)	1,202 (443)	1,141 (475)	1,169 (764)	4,851 (1,123)
Yellow Perch	0.0891 (0.0251)	987 (858)	849 (478)	3,139 (1,318)	3,131 (1,341)	930 (630)	9,035 (2,213)
Northern pike	0.0014 (0.0009)	25 (38)	41 (50)	48 (48)	6 (13)	25 (32)	145 (86)
Black crappie	0.0001 (0.0001)	6 (9)	0 (0)	0 (0)	0 (0)	0 (0)	6 (9)
Bluegill	0.0005 (0.0008)	0 (0)	0 (0)	0 (0)	0 (0)	47 (85)	47 (85)
Largemouth bass	0.0002 (0.0003)	17 (34)	0 (0)	0 (0)	0 (0)	0 (0)	17 (34)
Pumpkinseed	0.0022 (0.0018)	46 (72)	104 (141)	20 (40)	19 (37)	29 (50)	218 (175)
Rock bass	0.0020 (0.0021)	24 (37)	79 (128)	96 (158)	0 (0)	0 (0)	199 (206)
Common white sucker	0.0002 (0.0004)	0 (0)	18 (36)	0 (0)	0 (0)	0 (0)	18 (36)
<b>TOTAL HARVEST</b>	<b>0.1548 (0.0330)</b>	<b>1,565 (902)</b>	<b>2,523 (745)</b>	<b>4,609 (1,404)</b>	<b>4,614 (1,444)</b>	<b>2,378 (1,011)</b>	<b>15,689 (2,539)</b>
<b>RELEASED</b>							
Smallmouth bass	0.0679 (0.0295)	438 (475)	4,030 (2,634)	790 (397)	1,368 (804)	256 (231)	6,882 (2,832)
Walleye	0.1452 (0.0366)	2,778 (1,673)	3,532 (1,411)	3,057 (1,169)	3,409 (1,306)	1,947 (1,323)	14,723 (3,100)
Northern pike	0.0339 (0.0105)	683 (478)	1,194 (571)	716 (406)	434 (281)	407 (322)	3,435 (949)
Common white sucker	0.0001 (0.0002)	0 (0)	12 (24)	0 (0)	0 (0)	0 (0)	12 (24)
Rock bass	0.0141 (0.0098)	20 (40)	307 (378)	445 (362)	424 (716)	235 (404)	1,431 (976)
Bluegill	0.0011 (0.0017)	0 (0)	0 (0)	0 (0)	8 (16)	99 (166)	107 (167)
Pumpkinseed	0.0038 (0.0053)	0 (0)	0 (0)	0 (0)	0 (0)	390 (535)	390 (535)
Yellow Perch	0.0451 (0.0166)	586 (662)	376 (286)	1,342 (752)	1,499 (831)	770 (806)	4,573 (1,558)



TOTAL RELEASED	0.3113 (0.0635)	4,506 (1,921)	9,451 (3,079)	6,349 (1,545)	7,141 (1,906)	4,105 (1,742)	31,553 (4,714)
TOTAL CATCH	0.4660 (0.0835)	6,071 (2,123)	11,974 (3,168)	10,958 (2,087)	11,756 (2,391)	6,483 (2,014)	47,242 (5,355)
ANGLER HOURS		15,430 (6,442)	26,438 (7,108)	21,496 (4,030)	21,765 (4,114)	16,243 (8,515)	101,372 (14,060)
ANGLER TRIPS		4,649 (1,996)	7,012 (2,487)	7,173 (1,600)	4,757 (1,021)	4,552 (2,895)	28,143 (4,707)

## Survey 48 Fletcher Floodwater, Alpena County, Summer, 2005

<b>Waterbody</b>	Fletcher Floodwater
<b>Year</b>	Summer 2005
<b>County</b>	Alpena
<b>Sites</b>	542 (Figure 1)
<b>Survey period</b>	April 30-September 30
<b>Survey design</b>	Roving-roving and roving-access
<b>Interview type/mode</b>	Roving and access/boat, shore
<b>Count type/mode</b>	roving/boat, shore
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a roving-roving and access (roving counts and roving and access interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing (Figure 1). roving counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was April 30-September 30. Months were estimated separately. Estimates are given in tables 2-4.

Figure 1.— Creel clerk interview and count path for the Fletcher angler survey

Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch and effort at Fletcher, April 30-September 30, Summer 2005

	<b>Year</b>	<b>Month</b>	<b>F</b>
1	2005	5	15
2	2005	6	16
3	2005	7	16
4	2005	8	15
5	2005	9	13
6	2005	10	12
7	2005	4	14

Table 2. Estimated harvest, catch per hour, and fishing pressure for boat. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Smallmouth bass	0.0019 (0.0013)	22 (44)	88 (104)	75 (114)	39 (61)	32 (41)	255 (177)
Bullhead spp.	0.0003 (0.0004)	11 (22)	0 (0)	0 (0)	12 (24)	18 (36)	41 (48)
Yellow Perch	0.1250 (0.0291)	1,108 (736)	3,816 (1,748)	6,455 (2,141)	3,609 (1,456)	2,146 (1,031)	17,133 (3,371)
Northern pike	0.0068 (0.0028)	136 (121)	214 (169)	202 (155)	239 (225)	147 (112)	938 (361)
Black crappie	0.0172 (0.0118)	941 (785)	871 (1,341)	127 (120)	403 (321)	23 (29)	2,365 (1,592)
Bluegill	0.3736 (0.0791)	2,432 (1,351)	14,771 (5,096)	20,723 (5,655)	10,396 (3,926)	2,907 (1,314)	51,229 (8,770)
Largemouth bass	0.0276 (0.0080)	371 (282)	1,440 (690)	1,054 (466)	748 (427)	176 (137)	3,789 (987)
Pumpkinseed	0.3113 (0.0688)	1,471 (978)	11,752 (3,984)	18,912 (5,543)	8,409 (3,501)	2,144 (940)	42,688 (7,790)
Rock bass	0.0025 (0.0016)	63 (81)	183 (175)	67 (78)	26 (39)	0 (0)	339 (211)
Bowfin	0.0002 (0.0004)	0 (0)	29 (59)	0 (0)	0 (0)	0 (0)	29 (59)
<b>TOTAL HARVEST</b>	<b>0.8665 (0.1405)</b>	<b>6,555 (2,011)</b>	<b>33,164 (6,873)</b>	<b>47,614 (8,220)</b>	<b>23,882 (5,489)</b>	<b>7,592 (1,925)</b>	<b>118,806 (12,357)</b>
<b>RELEASED</b>							
Smallmouth bass	0.0276 (0.0111)	554 (429)	1,718 (1,277)	694 (364)	509 (332)	310 (216)	3,786 (1,451)
Largemouth bass	0.3556 (0.0723)	3,765 (2,117)	21,878 (6,095)	10,148 (2,805)	9,652 (3,216)	3,311 (1,313)	48,753 (7,846)
Northern pike	0.0478 (0.0109)	1,017 (557)	1,911 (667)	1,887 (659)	1,259 (561)	482 (277)	6,556 (1,258)
Rock bass	0.0205 (0.0084)	545 (377)	1,297 (872)	750 (499)	8 (15)	213 (256)	2,813 (1,104)
Bowfin	0.0015 (0.0014)	8 (17)	180 (181)	14 (29)	0 (0)	0 (0)	202 (184)
Bullhead spp.	0.0033 (0.0017)	9 (18)	29 (42)	131 (126)	144 (134)	143 (123)	456 (226)
Carp	0.0002 (0.0003)	0 (0)	0 (0)	23 (46)	0 (0)	0 (0)	23 (46)
Bluegill	1.2524 (0.2504)	10,952 (5,688)	42,363 (12,953)	68,145 (18,050)	38,843 (13,309)	11,412 (4,500)	171,716 (26,894)
Pumpkinseed	1.0287 (0.2098)	5,085 (3,240)	35,968 (11,189)	58,274 (14,905)	30,245 (11,824)	11,476 (4,698)	141,049 (22,798)
Yellow Perch	0.3281 (0.0695)	2,980 (1,673)	8,181 (3,158)	19,067 (5,369)	9,754 (3,625)	5,002 (2,175)	44,983 (7,711)
<b>TOTAL RELEASED</b>	<b>3.0656 (0.4670)</b>	<b>24,915 (7,125)</b>	<b>113,524 (18,519)</b>	<b>159,133 (24,197)</b>	<b>90,414 (18,462)</b>	<b>32,351 (6,998)</b>	<b>420,338 (37,001)</b>
<b>TOTAL CATCH</b>	<b>3.9321 (0.5657)</b>	<b>31,471 (7,404)</b>	<b>146,688 (19,754)</b>	<b>206,747 (25,555)</b>	<b>114,296 (19,261)</b>	<b>39,942 (7,258)</b>	<b>539,144 (39,010)</b>
<b>ANGLER HOURS</b>		<b>14,230 (7,217)</b>	<b>38,257 (9,560)</b>	<b>45,451 (8,768)</b>	<b>26,264 (7,047)</b>	<b>12,914 (4,545)</b>	<b>137,115 (17,049)</b>
<b>ANGLER TRIPS</b>		<b>3,743 (1,938)</b>	<b>8,123 (2,262)</b>	<b>11,030 (2,268)</b>	<b>5,199 (1,436)</b>	<b>3,276 (1,181)</b>	<b>31,371 (4,181)</b>

Table 3. Estimated harvest, catch per hour, and fishing pressure for shore. Two standard errors are given in parentheses.

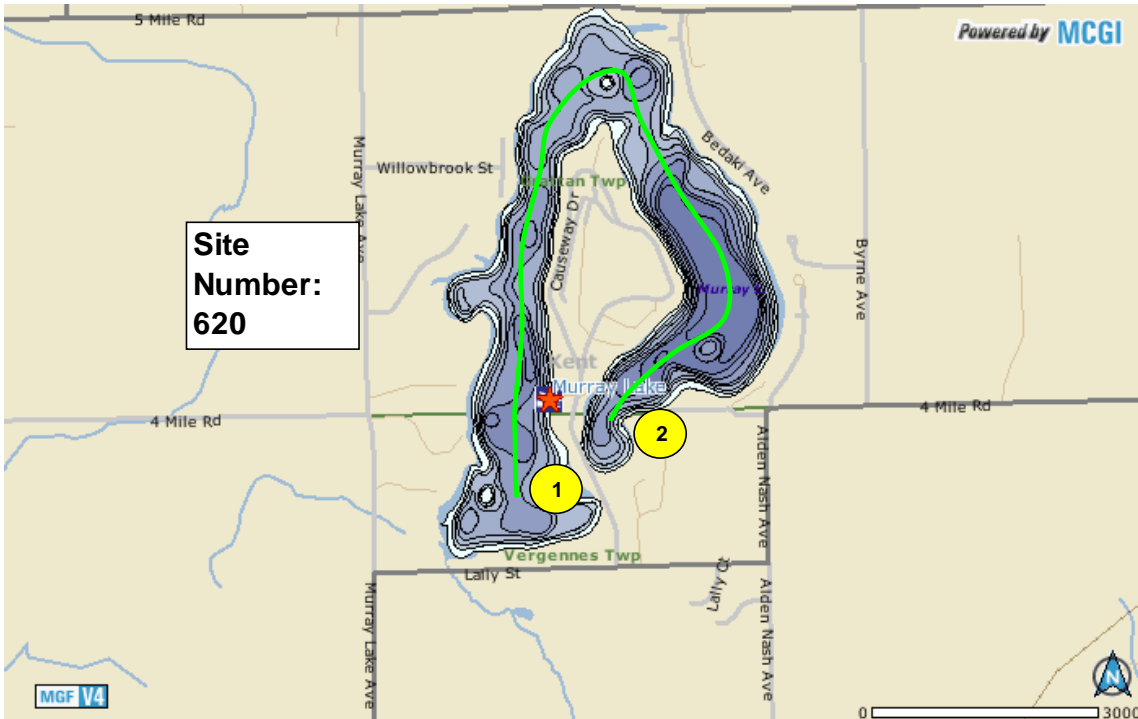
Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Smallmouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bullhead spp.	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	0.0084 (0.0121)	27 (38)	0 (0)	0 (0)	0 (0)	0 (0)	27 (38)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Black crappie	0.6687 (0.3978)	2,151 (1,107)	0 (0)	0 (0)	0 (0)	0 (0)	2,151 (1,107)
Bluegill	0.0249 (0.0503)	80 (160)	0 (0)	0 (0)	0 (0)	0 (0)	80 (160)
Largemouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pumpkinseed	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bowfin	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.7020 (0.4061)</b>	<b>2,258 (1,120)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>2,258 (1,120)</b>
<b>RELEASED</b>							
Smallmouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Largemouth bass	0.0141 (0.0120)	46 (36)	0 (0)	0 (0)	0 (0)	0 (0)	46 (36)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0.0120 (0.0160)	39 (50)	0 (0)	0 (0)	0 (0)	0 (0)	39 (50)
Bowfin	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bullhead spp.	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Carp	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bluegill	2.1277 (1.5207)	624 (451)	0 (0)	3,520 (3,494)	2,700 (2,712)	0 (0)	6,844 (4,446)
Pumpkinseed	1.8181 (1.4570)	408 (404)	0 (0)	5,440 (4,331)	0 (0)	0 (0)	5,848 (4,350)
Yellow Perch	0.0496 (0.0446)	159 (135)	0 (0)	0 (0)	0 (0)	0 (0)	159 (135)
<b>TOTAL RELEASED</b>	<b>4.0215 (2.2756)</b>	<b>1,275 (623)</b>	<b>0 (0)</b>	<b>8,960 (5,565)</b>	<b>2,700 (2,712)</b>	<b>0 (0)</b>	<b>12,935 (6,222)</b>
<b>TOTAL CATCH</b>	<b>4.7235 (2.4176)</b>	<b>3,533 (1,281)</b>	<b>0 (0)</b>	<b>8,960 (5,565)</b>	<b>2,700 (2,712)</b>	<b>0 (0)</b>	<b>15,193 (6,322)</b>
<b>ANGLER HOURS</b>		<b>1,256 (418)</b>	<b>0 (0)</b>	<b>1,600 (813)</b>	<b>360 (287)</b>	<b>0 (0)</b>	<b>3,216 (959)</b>
<b>ANGLER TRIPS</b>		<b>530 (228)</b>	<b>0 (0)</b>	<b>1,600 (813)</b>	<b>360 (287)</b>	<b>0 (0)</b>	<b>2,490 (892)</b>

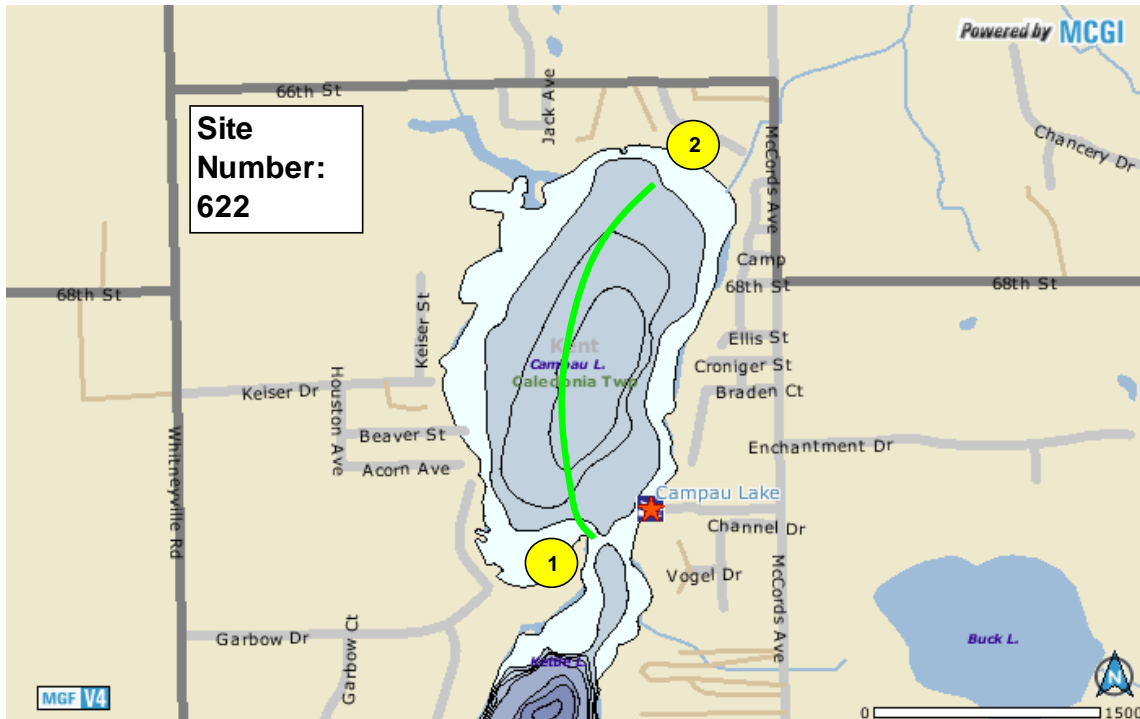
Table 4. Estimated harvest, catch per hour, and fishing pressure for Fletcher Floodwaters. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Smallmouth bass	0.0018 (0.0013)	22 (44)	88 (104)	75 (114)	39 (61)	32 (41)	255 (177)
Bullhead spp.	0.0003 (0.0003)	11 (22)	0 (0)	0 (0)	12 (24)	18 (36)	41 (48)
Yellow Perch	0.1223 (0.0283)	1,135 (737)	3,816 (1,748)	6,455 (2,141)	3,609 (1,456)	2,146 (1,031)	17,160 (3,371)
Northern pike	0.0067 (0.0027)	136 (121)	214 (169)	202 (155)	239 (225)	147 (112)	938 (361)
Black crappie	0.0322 (0.0144)	3,092 (1,358)	871 (1,341)	127 (120)	403 (321)	23 (29)	4,516 (1,939)
Bluegill	0.3656 (0.0767)	2,512 (1,360)	14,771 (5,096)	20,723 (5,655)	10,396 (3,926)	2,907 (1,314)	51,309 (8,772)
Largemouth bass	0.0270 (0.0078)	371 (282)	1,440 (690)	1,054 (466)	748 (427)	176 (137)	3,789 (987)
Pumpkinseed	0.3042 (0.0667)	1,471 (978)	11,752 (3,984)	18,912 (5,543)	8,409 (3,501)	2,144 (940)	42,688 (7,790)
Rock bass	0.0024 (0.0015)	63 (81)	183 (175)	67 (78)	26 (39)	0 (0)	339 (211)
Bowfin	0.0002 (0.0004)	0 (0)	29 (59)	0 (0)	0 (0)	0 (0)	29 (59)
<b>TOTAL HARVEST</b>	<b>0.8627 (0.1373)</b>	<b>8,813 (2,302)</b>	<b>33,164 (6,873)</b>	<b>47,614 (8,220)</b>	<b>23,882 (5,489)</b>	<b>7,592 (1,925)</b>	<b>121,064 (12,407)</b>
<b>RELEASED</b>							
Smallmouth bass	0.0270 (0.0108)	554 (429)	1,718 (1,277)	694 (364)	509 (332)	310 (216)	3,786 (1,451)
Largemouth bass	0.3477 (0.0701)	3,810 (2,117)	21,878 (6,095)	10,148 (2,805)	9,652 (3,216)	3,311 (1,313)	48,799 (7,846)
Northern pike	0.0467 (0.0106)	1,017 (557)	1,911 (667)	1,887 (659)	1,259 (561)	482 (277)	6,556 (1,258)
Rock bass	0.0203 (0.0083)	584 (380)	1,297 (872)	750 (499)	8 (15)	213 (256)	2,852 (1,105)
Bowfin	0.0014 (0.0013)	8 (17)	180 (181)	14 (29)	0 (0)	0 (0)	202 (184)
Bullhead spp.	0.0032 (0.0017)	9 (18)	29 (42)	131 (126)	144 (134)	143 (123)	456 (226)
Carp	0.0002 (0.0003)	0 (0)	0 (0)	23 (46)	0 (0)	0 (0)	23 (46)
Bluegill	1.2724 (0.2484)	11,575 (5,706)	42,363 (12,953)	71,665 (18,385)	41,543 (13,582)	11,412 (4,500)	178,559 (27,259)
Pumpkinseed	1.0468 (0.2088)	5,493 (3,265)	35,968 (11,189)	63,714 (15,522)	30,245 (11,824)	11,476 (4,698)	146,896 (23,209)
Yellow Perch	0.3217 (0.0675)	3,140 (1,679)	8,181 (3,158)	19,067 (5,369)	9,754 (3,625)	5,002 (2,175)	45,143 (7,713)
<b>TOTAL RELEASED</b>	<b>3.0875 (0.4611)</b>	<b>26,190 (7,152)</b>	<b>113,524 (18,519)</b>	<b>168,093 (24,829)</b>	<b>93,114 (18,660)</b>	<b>32,351 (6,998)</b>	<b>433,272 (37,520)</b>
<b>TOTAL CATCH</b>	<b>3.9502 (0.5571)</b>	<b>35,004 (7,514)</b>	<b>146,688 (19,754)</b>	<b>215,707 (26,154)</b>	<b>116,996 (19,451)</b>	<b>39,942 (7,258)</b>	<b>554,337 (39,519)</b>
<b>ANGLER HOURS</b>		<b>15,486 (7,229)</b>	<b>38,257 (9,560)</b>	<b>47,051 (8,806)</b>	<b>26,624 (7,053)</b>	<b>12,914 (4,545)</b>	<b>140,331 (17,076)</b>
<b>ANGLER TRIPS</b>		<b>4,273 (1,952)</b>	<b>8,123 (2,262)</b>	<b>12,630 (2,410)</b>	<b>5,559 (1,465)</b>	<b>3,276 (1,181)</b>	<b>33,861 (4,275)</b>

# Survey 49 Murray and Campau Lakes, Kent County, Summer, 2005

<b>Waterbody</b>	Murray, Campau Lakes
<b>Year</b>	Summer, 2005
<b>County</b>	Kent
<b>Sites</b>	620,622
<b>Survey period</b>	April 1 to October 31
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access/boat, shore
<b>Count type/mode</b>	roving/boat and shore
<b>Clerk time</b>	1/2 time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery





**Notes**

Survey followed a roving-access (roving counts and access interviews) design. All funding was provided through Fisheries Division. One clerk worked 1/2 time to collect angler-creel data for this two lakes. Survey was done in conjunction with Great Lakes angler surveys. weekend day and 1 or 2 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. Each lake was sampled per day. Starting location within a section and direction of travel were randomized for both counting and interviewing. Roving counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was April 1 to October 31. Months were estimated separately. Estimates are given in Tables 2 and 3.

Table 1. Expansion values (referred to as “F” in Lockwood et al. 1999) shifts used to estimate catch and effort at Murray Campau, April 1 to October 31, Summer, 2005

	Year	Month	F
1	2005	4	15
2	2005	5	16
3	2005	6	16
4	2005	7	15
5	2005	8	15
6	2005	9	13
7	2005	10	12

Table 2. Estimated harvest, catch per hour, and fishing pressure for 620, Murray. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Yellow Perch	0.0455 (0.0396)	32 (63)	96 (119)	541 (838)	237 (351)	201 (221)	0 (0)	0 (0)	1,106 (945)
Northern pike	0.0005 (0.0010)	0 (0)	12 (25)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	12 (25)
Black crappie	0.0143 (0.0166)	0 (0)	314 (398)	17 (33)	0 (0)	19 (37)	0 (0)	0 (0)	349 (401)
Bluegill	0.4699 NAN	788 (758)	832 NAN	4,042 (1,969)	2,934 (1,895)	1,763 (1,211)	700 (682)	379 NAN	11,436 NAN
Largemouth bass	0.0040 (0.0036)	0 (0)	0 (0)	28 (40)	56 (71)	0 (0)	13 (26)	0 (0)	97 (85)
Pumpkinseed	0.0289 NAN	47 (68)	178 (192)	416 (309)	0 (0)	48 (96)	0 (0)	14 NAN	703 NAN
Rock bass	0.0077 (0.0064)	19 (26)	69 (96)	22 (44)	0 (0)	67 (103)	11 (23)	0 (0)	188 (152)
Green Sunfish	0.0005 (0.0011)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	13 (26)	0 (0)	13 (26)
Other	0.0027 (0.0055)	0 (0)	67 (133)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	67 (133)
<b>TOTAL HARVEST</b>	0.5741 NAN	885 (764)	1,567 NAN	5,065 (2,164)	3,227 (1,928)	2,098 (1,239)	737 (683)	393 NAN	13,972 NAN
<b>RELEASED</b>									
Smallmouth bass	0.0010 (0.0023)	0 (0)	0 (0)	25 (56)	0 (0)	0 (0)	0 (0)	0 (0)	25 (56)
Largemouth bass	0.3676 (0.1305)	34 (50)	356 (253)	2,675 (1,764)	2,758 (1,568)	2,561 (1,465)	423 (266)	139 (127)	8,947 (2,805)
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0.0032 (0.0026)	0 (0)	44 (52)	12 (24)	0 (0)	0 (0)	9 (19)	12 (17)	78 (62)
Muskellunge	0.0240 (0.0098)	49 (62)	57 (60)	147 (118)	0 (0)	140 (114)	107 (92)	83 (63)	584 (217)
Rock bass	0.0446 NAN	26 (40)	66 (79)	611 (595)	224 (251)	39 (47)	119 NAN	0 (0)	1,085 NAN
Carp	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bluegill	1.5608 NAN	571 (524)	1,412 NAN	6,609 (2,997)	11,512 (5,823)	10,283 (5,024)	4,037 (2,334)	3,559 NAN	37,983 NAN
Pumpkinseed	0.0256 (0.0177)	0 (0)	0 (0)	33 (67)	233 (288)	286 (257)	72 (145)	0 (0)	624 (418)
Green Sunfish	0.0005 (0.0010)	0 (0)	0 (0)	0 (0)	0 (0)	12 (24)	0 (0)	0 (0)	12 (24)
Yellow Perch	0.0842 NAN	0 (0)	179 (211)	309 (312)	480 (419)	767 (615)	178 NAN	137 NAN	2,050 NAN
<b>TOTAL RELEASED</b>	2.1116 NAN	680 (531)	2,114 NAN	10,422 (3,545)	15,207 (6,057)	14,088 (5,276)	4,945 NAN	3,930 NAN	51,387 NAN
<b>TOTAL CATCH</b>	2.6857 NAN	1,565 (930)	3,681 NAN	15,487 (4,153)	18,434 (6,357)	16,186 (5,420)	5,682 NAN	4,323 NAN	65,359 NAN
<b>ANGLER HOURS</b>		1,235 (863)	3,386 (1,291)	5,621 (2,335)	4,836 (1,586)	5,312 (2,226)	2,515 (894)	1,432 (540)	24,336 (4,053)



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ANGLER TRIPS	384	1,073	1,658	1,184	1,390	822	346	6,857
	(235)	(453)	(827)	(479)	(582)	(359)	(138)	(1,288)

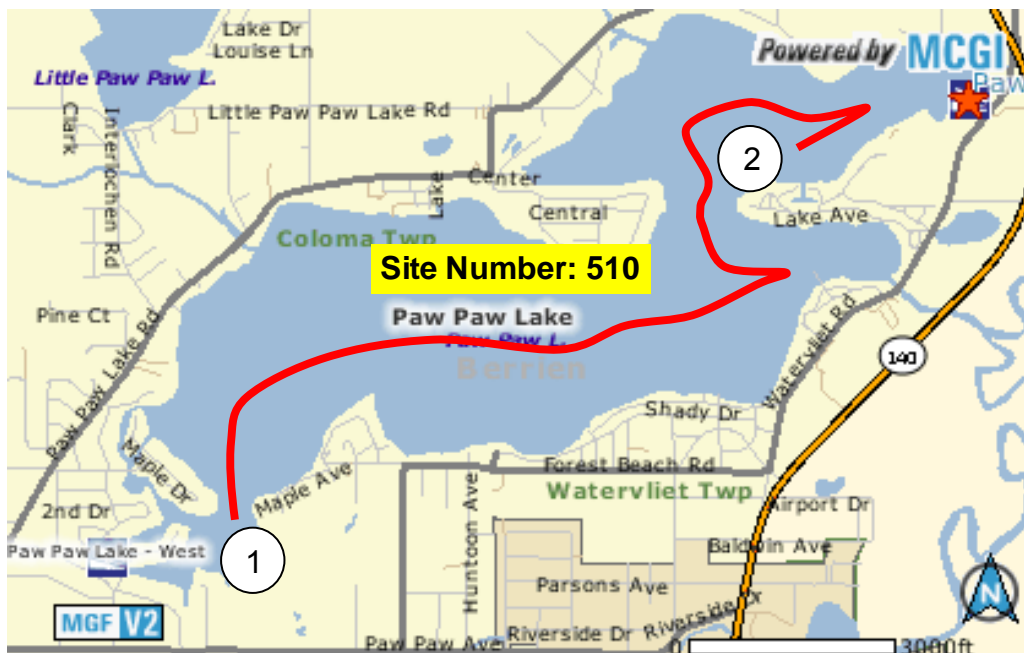
Table 3. Estimated harvest, catch per hour, and fishing pressure for 622, Campau. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Yellow Perch	0.0025	0	0	0	18	0	0	0	18
	NAN	(0)	(0)	(0)	(38)	(0)	(0)	(0)	(38)
Northern pike	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Black crappie	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Bluegill	0.0491	0	0	100	258	0	0	0	359
	NAN	(0)	(0)	(203)	(404)	(0)	(0)	(0)	(452)
Largemouth bass	0.0312	0	0	178	51	0	0	0	229
	NAN	(0)	(0)	(230)	(70)	(0)	(0)	(0)	(241)
Pumpkinseed	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Rock bass	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Green Sunfish	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Other	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
<b>TOTAL HARVEST</b>	<b>0.0828</b>	<b>0</b>	<b>0</b>	<b>278</b>	<b>328</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>606</b>
	NAN	(0)	(0)	(307)	(412)	(0)	(0)	(0)	(513)
<b>RELEASED</b>									
Smallmouth bass	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Largemouth bass	0.1808	0	261	340	722	0	0	0	1,323
	NAN	(0)	(513)	(340)	(575)	(0)	(0)	(0)	(843)
Walleye	0.0051	0	37	0	0	0	0	0	37
	NAN	(0)	(74)	(0)	(0)	(0)	(0)	(0)	(74)
Northern pike	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Muskellunge	0.0051	0	37	0	0	0	0	0	37
	NAN	(0)	(74)	(0)	(0)	(0)	(0)	(0)	(74)
Rock bass	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Carp	0.0044	0	0	0	32	0	0	0	32
	NAN	(0)	(0)	(0)	(59)	(0)	(0)	(0)	(59)
Bluegill	1.1902	0	1,378	1,760	1,744	3,534	0	292	8,707
	NAN	(0)	(2,713)	(1,262)	(1,460)	NAN	(0)	(583)	NAN
Pumpkinseed	0.0153	0	112	0	0	0	0	0	112
	NAN	(0)	(221)	(0)	(0)	(0)	(0)	(0)	(221)
Green Sunfish	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Yellow Perch	0.1167	0	335	307	211	0	0	0	854
	NAN	(0)	(661)	(327)	(202)	(0)	(0)	(0)	(764)
<b>TOTAL RELEASED</b>	<b>1.5176</b>	<b>0</b>	<b>2,160</b>	<b>2,407</b>	<b>2,709</b>	<b>3,534</b>	<b>0</b>	<b>292</b>	<b>11,102</b>
	NAN	(0)	(2,850)	(1,347)	(1,583)	NAN	(0)	(583)	NAN
<b>TOTAL CATCH</b>	<b>1.6004</b>	<b>0</b>	<b>2,160</b>	<b>2,686</b>	<b>3,037</b>	<b>3,534</b>	<b>0</b>	<b>292</b>	<b>11,708</b>
	NAN	(0)	(2,850)	(1,382)	(1,636)	NAN	(0)	(583)	NAN
<b>ANGLER HOURS</b>		<b>0</b>	<b>2,067</b>	<b>1,899</b>	<b>2,315</b>	<b>930</b>	<b>0</b>	<b>105</b>	<b>7,316</b>
		(0)	(4,050)	(749)	(1,052)	NAN	(0)	(210)	NAN
<b>ANGLER TRIPS</b>		<b>0</b>	<b>573</b>	<b>745</b>	<b>741</b>	<b>310</b>	<b>0</b>	<b>58</b>	<b>2,428</b>

(0) (1,126) (368) (367) (NAN) (0) (117) (NAN)

## Survey 50 Paw Paw Lake, Berrien County, Summer, 2005

<b>Waterbody</b>	Paw Paw Lake
<b>Year</b>	Summer, 2005
<b>County</b>	Berrien
<b>Sites</b>	510
<b>Survey period</b>	March 1 to November 30
<b>Survey design</b>	Roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	roving/ boat and shore angling
<b>Count type/mode</b>	progressive/boat and shore
<b>Clerk time</b>	1/2 time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery



### Estimation options applied

Boat-April day types were combined.

### Notes

Survey followed a roving-roving (roving counts and interviews) design. All funding was provided through Fisheries Division. One clerk worked 1/2 time to collect angler-creel data. One weekend day and 1 or 2 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. progressive counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was March 1 to November 30. Months were estimated separately. Estimates are given in Table 2.

Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch and effort at Paw Paw Lake, March 1 to November 30, Summer, 2005

	<b>Year</b>	<b>Month</b>	<b>F</b>
1	2005	3	13
2	2005	4	14
3	2005	5	15
4	2005	6	16
5	2005	7	16
6	2005	8	15
7	2005	9	13
8	2005	10	12
9	2005	11	11

Table 2. Estimated harvest, catch per hour, and fishing pressure for Paw Paw Lake.

Species	C/H	March	April	May	June	July	August	September	October	November	Season
<b>HARVEST</b>											
Bullhead spp.	0.0003	0	0	0	6	0	0	0	0	0	6
	(0.0007)	(0)	(0)	(0)	(12)	(0)	(0)	(0)	(0)	(0)	(12)
Walleye	0.0007	0	0	4	0	0	6	0	2	0	12
	(0.0009)	(0)	(0)	(8)	(0)	(0)	(13)	(0)	(3)	(0)	(15)
Yellow Perch	0.0229	0	0	0	217	172	6	0	0	0	395
	(0.0213)	(0)	(0)	(0)	(331)	(142)	(11)	(0)	(0)	(0)	(360)
Northern pike	0.0041	0	0	0	26	15	17	8	4	0	70
	(0.0030)	(0)	(0)	(0)	(37)	(24)	(19)	(13)	(7)	(0)	(50)
Black crappie	0.0232	0	0	76	193	8	60	64	0	0	401
	(0.0167)	(0)	(0)	(86)	(245)	(16)	(64)	(75)	(0)	(0)	(278)
Bluegill	0.3365	0	0	644	2,376	1,029	1,105	505	141	0	5,800
	(0.1578)	(0)	(0)	(766)	(1,955)	(753)	(927)	(564)	(135)	(0)	(2,484)
Largemouth bass	0.0007	0	0	12	0	0	0	0	0	0	12
	(0.0014)	(0)	(0)	(25)	(0)	(0)	(0)	(0)	(0)	(0)	(25)
Pumpkinseed	0.0137	0	0	64	130	14	25	0	3	0	236
	(0.0139)	(0)	(0)	(111)	(204)	(22)	(32)	(0)	(5)	(0)	(235)
Rock bass	0.0021	0	0	6	2	0	28	0	0	0	36
	(0.0033)	(0)	(0)	(11)	(4)	(0)	(56)	(0)	(0)	(0)	(57)
Carp	0.0002	0	0	3	0	0	0	0	0	0	3
	(0.0004)	(0)	(0)	(6)	(0)	(0)	(0)	(0)	(0)	(0)	(6)
Channel catfish	0.0021	0	0	0	0	37	0	0	0	0	37
	(0.0034)	(0)	(0)	(0)	(0)	(57)	(0)	(0)	(0)	(0)	(57)
<b>TOTAL HARVEST</b>	<b>0.4066</b>	<b>0</b>	<b>0</b>	<b>809</b>	<b>2,950</b>	<b>1,274</b>	<b>1,247</b>	<b>578</b>	<b>149</b>	<b>0</b>	<b>7,008</b>
	(0.1664)	(0)	(0)	(779)	(2,008)	(769)	(932)	(569)	(135)	(0)	(2,538)
<b>RELEASED</b>											
Smallmouth bass	0.0007	0	0	0	0	0	12	0	0	0	12
	(0.0014)	(0)	(0)	(0)	(0)	(0)	(24)	(0)	(0)	(0)	(24)
Largemouth bass	0.0486	0	0	146	368	37	128	98	47	14	838
	(0.0271)	(0)	(0)	(153)	(385)	(43)	(105)	(77)	(41)	(20)	(439)
Walleye	0.0012	0	0	0	0	0	18	1	1	0	21
	(0.0017)	(0)	(0)	(0)	(0)	(0)	(28)	(3)	(3)	(0)	(28)
Northern pike	0.0255	0	0	68	46	102	104	70	49	0	439
	(0.0123)	(0)	(0)	(94)	(50)	(116)	(90)	(63)	(35)	(0)	(196)
Rock bass	0.0122	0	0	119	88	0	0	4	0	0	211
	(0.0173)	(0)	(0)	(237)	(176)	(0)	(0)	(9)	(0)	(0)	(295)
Carp	0.0006	0	0	10	0	0	0	0	0	0	10
	(0.0011)	(0)	(0)	(19)	(0)	(0)	(0)	(0)	(0)	(0)	(19)
Bluegill	1.4850	0	0	938	8,392	6,550	7,675	1,286	756	0	25,596
	(0.6005)	(0)	(0)	(1,252)	(5,312)	(3,490)	(6,355)	(845)	(466)	(0)	(9,126)
Pumpkinseed	0.0008	0	0	0	0	0	0	13	0	0	13
	(0.0015)	(0)	(0)	(0)	(0)	(0)	(0)	(26)	(0)	(0)	(26)
Yellow Perch	0.0120	0	0	24	44	77	58	5	0	0	206
	(0.0090)	(0)	(0)	(48)	(62)	(108)	(68)	(9)	(0)	(0)	(151)
<b>TOTAL RELEASED</b>	<b>1.5865</b>	<b>0</b>	<b>0</b>	<b>1,304</b>	<b>8,937</b>	<b>6,766</b>	<b>7,993</b>	<b>1,478</b>	<b>853</b>	<b>14</b>	<b>27,345</b>
	(0.6108)	(0)	(0)	(1,288)	(5,330)	(3,494)	(6,357)	(852)	(469)	(20)	(9,145)
<b>TOTAL CATCH</b>	<b>1.9931</b>	<b>0</b>	<b>0</b>	<b>2,113</b>	<b>11,887</b>	<b>8,040</b>	<b>9,241</b>	<b>2,056</b>	<b>1,002</b>	<b>14</b>	<b>34,353</b>
	(0.6691)	(0)	(0)	(1,505)	(5,696)	(3,577)	(6,425)	(1,025)	(488)	(20)	(9,491)
<b>ANGLER HOURS</b>		<b>927</b>	<b>685</b>	<b>3,255</b>	<b>3,950</b>	<b>3,684</b>	<b>2,661</b>	<b>1,128</b>	<b>852</b>	<b>96</b>	<b>17,236</b>
		(831)	(599)	(2,156)	(1,058)	(1,611)	(956)	(598)	(326)	(109)	(3,287)
<b>ANGLER TRIPS</b>		<b>526</b>	<b>418</b>	<b>1,088</b>	<b>1,849</b>	<b>1,891</b>	<b>1,191</b>	<b>272</b>	<b>255</b>	<b>42</b>	<b>7,532</b>
		(563)	(387)	(738)	(767)	(1,126)	(758)	(151)	(112)	(64)	(1,866)

## Survey 51 Boardman River lower, Grand and Traverse, Summer, 2005

<b>Waterbody</b>	Boardman River lower
<b>Year</b>	Summer, 2005
<b>County</b>	Grand and Traverse
<b>Sites</b>	295, 296
<b>Survey period</b>	April 26 to September 30
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	roving and access/boat angling and shore angling
<b>Count type/mode</b>	progressive/boat and shore
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Interview and Count Site (see the map)

**Site No.: 295 – River mouth to downstream of Brown Bridge Pond**

**Site No.: 296 -- Brown Bridge Pond to Forks**

### Estimation options applied

Day types with the number of party (or parties) equal to 1 in a month were excluded in the estimation.

### Notes

Survey followed a roving-access (roving counts and access interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. One of two sites was sampled each day. Starting location within the site and direction of travel were randomized for both counting and interviewing. Progressive counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was April 26 to September 30. Months were estimated separately. Estimates are given in Table 2.

Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch and effort at Boardman River lower, April 26 to September 30, Summer, 2005

	<b>Year</b>	<b>Month</b>	<b>F</b>
1	2005	4	14
2	2005	5	15
3	2005	6	16
4	2005	7	16
5	2005	8	15
6	2005	9	13

Table 2. Estimated harvest, catch per hour, and fishing pressure for Boardman River. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Chinook salmon	0.0053	0	0	0	0	154	154
	NAN	(0)	(0)	(0)	(0)	(152)	(152)
Rainbow trout	0.0050	135	0	10	0	0	145
	NAN	(127)	(0)	(21)	(0)	(0)	(129)
Brown trout	0.0028	68	13	0	0	0	81
	NAN	(76)	(20)	(0)	(0)	(0)	(79)
Brook trout	0.0017	4	45	0	0	0	49
	NAN	(9)	(63)	(0)	(0)	(0)	(64)
Lake trout	0.0016	46	0	0	0	0	46
	NAN	(66)	(0)	(0)	(0)	(0)	(66)
Smallmouth bass	0.0081	13	122	99	0	0	234
	NAN	(26)	(168)	(198)	(0)	(0)	(261)
Yellow Perch	0.0084	2	73	157	9	0	241
	NAN	(5)	(107)	(217)	(17)	(0)	(243)
Northern pike	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Bluegill	0.0120	245	73	27	0	0	345
	NAN	(455)	(107)	(54)	(0)	(0)	(470)
Largemouth bass	0.0013	38	0	0	0	0	38
	NAN	(57)	(0)	(0)	(0)	(0)	(57)
Rock bass	0.0171	72	0	422	0	0	494
	NAN	(78)	(0)	(618)	(0)	(0)	(623)
Carp	0.0016	0	45	0	0	0	45
	NAN	(0)	(74)	(0)	(0)	(0)	(74)
Common white sucker	0.0043	124	0	0	0	0	124
	NAN	(162)	(0)	(0)	(0)	(0)	(162)
Other	0.0007	0	0	0	0	19	19
	NAN	(0)	(0)	(0)	(0)	(38)	(38)
<b>TOTAL HARVEST</b>	0.0699	748	372	716	9	173	2,016
	NAN	(519)	(247)	(687)	(17)	(157)	(910)
<b>RELEASED</b>							
Coho salmon	0.0033	94	0	0	0	0	94
	NAN	(133)	(0)	(0)	(0)	(0)	(133)
Chinook salmon	0.0064	0	0	0	0	185	185
	NAN	(0)	(0)	(0)	(0)	(208)	(208)
Rainbow trout	0.0761	1,302	104	763	6	19	2,193
	NAN	(997)	(148)	(869)	(12)	(38)	(1,331)
Brown trout	0.0359	505	178	317	3	32	1,036
	NAN	(601)	(223)	(327)	(6)	(48)	(721)
Lake trout	0.0028	81	0	0	0	0	81
	NAN	(95)	(0)	(0)	(0)	(0)	(95)
Smallmouth bass	0.1552	109	1,399	1,897	591	479	4,475
	NAN	(132)	(953)	(1,066)	(512)	(453)	(1,590)
Largemouth bass	0.0082	180	26	30	0	0	235
	NAN	(304)	(49)	(62)	(0)	(0)	(314)
Walleye	0.0028	0	23	39	20	0	82
	NAN	(0)	(47)	(48)	(39)	(0)	(78)
Northern pike	0.0065	0	77	99	12	0	188
	NAN	(0)	(127)	(198)	(22)	(0)	(237)



Common white sucker	0.0139	326	54	20	0	0	400
	NAN	(222)	(100)	(40)	(0)	(0)	(247)
Rock bass	0.0982	497	1,054	938	288	53	2,829
	NAN	(405)	(935)	(625)	(252)	(66)	(1,223)
Carp	0.0084	11	199	10	0	21	242
	NAN	(21)	(354)	(20)	(0)	(43)	(358)
Bluegill	0.0568	287	279	641	251	181	1,639
	NAN	(352)	(286)	(702)	(245)	(269)	(911)
Pumpkinseed	0.0005	0	0	0	0	14	14
	NAN	(0)	(0)	(0)	(0)	(28)	(28)
Other	0.0049	0	0	0	0	140	140
	NAN	(0)	(0)	(0)	(0)	(280)	(280)
Yellow Perch	0.0513	4	93	1,184	115	82	1,478
	NAN	(9)	(109)	(1,617)	(86)	(89)	(1,625)
TOTAL RELEASED	0.5311	3,396	3,486	5,937	1,285	1,206	15,311
	NAN	(1,353)	(1,450)	(2,354)	(628)	(646)	(3,207)
TOTAL CATCH	0.6011	4,144	3,858	6,653	1,294	1,378	17,327
	NAN	(1,449)	(1,471)	(2,452)	(629)	(665)	(3,334)
ANGLER HOURS		9,107	5,417	7,567	2,643	4,092	28,826
		NAN	(2,677)	(2,010)	NAN	(2,114)	NAN
ANGLER TRIPS		5,079	2,467	3,826	926	2,384	14,681
		(NAN)	(1,473)	(1,074)	(NAN)	(1,363)	(NAN)

## Survey 52 Menominee River lower, Menominee, Summer, 2005

<b>Waterbody</b>	Menominee River lower
<b>Year</b>	Summer, 2005
<b>County</b>	Menominee
<b>Survey period</b>	April 1 to October 31
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	roving and access/ boat angling and shore angling
<b>Count type/mode</b>	progressive/boat and shore
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Interview and Count Site

#### Site No.: 440 -- Ansul-Mason

Site	Interview time (hours) at each site
Ansul Island	1.0
11th ave access site	1.0
18th ave access site	1.0
Mason Park, (Kautenbach Island)	4.0

#### Site No.: 441 -- Upper Reach (up of Mason Park)

Site	Interview time (hours) at each site
River side above Mason Park	1.0
River county park access	1.0
No.3 Sturgeon access, just below Grand Rapids dam	1.0
No. 2 East bay access, just above the Grand Rapids dam	1.0
McAllister park	1.0
Menominee river park	1.0

### Notes

Survey followed a roving-access (roving counts and access interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. One of the two sites was sampled each day. Starting location within the site and direction of travel were randomized for both counting and interviewing. Progressive counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was April 1 to October 31. Months were estimated separately. Estimates are given in Tables 2, 3.

Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch and effort at Menominee River lower, April 1 to October 31, Summer, 2005

	Year	Month	F
1	2005	4	15
2	2005	5	15
3	2005	6	16
4	2005	7	16
5	2005	8	15
6	2005	9	15
7	2005	10	15

Table 2. Estimated harvest, catch per hour, and fishing pressure for boat. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Brook trout	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Smallmouth bass	0.0502 (0.0321)	0 (0)	0 (0)	104 (148)	433 (467)	228 (222)	56 (94)	153 (268)	974 (608)
Bullhead spp.	0.0016 (0.0032)	0 (0)	0 (0)	32 (62)	0 (0)	0 (0)	0 (0)	0 (0)	32 (62)
Walleye	0.0136 (0.0083)	44 (36)	44 (62)	34 (47)	49 (79)	38 (48)	46 (91)	8 (17)	263 (156)
Yellow Perch	0.0299 (0.0277)	0 (0)	0 (0)	0 (0)	0 (0)	167 (252)	389 (466)	24 (51)	580 (532)
Northern pike	0.0122 (0.0106)	0 (0)	64 (71)	0 (0)	83 (146)	0 (0)	56 (103)	34 (67)	237 (204)
Redhorse	0.0024 (0.0053)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	47 (102)	0 (0)	47 (102)
Black crappie	0.0081 (0.0090)	14 (26)	0 (0)	0 (0)	0 (0)	0 (0)	36 (73)	107 (155)	157 (173)
Bluegill	0.0172 (0.0223)	0 (0)	0 (0)	0 (0)	0 (0)	288 (421)	45 (91)	0 (0)	333 (430)
Largemouth bass	0.0004 (0.0008)	0 (0)	0 (0)	8 (16)	0 (0)	0 (0)	0 (0)	0 (0)	8 (16)
Rock bass	0.0022 (0.0031)	0 (0)	0 (0)	0 (0)	19 (40)	0 (0)	23 (46)	0 (0)	42 (60)
Common white sucker	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.1378 (0.0536)</b>	<b>58 (45)</b>	<b>108 (94)</b>	<b>177 (168)</b>	<b>585 (497)</b>	<b>722 (540)</b>	<b>698 (521)</b>	<b>326 (321)</b>	<b>2,674 (976)</b>
<b>RELEASED</b>									
Smallmouth bass	0.1950 (0.1137)	0 (0)	92 (86)	147 (205)	700 (761)	699 (642)	1,425 (1,663)	720 (899)	3,783 (2,148)
Walleye	0.0130 (0.0102)	0 (0)	10 (19)	16 (33)	47 (70)	39 (80)	100 (136)	40 (84)	253 (196)
Northern pike	0.0095 (0.0081)	0 (0)	54 (64)	0 (0)	28 (57)	0 (0)	102 (129)	0 (0)	184 (155)
Muskellunge	0.0032 (0.0032)	0 (0)	10 (19)	0 (0)	0 (0)	0 (0)	9 (18)	44 (55)	62 (61)
Redhorse	0.0049 (0.0055)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	94 (106)	0 (0)	94 (106)
Carp	0.0020 (0.0040)	0 (0)	0 (0)	0 (0)	40 (78)	0 (0)	0 (0)	0 (0)	40 (78)
Sturgeon	0.0581 (0.0633)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	613 (701)	515 (998)	1,128 (1,220)
Bluegill	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	0.0007	0	13	0	0	0	0	0	13

	(0.0013)	(0)	(25)	(0)	(0)	(0)	(0)	(0)	(25)
TOTAL RELEASED	0.2864	0	178	162	815	738	2,344	1,319	5,556
	(0.1338)	(0)	(114)	(208)	(770)	(647)	(1,818)	(1,347)	(2,487)
TOTAL CATCH	0.4242	58	286	340	1,400	1,460	3,042	1,644	8,230
	(0.1489)	(45)	(148)	(267)	(917)	(843)	(1,891)	(1,385)	(2,672)
ANGLER HOURS		308	3,240	2,733	3,949	2,393	4,497	2,283	19,404
		(194)	(1,092)	(612)	(1,072)	(726)	(1,656)	(829)	(2,591)
ANGLER TRIPS		88	817	596	987	624	1,174	558	4,845
		(62)	(286)	(138)	(308)	(197)	(487)	(203)	(719)

Table 3. Estimated harvest, catch per hour, and fishing pressure for shore. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Brook trout	0.0141	0	138	0	0	0	0	0	138
	(0.0290)	(0)	(281)	(0)	(0)	(0)	(0)	(0)	(281)
Smallmouth bass	0.0007	0	0	0	0	6	0	0	6
	(0.0013)	(0)	(0)	(0)	(0)	(13)	(0)	(0)	(13)
Bullhead spp.	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Walleye	0.0120	65	28	0	0	0	0	25	118
	(0.0114)	(73)	(55)	(0)	(0)	(0)	(0)	(54)	(106)
Yellow Perch	0.0088	0	0	86	0	0	0	0	86
	(0.0176)	(0)	(0)	(170)	(0)	(0)	(0)	(0)	(170)
Northern pike	0.0029	0	28	0	0	0	0	0	28
	(0.0060)	(0)	(58)	(0)	(0)	(0)	(0)	(0)	(58)
Redhorse	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Black crappie	0.0086	0	84	0	0	0	0	0	84
	(0.0163)	(0)	(158)	(0)	(0)	(0)	(0)	(0)	(158)
Bluegill	0.0301	0	227	0	68	0	0	0	295
	(0.0416)	(0)	(376)	(0)	(134)	(0)	(0)	(0)	(399)
Largemouth bass	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Rock bass	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Common white sucker	0.0110	95	0	12	0	0	0	0	107
	(0.0169)	(161)	(0)	(25)	(0)	(0)	(0)	(0)	(163)
TOTAL HARVEST	0.0882	160	505	99	68	6	0	25	863
	(0.0637)	(177)	(502)	(172)	(134)	(13)	(0)	(54)	(577)
<b>RELEASED</b>									
Smallmouth bass	0.2199	0	166	47	90	102	1,745	0	2,150
	(0.2427)	(0)	(194)	(71)	(129)	(149)	(2,283)	(0)	(2,301)
Walleye	0.0079	12	0	0	14	0	52	0	78
	(0.0099)	(25)	(0)	(0)	(27)	(0)	(88)	(0)	(95)
Northern pike	0.0114	8	28	28	27	0	22	0	112
	(0.0101)	(16)	(54)	(54)	(48)	(0)	(22)	(0)	(94)
Muskellunge	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Redhorse	0.0013	0	0	0	0	13	0	0	13
	(0.0026)	(0)	(0)	(0)	(0)	(25)	(0)	(0)	(25)
Carp	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Sturgeon	0.0116	0	28	33	0	9	43	0	114
	(0.0105)	(0)	(57)	(65)	(0)	(13)	(44)	(0)	(98)
Bluegill	0.0070	0	0	0	0	0	69	0	69
	(0.0142)	(0)	(0)	(0)	(0)	(0)	(137)	(0)	(137)
Yellow Perch	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)

TOTAL RELEASED	0.2592 (0.2466)	20 (30)	222 (209)	107 (111)	130 (140)	124 (152)	1,930 (2,289)	0 (0)	2,534 (2,311)
TOTAL CATCH	0.3474 (0.2612)	180 (179)	727 (543)	206 (204)	198 (194)	131 (153)	1,930 (2,289)	25 (54)	3,397 (2,382)
ANGLER HOURS		1,492 (1,085)	1,796 (1,303)	1,960 (1,256)	2,301 (1,341)	549 (347)	1,260 (763)	419 (301)	9,778 (2,654)
ANGLER TRIPS		530 (377)	619 (455)	717 (490)	663 (380)	309 (234)	321 (245)	160 (127)	3,319 (930)

Table 4. Estimated harvest, catch per hour, and fishing pressure for Menominee River. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Brook trout	0.0047 (0.0097)	0 (0)	138 (281)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	138 (281)
Smallmouth bass	0.0336 (0.0213)	0 (0)	0 (0)	104 (148)	433 (467)	235 (223)	56 (94)	153 (268)	981 (608)
Bullhead spp.	0.0011 (0.0021)	0 (0)	0 (0)	32 (62)	0 (0)	0 (0)	0 (0)	0 (0)	32 (62)
Walleye	0.0130 (0.0067)	109 (82)	71 (83)	34 (47)	49 (79)	38 (48)	46 (91)	33 (56)	381 (189)
Yellow Perch	0.0228 (0.0194)	0 (0)	0 (0)	86 (170)	0 (0)	167 (252)	389 (466)	24 (51)	666 (559)
Northern pike	0.0091 (0.0074)	0 (0)	92 (91)	0 (0)	83 (146)	0 (0)	56 (103)	34 (67)	265 (212)
Redhorse	0.0016 (0.0035)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	47 (102)	0 (0)	47 (102)
Black crappie	0.0083 (0.0081)	14 (26)	84 (158)	0 (0)	0 (0)	0 (0)	36 (73)	107 (155)	242 (234)
Bluegill	0.0215 (0.0203)	0 (0)	227 (376)	0 (0)	68 (134)	288 (421)	45 (91)	0 (0)	628 (586)
Largemouth bass	0.0003 (0.0006)	0 (0)	0 (0)	8 (16)	0 (0)	0 (0)	0 (0)	0 (0)	8 (16)
Rock bass	0.0015 (0.0021)	0 (0)	0 (0)	0 (0)	19 (40)	0 (0)	23 (46)	0 (0)	42 (60)
Common white sucker	0.0037 (0.0056)	95 (161)	0 (0)	12 (25)	0 (0)	0 (0)	0 (0)	0 (0)	107 (163)
<b>TOTAL HARVEST</b>	<b>0.1212 (0.0418)</b>	<b>218 (183)</b>	<b>613 (510)</b>	<b>276 (241)</b>	<b>652 (515)</b>	<b>728 (540)</b>	<b>698 (521)</b>	<b>351 (325)</b>	<b>3,537 (1,134)</b>
<b>RELEASED</b>									
Smallmouth bass	0.2033 (0.1109)	0 (0)	258 (212)	193 (217)	790 (772)	801 (660)	3,170 (2,824)	720 (899)	5,933 (3,148)
Walleye	0.0113 (0.0076)	12 (25)	10 (19)	16 (33)	61 (75)	39 (80)	152 (162)	40 (84)	330 (218)
Northern pike	0.0101 (0.0064)	8 (16)	81 (84)	28 (54)	55 (75)	0 (0)	123 (131)	0 (0)	295 (182)
Muskellunge	0.0021 (0.0021)	0 (0)	10 (19)	0 (0)	0 (0)	0 (0)	9 (18)	44 (55)	62 (61)
Redhorse	0.0037 (0.0038)	0 (0)	0 (0)	0 (0)	0 (0)	13 (25)	94 (106)	0 (0)	107 (109)
Carp	0.0014 (0.0027)	0 (0)	0 (0)	0 (0)	40 (78)	0 (0)	0 (0)	0 (0)	40 (78)
Sturgeon	0.0426 (0.0423)	0 (0)	28 (57)	33 (65)	0 (0)	9 (13)	656 (702)	515 (998)	1,242 (1,223)
Bluegill	0.0024 (0.0047)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	69 (137)	0 (0)	69 (137)
Yellow Perch	0.0004 (0.0009)	0 (0)	13 (25)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	13 (25)
<b>TOTAL</b>	<b>0.2773</b>	<b>20</b>	<b>400</b>	<b>270</b>	<b>945</b>	<b>862</b>	<b>4,274</b>	<b>1,319</b>	<b>8,091</b>

RELEASED	(0.1216)	(30)	(238)	(235)	(783)	(665)	(2,923)	(1,347)	(3,395)
TOTAL CATCH	0.3985	239	1,013	546	1,598	1,591	4,972	1,670	11,628
	(0.1327)	(185)	(563)	(337)	(937)	(857)	(2,969)	(1,386)	(3,579)
ANGLER HOURS		1,799	5,036	4,694	6,250	2,942	5,757	2,703	29,181
		(1,102)	(1,700)	(1,398)	(1,717)	(805)	(1,823)	(882)	(3,709)
ANGLER TRIPS		618	1,436	1,312	1,651	933	1,494	719	8,164
		(382)	(538)	(509)	(489)	(306)	(546)	(239)	(1,176)

## Survey 53 Belleville Lake, Wayne County, Summer, 2005

<b>Waterbody</b>	Belleville Lake
<b>Year</b>	Summer, 2005
<b>County</b>	Wayne
<b>Sites</b>	660
<b>Survey period</b>	April 1 to October 31
<b>Survey design</b>	Roving-roving, access (roving counts and roving, access interviews)
<b>Interview type/mode</b>	roving and access/boat angling and shore angling
<b>Count type/mode</b>	progressive/boat and shore
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a roving-access (roving counts and access interviews) and roving-roving (roving counts and interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. Progressive counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was April 1 to October 31. Months were estimated separately. Estimates are given in Tables 2-4.

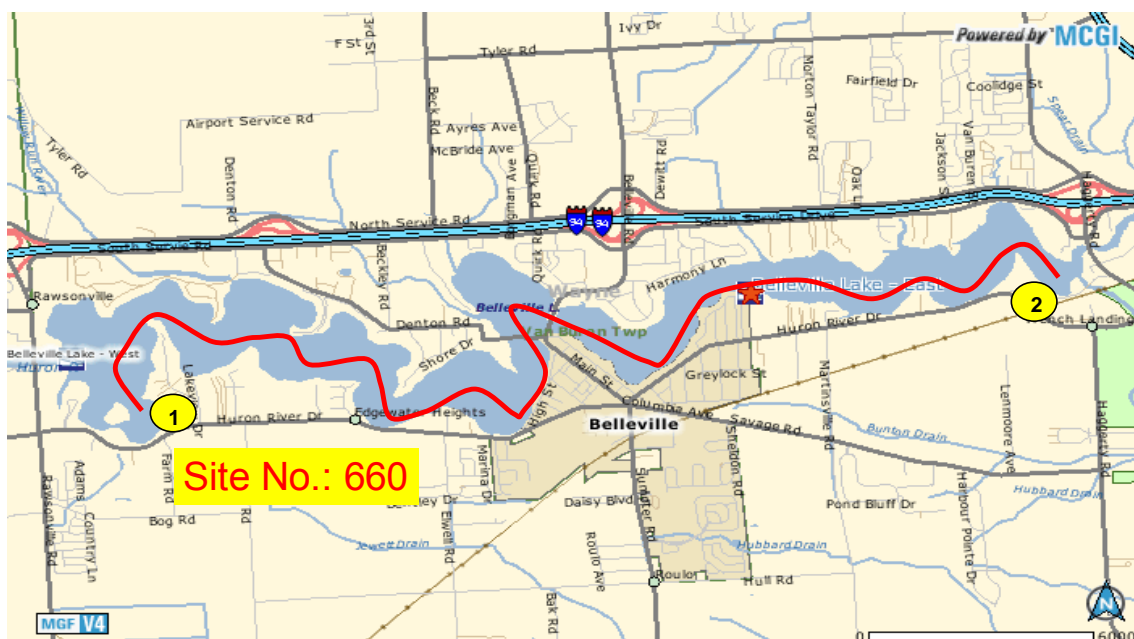


Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch

and effort at Belleville Lake, April 1 to October 31, Summer, 2005

	Year	Month	F
1	2005	4	14
2	2005	5	15
3	2005	6	16
4	2005	7	16
5	2005	8	15
6	2005	9	13
7	2005	10	12

Table 2. Estimated harvest, catch per hour, and fishing pressure for boat. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Smallmouth bass	0.0009 (0.0013)	0 (0)	25 (50)	16 (33)	0 (0)	0 (0)	0 (0)	0 (0)	41 (60)
Walleye	0.0686 (0.0259)	140 (129)	2,464 (1,032)	512 (358)	0 (0)	0 (0)	0 (0)	33 (42)	3,149 (1,101)
Yellow Perch	0.0019 (0.0038)	0 (0)	0 (0)	0 (0)	0 (0)	87 (175)	0 (0)	0 (0)	87 (175)
White bass	0.0091 (0.0114)	210 (419)	153 (282)	0 (0)	56 (113)	0 (0)	0 (0)	0 (0)	419 (518)
Black crappie	0.0076 (0.0057)	34 (68)	124 (166)	62 (90)	0 (0)	0 (0)	130 (162)	0 (0)	350 (258)
Bluegill	0.0296 (0.0251)	0 (0)	195 (345)	0 (0)	668 (1,009)	87 (175)	287 (300)	122 (181)	1,359 (1,136)
Largemouth bass	0.0051 (0.0074)	0 (0)	0 (0)	234 (336)	0 (0)	0 (0)	0 (0)	0 (0)	234 (336)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Channel catfish	0.0069 (0.0050)	0 (0)	84 (90)	26 (37)	131 (185)	45 (67)	27 (36)	5 (11)	318 (223)
White crappie	0.0076 (0.0106)	9 (18)	0 (0)	0 (0)	333 (484)	0 (0)	0 (0)	5 (10)	347 (485)
<b>TOTAL HARVEST</b>	<b>0.1374 (0.0440)</b>	<b>393 (444)</b>	<b>3,047 (1,141)</b>	<b>850 (502)</b>	<b>1,188 (1,139)</b>	<b>219 (257)</b>	<b>444 (343)</b>	<b>165 (187)</b>	<b>6,305 (1,808)</b>
<b>RELEASED</b>									
Smallmouth bass	0.2753 (0.0920)	43 (50)	3,858 (2,069)	2,779 (2,164)	2,362 (1,206)	2,198 (1,904)	884 (587)	503 (386)	12,628 (3,813)
Largemouth bass	0.0484 (0.0178)	31 (36)	850 (491)	271 (227)	352 (263)	279 (312)	383 (323)	55 (59)	2,221 (753)
Walleye	0.0583 (0.0265)	102 (103)	1,330 (720)	751 (690)	219 (261)	255 (510)	0 (0)	17 (27)	2,675 (1,155)
Northern pike	0.0004 (0.0008)	0 (0)	0 (0)	18 (35)	0 (0)	0 (0)	0 (0)	0 (0)	18 (35)
Muskellunge	0.0003 (0.0004)	0 (0)	8 (17)	0 (0)	0 (0)	0 (0)	5 (10)	0 (0)	14 (20)
White bass	0.0330 (0.0254)	5 (9)	1,416 (1,140)	53 (81)	19 (37)	7 (14)	9 (19)	5 (10)	1,514 (1,144)
Common white sucker	0.0004 (0.0006)	5 (9)	14 (28)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	18 (29)
Rock bass	0.0020 (0.0020)	0 (0)	42 (47)	35 (74)	0 (0)	0 (0)	0 (0)	15 (29)	93 (92)
Carp	0.0037 (0.0040)	9 (18)	85 (155)	0 (0)	37 (74)	31 (61)	10 (20)	0 (0)	172 (184)
Bluegill	0.1335 (0.0566)	15 (21)	272 (260)	1,138 (868)	1,890 (1,415)	2,179 (1,702)	541 (502)	91 (115)	6,125 (2,446)
Pumpkinseed	0.0046 (0.0046)	0 (0)	34 (49)	0 (0)	159 (199)	0 (0)	17 (33)	0 (0)	209 (207)



Other	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Yellow Perch	0.0035	0	0	16	111	29	4	0	160
	(0.0035)	(0)	(0)	(31)	(144)	(56)	(8)	(0)	(158)
TOTAL RELEASED	0.5634	210	7,910	5,061	5,149	4,978	1,854	685	25,846
	(0.1335)	(124)	(2,537)	(2,445)	(1,913)	(2,624)	(838)	(409)	(4,883)
TOTAL CATCH	0.7008	603	10,956	5,911	6,336	5,197	2,297	850	32,151
	(0.1514)	(461)	(2,782)	(2,496)	(2,227)	(2,637)	(905)	(450)	(5,207)
ANGLER HOURS		3,024	12,363	9,325	8,853	6,137	3,751	2,421	45,875
		(1,544)	(3,840)	(3,069)	(2,424)	(2,579)	(1,720)	(1,003)	(6,560)
ANGLER TRIPS		758	3,132	2,384	2,406	1,432	817	602	11,531
		(395)	(994)	(854)	(711)	(626)	(379)	(259)	(1,727)

Table 3. Estimated harvest, catch per hour, and fishing pressure for shore. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Smallmouth bass	0.0041	0	0	0	100	0	0	0	100
	(0.0065)	(0)	(0)	(0)	(158)	(0)	(0)	(0)	(158)
Walleye	0.0330	0	493	300	0	0	0	13	806
	(0.0301)	(0)	(413)	(600)	(0)	(0)	(0)	(26)	(729)
Yellow Perch	0.0077	0	0	0	0	26	163	0	189
	(0.0105)	(0)	(0)	(0)	(0)	(51)	(250)	(0)	(255)
White bass	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Black crappie	0.0088	0	0	0	172	0	43	0	215
	(0.0146)	(0)	(0)	(0)	(344)	(0)	(86)	(0)	(355)
Bluegill	0.0993	0	0	0	750	1,166	509	0	2,424
	(0.0637)	(0)	(0)	(0)	(1,057)	(865)	(682)	(0)	(1,526)
Largemouth bass	0.0016	0	38	0	0	0	0	0	38
	(0.0031)	(0)	(76)	(0)	(0)	(0)	(0)	(0)	(76)
Rock bass	0.0123	0	0	300	0	0	0	0	300
	(0.0246)	(0)	(0)	(600)	(0)	(0)	(0)	(0)	(600)
Channel catfish	0.0194	0	0	0	30	195	185	63	473
	(0.0156)	(0)	(0)	(0)	(60)	(320)	(167)	(84)	(376)
White crappie	0.0069	0	0	0	0	0	168	0	168
	(0.0138)	(0)	(0)	(0)	(0)	(0)	(336)	(0)	(336)
TOTAL HARVEST	0.1931	0	531	600	1,052	1,387	1,068	76	4,713
	(0.0823)	(0)	(420)	(849)	(1,124)	(924)	(822)	(88)	(1,923)
<b>RELEASED</b>									
Smallmouth bass	0.0331	0	116	287	137	0	201	67	807
	(0.0254)	(0)	(164)	(373)	(174)	(0)	(401)	(133)	(612)
Largemouth bass	0.0379	0	0	900	0	26	0	0	926
	(0.0739)	(0)	(0)	(1,800)	(0)	(51)	(0)	(0)	(1,801)
Walleye	0.0226	36	68	274	150	0	0	22	551
	(0.0240)	(57)	(99)	(483)	(300)	(0)	(0)	(34)	(581)
Northern pike	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Muskellunge	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
White bass	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Common white sucker	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Rock bass	0.0046	0	0	0	86	26	0	0	112
	(0.0074)	(0)	(0)	(0)	(172)	(51)	(0)	(0)	(180)
Carp	0.0062	35	0	0	108	0	0	8	151
	(0.0076)	(49)	(0)	(0)	(176)	(0)	(0)	(16)	(184)
Bluegill	0.1498	0	0	729	690	1,753	330	154	3,656

Pumpkinseed	(0.0837)	(0)	(0)	(999)	(697)	(1,490)	(450)	(269)	(1,994)
	0	0	0	0	0	0	0	0	0
Other	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	0.0086	0	210	0	0	0	0	0	210
Yellow Perch	(0.0172)	(0)	(419)	(0)	(0)	(0)	(0)	(0)	(419)
	0.0099	0	0	0	0	169	72	0	241
	(0.0125)	(0)	(0)	(0)	(0)	(267)	(143)	(0)	(303)
<b>TOTAL RELEASED</b>	<b>0.2725</b>	<b>72</b>	<b>393</b>	<b>2,191</b>	<b>1,170</b>	<b>1,974</b>	<b>602</b>	<b>251</b>	<b>6,652</b>
	(0.1224)	(75)	(461)	(2,147)	(816)	(1,515)	(620)	(303)	(2,875)
<b>TOTAL CATCH</b>	<b>0.4656</b>	<b>72</b>	<b>925</b>	<b>2,791</b>	<b>2,222</b>	<b>3,361</b>	<b>1,669</b>	<b>327</b>	<b>11,366</b>
	(0.1528)	(75)	(624)	(2,309)	(1,389)	(1,774)	(1,029)	(315)	(3,459)
<b>ANGLER HOURS</b>		<b>4,022</b>	<b>6,376</b>	<b>3,979</b>	<b>4,292</b>	<b>2,996</b>	<b>1,641</b>	<b>1,104</b>	<b>24,409</b>
		(1,510)	(1,323)	(1,625)	(975)	(743)	(579)	(672)	(2,993)
<b>ANGLER TRIPS</b>		<b>1,908</b>	<b>2,959</b>	<b>1,556</b>	<b>1,684</b>	<b>1,233</b>	<b>489</b>	<b>542</b>	<b>10,370</b>
		(762)	(1,197)	(1,041)	(867)	(531)	(200)	(344)	(2,071)

Table 4. Estimated harvest, catch per hour, and fishing pressure for Belleville Lake. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>September</b>	<b>October</b>	<b>Season</b>
<b>HARVEST</b>									
Smallmouth bass	0.0020	0	25	16	100	0	0	0	141
	(0.0024)	(0)	(50)	(33)	(158)	(0)	(0)	(0)	(169)
Walleye	0.0563	140	2,958	812	0	0	0	46	3,955
	(0.0197)	(129)	(1,112)	(699)	(0)	(0)	(0)	(49)	(1,320)
Yellow Perch	0.0039	0	0	0	0	113	163	0	276
	(0.0044)	(0)	(0)	(0)	(0)	(183)	(250)	(0)	(309)
White bass	0.0060	210	153	0	56	0	0	0	419
	(0.0074)	(419)	(282)	(0)	(113)	(0)	(0)	(0)	(518)
Black crappie	0.0080	34	124	62	172	0	173	0	565
	(0.0063)	(68)	(166)	(90)	(344)	(0)	(183)	(0)	(438)
Bluegill	0.0538	0	195	0	1,418	1,253	795	122	3,783
	(0.0276)	(0)	(345)	(0)	(1,461)	(883)	(745)	(181)	(1,903)
Largemouth bass	0.0039	0	38	234	0	0	0	0	272
	(0.0049)	(0)	(76)	(336)	(0)	(0)	(0)	(0)	(344)
Rock bass	0.0043	0	0	300	0	0	0	0	300
	(0.0085)	(0)	(0)	(600)	(0)	(0)	(0)	(0)	(600)
Channel catfish	0.0113	0	84	26	161	240	212	69	791
	(0.0063)	(0)	(90)	(37)	(194)	(327)	(171)	(85)	(437)
White crappie	0.0073	9	0	0	333	0	168	5	515
	(0.0084)	(18)	(0)	(0)	(484)	(0)	(336)	(10)	(590)
<b>TOTAL HARVEST</b>	<b>0.1568</b>	<b>393</b>	<b>3,578</b>	<b>1,450</b>	<b>2,239</b>	<b>1,606</b>	<b>1,511</b>	<b>241</b>	<b>11,018</b>
	(0.0408)	(444)	(1,216)	(986)	(1,601)	(959)	(890)	(206)	(2,639)
<b>RELEASED</b>									
Smallmouth bass	0.1911	43	3,974	3,066	2,499	2,198	1,085	569	13,435
	(0.0583)	(50)	(2,076)	(2,195)	(1,218)	(1,904)	(711)	(408)	(3,862)
Largemouth bass	0.0448	31	850	1,171	352	304	383	55	3,146
	(0.0281)	(36)	(491)	(1,814)	(263)	(316)	(323)	(59)	(1,952)
Walleye	0.0459	139	1,398	1,026	369	255	0	39	3,226
	(0.0190)	(117)	(726)	(842)	(398)	(510)	(0)	(43)	(1,293)
Northern pike	0.0003	0	0	18	0	0	0	0	18
	(0.0005)	(0)	(0)	(35)	(0)	(0)	(0)	(0)	(35)
Muskellunge	0.0002	0	8	0	0	0	5	0	14
	(0.0003)	(0)	(17)	(0)	(0)	(0)	(10)	(0)	(20)
White bass	0.0215	5	1,416	53	19	7	9	5	1,514
	(0.0164)	(9)	(1,140)	(81)	(37)	(14)	(19)	(10)	(1,144)
Common white sucker	0.0003	5	14	0	0	0	0	0	18
	(0.0004)	(9)	(28)	(0)	(0)	(0)	(0)	(0)	(29)
Rock bass	0.0029	0	42	35	86	26	0	15	205
	(0.0029)	(0)	(47)	(74)	(172)	(51)	(0)	(29)	(202)

Carp	0.0046	45	85	0	145	31	10	8	322
	(0.0037)	(52)	(155)	(0)	(191)	(61)	(20)	(16)	(260)
Bluegill	0.1392	15	272	1,867	2,580	3,932	870	245	9,781
	(0.0471)	(21)	(260)	(1,324)	(1,577)	(2,262)	(674)	(293)	(3,156)
Pumpkinseed	0.0030	0	34	0	159	0	17	0	209
	(0.0030)	(0)	(49)	(0)	(199)	(0)	(33)	(0)	(207)
Other	0.0030	0	210	0	0	0	0	0	210
	(0.0060)	(0)	(419)	(0)	(0)	(0)	(0)	(0)	(419)
Yellow Perch	0.0057	0	0	16	111	198	76	0	401
	(0.0049)	(0)	(0)	(31)	(144)	(273)	(144)	(0)	(342)
TOTAL RELEASED	0.4624	282	8,303	7,252	6,319	6,952	2,455	936	32,499
	(0.0935)	(145)	(2,579)	(3,254)	(2,080)	(3,030)	(1,042)	(509)	(5,667)
TOTAL CATCH	0.6192	675	11,881	8,702	8,558	8,558	3,967	1,177	43,517
	(0.1093)	(467)	(2,851)	(3,400)	(2,625)	(3,178)	(1,371)	(549)	(6,251)
ANGLER HOURS		7,046	18,739	13,304	13,145	9,133	5,392	3,525	70,284
		(2,160)	(4,061)	(3,473)	(2,612)	(2,683)	(1,815)	(1,207)	(7,211)
ANGLER TRIPS		2,665	6,091	3,940	4,090	2,665	1,306	1,144	21,901
		(859)	(1,556)	(1,346)	(1,121)	(821)	(428)	(430)	(2,696)

## Survey 54 Maceday Lake, Oakland, Summer, 2005

<b>Waterbody</b>	Maceday Lake
<b>Year</b>	Summer, 2005
<b>County</b>	Oakland
<b>Sites</b>	665
<b>Survey period</b>	April 1 to October 31
<b>Survey design</b>	Roving-roving and access (roving counts and roving, access interviews)
<b>Interview type/mode</b>	roving and access/shore and boat angling
<b>Count type/mode</b>	progressive/boat and shore
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a roving- roving and access (roving counts and roving, access interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. Progressive counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was April 1 to October 31. Months were estimated separately. Estimates are given in Tables 2-4.

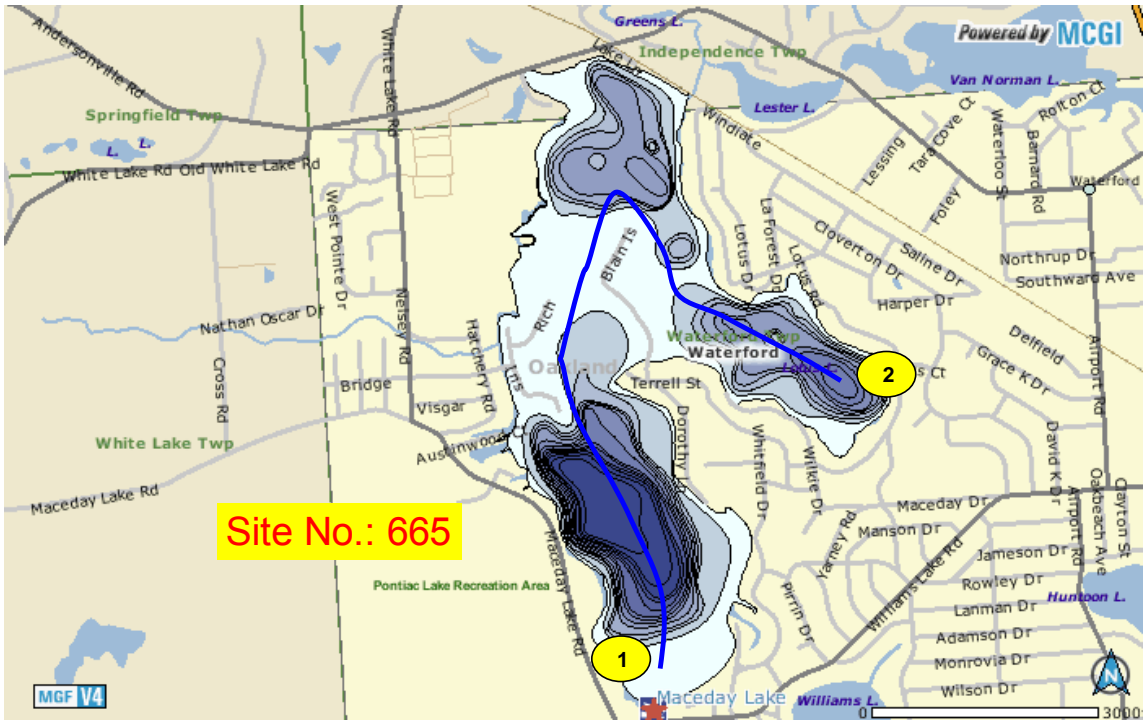


Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch and effort at Maceday Lake, April 1 to October 31, Summer, 2005

	Year	Month	F
1	2005	4	14
2	2005	5	15
3	2005	6	16
4	2005	7	16
5	2005	8	15
6	2005	9	13
7	2005	10	12

Table 2. Estimated harvest, catch per hour, and fishing pressure for boat. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Rainbow trout	0.0150 (0.0075)	0 (0)	0 (0)	4 (6)	89 (65)	52 (48)	15 (15)	12 (17)	172 (84)
Lake trout	0.0009 (0.0010)	0 (0)	0 (0)	0 (0)	8 (11)	0 (0)	0 (0)	2 (5)	10 (12)
Splake	0.0287 (0.0162)	10 (18)	3 (5)	2 (5)	211 (169)	85 (63)	5 (10)	12 (18)	329 (183)
Cisco	0.0006 (0.0012)	0 (0)	0 (0)	0 (0)	7 (14)	0 (0)	0 (0)	0 (0)	7 (14)
Smallmouth bass	0.0011 (0.0014)	0 (0)	0 (0)	7 (13)	0 (0)	0 (0)	5 (8)	0 (0)	12 (16)
Bullhead spp.	0.0002 (0.0004)	0 (0)	0 (0)	2 (5)	0 (0)	0 (0)	0 (0)	0 (0)	2 (5)
Yellow Perch	0.0135 (0.0066)	9 (17)	10 (14)	76 (53)	41 (44)	4 (8)	13 (13)	0 (0)	155 (74)
Black crappie	0.0679 (0.0424)	394 (425)	250 (193)	104 (110)	18 (21)	0 (0)	10 (13)	2 (5)	778 (480)
Bluegill	0.6063 (0.1476)	227 (347)	1,250 (581)	2,789 (1,064)	296 (186)	291 (193)	1,360 (668)	736 (532)	6,949 (1,546)
Largemouth bass	0.0079 (0.0051)	0 (0)	5 (8)	30 (42)	38 (35)	3 (6)	5 (6)	9 (15)	90 (58)
Pumpkinseed	0.0301 (0.0176)	91 (169)	97 (66)	60 (54)	7 (10)	33 (33)	58 (48)	0 (0)	345 (199)
Rock bass	0.0040 (0.0036)	0 (0)	16 (23)	17 (28)	0 (0)	13 (19)	0 (0)	0 (0)	45 (41)
White crappie	0.0004 (0.0009)	5 (10)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	5 (10)
<b>TOTAL HARVEST</b>	<b>0.7765 (0.1629)</b>	<b>736 (575)</b>	<b>1,631 (616)</b>	<b>3,091 (1,074)</b>	<b>714 (267)</b>	<b>480 (212)</b>	<b>1,471 (670)</b>	<b>775 (533)</b>	<b>8,899 (1,647)</b>
<b>RELEASED</b>									
Rainbow trout	0.0172 (0.0114)	0 (0)	103 (108)	51 (62)	30 (33)	13 (13)	0 (0)	0 (0)	198 (129)
Smallmouth bass	0.0226 (0.0090)	0 (0)	8 (16)	43 (43)	55 (42)	101 (58)	51 (53)	0 (0)	259 (100)
Largemouth bass	0.4081 (0.0804)	204 (180)	624 (333)	1,451 (509)	1,010 (334)	890 (281)	435 (199)	64 (52)	4,677 (797)
Walleye	0.0008 (0.0011)	0 (0)	0 (0)	4 (7)	5 (10)	0 (0)	0 (0)	0 (0)	9 (12)
Northern pike	0.0026 (0.0037)	21 (41)	0 (0)	0 (0)	0 (0)	5 (7)	4 (9)	0 (0)	30 (43)
Rock bass	0.0412 (0.0197)	0 (0)	50 (44)	235 (157)	141 (142)	21 (28)	2 (4)	23 (33)	472 (221)
Bullhead spp.	0.0018 (0.0024)	0 (0)	0 (0)	0 (0)	18 (26)	3 (6)	0 (0)	0 (0)	21 (27)
Bluegill	1.1209 (0.2326)	195 (289)	766 (419)	2,939 (1,117)	2,314 (826)	2,542 (801)	3,472 (1,576)	618 (431)	12,847 (2,345)

Pumpkinseed	0.0364 (0.0271)	120 (248)	5 (10)	30 (41)	61 (51)	183 (169)	17 (25)	0 (0)	417 (308)
Green Sunfish	0.0006 (0.0012)	0 (0)	0 (0)	0 (0)	7 (14)	0 (0)	0 (0)	0 (0)	7 (14)
Yellow Perch	0.0263 (0.0113)	0 (0)	13 (16)	50 (39)	116 (84)	108 (82)	13 (18)	2 (5)	302 (126)
TOTAL RELEASED	1.6784 (0.2750)	540 (423)	1,569 (548)	4,803 (1,241)	3,758 (910)	3,867 (872)	3,994 (1,589)	707 (435)	19,237 (2,515)
TOTAL CATCH	2.4549 (0.3573)	1,276 (714)	3,200 (825)	7,895 (1,641)	4,472 (948)	4,347 (897)	5,465 (1,725)	1,481 (688)	28,136 (3,006)
ANGLER HOURS		626 (276)	1,638 (487)	2,242 (523)	2,810 (622)	2,266 (413)	1,396 (339)	484 (155)	11,461 (1,133)
ANGLER TRIPS		191 (98)	480 (154)	587 (146)	852 (201)	598 (122)	364 (110)	160 (61)	3,232 (355)

Table 3. Estimated harvest, catch per hour, and fishing pressure for shore. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Bluegill	0.1321 (0.2078)	0 (0)	53 (106)	0 (0)	0 (0)	142 (285)	0 (0)	0 (0)	195 (304)
Pumpkinseed	0.1391 (0.2181)	0 (0)	0 (0)	0 (0)	0 (0)	206 (319)	0 (0)	0 (0)	206 (319)
Rock bass	0.1073 (0.1419)	0 (0)	159 (206)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	159 (206)
TOTAL HARVEST	0.3784 (0.3409)	0 (0)	211 (232)	0 (0)	0 (0)	348 (427)	0 (0)	0 (0)	559 (486)
<b>RELEASED</b>									
Largemouth bass	0.4764 (0.5323)	0 (0)	53 (106)	324 (648)	169 (338)	158 (214)	0 (0)	0 (0)	704 (769)
Rock bass	0.0428 (0.0560)	0 (0)	0 (0)	0 (0)	0 (0)	63 (81)	0 (0)	0 (0)	63 (81)
Bluegill	2.1842 (1.4114)	0 (0)	211 (423)	648 (498)	977 (1,112)	1,392 (1,449)	0 (0)	0 (0)	3,228 (1,940)
Yellow Perch	0.1652 (0.1698)	0 (0)	0 (0)	216 (238)	28 (56)	0 (0)	0 (0)	0 (0)	244 (244)
TOTAL RELEASED	2.8686 (1.5773)	0 (0)	264 (436)	1,188 (851)	1,174 (1,164)	1,613 (1,467)	0 (0)	0 (0)	4,240 (2,103)
TOTAL CATCH	3.2470 (1.6512)	0 (0)	476 (494)	1,188 (851)	1,174 (1,164)	1,961 (1,528)	0 (0)	0 (0)	4,799 (2,158)
ANGLER HOURS		158 (146)	159 (116)	324 (172)	338 (148)	332 (165)	158 (97)	10 (20)	1,478 (351)
ANGLER TRIPS		126 (137)	127 (118)	259 (201)	271 (194)	266 (200)	126 (106)	8 (16)	1,182 (402)

Table 4. Estimated harvest, catch per hour, and fishing pressure for Maceday Lake. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Rainbow trout	0.0133 (0.0066)	0 (0)	0 (0)	4 (6)	89 (65)	52 (48)	15 (15)	12 (17)	172 (84)
Lake trout	0.0008 (0.0009)	0 (0)	0 (0)	0 (0)	8 (11)	0 (0)	0 (0)	2 (5)	10 (12)
Splake	0.0254 (0.0143)	10 (18)	3 (5)	2 (5)	211 (169)	85 (63)	5 (10)	12 (18)	329 (183)
Cisco	0.0005 (0.0011)	0 (0)	0 (0)	0 (0)	7 (14)	0 (0)	0 (0)	0 (0)	7 (14)
Smallmouth bass	0.0009 (0.0012)	0 (0)	0 (0)	7 (13)	0 (0)	0 (0)	5 (8)	0 (0)	12 (16)
Bullhead spp.	0.0002 (0.0004)	0 (0)	0 (0)	2 (5)	0 (0)	0 (0)	0 (0)	0 (0)	2 (5)
Yellow Perch	0.0119 (0.0058)	9 (17)	10 (14)	76 (53)	41 (44)	4 (8)	13 (13)	0 (0)	155 (74)
Black crappie	0.0601 (0.0375)	394 (425)	250 (193)	104 (110)	18 (21)	0 (0)	10 (13)	2 (5)	778 (480)
Bluegill	0.5521 (0.1319)	227 (347)	1,303 (590)	2,789 (1,064)	296 (186)	433 (344)	1,360 (668)	736 (532)	7,144 (1,576)
Largemouth bass	0.0070 (0.0045)	0 (0)	5 (8)	30 (42)	38 (35)	3 (6)	5 (6)	9 (15)	90 (58)
Pumpkinseed	0.0426 (0.0293)	91 (169)	97 (66)	60 (54)	7 (10)	238 (320)	58 (48)	0 (0)	551 (375)
Rock bass	0.0158 (0.0163)	0 (0)	174 (208)	17 (28)	0 (0)	13 (19)	0 (0)	0 (0)	204 (210)
White crappie	0.0004 (0.0008)	5 (10)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	5 (10)
<b>TOTAL HARVEST</b>	<b>0.7310 (0.1487)</b>	<b>736 (575)</b>	<b>1,842 (658)</b>	<b>3,091 (1,074)</b>	<b>714 (267)</b>	<b>828 (477)</b>	<b>1,471 (670)</b>	<b>775 (533)</b>	<b>9,459 (1,717)</b>
<b>RELEASED</b>									
Rainbow trout	0.0153 (0.0101)	0 (0)	103 (108)	51 (62)	30 (33)	13 (13)	0 (0)	0 (0)	198 (129)
Smallmouth bass	0.0200 (0.0079)	0 (0)	8 (16)	43 (43)	55 (42)	101 (58)	51 (53)	0 (0)	259 (100)
Largemouth bass	0.4159 (0.0937)	204 (180)	676 (350)	1,775 (824)	1,179 (475)	1,048 (353)	435 (199)	64 (52)	5,381 (1,108)
Walleye	0.0007 (0.0010)	0 (0)	0 (0)	4 (7)	5 (10)	0 (0)	0 (0)	0 (0)	9 (12)
Northern pike	0.0023 (0.0033)	21 (41)	0 (0)	0 (0)	0 (0)	5 (7)	4 (9)	0 (0)	30 (43)
Rock bass	0.0414 (0.0186)	0 (0)	50 (44)	235 (157)	141 (142)	85 (86)	2 (4)	23 (33)	535 (235)
Bullhead spp.	0.0016 (0.0021)	0 (0)	0 (0)	0 (0)	18 (26)	3 (6)	0 (0)	0 (0)	21 (27)
Bluegill	1.2423 (0.2613)	195 (289)	978 (595)	3,587 (1,223)	3,291 (1,385)	3,934 (1,656)	3,472 (1,576)	618 (431)	16,075 (3,043)
Pumpkinseed	0.0322 (0.0240)	120 (248)	5 (10)	30 (41)	61 (51)	183 (169)	17 (25)	0 (0)	417 (308)
Green Sunfish	0.0005 (0.0011)	0 (0)	0 (0)	0 (0)	7 (14)	0 (0)	0 (0)	0 (0)	7 (14)
Yellow Perch	0.0422 (0.0216)	0 (0)	13 (16)	266 (241)	144 (101)	108 (82)	13 (18)	2 (5)	546 (275)
<b>TOTAL RELEASED</b>	<b>1.8144 (0.3030)</b>	<b>540 (423)</b>	<b>1,834 (700)</b>	<b>5,991 (1,505)</b>	<b>4,932 (1,477)</b>	<b>5,480 (1,707)</b>	<b>3,994 (1,589)</b>	<b>707 (435)</b>	<b>23,477 (3,278)</b>
<b>TOTAL CATCH</b>	<b>2.5453 (0.3690)</b>	<b>1,276 (714)</b>	<b>3,676 (961)</b>	<b>9,083 (1,849)</b>	<b>5,646 (1,501)</b>	<b>6,308 (1,772)</b>	<b>5,465 (1,725)</b>	<b>1,481 (688)</b>	<b>32,935 (3,700)</b>
<b>ANGLER HOURS</b>		<b>784</b>	<b>1,797</b>	<b>2,566</b>	<b>3,148</b>	<b>2,598</b>	<b>1,553</b>	<b>494</b>	<b>12,939</b>



	(312)	(500)	(550)	(640)	(445)	(352)	(156)	(1,186)
ANGLER TRIPS	317	607	847	1,122	864	490	168	4,415
	(168)	(193)	(248)	(279)	(234)	(153)	(63)	(536)

## Survey 55 Tahquamenon River lower, Luce, Summer, 2005

<b>Waterbody</b>	Tahquamenon River lower
<b>Year</b>	Summer, 2005
<b>County</b>	Luce
<b>Sites</b>	445, 446
<b>Survey period</b>	May 16 to October 31
<b>Survey design</b>	Roving-roving, access (roving counts and roving, access interviews)
<b>Interview type/mode</b>	access and roving/boat angling and shore angling
<b>Count type/mode</b>	progressive/boat and shore
<b>Clerk time</b>	1/2 time (Survey was done in conjunction with Great Lakes angler surveys.)
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Interview and Count Site (see the map)**

**Site No.: 445 -- DOLLARVILLE DAM & BOAT LAUNCH to SAGE RIVER**

**Site No.: 446 -- SAGE RIVER to JOY ISLAND**

For **Site No.: 445 -- DOLLARVILLE BOAT LAUNCH to SAGE RIVER**, the survey followed a progressive-access design. The clerk traveled along the river by a vehicle to collect angler count and interview data.

For **Site No.: 446 -- SAGE RIVER to JOY ISLAND**, the survey followed a **progressive-roving design**. The clerk motored on the river by a boat to collect angler count and interview data.

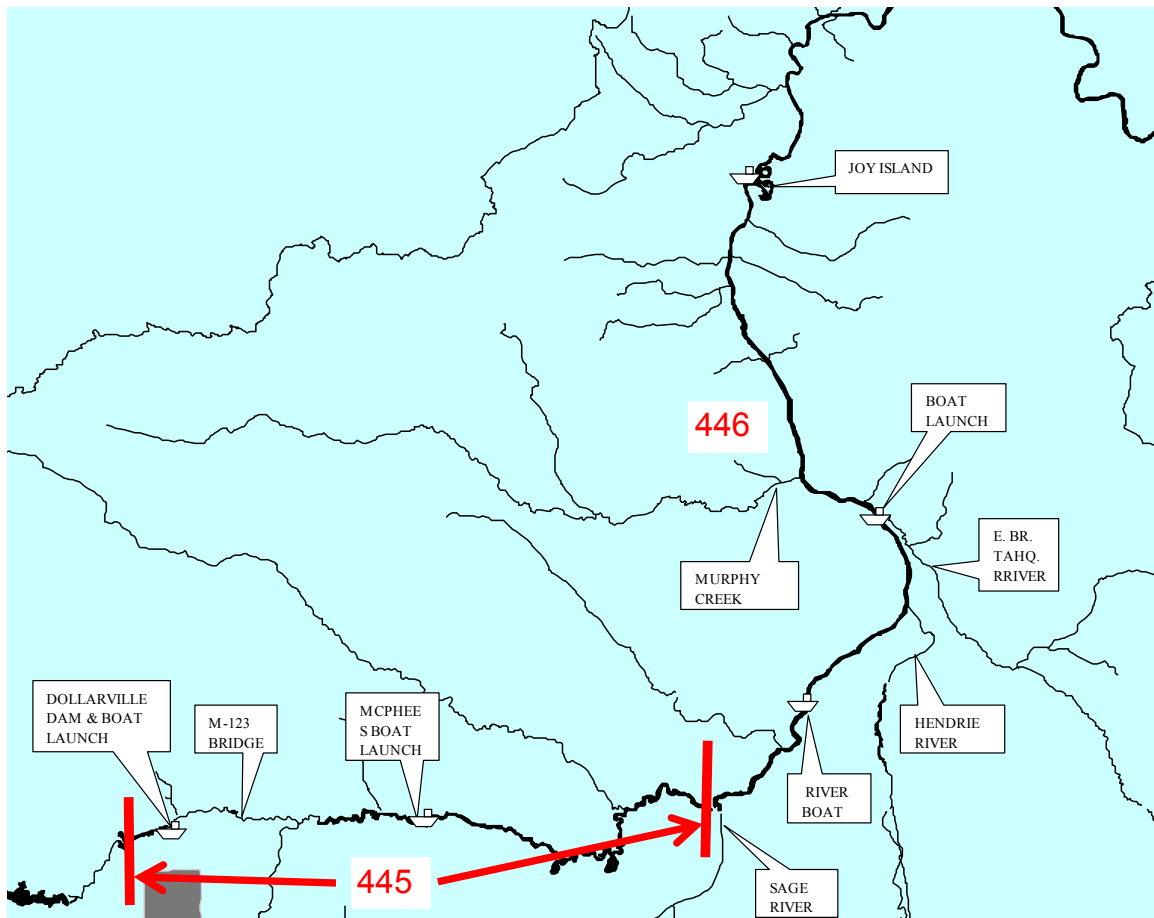


Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch and effort at Tahquamenon River lower, May 16 to October 31, Summer, 2005

	Year	Month	F
1	2005	5	12
2	2005	6	16
3	2005	7	16
4	2005	8	15
5	2005	9	15
6	2005	10	13

Table 2. Estimated harvest, catch per hour, and fishing pressure for boat. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	October	Season
<b>HARVEST</b>								
Walleye	0.0223 (0.0298)	16 (34)	0 (0)	180 (360)	0 (0)	0 (0)	101 (139)	297 (387)
Yellow Perch	0.0358 (0.0444)	286 (477)	0 (0)	0 (0)	156 (311)	0 (0)	36 (73)	478 (574)
Northern pike	0.0128 (0.0144)	31 (53)	0 (0)	32 (65)	77 (153)	30 (62)	0 (0)	170 (185)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.0709 (0.0579)</b>	<b>333 (481)</b>	<b>0 (0)</b>	<b>212 (366)</b>	<b>232 (347)</b>	<b>30 (62)</b>	<b>137 (157)</b>	<b>945 (717)</b>
<b>RELEASED</b>								
Smallmouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Largemouth bass	0.0204 (0.0413)	0 (0)	0 (0)	0 (0)	272 (544)	0 (0)	0 (0)	272 (544)
Walleye	0.0358 (0.0343)	16 (34)	0 (0)	3 (6)	217 (320)	72 (114)	169 (268)	477 (434)
Northern pike	0.1519 (0.1133)	206 (382)	166 (214)	1,191 (1,235)	161 (307)	300 (318)	0 (0)	2,024 (1,383)
Muskellunge	0.0223 (0.0187)	74 (118)	0 (0)	140 (181)	0 (0)	61 (73)	22 (44)	298 (232)
Rock bass	0.1235 (0.1521)	0 (0)	0 (0)	1,023 (1,805)	284 (568)	23 (47)	316 (531)	1,646 (1,966)
Bluegill	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pumpkinseed	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	0.0477 (0.0832)	0 (0)	0 (0)	559 (1,081)	77 (154)	0 (0)	0 (0)	636 (1,092)
<b>TOTAL RELEASED</b>	<b>0.4017 (0.2383)</b>	<b>296 (401)</b>	<b>166 (214)</b>	<b>2,915 (2,447)</b>	<b>1,012 (916)</b>	<b>457 (349)</b>	<b>507 (596)</b>	<b>5,353 (2,740)</b>
<b>TOTAL CATCH</b>	<b>0.4726 (0.2555)</b>	<b>629 (626)</b>	<b>166 (214)</b>	<b>3,128 (2,474)</b>	<b>1,244 (979)</b>	<b>487 (354)</b>	<b>644 (617)</b>	<b>6,297 (2,832)</b>
<b>ANGLER HOURS</b>		<b>2,162 (1,491)</b>	<b>1,371 (577)</b>	<b>3,937 (1,639)</b>	<b>1,985 (2,489)</b>	<b>2,399 (1,061)</b>	<b>1,472 (1,848)</b>	<b>13,326 (3,998)</b>
<b>ANGLER TRIPS</b>		<b>483 (420)</b>	<b>577 (259)</b>	<b>1,233 (652)</b>	<b>690 (909)</b>	<b>542 (270)</b>	<b>575 (755)</b>	<b>4,101 (1,462)</b>

Table 3. Estimated harvest, catch per hour, and fishing pressure for shore. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	October	Season
<b>HARVEST</b>								
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	0.0046 (0.0103)	0 (0)	16 (36)	0 (0)	0 (0)	0 (0)	0 (0)	16 (36)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0.0207 (0.0462)	0 (0)	74 (162)	0 (0)	0 (0)	0 (0)	0 (0)	74 (162)
<b>TOTAL HARVEST</b>	<b>0.0253 (0.0477)</b>	<b>0 (0)</b>	<b>90 (166)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>90 (166)</b>
<b>RELEASED</b>								
Smallmouth bass	0.0522 (0.0978)	0 (0)	0 (0)	16 (39)	0 (0)	169 (338)	0 (0)	185 (340)
Largemouth bass	0.0318 (0.0587)	0 (0)	0 (0)	0 (0)	11 (23)	101 (203)	0 (0)	113 (204)
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0.0124 (0.0212)	38 (72)	0 (0)	0 (0)	0 (0)	7 (13)	0 (0)	44 (73)
Muskellunge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0.0852 (0.0731)	38 (83)	57 (102)	120 (165)	35 (60)	53 (78)	0 (0)	302 (233)
Bluegill	0.0421 (0.0597)	0 (0)	41 (58)	16 (31)	92 (193)	0 (0)	0 (0)	149 (204)
Pumpkinseed	0.0352 (0.0565)	0 (0)	0 (0)	33 (62)	92 (185)	0 (0)	0 (0)	125 (195)
Yellow Perch	0.0622 (0.0803)	113 (248)	33 (65)	16 (31)	46 (83)	13 (26)	0 (0)	221 (272)
<b>TOTAL RELEASED</b>	<b>0.3210 (0.2102)</b>	<b>188 (271)</b>	<b>131 (134)</b>	<b>202 (186)</b>	<b>276 (287)</b>	<b>343 (402)</b>	<b>0 (0)</b>	<b>1,139 (609)</b>
<b>TOTAL CATCH</b>	<b>0.3464 (0.2208)</b>	<b>188 (271)</b>	<b>221 (213)</b>	<b>202 (186)</b>	<b>276 (287)</b>	<b>343 (402)</b>	<b>0 (0)</b>	<b>1,229 (631)</b>
<b>ANGLER HOURS</b>		<b>544 (720)</b>	<b>917 (634)</b>	<b>785 (328)</b>	<b>690 (643)</b>	<b>188 (290)</b>	<b>424 (524)</b>	<b>3,548 (1,342)</b>
<b>ANGLER TRIPS</b>		<b>340 (457)</b>	<b>314 (244)</b>	<b>337 (228)</b>	<b>290 (308)</b>	<b>170 (280)</b>	<b>201 (235)</b>	<b>1,652 (741)</b>

Table 4. Estimated harvest, catch per hour, and fishing pressure for Tahquamenon River. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	October	Season
<b>HARVEST</b>								
Walleye	0.0176 (0.0234)	16 (34)	0 (0)	180 (360)	0 (0)	0 (0)	101 (139)	297 (387)
Yellow Perch	0.0293 (0.0349)	286 (477)	16 (36)	0 (0)	156 (311)	0 (0)	36 (73)	494 (575)
Northern pike	0.0101 (0.0113)	31 (53)	0 (0)	32 (65)	77 (153)	30 (62)	0 (0)	170 (185)
Rock bass	0.0044 (0.0096)	0 (0)	74 (162)	0 (0)	0 (0)	0 (0)	0 (0)	74 (162)
<b>TOTAL HARVEST</b>	<b>0.0613 (0.0462)</b>	<b>333 (481)</b>	<b>90 (166)</b>	<b>212 (366)</b>	<b>232 (347)</b>	<b>30 (62)</b>	<b>137 (157)</b>	<b>1,035 (736)</b>
<b>RELEASED</b>								
Smallmouth bass	0.0110 (0.0203)	0 (0)	0 (0)	16 (39)	0 (0)	169 (338)	0 (0)	185 (340)
Largemouth bass	0.0228 (0.0349)	0 (0)	0 (0)	0 (0)	284 (545)	101 (203)	0 (0)	385 (581)
Walleye	0.0283 (0.0267)	16 (34)	0 (0)	3 (6)	217 (320)	72 (114)	169 (268)	477 (434)
Northern pike	0.1226 (0.0876)	244 (388)	166 (214)	1,191 (1,235)	161 (307)	307 (318)	0 (0)	2,068 (1,385)
Muskellunge	0.0176 (0.0145)	74 (118)	0 (0)	140 (181)	0 (0)	61 (73)	22 (44)	298 (232)
Rock bass	0.1154 (0.1208)	38 (83)	57 (102)	1,142 (1,813)	318 (571)	77 (91)	316 (531)	1,948 (1,980)
Bluegill	0.0088 (0.0123)	0 (0)	41 (58)	16 (31)	92 (193)	0 (0)	0 (0)	149 (204)
Pumpkinseed	0.0074 (0.0117)	0 (0)	0 (0)	33 (62)	92 (185)	0 (0)	0 (0)	125 (195)
Yellow Perch	0.0508 (0.0679)	113 (248)	33 (65)	575 (1,081)	123 (175)	13 (26)	0 (0)	857 (1,125)
<b>TOTAL RELEASED</b>	<b>0.3847 (0.1921)</b>	<b>484 (484)</b>	<b>297 (252)</b>	<b>3,117 (2,454)</b>	<b>1,288 (960)</b>	<b>800 (533)</b>	<b>507 (596)</b>	<b>6,492 (2,807)</b>
<b>TOTAL CATCH</b>	<b>0.4460 (0.2049)</b>	<b>816 (682)</b>	<b>387 (302)</b>	<b>3,329 (2,481)</b>	<b>1,520 (1,021)</b>	<b>830 (536)</b>	<b>644 (617)</b>	<b>7,526 (2,902)</b>
<b>ANGLER HOURS</b>		<b>2,706 (1,656)</b>	<b>2,289 (857)</b>	<b>4,722 (1,672)</b>	<b>2,675 (2,571)</b>	<b>2,586 (1,100)</b>	<b>1,896 (1,921)</b>	<b>16,874 (4,217)</b>
<b>ANGLER TRIPS</b>		<b>823 (621)</b>	<b>891 (356)</b>	<b>1,570 (691)</b>	<b>980 (960)</b>	<b>712 (389)</b>	<b>776 (790)</b>	<b>5,753 (1,639)</b>

## Survey 56 Sucker River, Alger County, Summer, 2005

<b>Waterbody</b>	Sucker River
<b>Year</b>	Summer, 2005
<b>County</b>	Alger
<b>Sites</b>	150, River mouth to Whitewash
<b>Survey period</b>	April 17 to Dec 1
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	roving and access/shore angling
<b>Count type/mode</b>	progressive/shore
<b>Clerk time</b>	1/2
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch and effort at Sucker River, April 17 to Dec 1, Summer, 2005

	<b>Year</b>	<b>Month</b>	<b>F</b>
1	2005	4	14
2	2005	5	15

Table 2. Estimated harvest, catch per hour, and fishing pressure for sucker river. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>April-May</b>	<b>Season</b>
<b>HARVEST</b>			
Rainbow trout	0.0706 (0.0493)	119 (62)	119 (62)
<b>TOTAL HARVEST</b>	<b>0.0706</b> <b>(0.0493)</b>	<b>119</b> <b>(62)</b>	<b>119</b> <b>(62)</b>
<b>RELEASED</b>			
Rainbow trout	0.0613 (0.0533)	103 (76)	103 (76)
Common white sucker	0.0142 (0.0195)	24 (31)	24 (31)
<b>TOTAL RELEASED</b>	<b>0.0755</b> <b>(0.0600)</b>	<b>127</b> <b>(82)</b>	<b>127</b> <b>(82)</b>
<b>TOTAL CATCH</b>	<b>0.1461</b> <b>(0.0914)</b>	<b>245</b> <b>(102)</b>	<b>245</b> <b>(102)</b>
<b>ANGLER HOURS</b>		<b>1,680</b> <b>(783)</b>	<b>1,680</b> <b>(783)</b>
<b>ANGLER TRIPS</b>		<b>389</b> <b>(201)</b>	<b>389</b> <b>(201)</b>

## Survey 57 Black Lake, Alpena, Winter, 2006

<b>Waterbody</b>	Black Lake
<b>Year</b>	Winter, 2006
<b>County</b>	Alpena
<b>Sites</b>	544
<b>Survey period</b>	January 4 - March 26
<b>Survey design</b>	progressive-roving (roving counts and interviews)
<b>Interview type/mode</b>	Roving /open ice, shanty
<b>Count type/mode</b>	Roving /open ice and shanty
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a progressive-roving (roving counts and interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. Progressive counts of open ice and shanty anglers were made once per day. Survey period for both counts and interviews was January 4 - March 26. Months were estimated separately. Estimates are given in tables 2-4.



Figure 1.— Creel clerk interview and count path for the Black Lake angler survey

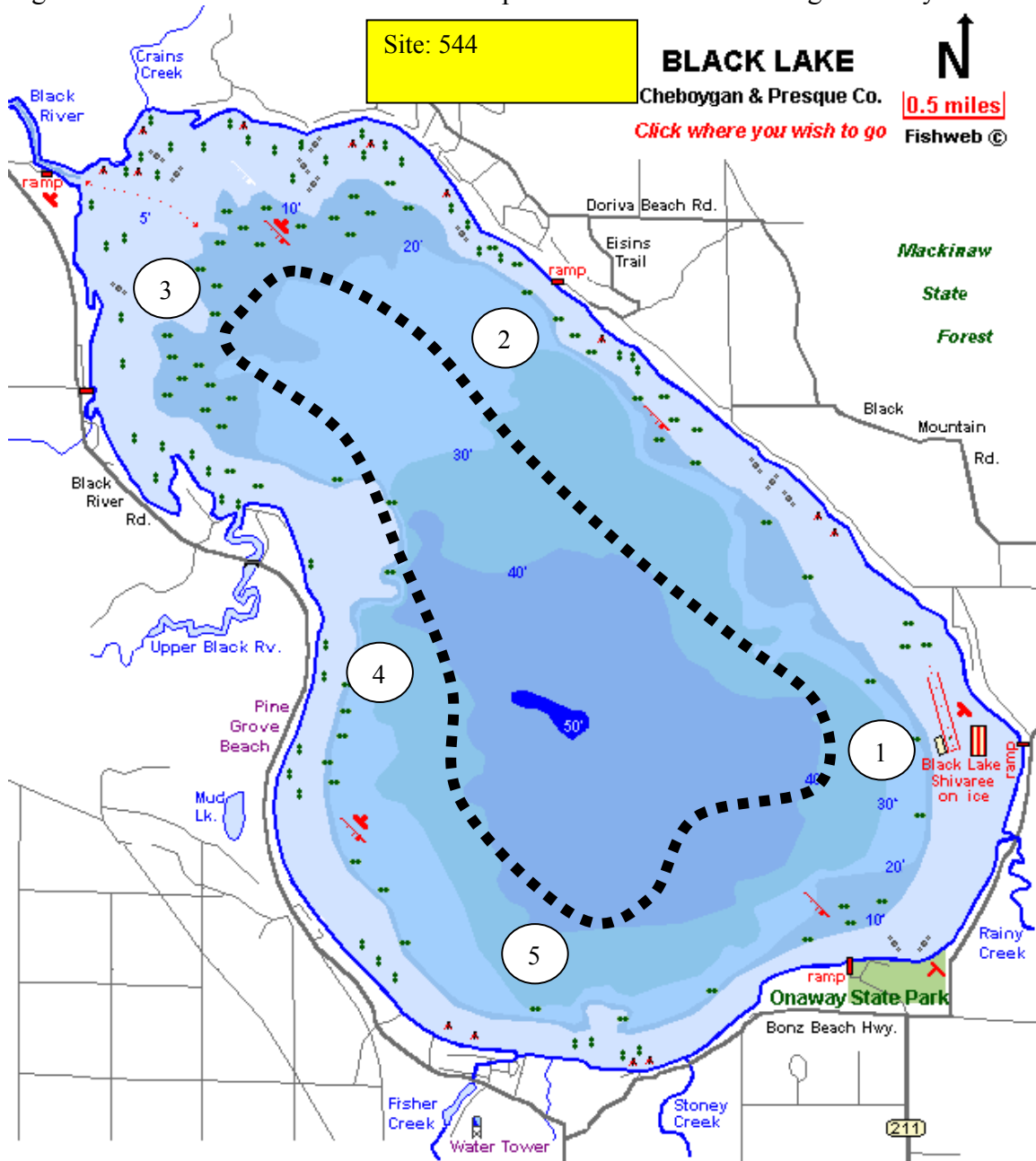


Table 1. Expansion values (referred to as “F” in Lockwood et al. 1999) to estimate catch and effort at Black Lake, January 4 - March 26, Winter, 2006

	Year	Month	F
1	2006	1	11
2	2006	2	11
3	2006	3	13

Table 2. Estimated harvest, catch per hour, and fishing pressure for open ice. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>Season</b>
<b>HARVEST</b>					
Walleye	0.0349 (0.0466)	50 (100)	15 (25)	30 (60)	95 (119)
Yellow Perch	0.3510 (0.3211)	164 (288)	351 (437)	436 (545)	951 (755)
Longnose Gar	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0.0032 (0.0066)	0 (0)	0 (0)	9 (17)	9 (17)
Muskellunge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Redhorse	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bowfin	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.3891 (0.3330)</b>	<b>214 (304)</b>	<b>366 (438)</b>	<b>474 (548)</b>	<b>1,054 (765)</b>
<b>RELEASED</b>					
Northern pike	0.0188 (0.0272)	33 (66)	2 (5)	15 (22)	51 (70)
Yellow Perch	1.1106 (0.8447)	1,811 (1,544)	178 (265)	1,019 (958)	3,009 (1,836)
<b>TOTAL RELEASED</b>	<b>1.1294 (0.8502)</b>	<b>1,844 (1,545)</b>	<b>181 (265)</b>	<b>1,035 (959)</b>	<b>3,060 (1,838)</b>
<b>TOTAL CATCH</b>	<b>1.5185 (1.0074)</b>	<b>2,058 (1,575)</b>	<b>546 (512)</b>	<b>1,509 (1,104)</b>	<b>4,114 (1,991)</b>
<b>ANGLER HOURS</b>		<b>1,322 (838)</b>	<b>678 (729)</b>	<b>709 (528)</b>	<b>2,709 (1,230)</b>
<b>ANGLER TRIPS</b>		<b>395 (251)</b>	<b>203 (218)</b>	<b>212 (158)</b>	<b>809 (368)</b>

Table 3. Estimated harvest, catch per hour, and fishing pressure for shanty. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>Season</b>
<b>HARVEST</b>					
Walleye	0.0136 (0.0100)	135 (110)	14 (21)	27 (45)	175 (121)
Yellow Perch	0.2870 (0.1299)	2,408 (1,033)	1,074 (948)	207 (204)	3,689 (1,417)
Longnose Gar	0.0010 (0.0015)	0 (0)	13 (19)	0 (0)	13 (19)
Northern pike	0.0143 (0.0082)	111 (69)	66 (66)	7 (13)	184 (96)
Muskellunge	0.0014 (0.0029)	18 (37)	0 (0)	0 (0)	18 (37)
Redhorse	0.0004 (0.0008)	5 (10)	0 (0)	0 (0)	5 (10)
Bowfin	0.0014 (0.0029)	18 (37)	0 (0)	0 (0)	18 (37)
<b>TOTAL HARVEST</b>	<b>0.3192 (0.1347)</b>	<b>2,695 (1,043)</b>	<b>1,167 (950)</b>	<b>240 (209)</b>	<b>4,103 (1,426)</b>
<b>RELEASED</b>					
Northern pike	0.0080 (0.0079)	46 (59)	12 (23)	46 (75)	103 (98)
Yellow Perch	0.4128 (0.1699)	3,641 (1,474)	860 (578)	805 (806)	5,306 (1,777)
<b>TOTAL RELEASED</b>	<b>0.4209 (0.1712)</b>	<b>3,687 (1,475)</b>	<b>871 (578)</b>	<b>851 (809)</b>	<b>5,409 (1,780)</b>
<b>TOTAL CATCH</b>	<b>0.7400 (0.2507)</b>	<b>6,383 (1,807)</b>	<b>2,038 (1,112)</b>	<b>1,091 (836)</b>	<b>9,512 (2,280)</b>
<b>ANGLER HOURS</b>		<b>7,383 (1,965)</b>	<b>4,237 (1,972)</b>	<b>1,234 (1,310)</b>	<b>12,853 (3,077)</b>
<b>ANGLER TRIPS</b>		<b>2,483 (708)</b>	<b>973 (447)</b>	<b>436 (444)</b>	<b>3,892 (948)</b>

Table 4. Estimated harvest, catch per hour, and fishing pressure for black lake. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>Season</b>
<b>HARVEST</b>					
Walleye	0.0173 (0.0115)	185 (149)	29 (32)	57 (75)	270 (170)
Yellow Perch	0.2981 (0.1211)	2,572 (1,072)	1,425 (1,044)	643 (582)	4,639 (1,605)
Longnose Gar	0.0008 (0.0012)	0 (0)	13 (19)	0 (0)	13 (19)
Northern pike	0.0124 (0.0068)	111 (69)	66 (66)	15 (22)	193 (98)
Muskellunge	0.0012 (0.0024)	18 (37)	0 (0)	0 (0)	18 (37)
Redhorse	0.0003 (0.0006)	5 (10)	0 (0)	0 (0)	5 (10)
Bowfin	0.0012 (0.0024)	18 (37)	0 (0)	0 (0)	18 (37)
<b>TOTAL HARVEST</b>	<b>0.3314 (0.1257)</b>	<b>2,909 (1,086)</b>	<b>1,533 (1,046)</b>	<b>715 (587)</b>	<b>5,157 (1,618)</b>
<b>RELEASED</b>					
Northern pike	0.0099 (0.0080)	79 (89)	14 (24)	61 (78)	154 (121)
Yellow Perch	0.5343 (0.1998)	5,453 (2,135)	1,038 (636)	1,825 (1,252)	8,315 (2,555)
<b>TOTAL RELEASED</b>	<b>0.5442 (0.2011)</b>	<b>5,532 (2,137)</b>	<b>1,052 (636)</b>	<b>1,886 (1,255)</b>	<b>8,469 (2,558)</b>
<b>TOTAL CATCH</b>	<b>0.8756 (0.2694)</b>	<b>8,441 (2,397)</b>	<b>2,584 (1,225)</b>	<b>2,600 (1,385)</b>	<b>13,626 (3,027)</b>
<b>ANGLER HOURS</b>		<b>8,705 (2,136)</b>	<b>4,915 (2,103)</b>	<b>1,942 (1,412)</b>	<b>15,563 (3,313)</b>
<b>ANGLER TRIPS</b>		<b>2,878 (751)</b>	<b>1,175 (497)</b>	<b>647 (471)</b>	<b>4,701 (1,017)</b>

## Survey 58 Lake Gogebic, Gogebic County, Winter, 2005-2006

<b>Waterbody</b>	Lake Gogebic
<b>Year</b>	Winter, 2005-2006
<b>County</b>	Gogebic
<b>Survey period</b>	December 22, 2005 to March 27, 2006
<b>Survey design</b>	Roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	Roving /open ice, shanty
<b>Count type/mode</b>	Roving /open ice and shanty
<b>Clerk time</b>	Full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a roving-roving (roving counts and interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. Progressive counts of open ice and shanty anglers were made once per day. Survey period for both counts and interviews was December 22 to March 27. Months were estimated separately. Estimates are given in Tables 2-4.

Figure 1.— Creel clerk interview and count path for the Lake Gogebic angler survey

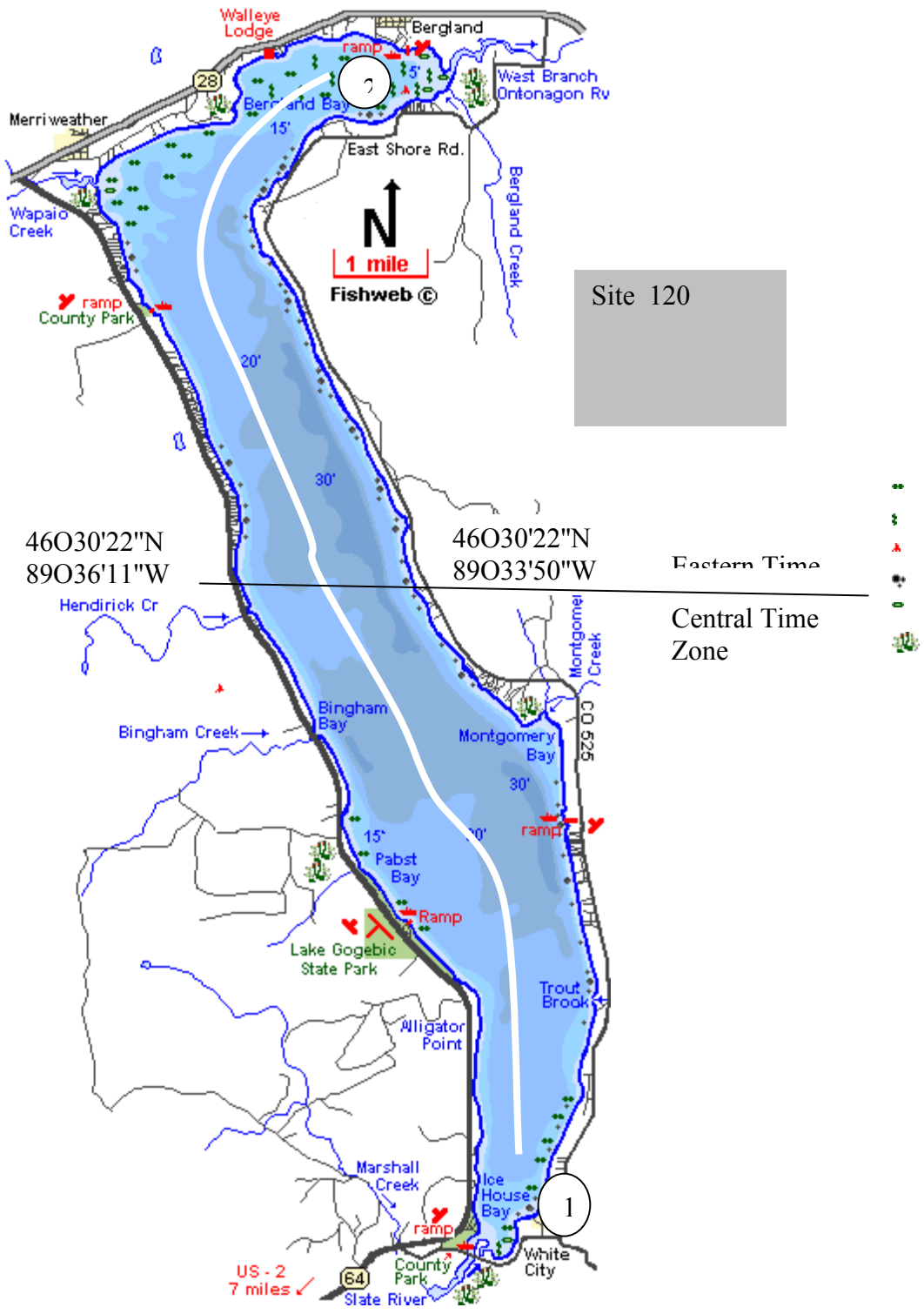


Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) to estimate catch and effort at Lake Gogebic, December 22 to March 27, Winter, 2005-2006

	Year	Month	F
1	2005	12	12
2	2006	1	11
3	2006	2	11
4	2006	3	13

Table 2. Estimated harvest, catch per hour, and fishing pressure for open ice. Two standard errors are given in parentheses.

Species	C/H	December-January	February	March	Season
<b>HARVEST</b>					
Cisco	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Walleye	0.0686 (0.0850)	197 (222)	8 (15)	0 (0)	205 (223)
Yellow Perch	0.0536 (0.0512)	121 (110)	25 (39)	14 (23)	160 (119)
Northern pike	0.0022 (0.0045)	6 (13)	0 (0)	0 (0)	6 (13)
Pumpkinseed	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0.0478 (0.0998)	143 (285)	0 (0)	0 (0)	143 (285)
Common white sucker	0.0011 (0.0023)	3 (6)	0 (0)	0 (0)	3 (6)
<b>TOTAL HARVEST</b>	<b>0.1733 (0.1642)</b>	<b>470 (378)</b>	<b>33 (42)</b>	<b>14 (23)</b>	<b>517 (381)</b>
<b>RELEASED</b>					
Cisco	0.0019 (0.0039)	6 (11)	0 (0)	0 (0)	6 (11)
Smallmouth bass	0.0060 (0.0100)	13 (26)	0 (0)	5 (10)	18 (28)
Walleye	0.0289 (0.0384)	85 (102)	2 (4)	0 (0)	86 (102)
Northern pike	0.0084 (0.0105)	21 (26)	4 (8)	0 (0)	25 (28)
Common white sucker	0.0013 (0.0026)	4 (8)	0 (0)	0 (0)	4 (8)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pumpkinseed	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	0.0037 (0.0051)	8 (13)	3 (6)	0 (0)	11 (14)
<b>TOTAL RELEASED</b>	<b>0.0502 (0.0477)</b>	<b>136 (110)</b>	<b>9 (10)</b>	<b>5 (10)</b>	<b>150 (111)</b>
<b>TOTAL CATCH</b>	<b>0.2235 (0.1881)</b>	<b>606 (394)</b>	<b>42 (43)</b>	<b>19 (25)</b>	<b>667 (397)</b>
<b>ANGLER HOURS</b>		<b>2,113 (1,590)</b>	<b>189 (203)</b>	<b>681 (760)</b>	<b>2,984 (1,774)</b>
<b>ANGLER TRIPS</b>		<b>885 (761)</b>	<b>83 (94)</b>	<b>261 (356)</b>	<b>1,229 (845)</b>

Table 3. Estimated harvest, catch per hour, and fishing pressure for shanty. Two standard errors are given in parentheses.

Species	C/H	December-January	February	March	Season
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HARVEST					
Cisco	0.0008	10	0	0	10
	(0.0012)	(15)	(0)	(0)	(15)
Walleye	0.0289	347	25	0	372
	(0.0185)	(211)	(22)	(0)	(212)
Yellow Perch	0.0733	638	70	236	944
	(0.0380)	(359)	(76)	(171)	(405)
Northern pike	0.0056	64	8	0	72
	(0.0054)	(65)	(10)	(0)	(66)
Pumpkinseed	0.0003	0	4	0	4
	(0.0006)	(0)	(8)	(0)	(8)
Rock bass	0.0018	20	2	0	23
	(0.0032)	(41)	(5)	(0)	(41)
Common white sucker	0.0014	18	0	0	18
	(0.0021)	(27)	(0)	(0)	(27)
TOTAL HARVEST	0.1120	1,098	109	236	1,444
	(0.0488)	(424)	(80)	(171)	(464)
RELEASED					
Cisco	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)
Smallmouth bass	0.0005	0	4	3	7
	(0.0008)	(0)	(7)	(6)	(10)
Walleye	0.0395	442	41	26	509
	(0.0234)	(257)	(49)	(25)	(262)
Northern pike	0.0236	215	70	18	304
	(0.0166)	(177)	(73)	(37)	(195)
Common white sucker	0.0017	15	0	8	22
	(0.0026)	(29)	(0)	(15)	(33)
Rock bass	0.0050	46	19	0	65
	(0.0078)	(92)	(38)	(0)	(99)
Pumpkinseed	0.0006	0	8	0	8
	(0.0012)	(0)	(15)	(0)	(15)
Yellow Perch	0.0298	302	5	77	384
	(0.0318)	(385)	(7)	(85)	(394)
TOTAL RELEASED	0.1007	1,020	146	132	1,298
	(0.0502)	(505)	(97)	(98)	(523)
TOTAL CATCH	0.2128	2,118	256	368	2,742
	(0.0827)	(659)	(126)	(197)	(700)
ANGLER HOURS		7,821	2,601	2,466	12,888
		(3,435)	(1,069)	(1,148)	(3,777)
ANGLER TRIPS		1,627	447	573	2,647
		(866)	(228)	(278)	(937)



Table 4. Estimated harvest, catch per hour, and fishing pressure for Lake Gogebic. Two standard errors are given in parentheses.

Species	C/H	December-January	February	March	Season
<b>HARVEST</b>					
Cisco	0.0006 (0.0010)	10 (15)	0 (0)	0 (0)	10 (15)
Walleye	0.0364 (0.0216)	544 (306)	33 (27)	0 (0)	577 (308)
Yellow Perch	0.0696 (0.0323)	759 (375)	95 (85)	250 (172)	1,104 (422)
Northern pike	0.0050 (0.0044)	70 (66)	8 (10)	0 (0)	79 (67)
Pumpkinseed	0.0002 (0.0005)	0 (0)	4 (8)	0 (0)	4 (8)
Rock bass	0.0104 (0.0184)	163 (288)	2 (5)	0 (0)	165 (288)
Common white sucker	0.0014 (0.0018)	22 (28)	0 (0)	0 (0)	22 (28)
<b>TOTAL HARVEST</b>	<b>0.1235 (0.0499)</b>	<b>1,568 (569)</b>	<b>142 (91)</b>	<b>250 (172)</b>	<b>1,961 (601)</b>
<b>RELEASED</b>					
Cisco	0.0004 (0.0007)	6 (11)	0 (0)	0 (0)	6 (11)
Smallmouth bass	0.0016 (0.0019)	13 (26)	4 (7)	8 (12)	25 (29)
Walleye	0.0375 (0.0203)	527 (276)	43 (49)	26 (25)	596 (282)
Northern pike	0.0207 (0.0135)	236 (179)	74 (73)	18 (37)	329 (197)
Common white sucker	0.0016 (0.0022)	18 (30)	0 (0)	8 (15)	26 (34)
Rock bass	0.0041 (0.0064)	46 (92)	19 (38)	0 (0)	65 (99)
Pumpkinseed	0.0005 (0.0010)	0 (0)	8 (15)	0 (0)	8 (15)
Yellow Perch	0.0249 (0.0257)	310 (385)	8 (9)	77 (85)	395 (395)
<b>TOTAL RELEASED</b>	<b>0.0912 (0.0414)</b>	<b>1,156 (517)</b>	<b>155 (98)</b>	<b>137 (98)</b>	<b>1,448 (535)</b>
<b>TOTAL CATCH</b>	<b>0.2148 (0.0759)</b>	<b>2,725 (768)</b>	<b>297 (133)</b>	<b>387 (198)</b>	<b>3,409 (804)</b>
<b>ANGLER HOURS</b>		<b>9,934 (3,785)</b>	<b>2,790 (1,088)</b>	<b>3,147 (1,377)</b>	<b>15,872 (4,173)</b>
<b>ANGLER TRIPS</b>		<b>2,512 (1,152)</b>	<b>531 (246)</b>	<b>834 (452)</b>	<b>3,876 (1,262)</b>

## Survey 59 Fletcher Pond, Alpena County, Winter, 2006

<b>Waterbody</b>	Fletcher Pond
<b>Year</b>	2006
<b>County</b>	Alpena
<b>Sites</b>	542
<b>Survey period</b>	Winter, January-March
<b>Survey design</b>	Roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	roving
<b>Count type/mode</b>	roving (instantaneous)
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Estimate angling pressure, harvest, and catch by species

### Notes

Survey followed a roving-roving (roving counts and interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. roving (instantaneous) counts of open ice and shanty anglers were made once per day. Survey period for both counts and interviews was Winter, January-March. Months were estimated separately.

Table 1. Work shifts used to estimate catch and effort at Fletcher Pond, Winter, January-March, 2006

	<b>Year</b>	<b>Month</b>	<b>F</b>
1	2005	5	15
2	2005	6	16
3	2005	7	16
4	2005	8	15
5	2005	9	13
6	2005	10	12
7	2005	4	14
8	2006	1	11
9	2006	2	11
10	2006	3	13

Table 2. Estimated harvest, catch per hour, and fishing pressure for open ice, 542. Two standard errors are given in parentheses.

Species	C/H	January	February	March	Season
<b>HARVEST</b>					
Walleye	0.0194 (0.0413)	187 (395)	0 (0)	0 (0)	187 (395)
Yellow Perch	0.6519 (0.3449)	61 (111)	519 (826)	5,704 (2,800)	6,284 (2,921)
Northern pike	0.0109 (0.0104)	97 (95)	8 (16)	0 (0)	105 (96)
Black crappie	0.1433 (0.0862)	289 (414)	14 (28)	1,078 (629)	1,382 (754)
Bluegill	0.5506 (0.2501)	1,268 (791)	681 (840)	3,359 (1,638)	5,307 (2,003)
Pumpkinseed	0.5387 (0.2363)	1,051 (734)	784 (876)	3,358 (1,469)	5,193 (1,862)
Rock bass	0.0025 (0.0036)	0 (0)	0 (0)	24 (34)	24 (34)
<b>TOTAL HARVEST</b>	<b>1.9174 (0.6442)</b>	<b>2,953 (1,231)</b>	<b>2,006 (1,468)</b>	<b>13,522 (3,616)</b>	<b>18,482 (4,092)</b>
<b>RELEASED</b>					
Smallmouth bass	0.0208 (0.0192)	44 (76)	16 (25)	140 (159)	200 (178)
Largemouth bass	0.0370 (0.0254)	33 (42)	227 (209)	96 (79)	356 (227)
Northern pike	0.0081 (0.0076)	46 (59)	14 (28)	18 (26)	78 (70)
Rock bass	0.0086 (0.0090)	0 (0)	14 (29)	69 (79)	83 (84)
Bluegill	2.4429 (1.0169)	7,220 (4,392)	5,140 (4,555)	11,185 (4,543)	23,546 (7,789)
Pumpkinseed	2.0007 (0.8559)	4,356 (2,908)	3,141 (2,642)	11,787 (5,374)	19,284 (6,657)
Yellow Perch	1.2478 (0.5541)	1,372 (1,088)	1,859 (1,968)	8,796 (3,772)	12,027 (4,392)
<b>TOTAL RELEASED</b>	<b>5.7658 (1.8605)</b>	<b>13,072 (5,380)</b>	<b>10,411 (5,625)</b>	<b>32,091 (7,987)</b>	<b>55,575 (11,152)</b>
<b>TOTAL CATCH</b>	<b>7.6833 (2.2997)</b>	<b>16,026 (5,519)</b>	<b>12,417 (5,814)</b>	<b>45,614 (8,767)</b>	<b>74,057 (11,879)</b>
<b>ANGLER HOURS</b>		<b>1,878 (789)</b>	<b>1,938 (1,395)</b>	<b>5,823 (1,834)</b>	<b>9,639 (2,436)</b>
<b>ANGLER TRIPS</b>		<b>519 (224)</b>	<b>707 (521)</b>	<b>1,373 (445)</b>	<b>2,598 (720)</b>

Table 3. Estimated harvest, catch per hour, and fishing pressure for shanty, 542. Two standard errors are given in parentheses.

Species	C/H	January	February	March	Season
<b>HARVEST</b>					
Bullhead spp.	0.0002 (0.0004)	0 (0)	8 (17)	0 (0)	8 (17)
Yellow Perch	0.1988 (0.0817)	3,019 (1,274)	2,247 (1,357)	3,440 (2,055)	8,706 (2,773)
Northern pike	0.0247 (0.0101)	703 (281)	295 (180)	85 (74)	1,083 (342)
Black crappie	0.0453 (0.0266)	276 (166)	711 (508)	997 (896)	1,983 (1,043)
Bluegill	0.2878 (0.1160)	3,428 (1,319)	5,798 (3,212)	3,378 (1,730)	12,604 (3,880)
Pumpkinseed	0.2438 (0.0951)	3,480 (1,396)	2,875 (1,776)	4,320 (2,130)	10,675 (3,105)
Rock bass	0.0041 (0.0034)	0 (0)	60 (88)	118 (109)	178 (140)
<b>TOTAL HARVEST</b>	<b>0.8046 (0.2476)</b>	<b>10,906 (2,328)</b>	<b>11,994 (3,951)</b>	<b>12,338 (3,546)</b>	<b>35,237 (5,797)</b>
<b>RELEASED</b>					
Smallmouth bass	0.0056 (0.0037)	176 (130)	67 (70)	0 (0)	244 (147)
Largemouth bass	0.0108 (0.0070)	137 (139)	163 (143)	174 (196)	475 (279)
Northern pike	0.0195 (0.0085)	542 (238)	234 (170)	77 (74)	853 (301)
Rock bass	0.0029 (0.0023)	0 (0)	46 (53)	82 (82)	128 (97)
Bullhead spp.	0.0003 (0.0005)	11 (22)	0 (0)	0 (0)	11 (22)
Bluegill	0.8875 (0.3518)	11,361 (4,067)	16,196 (9,421)	11,307 (5,467)	38,865 (11,627)
Pumpkinseed	0.7575 (0.3134)	7,727 (3,463)	14,030 (8,366)	11,415 (5,659)	33,172 (10,677)
Yellow Perch	0.3745 (0.1489)	5,556 (2,089)	5,730 (3,413)	5,116 (2,883)	16,403 (4,932)
<b>TOTAL RELEASED</b>	<b>2.0585 (0.6551)</b>	<b>25,512 (5,744)</b>	<b>36,467 (13,056)</b>	<b>28,172 (8,383)</b>	<b>90,150 (16,544)</b>
<b>TOTAL CATCH</b>	<b>2.8632 (0.8452)</b>	<b>36,417 (6,198)</b>	<b>48,460 (13,640)</b>	<b>40,509 (9,102)</b>	<b>125,387 (17,530)</b>
<b>ANGLER HOURS</b>		<b>18,222 (5,511)</b>	<b>16,735 (9,255)</b>	<b>8,836 (3,690)</b>	<b>43,793 (11,386)</b>
<b>ANGLER TRIPS</b>		<b>3,993 (1,190)</b>	<b>4,006 (2,176)</b>	<b>2,288 (992)</b>	<b>10,287 (2,672)</b>

Table 4. Estimated harvest, catch per hour, and fishing pressure for 542. Two standard errors are given in parentheses.

Species	C/H	January	February	March	Season
<b>HARVEST</b>					
Bullhead spp.	0.0002 (0.0003)	0 (0)	8 (17)	0 (0)	8 (17)
Walleye	0.0035 (0.0074)	187 (395)	0 (0)	0 (0)	187 (395)
Yellow Perch	0.2805 (0.0971)	3,080 (1,279)	2,766 (1,589)	9,143 (3,473)	14,989 (4,028)
Northern pike	0.0222 (0.0082)	800 (297)	303 (181)	85 (74)	1,188 (355)
Black crappie	0.0630 (0.0277)	565 (446)	725 (508)	2,075 (1,095)	3,365 (1,287)
Bluegill	0.3352 (0.1096)	4,696 (1,538)	6,479 (3,320)	6,737 (2,382)	17,911 (4,366)
Pumpkinseed	0.2970 (0.0937)	4,531 (1,577)	3,659 (1,980)	7,678 (2,587)	15,868 (3,620)
Rock bass	0.0038 (0.0028)	0 (0)	60 (88)	142 (114)	202 (144)
<b>TOTAL HARVEST</b>	<b>1.0054 (0.2562)</b>	<b>13,859 (2,633)</b>	<b>14,000 (4,215)</b>	<b>25,860 (5,065)</b>	<b>53,718 (7,096)</b>
<b>RELEASED</b>					
Smallmouth bass	0.0083 (0.0047)	221 (151)	83 (74)	140 (159)	444 (231)
Largemouth bass	0.0156 (0.0075)	170 (145)	391 (253)	271 (211)	831 (360)
Northern pike	0.0174 (0.0069)	588 (245)	248 (172)	95 (79)	931 (309)
Rock bass	0.0039 (0.0026)	0 (0)	60 (60)	151 (114)	211 (129)
Bullhead spp.	0.0002 (0.0004)	11 (22)	0 (0)	0 (0)	11 (22)
Bluegill	1.1680 (0.3652)	18,582 (5,986)	21,336 (10,465)	22,493 (7,108)	62,411 (13,995)
Pumpkinseed	0.9817 (0.3182)	12,084 (4,523)	17,170 (8,773)	23,202 (7,804)	52,456 (12,582)
Yellow Perch	0.5321 (0.1695)	6,929 (2,355)	7,589 (3,940)	13,912 (4,748)	28,430 (6,604)
<b>TOTAL RELEASED</b>	<b>2.7273 (0.7019)</b>	<b>38,584 (7,870)</b>	<b>46,878 (14,216)</b>	<b>60,263 (11,578)</b>	<b>145,725 (19,952)</b>
<b>TOTAL CATCH</b>	<b>3.7327 (0.9048)</b>	<b>52,443 (8,299)</b>	<b>60,877 (14,828)</b>	<b>86,123 (12,638)</b>	<b>199,443 (21,176)</b>
<b>ANGLER HOURS</b>		<b>20,101 (5,568)</b>	<b>18,672 (9,359)</b>	<b>14,659 (4,121)</b>	<b>53,432 (11,644)</b>
<b>ANGLER TRIPS</b>		<b>4,512 (1,211)</b>	<b>4,713 (2,238)</b>	<b>3,661 (1,087)</b>	<b>12,885 (2,767)</b>

Table 5. Estimated harvest, catch per hour, and fishing pressure for Fletcher Pond. Two standard errors are given in parentheses.

Species	C/H	January	February	March	Season
<b>HARVEST</b>					
Bullhead spp.	0.0002 (0.0003)	0 (0)	8 (17)	0 (0)	8 (17)
Walleye	0.0035 (0.0074)	187 (395)	0 (0)	0 (0)	187 (395)
Yellow Perch	0.2805 (0.0971)	3,080 (1,279)	2,766 (1,589)	9,143 (3,473)	14,989 (4,028)
Northern pike	0.0222 (0.0082)	800 (297)	303 (181)	85 (74)	1,188 (355)
Black crappie	0.0630 (0.0277)	565 (446)	725 (508)	2,075 (1,095)	3,365 (1,287)
Bluegill	0.3352 (0.1096)	4,696 (1,538)	6,479 (3,320)	6,737 (2,382)	17,911 (4,366)
Pumpkinseed	0.2970 (0.0937)	4,531 (1,577)	3,659 (1,980)	7,678 (2,587)	15,868 (3,620)
Rock bass	0.0038 (0.0028)	0 (0)	60 (88)	142 (114)	202 (144)
<b>TOTAL HARVEST</b>	<b>1.0054 (0.2562)</b>	<b>13,859 (2,633)</b>	<b>14,000 (4,215)</b>	<b>25,860 (5,065)</b>	<b>53,718 (7,096)</b>
<b>RELEASED</b>					
Smallmouth bass	0.0083 (0.0047)	221 (151)	83 (74)	140 (159)	444 (231)
Largemouth bass	0.0156 (0.0075)	170 (145)	391 (253)	271 (211)	831 (360)
Northern pike	0.0174 (0.0069)	588 (245)	248 (172)	95 (79)	931 (309)
Rock bass	0.0039 (0.0026)	0 (0)	60 (60)	151 (114)	211 (129)
Bullhead spp.	0.0002 (0.0004)	11 (22)	0 (0)	0 (0)	11 (22)
Bluegill	1.1680 (0.3652)	18,582 (5,986)	21,336 (10,465)	22,493 (7,108)	62,411 (13,995)
Pumpkinseed	0.9817 (0.3182)	12,084 (4,523)	17,170 (8,773)	23,202 (7,804)	52,456 (12,582)
Yellow Perch	0.5321 (0.1695)	6,929 (2,355)	7,589 (3,940)	13,912 (4,748)	28,430 (6,604)
<b>TOTAL RELEASED</b>	<b>2.7273 (0.7019)</b>	<b>38,584 (7,870)</b>	<b>46,878 (14,216)</b>	<b>60,263 (11,578)</b>	<b>145,725 (19,952)</b>
<b>TOTAL CATCH</b>	<b>3.7327 (0.9048)</b>	<b>52,443 (8,299)</b>	<b>60,877 (14,828)</b>	<b>86,123 (12,638)</b>	<b>199,443 (21,176)</b>
<b>ANGLER HOURS</b>		<b>20,101 (5,568)</b>	<b>18,672 (9,359)</b>	<b>14,659 (4,121)</b>	<b>53,432 (11,644)</b>
<b>ANGLER TRIPS</b>		<b>4,512 (1,211)</b>	<b>4,713 (2,238)</b>	<b>3,661 (1,087)</b>	<b>12,885 (2,767)</b>

## **Survey 60 Survey Report for Lake Charlevoix, Charlevoix, Summer, 2006**

<b>Waterbody</b>	Lake Charlevoix
<b>Year</b>	Summer, 2006
<b>County</b>	Charlevoix
<b>Sites</b>	East, South arm, West
<b>Survey period</b>	April 29 to September 30
<b>Survey design</b>	Aerial-roving (aerial counts, roving interviews)
<b>Interview type/mode</b>	roving/boat, shore
<b>Count type/mode</b>	aerial/boat
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Notes**

Survey followed an aerial-roving (aerial counts, roving interviews) design. All funding was provided through Fisheries Division. Counts progressed along a pre-defined flight path from Marker 17 to Marker 1 or from Marker 1 to Marker 17. Flight took approximately 20 min to complete. This sequence was randomized. Time of count was randomized to cover sample period. Only fishing boats were counted. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and one instantaneous count of fishing boats was made per day. One of two shifts was selected each sample day for interviewing (Table 1). One clerk worked full time to collect angler interview data. Starting location within a section and direction of travel were randomized for interviewing. Survey period for both counts and interviews was April 29 to September 30. Months were estimated separately. Estimates are given in Tables 2-5.

Figure 1.— Creel clerk interview and count path for the Lake Charlevoix angler survey

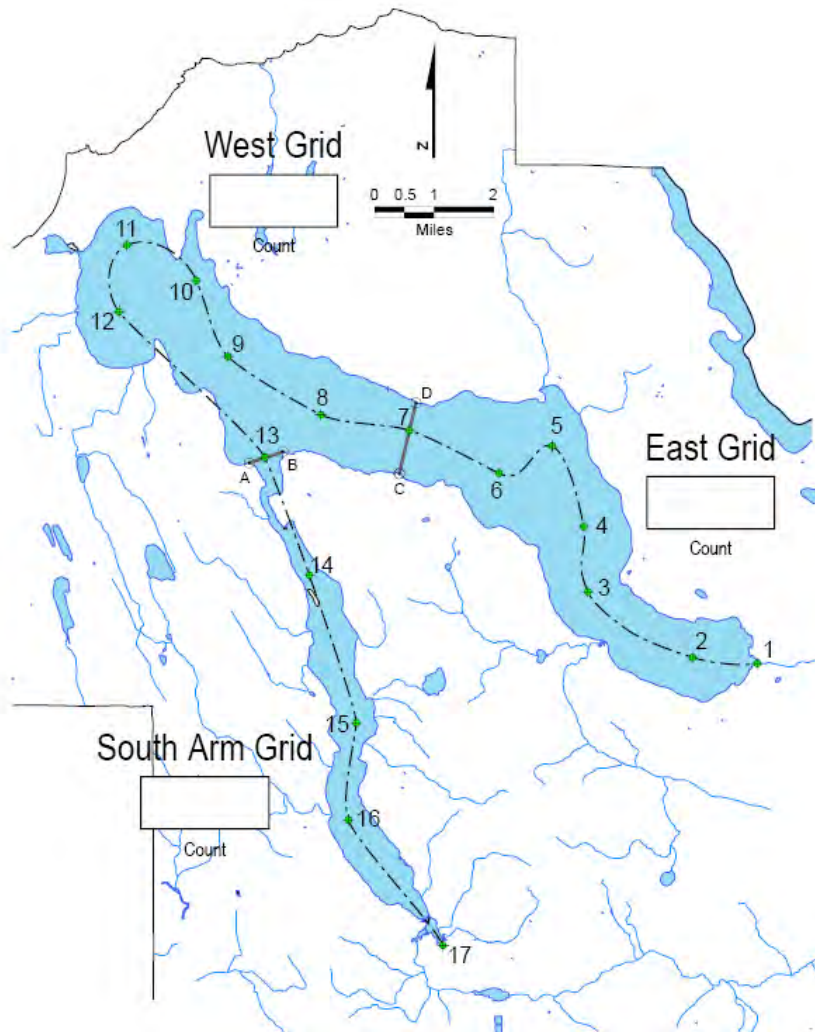


Table 1 –Expansion value (F) used to estimate catch and effort at Lake Charlevoix, April 29 to September 30, Summer, 2006

Year	Month	F
2006	4	14
2006	5	16
2006	6	16
2006	7	16
2006	8	16
2006	9	14



Table 2 – Estimated harvest, catch per hour, and fishing pressure for east, boat. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.0140 (0.0094)	0 (0)	43 (46)	91 (99)	51 (59)	28 (55)	212 (136)
Northern pike	0.0012 (0.0024)	18 (36)	0 (0)	0 (0)	0 (0)	0 (0)	18 (36)
Smallmouth bass	0.0369 (0.0153)	0 (0)	354 (159)	97 (79)	45 (64)	64 (83)	560 (206)
Yellow Perch	0.0539 (0.0485)	65 (130)	19 (38)	18 (36)	171 (142)	545 (691)	818 (719)
Rock bass	0.0102 (0.0131)	0 (0)	100 (182)	27 (55)	27 (54)	0 (0)	155 (197)
Channel catfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Chinook salmon	0.0058 (0.0057)	0 (0)	0 (0)	0 (0)	13 (26)	75 (81)	88 (85)
<b>TOTAL HARVEST</b>	<b>0.1219 (0.0572)</b>	<b>83 (135)</b>	<b>516 (248)</b>	<b>233 (143)</b>	<b>308 (177)</b>	<b>711 (702)</b>	<b>1,851 (791)</b>
<b>RELEASED</b>							
Walleye	0.0067 (0.0088)	0 (0)	95 (131)	0 (0)	7 (13)	0 (0)	102 (132)
Northern pike	0.0032 (0.0044)	18 (36)	3 (5)	0 (0)	27 (54)	0 (0)	48 (65)
Smallmouth bass	0.1825 (0.0657)	141 (182)	1,391 (670)	435 (268)	544 (321)	260 (230)	2,771 (842)
Yellow Perch	0.1050 (0.0514)	87 (124)	317 (254)	506 (462)	348 (341)	335 (324)	1,594 (717)
Bluegill	0.0027 (0.0041)	0 (0)	0 (0)	0 (0)	0 (0)	41 (61)	41 (61)
Rock bass	0.0664 (0.0286)	0 (0)	453 (243)	378 (245)	176 (177)	0 (0)	1,008 (388)
Rainbow trout	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Common white sucker	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Lake trout	0.0013 (0.0025)	0 (0)	19 (38)	0 (0)	0 (0)	0 (0)	19 (38)
Brown bullhead	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Channel catfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Chinook salmon	0.0026 (0.0052)	0 (0)	0 (0)	0 (0)	0 (0)	39 (79)	39 (79)
Freshwater drum	0.0022 (0.0024)	0 (0)	6 (12)	9 (18)	18 (29)	0 (0)	33 (36)
OTH1	0.0344 (0.0448)	520 (673)	3 (5)	0 (0)	0 (0)	0 (0)	522 (673)
<b>TOTAL RELEASED</b>	<b>0.4069 (0.1194)</b>	<b>765 (709)</b>	<b>2,288 (768)</b>	<b>1,329 (588)</b>	<b>1,121 (504)</b>	<b>675 (410)</b>	<b>6,177 (1,364)</b>
<b>TOTAL CATCH</b>	<b>0.5289 (0.1457)</b>	<b>848 (722)</b>	<b>2,804 (808)</b>	<b>1,562 (605)</b>	<b>1,428 (534)</b>	<b>1,386 (813)</b>	<b>8,029 (1,577)</b>
<b>ANGLER HOURS</b>		<b>1,277 (1,035)</b>	<b>2,827 (905)</b>	<b>3,753 (1,371)</b>	<b>3,934 (1,621)</b>	<b>3,391 (1,485)</b>	<b>15,181 (2,933)</b>

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ANGLER TRIPS	519	1,285	1,434	1,026	1,554	5,818
	(457)	(481)	(1,010)	(400)	(829)	(1,519)

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Table 3 – Estimated harvest, catch per hour, and fishing pressure for south arm, boat. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.0325 (0.0145)	199 (164)	421 (228)	125 (128)	26 (53)	0 (0)	771 (313)
Northern pike	0.0023 (0.0031)	44 (71)	10 (21)	0 (0)	0 (0)	0 (0)	54 (74)
Smallmouth bass	0.0270 (0.0123)	0 (0)	451 (235)	94 (81)	0 (0)	95 (99)	641 (268)
Yellow Perch	0.0327 (0.0198)	0 (0)	269 (291)	307 (287)	47 (95)	153 (156)	776 (448)
Rock bass	0.0129 (0.0085)	0 (0)	187 (155)	119 (114)	0 (0)	0 (0)	306 (193)
Channel catfish	0.0023 (0.0026)	0 (0)	55 (61)	0 (0)	0 (0)	0 (0)	55 (61)
Chinook salmon	0.0062 (0.0079)	0 (0)	0 (0)	0 (0)	0 (0)	148 (185)	148 (185)
<b>TOTAL HARVEST</b>	<b>0.1158 (0.0354)</b>	<b>243 (179)</b>	<b>1,393 (469)</b>	<b>645 (344)</b>	<b>74 (109)</b>	<b>397 (262)</b>	<b>2,750 (672)</b>
<b>RELEASED</b>							
Walleye	0.0354 (0.0176)	66 (68)	351 (283)	292 (225)	131 (123)	0 (0)	840 (388)
Northern pike	0.0097 (0.0058)	110 (102)	74 (65)	46 (48)	0 (0)	0 (0)	230 (130)
Smallmouth bass	0.1210 (0.0503)	989 (814)	1,460 (660)	226 (139)	111 (120)	86 (112)	2,873 (1,070)
Yellow Perch	0.1292 (0.0508)	34 (68)	830 (636)	1,091 (569)	572 (394)	541 (495)	3,068 (1,064)
Bluegill	0.0429 (0.0775)	914 (1,828)	74 (69)	22 (32)	8 (16)	0 (0)	1,018 (1,830)
Rock bass	0.0712 (0.0316)	0 (0)	762 (490)	486 (309)	444 (360)	0 (0)	1,691 (682)
Rainbow trout	0.0002 (0.0004)	0 (0)	0 (0)	0 (0)	0 (0)	5 (9)	5 (9)
Common white sucker	0.0036 (0.0028)	39 (46)	47 (44)	0 (0)	0 (0)	0 (0)	86 (64)
Lake trout	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Brown bullhead	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Channel catfish	0.0033 (0.0032)	0 (0)	68 (71)	11 (22)	0 (0)	0 (0)	79 (75)
Chinook salmon	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Freshwater drum	0.0120 (0.0097)	94 (187)	106 (84)	39 (47)	0 (0)	46 (73)	285 (223)
OTH1	0.0054 (0.0053)	0 (0)	7 (15)	121 (124)	0 (0)	0 (0)	129 (125)
<b>TOTAL RELEASED</b>	<b>0.4340 (0.1328)</b>	<b>2,245 (2,015)</b>	<b>3,781 (1,088)</b>	<b>2,335 (714)</b>	<b>1,266 (561)</b>	<b>678 (513)</b>	<b>10,304 (2,517)</b>
<b>TOTAL CATCH</b>	<b>0.5498 (0.1493)</b>	<b>2,488 (2,023)</b>	<b>5,173 (1,185)</b>	<b>2,980 (793)</b>	<b>1,339 (571)</b>	<b>1,075 (576)</b>	<b>13,055 (2,605)</b>
<b>ANGLER HOURS</b>		<b>4,685 (2,544)</b>	<b>6,792 (2,297)</b>	<b>5,780 (1,909)</b>	<b>3,042 (1,228)</b>	<b>3,445 (1,498)</b>	<b>23,743 (4,376)</b>

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ANGLER TRIPS	1,435	1,817	2,843	1,225	1,354	8,674
	(1,155)	(706)	(1,174)	(864)	(869)	(2,170)

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Table 4 – Estimated harvest, catch per hour, and fishing pressure for west, boat. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.0011 (0.0022)	0 (0)	0 (0)	13 (25)	0 (0)	0 (0)	13 (25)
Northern pike	0.0043 (0.0078)	0 (0)	6 (12)	44 (89)	0 (0)	0 (0)	50 (90)
Smallmouth bass	0.0339 (0.0198)	0 (0)	192 (134)	71 (120)	111 (111)	19 (28)	393 (213)
Yellow Perch	0.9145 (0.3585)	2,808 (2,209)	806 (596)	1,077 (915)	2,313 (1,470)	3,615 (1,912)	10,619 (3,448)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Channel catfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Chinook salmon	0.0015 (0.0022)	0 (0)	0 (0)	0 (0)	0 (0)	17 (25)	17 (25)
<b>TOTAL HARVEST</b>	<b>0.9552 (0.3642)</b>	<b>2,808 (2,209)</b>	<b>1,003 (611)</b>	<b>1,206 (928)</b>	<b>2,424 (1,475)</b>	<b>3,650 (1,913)</b>	<b>11,092 (3,456)</b>
<b>RELEASED</b>							
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Smallmouth bass	0.1274 (0.0745)	0 (0)	349 (279)	888 (736)	173 (131)	69 (66)	1,479 (801)
Yellow Perch	1.2677 (0.5157)	3,817 (3,093)	2,552 (2,203)	698 (617)	3,929 (2,627)	3,724 (1,922)	14,720 (5,040)
Bluegill	0.0040 (0.0081)	0 (0)	0 (0)	47 (94)	0 (0)	0 (0)	47 (94)
Rock bass	0.0197 (0.0169)	0 (0)	90 (136)	37 (48)	102 (122)	0 (0)	229 (189)
Rainbow trout	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Common white sucker	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Lake trout	0.0010 (0.0020)	0 (0)	12 (23)	0 (0)	0 (0)	0 (0)	12 (23)
Brown bullhead	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Channel catfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Chinook salmon	0.0020 (0.0041)	0 (0)	0 (0)	0 (0)	24 (47)	0 (0)	24 (47)
Freshwater drum	0.0005 (0.0009)	0 (0)	0 (0)	0 (0)	5 (11)	0 (0)	5 (11)
OTH1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL RELEASED</b>	<b>1.4223 (0.5396)</b>	<b>3,817 (3,093)</b>	<b>3,003 (2,225)</b>	<b>1,670 (966)</b>	<b>4,233 (2,633)</b>	<b>3,793 (1,923)</b>	<b>16,516 (5,108)</b>
<b>TOTAL CATCH</b>	<b>2.3775 (0.7450)</b>	<b>6,625 (3,801)</b>	<b>4,007 (2,307)</b>	<b>2,876 (1,340)</b>	<b>6,657 (3,018)</b>	<b>7,444 (2,713)</b>	<b>27,608 (6,167)</b>
<b>ANGLER HOURS</b>		<b>1,482 (966)</b>	<b>2,774 (1,196)</b>	<b>2,631 (1,442)</b>	<b>2,595 (1,168)</b>	<b>2,131 (840)</b>	<b>11,612 (2,552)</b>

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ANGLER TRIPS	376	857	744	1,023	681	3,681
	(260)	(INF)	(492)	(489)	(458)	(INF)

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Table 5 – Estimated harvest, catch per hour, and fishing pressure for boat. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.0197 (0.0071)	199 (164)	464 (232)	229 (164)	77 (79)	28 (55)	996 (342)
Northern pike	0.0024 (0.0024)	62 (79)	16 (24)	44 (89)	0 (0)	0 (0)	123 (121)
Smallmouth bass	0.0315 (0.0087)	0 (0)	997 (314)	262 (165)	157 (128)	178 (132)	1,594 (399)
Yellow Perch	0.2417 (0.0756)	2,873 (2,213)	1,093 (664)	1,402 (960)	2,532 (1,480)	4,312 (2,039)	12,213 (3,551)
Rock bass	0.0091 (0.0056)	0 (0)	287 (239)	146 (127)	27 (54)	0 (0)	460 (276)
Channel catfish	0.0011 (0.0012)	0 (0)	55 (61)	0 (0)	0 (0)	0 (0)	55 (61)
Chinook salmon	0.0050 (0.0041)	0 (0)	0 (0)	0 (0)	13 (26)	240 (203)	253 (205)
<b>TOTAL HARVEST</b>	<b>0.3105 (0.0800)</b>	<b>3,134 (2,220)</b>	<b>2,912 (809)</b>	<b>2,084 (1,000)</b>	<b>2,805 (1,489)</b>	<b>4,758 (2,054)</b>	<b>15,694 (3,608)</b>
<b>RELEASED</b>							
Walleye	0.0186 (0.0084)	66 (68)	446 (312)	292 (225)	138 (124)	0 (0)	942 (410)
Northern pike	0.0055 (0.0029)	128 (108)	77 (65)	46 (48)	27 (54)	0 (0)	278 (146)
Smallmouth bass	0.1410 (0.0353)	1,130 (834)	3,201 (981)	1,549 (796)	828 (366)	416 (264)	7,124 (1,580)
Yellow Perch	0.3835 (0.1121)	3,937 (3,097)	3,700 (2,307)	2,296 (957)	4,849 (2,678)	4,600 (2,011)	19,382 (5,201)
Bluegill	0.0219 (0.0364)	914 (1,828)	74 (69)	69 (99)	8 (16)	41 (61)	1,106 (1,833)
Rock bass	0.0579 (0.0173)	0 (0)	1,305 (563)	901 (397)	722 (419)	0 (0)	2,928 (807)
Rainbow trout	0.0001 (0.0002)	0 (0)	0 (0)	0 (0)	0 (0)	5 (9)	5 (9)
Common white sucker	0.0017 (0.0013)	39 (46)	47 (44)	0 (0)	0 (0)	0 (0)	86 (64)
Lake trout	0.0006 (0.0009)	0 (0)	31 (45)	0 (0)	0 (0)	0 (0)	31 (45)
Brown bullhead	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Channel catfish	0.0016 (0.0015)	0 (0)	68 (71)	11 (22)	0 (0)	0 (0)	79 (75)
Chinook salmon	0.0012 (0.0018)	0 (0)	0 (0)	0 (0)	24 (47)	39 (79)	63 (92)
Freshwater drum	0.0064 (0.0045)	94 (187)	112 (85)	48 (50)	23 (30)	46 (73)	323 (226)
OTH1	0.0129 (0.0136)	520 (673)	10 (16)	121 (124)	0 (0)	0 (0)	651 (685)
<b>TOTAL RELEASED</b>	<b>0.6530 (0.1384)</b>	<b>6,827 (3,759)</b>	<b>9,071 (2,593)</b>	<b>5,333 (1,338)</b>	<b>6,619 (2,739)</b>	<b>5,147 (2,032)</b>	<b>32,998 (5,855)</b>
<b>TOTAL CATCH</b>	<b>0.9635 (0.1760)</b>	<b>9,961 (4,366)</b>	<b>11,984 (2,717)</b>	<b>7,417 (1,670)</b>	<b>9,425 (3,118)</b>	<b>9,905 (2,890)</b>	<b>48,692 (6,878)</b>
<b>ANGLER HOURS</b>		<b>7,444 (2,912)</b>	<b>12,392 (2,743)</b>	<b>12,164 (2,757)</b>	<b>9,570 (2,345)</b>	<b>8,966 (2,271)</b>	<b>50,536 (5,853)</b>

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ANGLER TRIPS	2,330	3,958	5,022	3,274	3,589	18,173
	(1,269)	(NAN)	(1,625)	(1,070)	(1,285)	(NAN)

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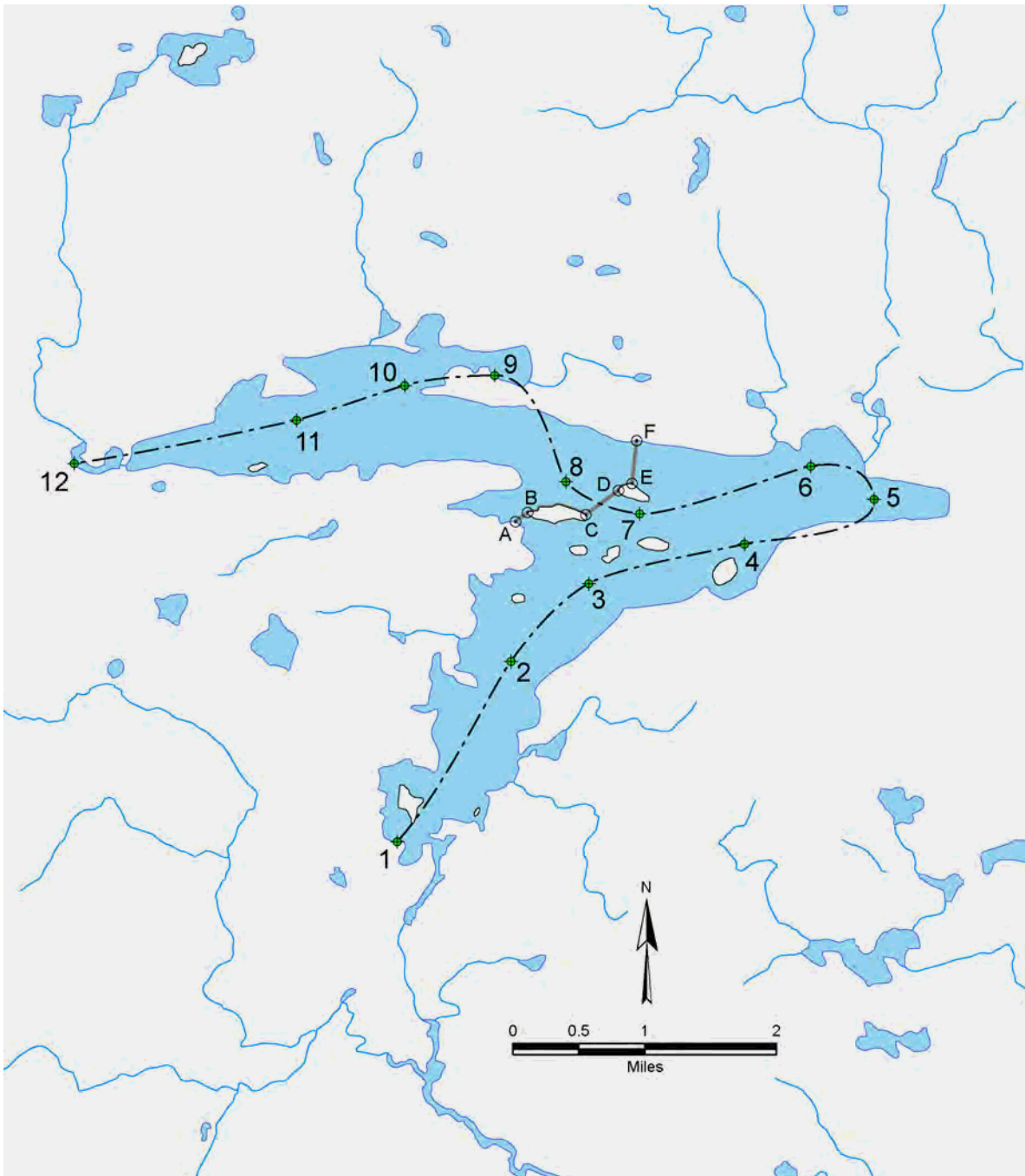


## **Survey 61 Survey Report for Lake Michigamme, Marquette County, Summer, 2006**

<b>Waterbody</b>	Lake Michigamme
<b>Year</b>	Summer, 2006
<b>County</b>	Marquette County
<b>Sites</b>	East, West
<b>Survey period</b>	May 15 to September 30
<b>Survey design</b>	Aerial-roving (aerial counts, roving interviews)
<b>Interview type/mode</b>	roving/boat, shore
<b>Count type/mode</b>	aerial/boat
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Notes**

Survey followed an aerial-roving (aerial counts, roving interviews) design. All funding was provided through Fisheries Division. Counts progressed along a predefined flight path from Marker 12 to Marker 1 or from Marker 1 to Marker 12. Flight took approximately 12 min to complete. This sequence was randomized. Time of count was randomized to cover sample period. Only fishing boats were counted. Both weekend days and 3 randomly selected weekdays were selected for counting and interviewing during each week of the survey season. No holidays were sampled. Counting and interviewing were done on the same days, and one instantaneous count of fishing boats was made per day. One of two shifts was selected each sample day for interviewing (Table 1). One clerk worked full time to collect angler interview data. Starting location within a section and direction of travel were randomized for interviewing. Survey period for both counts and interviews was May 15 to September 30. Months were estimated separately. Estimates are given in Tables 2-13.



GPS coordinates for Lake Michigan angler survey, 2006. See map on previous page for general flight path and numbered locations.

Location	Latitude	Longitude
(S end of Lake Michigan) 1	46° 29.06' N	88° 04.69' W
2	46° 30.27' N	88° 03.65' W
3	46° 30.79' N	88° 02.92' W

	4	46° 31.08' N	88° 01.44' W
	5	46° 31.40' N	88° 00.21' W
(E end of Lake Michigamme)	6	46° 31.60' N	88° 00.83' W
	7	46° 31.26' N	88° 02.45' W
	8	46° 31.46' N	88° 03.16' W
	9	46° 32.15' N	88° 03.87' W
(N center of Lake Michigamme)	10	46° 32.07' N	88° 04.73' W
	11	46° 31.82' N	88° 05.76' W
(W end of Lake Michigamme)	12	46° 31.50' N	88° 07.87' W

GPS coordinates that delineate the two survey sites of Lake Michigamme. See figure for general location. One site will be east and one site will be west of a line drawn between A thru F.

	<b>Location</b>	<b>Latitude</b>	<b>Longitude</b>
	(Middle shore between arms) A	46° 31.18' N	88° 03.63' W
	(W end of Ramsey's Island) B	46° 31.25' N	88° 03.52' W
	(E end of Ramsey's Island) C	46° 31.25' N	88° 02.97' W
	(W end of Harvey's Island) D	46° 31.42' N	88° 02.67' W
	(N center point of Harvey's Island) E	46° 31.47' N	88° 02.53' W
	(Point on N central shore of Lake) F	46° 31.75' N	88° 02.50' W

Table 1—Expansion value (F) used to estimate catch and effort at Lake Michigamme, May 15 to September 30, Summer, 2006

	<b>Year</b>	<b>Month</b>	<b>F</b>
1	2006	5	16
2	2006	6	16
3	2006	7	16
4	2006	8	16
5	2006	9	14
6	2006	4	14

Table 2—Estimated harvest, catch per hour, and fishing pressure for east, boat. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.1030 (0.0368)	170 (133)	268 (162)	712 (358)	383 (231)	82 (72)	1,615 (481)
Northern pike	0.0057 (0.0051)	0 (0)	9 (15)	21 (42)	55 (63)	5 (9)	89 (78)
Smallmouth bass	0.0050 (0.0050)	0 (0)	0 (0)	33 (40)	45 (65)	0 (0)	78 (77)
Yellow Perch	0.0203 (0.0128)	0 (0)	0 (0)	68 (80)	226 (167)	23 (46)	318 (191)
Rock bass	0.0386 (0.0215)	68 (135)	85 (97)	116 (120)	327 (239)	9 (14)	605 (315)
<b>TOTAL HARVEST</b>	<b>0.1724 (0.0519)</b>	<b>238 (190)</b>	<b>362 (190)</b>	<b>950 (390)</b>	<b>1,036 (383)</b>	<b>119 (87)</b>	<b>2,705 (615)</b>
<b>RELEASED</b>							
Walleye	0.1349 (0.0487)	181 (156)	164 (130)	780 (351)	818 (472)	174 (145)	2,116 (639)
Northern pike	0.0438 (0.0260)	15 (29)	321 (294)	85 (79)	250 (233)	17 (21)	688 (385)
Largemouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Smallmouth bass	0.1860 (0.0707)	66 (74)	482 (302)	883 (528)	1,223 (700)	265 (180)	2,918 (948)
Yellow Perch	0.0359 (0.0231)	7 (15)	33 (45)	76 (83)	401 (318)	46 (93)	563 (345)
Rock bass	0.1751 (0.0724)	0 (0)	480 (456)	1,246 (640)	626 (356)	396 (503)	2,747 (999)
<b>TOTAL RELEASED</b>	<b>0.5758 (0.1529)</b>	<b>269 (176)</b>	<b>1,479 (635)</b>	<b>3,070 (908)</b>	<b>3,316 (998)</b>	<b>898 (562)</b>	<b>9,032 (1,603)</b>
<b>TOTAL CATCH</b>	<b>0.7482 (0.1839)</b>	<b>507 (259)</b>	<b>1,841 (663)</b>	<b>4,020 (989)</b>	<b>4,352 (1,069)</b>	<b>1,017 (568)</b>	<b>11,737 (1,717)</b>
<b>ANGLER HOURS</b>		<b>1,534 (757)</b>	<b>3,057 (1,237)</b>	<b>4,664 (1,773)</b>	<b>5,008 (1,910)</b>	<b>1,422 (838)</b>	<b>15,686 (3,098)</b>
<b>ANGLER TRIPS</b>		<b>433 (274)</b>	<b>825 (515)</b>	<b>1,287 (759)</b>	<b>1,755 (944)</b>	<b>474 (343)</b>	<b>4,773 (1,388)</b>

Table 3—Estimated harvest, catch per hour, and fishing pressure for east, shore. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Smallmouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>RELEASED</b>							
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Largemouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Smallmouth bass	0.1000 (0.2315)	0 (0)	0 (0)	0 (0)	0 (0)	25 (50)	25 (50)
Yellow Perch	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL RELEASED</b>	0.1000 (0.2315)	0 (0)	0 (0)	0 (0)	0 (0)	25 (50)	25 (50)
<b>TOTAL CATCH</b>	0.1000 (0.2315)	0 (0)	0 (0)	0 (0)	0 (0)	25 (50)	25 (50)
<b>ANGLER HOURS</b>		150 (212)	0 (0)	0 (0)	0 (0)	100 (200)	250 (292)
<b>ANGLER TRIPS</b>		42 (60)	0 (0)	0 (0)	0 (0)	28 (56)	70 (82)

Table 4—Estimated harvest, catch per hour, and fishing pressure for wes, boat. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.0689 (0.0301)	0 (0)	168 (144)	213 (153)	262 (186)	80 (66)	723 (288)
Northern pike	0.0053 (0.0054)	0 (0)	4 (8)	37 (47)	14 (28)	0 (0)	55 (56)
Smallmouth bass	0.0009 (0.0019)	0 (0)	0 (0)	10 (20)	0 (0)	0 (0)	10 (20)
Yellow Perch	0.0095 (0.0093)	0 (0)	7 (13)	11 (23)	32 (55)	50 (74)	100 (96)
Rock bass	0.0680 (0.0433)	0 (0)	142 (203)	290 (315)	232 (210)	50 (74)	714 (436)
<b>TOTAL HARVEST</b>	<b>0.1526 (0.0578)</b>	<b>0 (0)</b>	<b>320 (249)</b>	<b>562 (355)</b>	<b>541 (287)</b>	<b>180 (124)</b>	<b>1,602 (535)</b>
<b>RELEASED</b>							
Walleye	0.0924 (0.0448)	83 (99)	90 (82)	142 (132)	445 (349)	209 (186)	969 (437)
Northern pike	0.0410 (0.0210)	3 (6)	191 (138)	84 (87)	112 (114)	40 (56)	430 (206)
Largemouth bass	0.0020 (0.0041)	0 (0)	21 (43)	0 (0)	0 (0)	0 (0)	21 (43)
Smallmouth bass	0.1212 (0.0481)	0 (0)	205 (143)	383 (242)	319 (185)	365 (301)	1,272 (451)
Yellow Perch	0.0088 (0.0078)	0 (0)	45 (52)	20 (40)	27 (47)	0 (0)	92 (81)
Rock bass	0.1971 (0.0781)	0 (0)	855 (521)	600 (405)	279 (202)	334 (247)	2,068 (733)
<b>TOTAL RELEASED</b>	<b>0.4624 (0.1253)</b>	<b>87 (99)</b>	<b>1,407 (568)</b>	<b>1,229 (499)</b>	<b>1,182 (460)</b>	<b>949 (435)</b>	<b>4,853 (991)</b>
<b>TOTAL CATCH</b>	<b>0.6151 (0.1534)</b>	<b>87 (99)</b>	<b>1,727 (620)</b>	<b>1,791 (612)</b>	<b>1,723 (543)</b>	<b>1,128 (452)</b>	<b>6,455 (1,126)</b>
<b>ANGLER HOURS</b>		<b>1,124 (455)</b>	<b>3,264 (1,009)</b>	<b>2,022 (819)</b>	<b>2,212 (854)</b>	<b>1,873 (933)</b>	<b>10,494 (1,870)</b>
<b>ANGLER TRIPS</b>		<b>378 (339)</b>	<b>1,399 (1,178)</b>	<b>921 (756)</b>	<b>564 (391)</b>	<b>567 (INF)</b>	<b>3,829 (INF)</b>

Table 5—Estimated harvest, catch per hour, and fishing pressure for west, shore. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Smallmouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>RELEASED</b>							
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Largemouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Smallmouth bass	0.6922 NAN	0 (0)	0 (0)	0 (0)	0 (0)	100 NAN	100 NAN
Yellow Perch	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL RELEASED</b>	0.6922 NAN	0 (0)	0 (0)	0 (0)	0 (0)	100 NAN	100 NAN
<b>TOTAL CATCH</b>	0.6922 NAN	0 (0)	0 (0)	0 (0)	0 (0)	100 NAN	100 NAN
<b>ANGLER HOURS</b>		44 (64)	0 (0)	0 (0)	0 (0)	100 (141)	144 (155)
<b>ANGLER TRIPS</b>		14 (20)	0 (0)	0 (0)	0 (0)	32 (46)	46 (50)

Table 6—Estimated harvest, catch per hour, and fishing pressure for east. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.1014 (0.0361)	170 (133)	268 (162)	712 (358)	383 (231)	82 (72)	1,615 (481)
Northern pike	0.0056 (0.0050)	0 (0)	9 (15)	21 (42)	55 (63)	5 (9)	89 (78)
Smallmouth bass	0.0049 (0.0049)	0 (0)	0 (0)	33 (40)	45 (65)	0 (0)	78 (77)
Yellow Perch	0.0199 (0.0126)	0 (0)	0 (0)	68 (80)	226 (167)	23 (46)	318 (191)
Rock bass	0.0380 (0.0211)	68 (135)	85 (97)	116 (120)	327 (239)	9 (14)	605 (315)
<b>TOTAL HARVEST</b>	<b>0.1697 (0.0509)</b>	<b>238 (190)</b>	<b>362 (190)</b>	<b>950 (390)</b>	<b>1,036 (383)</b>	<b>119 (87)</b>	<b>2,705 (615)</b>
<b>RELEASED</b>							
Walleye	0.1328 (0.0478)	181 (156)	164 (130)	780 (351)	818 (472)	174 (145)	2,116 (639)
Northern pike	0.0432 (0.0256)	15 (29)	321 (294)	85 (79)	250 (233)	17 (21)	688 (385)
Largemouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Smallmouth bass	0.1847 (0.0696)	66 (74)	482 (302)	883 (528)	1,223 (700)	290 (187)	2,943 (949)
Yellow Perch	0.0353 (0.0227)	7 (15)	33 (45)	76 (83)	401 (318)	46 (93)	563 (345)
Rock bass	0.1724 (0.0711)	0 (0)	480 (456)	1,246 (640)	626 (356)	396 (503)	2,747 (999)
<b>TOTAL RELEASED</b>	<b>0.5683 (0.1498)</b>	<b>269 (176)</b>	<b>1,479 (635)</b>	<b>3,070 (908)</b>	<b>3,316 (998)</b>	<b>923 (564)</b>	<b>9,057 (1,604)</b>
<b>TOTAL CATCH</b>	<b>0.7381 (0.1800)</b>	<b>507 (259)</b>	<b>1,841 (663)</b>	<b>4,020 (989)</b>	<b>4,352 (1,069)</b>	<b>1,042 (571)</b>	<b>11,762 (1,718)</b>
<b>ANGLER HOURS</b>		<b>1,684 (786)</b>	<b>3,057 (1,237)</b>	<b>4,664 (1,773)</b>	<b>5,008 (1,910)</b>	<b>1,522 (862)</b>	<b>15,936 (3,111)</b>
<b>ANGLER TRIPS</b>		<b>474 (281)</b>	<b>825 (515)</b>	<b>1,287 (759)</b>	<b>1,755 (944)</b>	<b>501 (348)</b>	<b>4,843 (1,390)</b>



Table 7—Estimated harvest, catch per hour, and fishing pressure for west. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.0679 (0.0296)	0 (0)	168 (144)	213 (153)	262 (186)	80 (66)	723 (288)
Northern pike	0.0052 (0.0053)	0 (0)	4 (8)	37 (47)	14 (28)	0 (0)	55 (56)
Smallmouth bass	0.0009 (0.0019)	0 (0)	0 (0)	10 (20)	0 (0)	0 (0)	10 (20)
Yellow Perch	0.0094 (0.0092)	0 (0)	7 (13)	11 (23)	32 (55)	50 (74)	100 (96)
Rock bass	0.0671 (0.0427)	0 (0)	142 (203)	290 (315)	232 (210)	50 (74)	714 (436)
<b>TOTAL HARVEST</b>	<b>0.1506 (0.0568)</b>	<b>0 (0)</b>	<b>320 (249)</b>	<b>562 (355)</b>	<b>541 (287)</b>	<b>180 (124)</b>	<b>1,602 (535)</b>
<b>RELEASED</b>							
Walleye	0.0911 (0.0441)	83 (99)	90 (82)	142 (132)	445 (349)	209 (186)	969 (437)
Northern pike	0.0404 (0.0207)	3 (6)	191 (138)	84 (87)	112 (114)	40 (56)	430 (206)
Largemouth bass	0.0020 (0.0040)	0 (0)	21 (43)	0 (0)	0 (0)	0 (0)	21 (43)
Smallmouth bass	0.1289 NAN	0 (0)	205 (143)	383 (242)	319 (185)	465 NAN	1,372 NAN
Yellow Perch	0.0087 (0.0077)	0 (0)	45 (52)	20 (40)	27 (47)	0 (0)	92 (81)
Rock bass	0.1944 (0.0769)	0 (0)	855 (521)	600 (405)	279 (202)	334 (247)	2,068 (733)
<b>TOTAL RELEASED</b>	<b>0.4656 NAN</b>	<b>87 (99)</b>	<b>1,407 (568)</b>	<b>1,229 (499)</b>	<b>1,182 (460)</b>	<b>1,049 NAN</b>	<b>4,953 NAN</b>
<b>TOTAL CATCH</b>	<b>0.6161 NAN</b>	<b>87 (99)</b>	<b>1,727 (620)</b>	<b>1,791 (612)</b>	<b>1,723 (543)</b>	<b>1,228 NAN</b>	<b>6,555 NAN</b>
<b>ANGLER HOURS</b>		<b>1,168 (459)</b>	<b>3,264 (1,009)</b>	<b>2,022 (819)</b>	<b>2,212 (854)</b>	<b>1,973 (944)</b>	<b>10,639 (1,876)</b>
<b>ANGLER TRIPS</b>		<b>392 (340)</b>	<b>1,399 (1,178)</b>	<b>921 (756)</b>	<b>564 (391)</b>	<b>599 (INF)</b>	<b>3,876 (INF)</b>

Table 8—Estimated harvest, catch per hour, and fishing pressure for boat. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.0893 (0.0247)	170 (133)	436 (217)	925 (389)	645 (297)	162 (98)	2,338 (560)
Northern pike	0.0055 (0.0037)	0 (0)	13 (17)	58 (63)	69 (69)	5 (9)	145 (96)
Smallmouth bass	0.0033 (0.0031)	0 (0)	0 (0)	43 (45)	45 (65)	0 (0)	88 (79)
Yellow Perch	0.0160 (0.0084)	0 (0)	7 (13)	80 (83)	259 (176)	73 (87)	418 (213)
Rock bass	0.0504 (0.0217)	68 (135)	226 (225)	406 (337)	559 (318)	59 (75)	1,318 (538)
<b>TOTAL HARVEST</b>	<b>0.1645 (0.0386)</b>	<b>238 (190)</b>	<b>682 (313)</b>	<b>1,511 (528)</b>	<b>1,577 (479)</b>	<b>299 (151)</b>	<b>4,307 (815)</b>
<b>RELEASED</b>							
Walleye	0.1179 (0.0338)	265 (185)	254 (154)	922 (375)	1,262 (587)	383 (236)	3,086 (774)
Northern pike	0.0427 (0.0177)	18 (30)	512 (324)	169 (118)	361 (260)	57 (60)	1,118 (437)
Largemouth bass	0.0008 (0.0016)	0 (0)	21 (43)	0 (0)	0 (0)	0 (0)	21 (43)
Smallmouth bass	0.1600 (0.0458)	66 (74)	686 (334)	1,266 (581)	1,542 (724)	630 (351)	4,190 (1,049)
Yellow Perch	0.0250 (0.0140)	7 (15)	78 (69)	96 (92)	428 (321)	46 (93)	656 (354)
Rock bass	0.1839 (0.0537)	0 (0)	1,334 (692)	1,846 (757)	905 (409)	729 (560)	4,815 (1,238)
<b>TOTAL RELEASED</b>	<b>0.5304 (0.1027)</b>	<b>355 (202)</b>	<b>2,886 (852)</b>	<b>4,299 (1,036)</b>	<b>4,499 (1,099)</b>	<b>1,846 (710)</b>	<b>13,885 (1,885)</b>
<b>TOTAL CATCH</b>	<b>0.6949 (0.1240)</b>	<b>594 (277)</b>	<b>3,567 (908)</b>	<b>5,810 (1,163)</b>	<b>6,075 (1,199)</b>	<b>2,145 (726)</b>	<b>18,191 (2,054)</b>
<b>ANGLER HOURS</b>		<b>2,658 (883)</b>	<b>6,321 (1,596)</b>	<b>6,687 (1,953)</b>	<b>7,220 (2,092)</b>	<b>3,295 (1,254)</b>	<b>26,180 (3,618)</b>
<b>ANGLER TRIPS</b>		<b>811 (436)</b>	<b>2,224 (1,285)</b>	<b>2,208 (1,071)</b>	<b>2,319 (1,022)</b>	<b>1,041 (NAN)</b>	<b>8,602 (NAN)</b>

Table 9—Estimated harvest, catch per hour, and fishing pressure for shore. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Smallmouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>RELEASED</b>							
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Largemouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Smallmouth bass	0.3169 NAN	0 (0)	0 (0)	0 (0)	0 (0)	125 NAN	125 NAN
Yellow Perch	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL RELEASED</b>	0.3169 NAN	0 (0)	0 (0)	0 (0)	0 (0)	125 NAN	125 NAN
<b>TOTAL CATCH</b>	0.3169 NAN	0 (0)	0 (0)	0 (0)	0 (0)	125 NAN	125 NAN
<b>ANGLER HOURS</b>		194 (221)	0 (0)	0 (0)	0 (0)	200 (245)	394 (330)
<b>ANGLER TRIPS</b>		56 (63)	0 (0)	0 (0)	0 (0)	60 (72)	116 (96)

Table 10—Estimated harvest, catch per hour, and fishing pressure for Lake Michigan. Two standard errors are given in parentheses.

Species	C/H	May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.0880 (0.0243)	170 (133)	436 (217)	925 (389)	645 (297)	162 (98)	2,338 (560)
Northern pike	0.0054 (0.0037)	0 (0)	13 (17)	58 (63)	69 (69)	5 (9)	145 (96)
Smallmouth bass	0.0033 (0.0030)	0 (0)	0 (0)	43 (45)	45 (65)	0 (0)	88 (79)
Yellow Perch	0.0157 (0.0083)	0 (0)	7 (13)	80 (83)	259 (176)	73 (87)	418 (213)
Rock bass	0.0496 (0.0214)	68 (135)	226 (225)	406 (337)	559 (318)	59 (75)	1,318 (538)
<b>TOTAL HARVEST</b>	<b>0.1621 (0.0378)</b>	<b>238 (190)</b>	<b>682 (313)</b>	<b>1,511 (528)</b>	<b>1,577 (479)</b>	<b>299 (151)</b>	<b>4,307 (815)</b>
<b>RELEASED</b>							
Walleye	0.1161 (0.0332)	265 (185)	254 (154)	922 (375)	1,262 (587)	383 (236)	3,086 (774)
Northern pike	0.0421 (0.0174)	18 (30)	512 (324)	169 (118)	361 (260)	57 (60)	1,118 (437)
Largemouth bass	0.0008 (0.0016)	0 (0)	21 (43)	0 (0)	0 (0)	0 (0)	21 (43)
Smallmouth bass	0.1624 NAN	66 (74)	686 (334)	1,266 (581)	1,542 (724)	755 NAN	4,315 NAN
Yellow Perch	0.0247 (0.0137)	7 (15)	78 (69)	96 (92)	428 (321)	46 (93)	656 (354)
Rock bass	0.1812 (0.0528)	0 (0)	1,334 (692)	1,846 (757)	905 (409)	729 (560)	4,815 (1,238)
<b>TOTAL RELEASED</b>	<b>0.5272 NAN</b>	<b>355 (202)</b>	<b>2,886 (852)</b>	<b>4,299 (1,036)</b>	<b>4,499 (1,099)</b>	<b>1,971 NAN</b>	<b>14,010 NAN</b>
<b>TOTAL CATCH</b>	<b>0.6893 NAN</b>	<b>594 (277)</b>	<b>3,567 (908)</b>	<b>5,810 (1,163)</b>	<b>6,075 (1,199)</b>	<b>2,270 NAN</b>	<b>18,316 NAN</b>
<b>ANGLER HOURS</b>		<b>2,852 (910)</b>	<b>6,321 (1,596)</b>	<b>6,687 (1,953)</b>	<b>7,220 (2,092)</b>	<b>3,495 (1,278)</b>	<b>26,574 (3,633)</b>
<b>ANGLER TRIPS</b>		<b>867 (441)</b>	<b>2,224 (1,285)</b>	<b>2,208 (1,071)</b>	<b>2,319 (1,022)</b>	<b>1,101 (INF)</b>	<b>8,719 (INF)</b>

## **Survey 62 Survey Report for Ford Lake, Washtenaw County, Summer, 2006**

<b>Waterbody</b>	Ford Lake
<b>Year</b>	Summer, 2006
<b>County</b>	Washtenaw County
<b>Sites</b>	Ford Lake
<b>Survey period</b>	April 1 to October 31
<b>Survey design</b>	roving-access and roving-roving design
<b>Interview type/mode</b>	access and roving/boat, shore
<b>Count type/mode</b>	Progressive/boat and shore
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Notes**

Survey followed an roving-access and roving-roving design (roving counts; access point or roving interviews). All funding was provided through Fisheries Division. One clerk worked full time to collect interview and count data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. Roving counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was from April 1 to October 31. Months were estimated separately. Estimates were given in Tables 2-4.

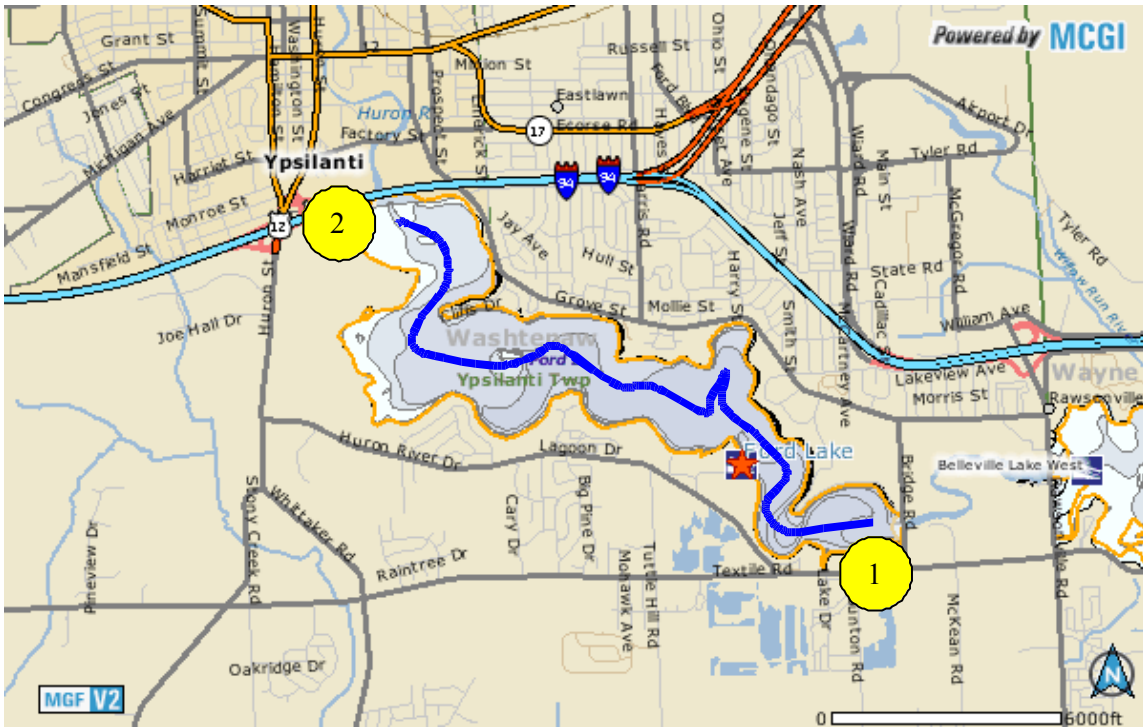


Table 1–Expansion values (F) used to estimate catch and effort at Ford Lake, April 1 to October 31, Summer, 2006

	Year	Month	F
1	2006	4	14
2	2006	5	15
3	2006	6	16
4	2006	7	16
5	2006	8	16
6	2006	9	15
7	2006	10	14

Table 2—Estimated harvest, catch per hour, and fishing pressure for boat angling. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Walleye	0.0557 (0.0230)	0 (0)	3 (7)	344 (185)	120 (88)	99 (140)	119 (111)	24 (29)	709 (273)
Largemouth bass	0.0006 (0.0008)	0 (0)	0 (0)	0 (0)	7 (10)	0 (0)	0 (0)	0 (0)	7 (10)
Smallmouth bass	0.0060 (0.0043)	0 (0)	0 (0)	23 (31)	12 (17)	10 (21)	10 (19)	21 (29)	76 (54)
Yellow Perch	0.0238 (0.0175)	0 (0)	99 (120)	7 (9)	10 (20)	0 (0)	108 (140)	79 (114)	303 (218)
Bluegill	0.2761 (0.1246)	6 (9)	8 (17)	23 (40)	135 (183)	877 (777)	1,676 (1,080)	787 (661)	3,512 (1,497)
Rock bass	0.0022 (0.0027)	0 (0)	0 (0)	0 (0)	15 (30)	0 (0)	3 (7)	10 (15)	28 (34)
Black crappie	0.0304 (0.0230)	0 (0)	0 (0)	3 (7)	159 (233)	97 (120)	81 (94)	45 (66)	386 (287)
Common white sucker	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Channel catfish	0.0009 (0.0010)	3 (6)	3 (7)	0 (0)	0 (0)	0 (0)	5 (9)	0 (0)	11 (13)
Carp	0.0012 (0.0024)	0 (0)	0 (0)	0 (0)	15 (30)	0 (0)	0 (0)	0 (0)	15 (30)
White bass	0.0155 (0.0212)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	120 (222)	77 (150)	197 (268)
<b>TOTAL HARVEST</b>	<b>0.4122 (0.1391)</b>	<b>9 (11)</b>	<b>114 (121)</b>	<b>400 (192)</b>	<b>473 (313)</b>	<b>1,084 (799)</b>	<b>2,122 (1,121)</b>	<b>1,042 (692)</b>	<b>5,244 (1,588)</b>
<b>RELEASED</b>									
Walleye	0.1278 (0.0469)	19 (19)	6 (8)	706 (380)	532 (328)	112 (139)	131 (98)	121 (129)	1,626 (545)
Largemouth bass	0.0228 (0.0130)	3 (6)	13 (19)	45 (47)	90 (67)	0 (0)	128 (135)	10 (16)	290 (160)
Smallmouth bass	0.3961 (0.1129)	463 (369)	415 (392)	1,365 (636)	1,133 (598)	826 (488)	467 (337)	370 (318)	5,039 (1,226)
Yellow Perch	0.0064 (0.0049)	53 (56)	0 (0)	0 (0)	14 (21)	3 (7)	5 (9)	6 (9)	81 (61)
Bluegill	0.1555 (0.0632)	55 (76)	62 (70)	331 (264)	421 (330)	196 (207)	354 (315)	559 (478)	1,978 (748)
Rock bass	0.0149 (0.0086)	35 (43)	47 (47)	29 (29)	37 (46)	41 (64)	0 (0)	0 (0)	190 (106)
Black crappie	0.0272 (0.0247)	3 (6)	31 (51)	41 (60)	27 (29)	152 (262)	0 (0)	92 (142)	346 (310)
Common white sucker	0.0003 (0.0006)	0 (0)	0 (0)	4 (8)	0 (0)	0 (0)	0 (0)	0 (0)	4 (8)
Brown bullhead	0.0008 (0.0016)	10 (21)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	10 (21)
Channel catfish	0.0082 (0.0107)	6 (9)	0 (0)	11 (13)	0 (0)	81 (134)	3 (6)	3 (6)	105 (135)
Carp	0.0030 (0.0041)	3 (6)	7 (15)	3 (7)	25 (49)	0 (0)	0 (0)	0 (0)	39 (52)
White bass	0.0329	7	2	68	156	69	104	12	418

	(0.0231)	(13)	(5)	(72)	(215)	(135)	(113)	(17)	(287)
OTH1	0.0003	0	3	0	0	0	0	0	3
	(0.0005)	(0)	(7)	(0)	(0)	(0)	(0)	(0)	(7)
TOTAL RELEASED	0.7961	656	587	2,604	2,436	1,481	1,191	1,173	10,127
	(0.1734)	(384)	(406)	(794)	(794)	(639)	(503)	(606)	(1,613)
TOTAL CATCH	1.2084	666	701	3,003	2,909	2,565	3,314	2,215	15,371
	(0.2528)	(385)	(423)	(817)	(853)	(1,023)	(1,228)	(920)	(2,264)
ANGLER HOURS		900	902	2,681	2,426	2,496	2,296	1,022	12,721
		(549)	(607)	(709)	(800)	(746)	(917)	(601)	(1,890)
ANGLER TRIPS		249	214	633	569	623	507	268	3,061
		(153)	(145)	(177)	(195)	(202)	(210)	(158)	(473)



Table 3—Estimated harvest, catch per hour, and fishing pressure for shore angling. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Walleye	0.0067 (0.0072)	0 (0)	11 (22)	45 (89)	0 (0)	0 (0)	25 (50)	22 (32)	103 (109)
Largemouth bass	0.0009 (0.0013)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	14 (21)	0 (0)	14 (21)
Smallmouth bass	0.0068 (0.0067)	0 (0)	58 (87)	22 (45)	0 (0)	13 (15)	12 (24)	0 (0)	105 (102)
Yellow Perch	0.0615 (0.0349)	573 (454)	0 (0)	0 (0)	13 (26)	0 (0)	201 (176)	161 (170)	947 (517)
Bluegill	0.4080 (0.1781)	85 (90)	510 (587)	135 (161)	103 (144)	1,608 (1,067)	2,045 (1,903)	1,800 (1,177)	6,286 (2,558)
Rock bass	0.0002 (0.0004)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (6)	3 (6)
Black crappie	0.0278 (0.0270)	0 (0)	0 (0)	11 (23)	0 (0)	186 (193)	8 (16)	222 (361)	428 (410)
Common white sucker	0.0011 (0.0018)	0 (0)	17 (27)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	17 (27)
Channel catfish	0.0026 (0.0041)	30 (60)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	10 (20)	40 (63)
Carp	0.0007 (0.0014)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	11 (22)	11 (22)
White bass	0.0093 (0.0090)	68 (112)	12 (25)	22 (45)	0 (0)	0 (0)	36 (58)	4 (9)	144 (136)
<b>TOTAL HARVEST</b>	<b>0.5256 (0.1910)</b>	<b>756 (480)</b>	<b>609 (595)</b>	<b>236 (196)</b>	<b>116 (147)</b>	<b>1,806 (1,085)</b>	<b>2,341 (1,913)</b>	<b>2,234 (1,244)</b>	<b>8,097 (2,651)</b>
<b>RELEASED</b>									
Walleye	0.0127 (0.0135)	90 (180)	18 (37)	11 (22)	12 (25)	0 (0)	0 (0)	65 (84)	196 (205)
Largemouth bass	0.0125 (0.0102)	17 (34)	60 (104)	11 (22)	16 (26)	48 (86)	39 (59)	0 (0)	192 (155)
Smallmouth bass	0.1404 (0.0631)	271 (247)	230 (257)	297 (296)	947 (716)	285 (308)	83 (68)	49 (55)	2,163 (911)
Yellow Perch	0.0142 (0.0119)	143 (159)	53 (79)	0 (0)	0 (0)	9 (13)	0 (0)	14 (28)	219 (180)
Bluegill	0.1934 (0.0820)	122 (185)	221 (187)	946 (799)	385 (458)	563 (461)	576 (458)	167 (190)	2,979 (1,172)
Rock bass	0.0004 (0.0009)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	7 (13)	0 (0)	7 (13)
Black crappie	0.0047 (0.0074)	18 (34)	0 (0)	0 (0)	0 (0)	54 (108)	0 (0)	0 (0)	72 (113)
Common white sucker	0.0023 (0.0045)	0 (0)	35 (69)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	35 (69)
Brown bullhead	0.0014 (0.0027)	0 (0)	0 (0)	0 (0)	21 (42)	0 (0)	0 (0)	0 (0)	21 (42)
Channel catfish	0.0033 (0.0059)	0 (0)	0 (0)	45 (89)	0 (0)	0 (0)	6 (11)	0 (0)	50 (90)
Carp	0.0477 (0.0223)	22 (28)	65 (130)	91 (110)	229 (172)	38 (56)	141 (130)	149 (158)	735 (323)
White bass	0.0009	14	0	0	0	0	0	0	14

OTH1	(0.0019)	(29)	(0)	(0)	(0)	(0)	(0)	(0)	(29)
	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
TOTAL RELEASED	0.4338	698	682	1,401	1,611	997	851	444	6,683
	(0.1223)	(396)	(376)	(864)	(869)	(574)	(485)	(269)	(1,561)
TOTAL CATCH	0.9594	1,454	1,290	1,637	1,726	2,804	3,192	2,678	14,780
	(0.2506)	(622)	(703)	(886)	(881)	(1,227)	(1,973)	(1,273)	(3,076)
ANGLER HOURS		2,239	1,600	2,473	2,709	2,077	2,556	1,752	15,406
		(927)	(1,026)	(970)	(855)	(637)	(1,179)	(726)	(2,431)
ANGLER TRIPS		1,430	428	1,103	854	598	855	679	5,947
		(706)	(364)	(548)	(346)	(213)	(487)	(307)	(1,195)

Table 4—Estimated harvest, catch per hour, and fishing pressure for Ford Lake, boat and shore angling combined. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Walleye	0.0289 (0.0109)	0 (0)	14 (23)	388 (205)	120 (88)	99 (140)	144 (122)	46 (43)	812 (294)
Largemouth bass	0.0007 (0.0008)	0 (0)	0 (0)	0 (0)	7 (10)	0 (0)	14 (21)	0 (0)	21 (23)
Smallmouth bass	0.0064 (0.0042)	0 (0)	58 (87)	45 (54)	12 (17)	23 (26)	22 (31)	21 (29)	181 (115)
Yellow Perch	0.0444 (0.0205)	573 (454)	99 (120)	7 (9)	23 (33)	0 (0)	309 (225)	240 (204)	1,250 (561)
Bluegill	0.3483 (0.1121)	91 (91)	519 (587)	159 (166)	237 (233)	2,484 (1,320)	3,721 (2,188)	2,587 (1,350)	9,798 (2,964)
Rock bass	0.0011 (0.0012)	0 (0)	0 (0)	0 (0)	15 (30)	0 (0)	3 (7)	13 (16)	31 (35)
Black crappie	0.0289 (0.0181)	0 (0)	0 (0)	15 (24)	159 (233)	283 (227)	89 (96)	267 (367)	814 (500)
Common white sucker	0.0006 (0.0010)	0 (0)	17 (27)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	17 (27)
Channel catfish	0.0018 (0.0023)	33 (60)	3 (7)	0 (0)	0 (0)	0 (0)	5 (9)	10 (20)	51 (65)
Carp	0.0009 (0.0013)	0 (0)	0 (0)	0 (0)	15 (30)	0 (0)	0 (0)	11 (22)	26 (37)
White bass	0.0121 (0.0108)	68 (112)	12 (25)	22 (45)	0 (0)	0 (0)	157 (229)	81 (150)	341 (300)
<b>TOTAL HARVEST</b>	<b>0.4743 (0.1215)</b>	<b>765 (480)</b>	<b>723 (607)</b>	<b>636 (274)</b>	<b>589 (346)</b>	<b>2,890 (1,347)</b>	<b>4,463 (2,217)</b>	<b>3,276 (1,423)</b>	<b>13,341 (3,090)</b>
<b>RELEASED</b>									
Walleye	0.0648 (0.0219)	109 (181)	24 (38)	717 (380)	544 (329)	112 (139)	131 (98)	186 (154)	1,822 (583)
Largemouth bass	0.0171 (0.0081)	20 (35)	74 (106)	56 (52)	107 (72)	48 (86)	167 (147)	10 (16)	482 (223)
Smallmouth bass	0.2560 (0.0611)	735 (444)	644 (469)	1,662 (701)	2,080 (933)	1,111 (577)	550 (343)	420 (323)	7,202 (1,527)
Yellow Perch	0.0107 (0.0069)	196 (168)	53 (79)	0 (0)	14 (21)	12 (14)	5 (9)	20 (30)	300 (190)
Bluegill	0.1763 (0.0531)	177 (200)	283 (200)	1,277 (841)	806 (564)	759 (505)	930 (556)	726 (515)	4,957 (1,391)
Rock bass	0.0070 (0.0039)	35 (43)	47 (47)	29 (29)	37 (46)	41 (64)	7 (13)	0 (0)	196 (106)
Black crappie	0.0149 (0.0118)	21 (34)	31 (51)	41 (60)	27 (29)	206 (283)	0 (0)	92 (142)	418 (330)
Common white sucker	0.0014 (0.0025)	0 (0)	35 (69)	4 (8)	0 (0)	0 (0)	0 (0)	0 (0)	39 (70)
Brown bullhead	0.0011 (0.0017)	10 (21)	0 (0)	0 (0)	21 (42)	0 (0)	0 (0)	0 (0)	31 (47)
Channel catfish	0.0055 (0.0058)	6 (9)	0 (0)	56 (90)	0 (0)	81 (134)	9 (13)	3 (6)	155 (162)
Carp	0.0275 (0.0120)	24 (29)	73 (131)	94 (110)	254 (179)	38 (56)	141 (130)	149 (158)	774 (328)
White bass	0.0154	21	2	68	156	69	104	12	432

OTH1	(0.0104)	(31)	(5)	(72)	(215)	(135)	(113)	(17)	(289)
	0.0001	0	3	0	0	0	0	0	3
	(0.0002)	(0)	(7)	(0)	(0)	(0)	(0)	(0)	(7)
TOTAL RELEASED	0.5977	1,354	1,268	4,004	4,046	2,478	2,042	1,617	16,811
	(0.1032)	(552)	(553)	(1,173)	(1,177)	(859)	(699)	(663)	(2,244)
TOTAL CATCH	1.0720	2,119	1,991	4,640	4,635	5,368	6,505	4,893	30,152
	(0.1795)	(732)	(821)	(1,205)	(1,227)	(1,597)	(2,325)	(1,570)	(3,819)
ANGLER HOURS		3,138	2,502	5,153	5,135	4,573	4,852	2,774	28,126
		(1,077)	(1,192)	(1,202)	(1,171)	(981)	(1,494)	(942)	(3,079)
ANGLER TRIPS		1,679	642	1,735	1,422	1,221	1,361	947	9,008
		(722)	(392)	(576)	(397)	(293)	(531)	(345)	(1,285)

## **Survey 63 Survey Report for Gun Lake, Allegan and Barry Counties, Summer, 2006**

<b>Waterbody</b>	Gun Lake
<b>Year</b>	Summer, 2006
<b>County</b>	Allegan and Barry counties
<b>Sites</b>	East, West Bay
<b>Survey period</b>	April 1 to September 30
<b>Survey design</b>	Roving-roving (roving counts and interviews)
<b>Interview type/mode</b>	Roving/boat and shore
<b>Count type/mode</b>	Progressive/boat and shore
<b>Clerk time</b>	Full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Notes**

Survey followed a roving-roving (roving counts and interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angling data. Both weekend days and 2 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two (10 hours) shifts was selected each sample day. Gun Lake was divided into 2 sections: East and West Bay. Each section was sampled per day. Starting location within a section and direction of travel were randomized for both counting and interviewing. progressive counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was April 1 to September 30. Months were estimated separately. Estimates are given in Tables 2-6.

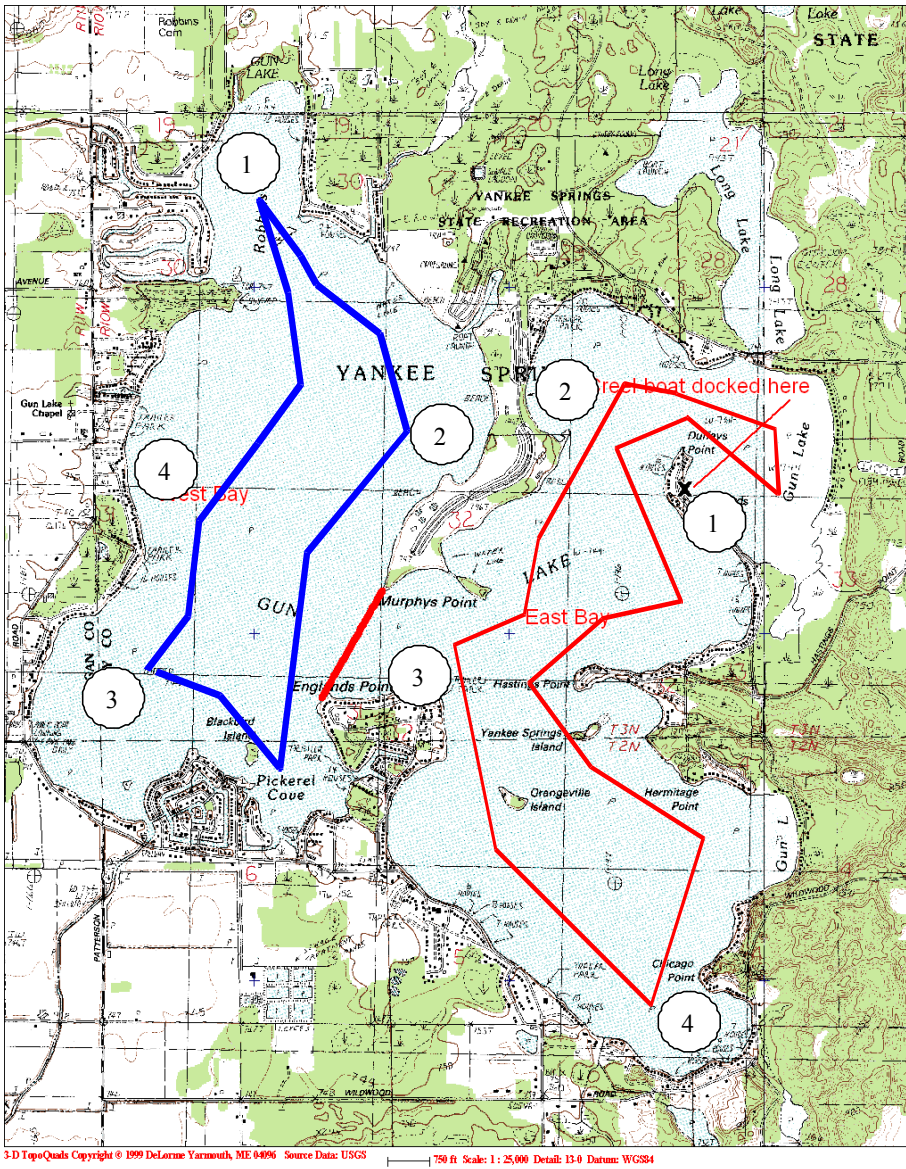


Table 1—Expansion values (F) used to estimate catch and effort at Gun Lake, April 1 to September 30, Summer, 2006

	Year	Month	F
1	2006	4	15
2	2006	5	17
3	2006	6	19
4	2006	7	19
5	2006	8	19
6	2006	9	16

Table 2— Estimated harvest, catch per hour, and fishing pressure for East Bay. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	Season
<b>HARVEST</b>								
Walleye	0.0001 (0.0001)	0 (0)	0 (0)	0 (0)	0 (0)	3 (6)	0 (0)	3 (6)
Northern pike	0.0036 (0.0028)	0 (0)	0 (0)	62 (88)	73 (80)	3 (6)	22 (31)	159 (123)
Largemouth bass	0.0068 (0.0041)	0 (0)	18 (36)	107 (94)	26 (38)	96 (116)	51 (75)	299 (175)
Smallmouth bass	0.0034 (0.0031)	0 (0)	0 (0)	91 (116)	32 (46)	26 (46)	0 (0)	148 (134)
Yellow Perch	0.0465 (0.0208)	574 (378)	313 (200)	203 (146)	166 (147)	188 (205)	610 (680)	2,054 (854)
Bluegill	0.4084 (0.1216)	671 (515)	1,847 (1,131)	11,144 (3,688)	1,444 (921)	1,414 (1,279)	1,526 (1,628)	18,047 (4,503)
Pumpkinseed	0.0144 (0.0077)	12 (20)	92 (121)	404 (281)	72 (96)	32 (33)	21 (32)	635 (324)
Rock bass	0.0374 (0.0191)	5 (10)	244 (202)	957 (712)	371 (298)	50 (61)	25 (42)	1,653 (801)
Black crappie	0.2112 (0.0726)	2,464 (1,412)	2,670 (1,758)	3,664 (1,666)	497 (374)	20 (28)	17 (34)	9,331 (2,829)
Channel catfish	0.0001 (0.0001)	0 (0)	0 (0)	0 (0)	0 (0)	3 (6)	0 (0)	3 (6)
Bowfin	0.0015 (0.0030)	0 (0)	67 (134)	0 (0)	0 (0)	0 (0)	0 (0)	67 (134)
OTH1	0.0008 (0.0012)	0 (0)	22 (45)	0 (0)	0 (0)	0 (0)	14 (27)	36 (52)
<b>TOTAL HARVEST</b>	<b>0.7340 (0.1718)</b>	<b>3,726 (1,550)</b>	<b>5,273 (2,118)</b>	<b>16,633 (4,125)</b>	<b>2,680 (1,057)</b>	<b>1,835 (1,303)</b>	<b>2,287 (1,767)</b>	<b>32,435 (5,463)</b>
<b>RELEASED</b>								
Walleye	0.0002 (0.0005)	0 (0)	0 (0)	0 (0)	11 (22)	0 (0)	0 (0)	11 (22)
Northern pike	0.0901 (0.0290)	128 (109)	380 (296)	1,543 (707)	833 (467)	629 (538)	468 (335)	3,980 (1,104)
Largemouth bass	0.2308 (0.0694)	463 (328)	833 (526)	4,077 (1,396)	1,717 (817)	2,208 (1,820)	899 (578)	10,197 (2,578)
Smallmouth bass	0.0555 (0.0203)	140 (150)	264 (224)	1,032 (464)	509 (404)	462 (435)	45 (53)	2,451 (802)
Yellow Perch	0.2017 NAN	2,119 (1,338)	853 (495)	1,614 (818)	1,496 NAN	1,289 (977)	1,544 (1,207)	8,914 NAN
Bluegill	1.1429 NAN	2,211 (1,268)	4,150 (1,911)	21,121 (6,099)	9,595 NAN	9,248 (6,468)	4,179 NAN	50,504 NAN
Pumpkinseed	0.0169 (0.0092)	73 (133)	77 (98)	339 (290)	132 (145)	24 (32)	101 (138)	745 (390)
Rock bass	0.4131 (0.1154)	1,560 (943)	5,151 (2,403)	7,541 (2,632)	2,458 (1,657)	1,085 (833)	460 (400)	18,254 (4,146)
Black crappie	0.1462 (0.0467)	1,139 (724)	1,823 (1,044)	2,880 (1,182)	503 (350)	74 (86)	42 (86)	6,462 (1,774)
Brown bullhead	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Muskellunge	0.0023 (0.0033)	0 (0)	0 (0)	0 (0)	0 (0)	103 (143)	0 (0)	103 (143)
Bowfin	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

OTH1	0.0008 (0.0013)	0 (0)	0 (0)	26 (53)	0 (0)	11 (22)	0 (0)	37 (57)
TOTAL RELEASED	2.3006 NAN	7,832 (2,230)	13,530 (3,345)	40,173 (6,995)	17,253 NAN	15,132 (6,878)	7,738 NAN	101,659 NAN
TOTAL CATCH	3.0346 NAN	11,559 (2,715)	18,804 (3,959)	56,806 (8,121)	19,934 NAN	16,967 (7,000)	10,025 NAN	134,094 NAN
ANGLER HOURS		3,532 (1,392)	5,443 (2,094)	14,088 (2,939)	9,367 (3,373)	7,292 (4,501)	4,467 (2,227)	44,189 (7,180)
ANGLER TRIPS		837 (363)	1,590 (656)	4,525 (1,097)	2,639 (1,076)	2,619 (1,793)	1,284 (685)	13,495 (2,570)



Table 3— Estimated harvest, catch per hour, and fishing pressure for West Bay. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	Season
<b>HARVEST</b>								
Walleye	0.0006 (0.0012)	0 (0)	18 (35)	0 (0)	0 (0)	0 (0)	0 (0)	18 (35)
Northern pike	0.0008 (0.0014)	0 (0)	0 (0)	0 (0)	22 (39)	0 (0)	0 (0)	22 (39)
Largemouth bass	0.0101 NAN	0 (0)	0 (0)	26 (40)	157 NAN	52 (55)	55 (76)	291 NAN
Smallmouth bass	0.0046 (0.0050)	0 (0)	0 (0)	4 (9)	30 (53)	89 (132)	9 (17)	132 (144)
Yellow Perch	0.0536 (0.0315)	928 (798)	215 (203)	143 (217)	166 (160)	42 (84)	52 (104)	1,547 (877)
Bluegill	0.1845 NAN	676 (500)	583 (602)	894 (636)	1,103 NAN	862 (1,027)	1,212 (1,517)	5,330 NAN
Pumpkinseed	0.0112 (0.0069)	32 (42)	43 (62)	81 (97)	101 (109)	48 (97)	17 (35)	323 (193)
Rock bass	0.0296 (0.0226)	339 (408)	396 (474)	0 (0)	83 (118)	24 (48)	12 (24)	854 (639)
Black crappie	0.0929 (0.0471)	1,051 (820)	1,378 (980)	75 (109)	126 (172)	16 (32)	37 (75)	2,683 (1,296)
Channel catfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bowfin	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
OTH1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	0.3877 NAN	3,027 (1,314)	2,634 (1,263)	1,223 (689)	1,789 NAN	1,134 (1,046)	1,395 (1,525)	11,201 NAN
<b>RELEASED</b>								
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0.0733 (0.0340)	58 (94)	142 (105)	569 (388)	965 (789)	73 (84)	312 (241)	2,119 (926)
Largemouth bass	0.3205 NAN	401 (301)	809 (527)	2,173 (979)	3,059 NAN	2,213 NAN	604 (395)	9,260 NAN
Smallmouth bass	0.0660 (0.0286)	221 (283)	652 (576)	278 (232)	378 (285)	206 (146)	171 (160)	1,906 (770)
Yellow Perch	0.1789 (0.0626)	1,289 (1,002)	780 (597)	980 (527)	1,100 (649)	318 (396)	702 (643)	5,167 (1,622)
Bluegill	0.7964 NAN	2,689 (1,879)	1,694 (1,274)	3,650 (1,701)	8,295 NAN	4,386 (3,143)	2,294 (1,976)	23,008 NAN
Pumpkinseed	0.0503 (0.0257)	396 (383)	155 (171)	47 (76)	348 (304)	431 (463)	76 (115)	1,453 (708)
Rock bass	0.3903 (0.1262)	1,397 (1,113)	3,181 (2,088)	2,146 (1,040)	2,416 (1,046)	849 (557)	1,287 (1,474)	11,276 (3,202)
Black crappie	0.0764 (0.0362)	440 (358)	1,058 (835)	228 (204)	365 (287)	76 (152)	41 (62)	2,207 (988)
Brown bullhead	0.0008 (0.0017)	0 (0)	0 (0)	0 (0)	0 (0)	24 (48)	0 (0)	24 (48)
Muskellunge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bowfin	0.0007 (0.0011)	0 (0)	16 (31)	4 (7)	0 (0)	0 (0)	0 (0)	20 (32)

OTH1	0.0021 (0.0025)	0 (0)	0 (0)	31 (51)	0 (0)	29 (49)	0 (0)	61 (71)
TOTAL RELEASED	1.9558 NAN	6,891 (2,496)	8,487 (2,772)	10,108 (2,338)	16,925 NAN	8,604 NAN	5,487 (2,597)	56,500 NAN
TOTAL CATCH	2.3435 NAN	9,917 (2,820)	11,120 (3,046)	11,331 (2,437)	18,713 NAN	9,738 NAN	6,882 (3,012)	67,701 NAN
ANGLER HOURS		2,625 (1,167)	3,731 (1,198)	5,900 (1,753)	8,991 (3,051)	5,476 (1,792)	2,165 (1,229)	28,888 (4,461)
ANGLER TRIPS		607 (272)	984 (411)	1,291 (483)	2,207 (777)	1,779 (875)	655 (436)	7,523 (1,427)

Table 4— Estimated harvest, catch per hour, and fishing pressure for boat angling. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	Season
<b>HARVEST</b>								
Walleye	0.0003 (0.0005)	0 (0)	18 (35)	0 (0)	0 (0)	3 (6)	0 (0)	20 (36)
Northern pike	0.0026 (0.0019)	0 (0)	0 (0)	62 (88)	94 (89)	3 (6)	22 (31)	181 (129)
Largemouth bass	0.0080 (0.0035)	0 (0)	18 (36)	133 (102)	159 (136)	148 (128)	107 (107)	566 (241)
Smallmouth bass	0.0040 (0.0028)	0 (0)	0 (0)	95 (117)	62 (70)	115 (140)	9 (17)	280 (196)
Yellow Perch	0.0509 (0.0184)	1,502 (883)	524 (285)	346 (261)	332 (217)	231 (222)	662 (688)	3,597 (1,224)
Bluegill	0.3122 (0.0791)	995 (626)	2,387 (1,279)	11,595 (3,684)	2,130 (1,031)	2,203 (1,633)	2,739 (2,225)	22,049 (4,928)
Pumpkinseed	0.0135 (0.0056)	44 (47)	132 (135)	485 (297)	174 (145)	81 (102)	39 (48)	954 (377)
Rock bass	0.0355 (0.0151)	344 (408)	640 (516)	957 (712)	453 (321)	74 (77)	38 (48)	2,507 (1,025)
Black crappie	0.1696 (0.0485)	3,481 (1,631)	4,048 (2,013)	3,739 (1,670)	622 (411)	36 (43)	54 (83)	11,980 (3,111)
Channel catfish	0.0000 (0.0001)	0 (0)	0 (0)	0 (0)	0 (0)	3 (6)	0 (0)	3 (6)
Bowfin	0.0010 (0.0019)	0 (0)	67 (134)	0 (0)	0 (0)	0 (0)	0 (0)	67 (134)
OTH1	0.0005 (0.0007)	0 (0)	22 (45)	0 (0)	0 (0)	0 (0)	14 (27)	36 (52)
<b>TOTAL HARVEST</b>	<b>0.5981 (0.1116)</b>	<b>6,366 (2,000)</b>	<b>7,856 (2,465)</b>	<b>17,413 (4,130)</b>	<b>4,027 (1,198)</b>	<b>2,896 (1,665)</b>	<b>3,682 (2,334)</b>	<b>42,240 (6,066)</b>
<b>RELEASED</b>								
Walleye	0.0002 (0.0003)	0 (0)	0 (0)	0 (0)	11 (22)	0 (0)	0 (0)	11 (22)
Northern pike	0.0864 (0.0229)	186 (144)	522 (314)	2,113 (806)	1,798 (917)	701 (545)	780 (413)	6,099 (1,441)
Largemouth bass	0.2705 (0.0561)	864 (446)	1,590 (741)	6,235 (1,705)	4,691 (1,485)	4,221 (2,046)	1,503 (700)	19,105 (3,245)
Smallmouth bass	0.0609 (0.0173)	360 (320)	916 (618)	1,253 (506)	887 (494)	668 (459)	216 (168)	4,300 (1,106)
Yellow Perch	0.1925 (0.0477)	3,408 (1,672)	1,595 (772)	2,240 (909)	2,574 (1,241)	1,591 (1,054)	2,187 (1,362)	13,594 (2,954)
Bluegill	0.9850 (0.2071)	4,221 (2,184)	5,484 (2,259)	23,131 (6,205)	17,459 (5,893)	13,209 (7,154)	6,059 (3,312)	69,563 (12,052)
Pumpkinseed	0.0295 (0.0118)	404 (384)	186 (174)	386 (299)	479 (337)	454 (464)	177 (179)	2,086 (793)
Rock bass	0.4127 (0.0889)	2,957 (1,459)	8,159 (3,176)	9,471 (2,818)	4,874 (1,959)	1,934 (1,002)	1,747 (1,527)	29,142 (5,228)
Black crappie	0.1228 (0.0323)	1,580 (808)	2,881 (1,337)	3,108 (1,199)	868 (452)	150 (175)	83 (106)	8,669 (2,031)
Brown bullhead	0.0003 (0.0007)	0 (0)	0 (0)	0 (0)	0 (0)	24 (48)	0 (0)	24 (48)
Muskellunge	0.0015 (0.0020)	0 (0)	0 (0)	0 (0)	0 (0)	103 (143)	0 (0)	103 (143)
Bowfin	0.0001 (0.0001)	0 (0)	0 (0)	4 (7)	0 (0)	0 (0)	0 (0)	4 (7)

OTH1	0.0014 (0.0013)	0 (0)	0 (0)	58 (73)	0 (0)	40 (54)	0 (0)	98 (91)
TOTAL RELEASED	2.1637 (0.3264)	13,979 (3,289)	21,334 (4,317)	47,999 (7,254)	33,641 (6,612)	23,097 (7,632)	12,751 (3,986)	152,799 (14,139)
TOTAL CATCH	2.7618 (0.3946)	20,345 (3,849)	29,189 (4,971)	65,412 (8,347)	37,668 (6,720)	25,993 (7,812)	16,433 (4,619)	195,040 (15,385)
ANGLER HOURS		5,760 (1,791)	8,730 (2,391)	19,162 (3,375)	18,027 (4,535)	12,449 (4,840)	6,492 (2,540)	70,620 (8,412)
ANGLER TRIPS		1,339 (447)	2,455 (770)	5,593 (1,189)	4,752 (1,323)	4,311 (1,994)	1,902 (811)	20,353 (2,931)

Table 5— Estimated harvest, catch per hour, and fishing pressure for shore angling. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	Season
<b>HARVEST</b>								
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Largemouth bass	0.0100 NAN	0 (0)	0 (0)	0 (0)	25 NAN	0 (0)	0 (0)	25 NAN
Smallmouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	0.0017 (0.0035)	0 (0)	4 (9)	0 (0)	0 (0)	0 (0)	0 (0)	4 (9)
Bluegill	0.5402 NAN	352 (350)	43 (70)	443 (655)	417 NAN	73 (146)	0 (0)	1,328 NAN
Pumpkinseed	0.0017 (0.0035)	0 (0)	4 (9)	0 (0)	0 (0)	0 (0)	0 (0)	4 (9)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Black crappie	0.0141 (0.0286)	35 (69)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	35 (69)
Channel catfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bowfin	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
OTH1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	0.5677 NAN	387 (357)	51 (71)	443 (655)	442 NAN	73 (146)	0 (0)	1,395 NAN
<b>RELEASED</b>								
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Largemouth bass	0.1433 NAN	0 (0)	52 (74)	15 (30)	86 NAN	199 NAN	0 (0)	352 NAN
Smallmouth bass	0.0232 (0.0470)	0 (0)	0 (0)	57 (114)	0 (0)	0 (0)	0 (0)	57 (114)
Yellow Perch	0.1981 NAN	0 (0)	37 (75)	353 (347)	21 NAN	15 (22)	60 (120)	487 NAN
Bluegill	1.6067 NAN	680 (608)	359 (416)	1,641 (1,260)	431 NAN	425 (732)	413 NAN	3,949 NAN
Pumpkinseed	0.0454 (0.0669)	65 (130)	47 (94)	0 (0)	0 (0)	0 (0)	0 (0)	112 (160)
Rock bass	0.1580 (0.1462)	0 (0)	173 (216)	216 (256)	0 (0)	0 (0)	0 (0)	388 (334)
Black crappie	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Brown bullhead	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Muskellunge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bowfin	0.0063 (0.0129)	0 (0)	16 (31)	0 (0)	0 (0)	0 (0)	0 (0)	16 (31)

OTH1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
TOTAL RELEASED	2.1810 NAN	745 (621)	684 (490)	2,282 (1,337)	538 NAN	639 NAN	473 NAN	5,360 NAN
TOTAL CATCH	2.7487 NAN	1,131 (717)	735 (495)	2,725 (1,489)	979 NAN	712 NAN	473 NAN	6,756 NAN
ANGLER HOURS		398 (303)	444 (321)	826 (564)	332 (342)	319 (206)	140 (139)	2,458 (832)
ANGLER TRIPS		105 (79)	119 (89)	222 (149)	95 (100)	87 (56)	37 (36)	664 (225)

Table 6— Estimated harvest, catch per hour, and fishing pressure for Gun Lake. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	Season
<b>HARVEST</b>								
Walleye	0.0003 (0.0005)	0 (0)	18 (35)	0 (0)	0 (0)	3 (6)	0 (0)	20 (36)
Northern pike	0.0025 (0.0018)	0 (0)	0 (0)	62 (88)	94 (89)	3 (6)	22 (31)	181 (129)
Largemouth bass	0.0081 NAN	0 (0)	18 (36)	133 (102)	184 NAN	148 (128)	107 (107)	590 NAN
Smallmouth bass	0.0038 (0.0027)	0 (0)	0 (0)	95 (117)	62 (70)	115 (140)	9 (17)	280 (196)
Yellow Perch	0.0493 (0.0177)	1,502 (883)	528 (285)	346 (261)	332 (217)	231 (222)	662 (688)	3,601 (1,224)
Bluegill	0.3199 NAN	1,347 (718)	2,429 (1,281)	12,038 (3,742)	2,548 NAN	2,276 (1,640)	2,739 (2,225)	23,377 NAN
Pumpkinseed	0.0131 (0.0054)	44 (47)	136 (136)	485 (297)	174 (145)	81 (102)	39 (48)	958 (377)
Rock bass	0.0343 (0.0146)	344 (408)	640 (516)	957 (712)	453 (321)	74 (77)	38 (48)	2,507 (1,025)
Black crappie	0.1644 (0.0466)	3,515 (1,632)	4,048 (2,013)	3,739 (1,670)	622 (411)	36 (43)	54 (83)	12,014 (3,112)
Channel catfish	0.0000 (0.0001)	0 (0)	0 (0)	0 (0)	0 (0)	3 (6)	0 (0)	3 (6)
Bowfin	0.0009 (0.0018)	0 (0)	67 (134)	0 (0)	0 (0)	0 (0)	0 (0)	67 (134)
OTH1	0.0005 (0.0007)	0 (0)	22 (45)	0 (0)	0 (0)	0 (0)	14 (27)	36 (52)
<b>TOTAL HARVEST</b>	0.5971 NAN	6,753 (2,032)	7,907 (2,466)	17,856 (4,182)	4,469 NAN	2,969 (1,671)	3,682 (2,334)	43,636 NAN
<b>RELEASED</b>								
Walleye	0.0001 (0.0003)	0 (0)	0 (0)	0 (0)	11 (22)	0 (0)	0 (0)	11 (22)
Northern pike	0.0835 (0.0220)	186 (144)	522 (314)	2,113 (806)	1,798 (917)	701 (545)	780 (413)	6,099 (1,441)
Largemouth bass	0.2663 NAN	864 (446)	1,642 (744)	6,250 (1,705)	4,777 NAN	4,421 NAN	1,503 (700)	19,457 NAN
Smallmouth bass	0.0596 (0.0167)	360 (320)	916 (618)	1,310 (519)	887 (494)	668 (459)	216 (168)	4,357 (1,112)
Yellow Perch	0.1927 NAN	3,408 (1,672)	1,632 (776)	2,593 (973)	2,595 NAN	1,607 (1,054)	2,247 (1,367)	14,081 NAN
Bluegill	1.0059 NAN	4,900 (2,267)	5,844 (2,297)	24,772 (6,332)	17,890 NAN	13,634 (7,191)	6,473 NAN	73,512 NAN
Pumpkinseed	0.0301 (0.0116)	469 (405)	232 (197)	386 (299)	479 (337)	454 (464)	177 (179)	2,198 (809)
Rock bass	0.4041 (0.0856)	2,957 (1,459)	8,332 (3,183)	9,687 (2,829)	4,874 (1,959)	1,934 (1,002)	1,747 (1,527)	29,530 (5,238)
Black crappie	0.1186 (0.0310)	1,580 (808)	2,881 (1,337)	3,108 (1,199)	868 (452)	150 (175)	83 (106)	8,669 (2,031)
Brown bullhead	0.0003 (0.0007)	0 (0)	0 (0)	0 (0)	0 (0)	24 (48)	0 (0)	24 (48)
Muskellunge	0.0014 (0.0020)	0 (0)	0 (0)	0 (0)	0 (0)	103 (143)	0 (0)	103 (143)
Bowfin	0.0003 (0.0004)	0 (0)	16 (31)	4 (7)	0 (0)	0 (0)	0 (0)	20 (32)

OTH1	0.0013 (0.0013)	0 (0)	0 (0)	58 (73)	0 (0)	40 (54)	0 (0)	98 (91)
TOTAL RELEASED	2.1643 NAN	14,723 (3,347)	22,017 (4,344)	50,280 (7,376)	34,178 NAN	23,736 NAN	13,225 NAN	158,160 NAN
TOTAL CATCH	2.7614 NAN	21,476 (3,915)	29,924 (4,996)	68,137 (8,479)	38,647 NAN	26,705 NAN	16,907 NAN	201,795 NAN
ANGLER HOURS		6,157 (1,816)	9,174 (2,412)	19,987 (3,422)	18,359 (4,548)	12,768 (4,845)	6,632 (2,544)	73,077 (8,453)
ANGLER TRIPS		1,444 (454)	2,574 (775)	5,815 (1,198)	4,847 (1,327)	4,398 (1,995)	1,939 (812)	21,018 (2,940)



## **Survey 64 Survey Report for Hardy Impoundment, Newaygo County, Summer, 2006**

<b>Waterbody</b>	Hardy Impoundment
<b>Year</b>	Summer, 2006
<b>County</b>	Newaygo County
<b>Sites</b>	North, South
<b>Survey period</b>	April 1 to October 31
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access/boat
<b>Count type/mode</b>	roving/boat, shore and non-fishing
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Notes**

Survey followed a roving-access (roving counts and access interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angling (interview and count) data. Both weekend days and 2 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two (10 hours) shifts was selected each sample day. Hardy Impoundment was divided into 2 sections: North, South. Each section was sampled per day. Starting location within a section and direction of travel were randomized for both counting and interviewing. roving counts of boat and shore and non-fishing anglers were made once per day. Survey period for both counts and interviews was April 1 to October 31. Months were estimated separately. Estimates are given in Tables 2-10.

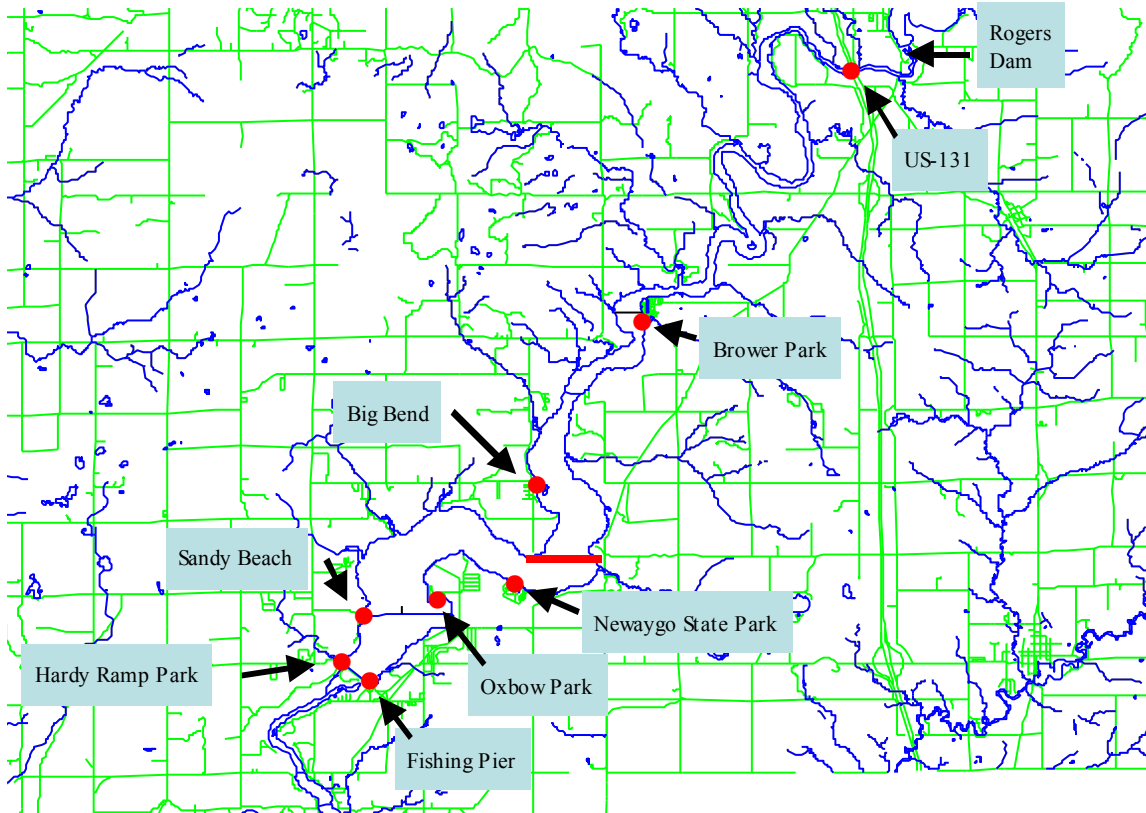


Table 1– Expansion values (F) used to estimate catch and effort at Hardy Impoundment, April 1 to October 31, Summer, 2006

	<b>Year</b>	<b>Month</b>	<b>F</b>
1	2006	4	15
2	2006	5	16
3	2006	6	16
4	2006	7	16
5	2006	8	16
6	2006	9	16
7	2006	10	15

Table 2— Estimated harvest, catch per hour, and fishing pressure for north, boat. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Walleye	0.0085 (0.0089)	0 (0)	185 (255)	0 (0)	0 (0)	0 (0)	112 (245)	234 (412)	530 (543)
Northern pike	0.0107 (0.0116)	0 (0)	46 (95)	278 (542)	0 (0)	0 (0)	112 (219)	234 (382)	670 (705)
Smallmouth bass	0.0018 (0.0037)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	112 (230)	0 (0)	112 (230)
Yellow Perch	0.0470 (0.0517)	1,811 (2,907)	0 (0)	278 (533)	0 (0)	841 (1,075)	0 (0)	0 (0)	2,930 (3,145)
Bluegill	0.0026 (0.0040)	0 (0)	0 (0)	53 (107)	0 (0)	0 (0)	112 (219)	0 (0)	164 (243)
Rock bass	0.0070 (0.0097)	0 (0)	46 (98)	278 (542)	0 (0)	0 (0)	112 (230)	0 (0)	435 (597)
Black crappie	0.0089 (0.0175)	0 (0)	0 (0)	556 (1,085)	0 (0)	0 (0)	0 (0)	0 (0)	556 (1,085)
<b>TOTAL HARVEST</b>	<b>0.0865 (0.0602)</b>	<b>1,811 (2,907)</b>	<b>277 (289)</b>	<b>1,442 (1,435)</b>	<b>0 (0)</b>	<b>841 (1,075)</b>	<b>558 (511)</b>	<b>468 (562)</b>	<b>5,397 (3,511)</b>
<b>RELEASED</b>									
Walleye	0.0654 (0.0547)	0 (0)	323 (374)	1,811 (1,913)	597 (816)	0 (0)	1,115 (2,450)	234 (412)	4,082 (3,261)
Northern pike	0.1490 (0.1068)	0 (0)	1,062 (1,225)	3,875 (4,818)	987 (1,483)	76 (178)	2,008 (2,987)	1,288 (1,815)	9,296 (6,258)
Largemouth bass	0.0058 (0.0106)	0 (0)	46 (98)	317 (648)	0 (0)	0 (0)	0 (0)	0 (0)	363 (655)
Smallmouth bass	0.1421 (0.1036)	0 (0)	2,140 (2,367)	2,406 (2,916)	358 (317)	2,063 (4,297)	1,896 (2,074)	0 (0)	8,864 (6,080)
Yellow Perch	0.0632 (0.0575)	0 (0)	46 (98)	278 (597)	0 (0)	3,058 (3,318)	446 (676)	117 (271)	3,945 (3,451)
Bluegill	0.1072 (0.1878)	0 (0)	0 (0)	1,111 (1,780)	0 (0)	5,245 (11,454)	335 (486)	0 (0)	6,691 (11,601)
Rock bass	0.0421 (0.0613)	0 (0)	92 (178)	1,667 (3,476)	119 (277)	76 (151)	669 (1,405)	0 (0)	2,624 (3,767)
Black crappie	0.0083 (0.0167)	466 (1,027)	0 (0)	53 (110)	0 (0)	0 (0)	0 (0)	0 (0)	519 (1,033)
Common white sucker	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Carp	0.0025 (0.0047)	0 (0)	0 (0)	158 (293)	0 (0)	0 (0)	0 (0)	0 (0)	158 (293)
<b>TOTAL RELEASED</b>	<b>0.5856 (0.2913)</b>	<b>466 (1,027)</b>	<b>3,710 (2,700)</b>	<b>11,676 (7,177)</b>	<b>2,062 (1,744)</b>	<b>10,518 (12,677)</b>	<b>6,469 (4,678)</b>	<b>1,640 (1,881)</b>	<b>36,541 (15,781)</b>
<b>TOTAL CATCH</b>	<b>0.6721 (0.3076)</b>	<b>2,277 (3,083)</b>	<b>3,987 (2,716)</b>	<b>13,118 (7,319)</b>	<b>2,062 (1,744)</b>	<b>11,359 (12,723)</b>	<b>7,026 (4,706)</b>	<b>2,108 (1,963)</b>	<b>41,938 (16,167)</b>
<b>ANGLER HOURS</b>		<b>2,070 (1,488)</b>	<b>10,240 (10,349)</b>	<b>13,504 (6,159)</b>	<b>7,412 (1,202)</b>	<b>15,560 (7,058)</b>	<b>8,867 (5,120)</b>	<b>4,743 (3,474)</b>	<b>62,395 (15,388)</b>
<b>ANGLER TRIPS</b>		<b>440 (380)</b>	<b>1,893 (2,039)</b>	<b>4,360 (2,268)</b>	<b>1,827 (628)</b>	<b>4,005 (1,925)</b>	<b>1,612 (1,066)</b>	<b>1,009 (972)</b>	<b>15,146 (3,954)</b>

Table 3– Estimated harvest, catch per hour, and fishing pressure for north, shore. Two standard errors are given in parentheses. Interviews were not collected for shore angling.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
TOTAL HARVEST	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>RELEASED</b>									
TOTAL RELEASED	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
TOTAL CATCH	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
ANGLER HOURS		1,215 (798)	640 (498)	890 (516)	239 (272)	515 (858)	440 (378)	108 (157)	4,046 (1,459)
ANGLER TRIPS		277 (183)	146 (114)	203 (118)	54 (62)	118 (196)	100 (86)	25 (36)	923 (334)

Table 4— Estimated harvest, catch per hour, and fishing pressure for south, boat. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Walleye	0.0353 (0.0272)	20 (40)	320 (560)	160 (165)	306 (383)	55 (121)	0 (0)	131 (206)	992 (739)
Northern pike	0.0025 (0.0055)	0 (0)	0 (0)	0 (0)	70 (154)	0 (0)	0 (0)	0 (0)	70 (154)
Smallmouth bass	0.0020 (0.0037)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	56 (103)	56 (103)
Yellow Perch	0.0187 (0.0233)	0 (0)	189 (399)	0 (0)	0 (0)	0 (0)	0 (0)	336 (508)	525 (646)
Bluegill	0.0969 (0.1029)	0 (0)	0 (0)	1,063 (1,493)	1,363 (2,380)	183 (324)	0 (0)	112 (229)	2,722 (2,838)
Rock bass	0.0177 (0.0293)	0 (0)	113 (239)	385 (782)	0 (0)	0 (0)	0 (0)	0 (0)	499 (818)
Black crappie	0.0023 (0.0031)	0 (0)	38 (70)	26 (52)	0 (0)	0 (0)	0 (0)	0 (0)	63 (87)
<b>TOTAL HARVEST</b>	<b>0.1754 (0.1165)</b>	<b>20 (40)</b>	<b>659 (731)</b>	<b>1,635 (1,695)</b>	<b>1,739 (2,416)</b>	<b>238 (346)</b>	<b>0 (0)</b>	<b>636 (602)</b>	<b>4,928 (3,119)</b>
<b>RELEASED</b>									
Walleye	0.0558 (0.0349)	82 (108)	302 (559)	410 (423)	321 (405)	248 (277)	0 (0)	206 (341)	1,568 (927)
Northern pike	0.1284 (0.0626)	676 (729)	795 (818)	1,057 (887)	423 (457)	432 (553)	0 (0)	224 (247)	3,607 (1,601)
Largemouth bass	0.0310 (0.0352)	0 (0)	189 (373)	26 (52)	0 (0)	46 (81)	611 (896)	0 (0)	871 (975)
Smallmouth bass	0.2334 (0.1734)	655 (957)	3,354 (4,345)	705 (843)	822 (988)	798 (642)	0 (0)	224 (342)	6,560 (4,691)
Yellow Perch	0.0341 (0.0494)	20 (40)	0 (0)	51 (75)	141 (285)	91 (162)	0 (0)	654 (1,333)	959 (1,376)
Bluegill	0.1013 (0.1251)	61 (123)	0 (0)	0 (0)	376 (554)	1,473 (2,841)	0 (0)	935 (1,905)	2,846 (3,467)
Rock bass	0.0494 (0.0455)	20 (42)	0 (0)	1,111 (1,155)	211 (461)	46 (99)	0 (0)	0 (0)	1,389 (1,249)
Black crappie	0.0031 (0.0048)	61 (123)	0 (0)	26 (51)	0 (0)	0 (0)	0 (0)	0 (0)	87 (134)
Common white sucker	0.0009 (0.0019)	0 (0)	0 (0)	26 (52)	0 (0)	0 (0)	0 (0)	0 (0)	26 (52)
Carp	0.0009 (0.0018)	0 (0)	0 (0)	26 (49)	0 (0)	0 (0)	0 (0)	0 (0)	26 (49)
<b>TOTAL RELEASED</b>	<b>0.6383 (0.2638)</b>	<b>1,577 (1,222)</b>	<b>4,639 (4,472)</b>	<b>3,437 (1,740)</b>	<b>2,295 (1,397)</b>	<b>3,135 (2,984)</b>	<b>611 (896)</b>	<b>2,243 (2,388)</b>	<b>17,938 (6,471)</b>
<b>TOTAL CATCH</b>	<b>0.8137 (0.3037)</b>	<b>1,597 (1,223)</b>	<b>5,298 (4,531)</b>	<b>5,072 (2,429)</b>	<b>4,034 (2,790)</b>	<b>3,373 (3,004)</b>	<b>611 (896)</b>	<b>2,879 (2,462)</b>	<b>22,865 (7,184)</b>
<b>ANGLER HOURS</b>		<b>2,837 (2,566)</b>	<b>4,351 (2,741)</b>	<b>7,091 (2,804)</b>	<b>4,794 (2,032)</b>	<b>3,848 (1,514)</b>	<b>3,300 (1,542)</b>	<b>1,879 (1,152)</b>	<b>28,100 (5,664)</b>
<b>ANGLER TRIPS</b>		<b>482 (446)</b>	<b>754 (474)</b>	<b>1,512 (709)</b>	<b>1,532 (692)</b>	<b>1,094 (482)</b>	<b>733 (706)</b>	<b>363 (238)</b>	<b>6,471 (1,481)</b>

Table 5– Estimated harvest, catch per hour, and fishing pressure for south, shore. Two standard errors are given in parentheses. Interviews were not collected for shore angling.

Species	C/H	April	May	June	July	August	September	October	Season
TOTAL CATCH	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
ANGLER HOURS		150 (171)	336 (402)	746 (441)	750 (377)	462 (361)	32 (64)	82 (101)	2,557 (820)
ANGLER TRIPS		33 (38)	75 (90)	166 (100)	167 (86)	103 (82)	7 (14)	18 (23)	571 (185)

Table 6— Estimated harvest, catch per hour, and fishing pressure for north. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Walleye	0.0080 (0.0084)	0 (0)	185 (255)	0 (0)	0 (0)	0 (0)	112 (245)	234 (412)	530 (543)
Northern pike	0.0101 (0.0109)	0 (0)	46 (95)	278 (542)	0 (0)	0 (0)	112 (219)	234 (382)	670 (705)
Smallmouth bass	0.0017 (0.0035)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	112 (230)	0 (0)	112 (230)
Yellow Perch	0.0441 (0.0484)	1,811 (2,907)	0 (0)	278 (533)	0 (0)	841 (1,075)	0 (0)	0 (0)	2,930 (3,145)
Bluegill	0.0025 (0.0037)	0 (0)	0 (0)	53 (107)	0 (0)	0 (0)	112 (219)	0 (0)	164 (243)
Rock bass	0.0066 (0.0091)	0 (0)	46 (98)	278 (542)	0 (0)	0 (0)	112 (230)	0 (0)	435 (597)
Black crappie	0.0084 (0.0164)	0 (0)	0 (0)	556 (1,085)	0 (0)	0 (0)	0 (0)	0 (0)	556 (1,085)
<b>TOTAL HARVEST</b>	<b>0.0812 (0.0561)</b>	<b>1,811 (2,907)</b>	<b>277 (289)</b>	<b>1,442 (1,435)</b>	<b>0 (0)</b>	<b>841 (1,075)</b>	<b>558 (511)</b>	<b>468 (562)</b>	<b>5,397 (3,511)</b>
<b>RELEASED</b>									
Walleye	0.0614 (0.0511)	0 (0)	323 (374)	1,811 (1,913)	597 (816)	0 (0)	1,115 (2,450)	234 (412)	4,082 (3,261)
Northern pike	0.1399 (0.0996)	0 (0)	1,062 (1,225)	3,875 (4,818)	987 (1,483)	76 (178)	2,008 (2,987)	1,288 (1,815)	9,296 (6,258)
Largemouth bass	0.0055 (0.0099)	0 (0)	46 (98)	317 (648)	0 (0)	0 (0)	0 (0)	0 (0)	363 (655)
Smallmouth bass	0.1334 (0.0966)	0 (0)	2,140 (2,367)	2,406 (2,916)	358 (317)	2,063 (4,297)	1,896 (2,074)	0 (0)	8,864 (6,080)
Yellow Perch	0.0594 (0.0537)	0 (0)	46 (98)	278 (597)	0 (0)	3,058 (3,318)	446 (676)	117 (271)	3,945 (3,451)
Bluegill	0.1007 (0.1762)	0 (0)	0 (0)	1,111 (1,780)	0 (0)	5,245 (11,454)	335 (486)	0 (0)	6,691 (11,601)
Rock bass	0.0395 (0.0574)	0 (0)	92 (178)	1,667 (3,476)	119 (277)	76 (151)	669 (1,405)	0 (0)	2,624 (3,767)
Black crappie	0.0078 (0.0156)	466 (1,027)	0 (0)	53 (110)	0 (0)	0 (0)	0 (0)	0 (0)	519 (1,033)
Common white sucker	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Carp	0.0024 (0.0044)	0 (0)	0 (0)	158 (293)	0 (0)	0 (0)	0 (0)	0 (0)	158 (293)
<b>TOTAL RELEASED</b>	<b>0.5500 (0.2698)</b>	<b>466 (1,027)</b>	<b>3,710 (2,700)</b>	<b>11,676 (7,177)</b>	<b>2,062 (1,744)</b>	<b>10,518 (12,677)</b>	<b>6,469 (4,678)</b>	<b>1,640 (1,881)</b>	<b>36,541 (15,781)</b>
<b>TOTAL CATCH</b>	<b>0.6312 (0.2842)</b>	<b>2,277 (3,083)</b>	<b>3,987 (2,716)</b>	<b>13,118 (7,319)</b>	<b>2,062 (1,744)</b>	<b>11,359 (12,723)</b>	<b>7,026 (4,706)</b>	<b>2,108 (1,963)</b>	<b>41,938 (16,167)</b>
<b>ANGLER HOURS</b>		<b>3,285 (1,688)</b>	<b>10,880 (10,361)</b>	<b>14,394 (6,181)</b>	<b>7,650 (1,233)</b>	<b>16,075 (7,110)</b>	<b>9,307 (5,134)</b>	<b>4,851 (3,477)</b>	<b>66,442 (15,457)</b>
<b>ANGLER TRIPS</b>		<b>718 (422)</b>	<b>2,039 (2,043)</b>	<b>4,563 (2,271)</b>	<b>1,881 (631)</b>	<b>4,123 (1,935)</b>	<b>1,713 (1,070)</b>	<b>1,034 (973)</b>	<b>16,070 (3,968)</b>

Table 7– Estimated harvest, catch per hour, and fishing pressure for south. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Walleye	0.0324 (0.0249)	20 (40)	320 (560)	160 (165)	306 (383)	55 (121)	0 (0)	131 (206)	992 (739)
Northern pike	0.0023 (0.0050)	0 (0)	0 (0)	0 (0)	70 (154)	0 (0)	0 (0)	0 (0)	70 (154)
Smallmouth bass	0.0018 (0.0034)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	56 (103)	56 (103)
Yellow Perch	0.0171 (0.0213)	0 (0)	189 (399)	0 (0)	0 (0)	0 (0)	0 (0)	336 (508)	525 (646)
Bluegill	0.0888 (0.0940)	0 (0)	0 (0)	1,063 (1,493)	1,363 (2,380)	183 (324)	0 (0)	112 (229)	2,722 (2,838)
Rock bass	0.0163 (0.0269)	0 (0)	113 (239)	385 (782)	0 (0)	0 (0)	0 (0)	0 (0)	499 (818)
Black crappie	0.0021 (0.0029)	0 (0)	38 (70)	26 (52)	0 (0)	0 (0)	0 (0)	0 (0)	63 (87)
<b>TOTAL HARVEST</b>	<b>0.1607 (0.1061)</b>	<b>20 (40)</b>	<b>659 (731)</b>	<b>1,635 (1,695)</b>	<b>1,739 (2,416)</b>	<b>238 (346)</b>	<b>0 (0)</b>	<b>636 (602)</b>	<b>4,928 (3,119)</b>
<b>RELEASED</b>									
Walleye	0.0511 (0.0317)	82 (108)	302 (559)	410 (423)	321 (405)	248 (277)	0 (0)	206 (341)	1,568 (927)
Northern pike	0.1177 (0.0567)	676 (729)	795 (818)	1,057 (887)	423 (457)	432 (553)	0 (0)	224 (247)	3,607 (1,601)
Largemouth bass	0.0284 (0.0322)	0 (0)	189 (373)	26 (52)	0 (0)	46 (81)	611 (896)	0 (0)	871 (975)
Smallmouth bass	0.2140 (0.1581)	655 (957)	3,354 (4,345)	705 (843)	822 (988)	798 (642)	0 (0)	224 (342)	6,560 (4,691)
Yellow Perch	0.0313 (0.0453)	20 (40)	0 (0)	51 (75)	141 (285)	91 (162)	0 (0)	654 (1,333)	959 (1,376)
Bluegill	0.0928 (0.1144)	61 (123)	0 (0)	0 (0)	376 (554)	1,473 (2,841)	0 (0)	935 (1,905)	2,846 (3,467)
Rock bass	0.0453 (0.0416)	20 (42)	0 (0)	1,111 (1,155)	211 (461)	46 (99)	0 (0)	0 (0)	1,389 (1,249)
Black crappie	0.0028 (0.0044)	61 (123)	0 (0)	26 (51)	0 (0)	0 (0)	0 (0)	0 (0)	87 (134)
Common white sucker	0.0008 (0.0017)	0 (0)	0 (0)	26 (52)	0 (0)	0 (0)	0 (0)	0 (0)	26 (52)
Carp	0.0008 (0.0016)	0 (0)	0 (0)	26 (49)	0 (0)	0 (0)	0 (0)	0 (0)	26 (49)
<b>TOTAL RELEASED</b>	<b>0.5851 (0.2377)</b>	<b>1,577 (1,222)</b>	<b>4,639 (4,472)</b>	<b>3,437 (1,740)</b>	<b>2,295 (1,397)</b>	<b>3,135 (2,984)</b>	<b>611 (896)</b>	<b>2,243 (2,388)</b>	<b>17,938 (6,471)</b>
<b>TOTAL CATCH</b>	<b>0.7458 (0.2726)</b>	<b>1,597 (1,223)</b>	<b>5,298 (4,531)</b>	<b>5,072 (2,429)</b>	<b>4,034 (2,790)</b>	<b>3,373 (3,004)</b>	<b>611 (896)</b>	<b>2,879 (2,462)</b>	<b>22,865 (7,184)</b>
<b>ANGLER HOURS</b>		<b>2,987 (2,571)</b>	<b>4,687 (2,770)</b>	<b>7,837 (2,839)</b>	<b>5,544 (2,067)</b>	<b>4,310 (1,557)</b>	<b>3,332 (1,544)</b>	<b>1,961 (1,156)</b>	<b>30,658 (5,723)</b>
<b>ANGLER TRIPS</b>		<b>515 (448)</b>	<b>829 (482)</b>	<b>1,679 (716)</b>	<b>1,700 (698)</b>	<b>1,198 (489)</b>	<b>740 (706)</b>	<b>381 (239)</b>	<b>7,042 (1,492)</b>



Table 8— Estimated harvest, catch per hour, and fishing pressure for boat. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Walleye	0.0168 (0.0106)	20 (40)	505 (615)	160 (165)	306 (383)	55 (121)	112 (245)	365 (461)	1,523 (917)
Northern pike	0.0082 (0.0081)	0 (0)	46 (95)	278 (542)	70 (154)	0 (0)	112 (219)	234 (382)	740 (721)
Smallmouth bass	0.0019 (0.0028)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	112 (230)	56 (103)	168 (252)
Yellow Perch	0.0382 (0.0361)	1,811 (2,907)	189 (399)	278 (533)	0 (0)	841 (1,075)	0 (0)	336 (508)	3,455 (3,210)
Bluegill	0.0319 (0.0320)	0 (0)	0 (0)	1,116 (1,497)	1,363 (2,380)	183 (324)	112 (219)	112 (229)	2,886 (2,848)
Rock bass	0.0103 (0.0113)	0 (0)	159 (259)	663 (952)	0 (0)	0 (0)	112 (230)	0 (0)	934 (1,013)
Black crappie	0.0068 (0.0121)	0 (0)	38 (70)	581 (1,086)	0 (0)	0 (0)	0 (0)	0 (0)	619 (1,088)
<b>TOTAL HARVEST</b>	<b>0.1141 (0.0559)</b>	<b>1,832 (2,907)</b>	<b>936 (786)</b>	<b>3,076 (2,221)</b>	<b>1,739 (2,416)</b>	<b>1,079 (1,129)</b>	<b>558 (511)</b>	<b>1,104 (824)</b>	<b>10,325 (4,696)</b>
<b>RELEASED</b>									
Walleye	0.0624 (0.0391)	82 (108)	625 (673)	2,221 (1,959)	919 (911)	248 (277)	1,115 (2,450)	440 (534)	5,650 (3,391)
Northern pike	0.1426 (0.0759)	676 (729)	1,856 (1,473)	4,932 (4,899)	1,410 (1,552)	509 (581)	2,008 (2,987)	1,513 (1,832)	12,903 (6,459)
Largemouth bass	0.0136 (0.0132)	0 (0)	235 (385)	343 (650)	0 (0)	46 (81)	611 (896)	0 (0)	1,234 (1,175)
Smallmouth bass	0.1704 (0.0903)	655 (957)	5,495 (4,947)	3,111 (3,036)	1,181 (1,038)	2,861 (4,345)	1,896 (2,074)	224 (342)	15,423 (7,680)
Yellow Perch	0.0542 (0.0422)	20 (40)	46 (98)	329 (602)	141 (285)	3,149 (3,322)	446 (676)	771 (1,361)	4,904 (3,715)
Bluegill	0.1054 (0.1352)	61 (123)	0 (0)	1,111 (1,780)	376 (554)	6,719 (11,801)	335 (486)	935 (1,905)	9,536 (12,108)
Rock bass	0.0443 (0.0446)	20 (42)	92 (178)	2,778 (3,663)	331 (537)	122 (180)	669 (1,405)	0 (0)	4,013 (3,968)
Black crappie	0.0067 (0.0116)	527 (1,034)	0 (0)	79 (121)	0 (0)	0 (0)	0 (0)	0 (0)	606 (1,041)
Common white sucker	0.0003 (0.0006)	0 (0)	0 (0)	26 (52)	0 (0)	0 (0)	0 (0)	0 (0)	26 (52)
Carp	0.0020 (0.0033)	0 (0)	0 (0)	184 (297)	0 (0)	0 (0)	0 (0)	0 (0)	184 (297)
<b>TOTAL RELEASED</b>	<b>0.6020 (0.2178)</b>	<b>2,043 (1,596)</b>	<b>8,349 (5,224)</b>	<b>15,114 (7,385)</b>	<b>4,357 (2,234)</b>	<b>13,653 (13,024)</b>	<b>7,080 (4,763)</b>	<b>3,883 (3,039)</b>	<b>54,478 (17,056)</b>
<b>TOTAL CATCH</b>	<b>0.7161 (0.2346)</b>	<b>3,874 (3,316)</b>	<b>9,285 (5,283)</b>	<b>18,190 (7,711)</b>	<b>6,096 (3,291)</b>	<b>14,732 (13,073)</b>	<b>7,638 (4,791)</b>	<b>4,987 (3,149)</b>	<b>64,803 (17,691)</b>
<b>ANGLER HOURS</b>		<b>4,907 (2,966)</b>	<b>14,591 (10,706)</b>	<b>20,595 (6,768)</b>	<b>12,206 (2,361)</b>	<b>19,408 (7,219)</b>	<b>12,167 (5,348)</b>	<b>6,622 (3,659)</b>	<b>90,496 (16,397)</b>
<b>ANGLER TRIPS</b>		<b>922 (586)</b>	<b>2,647 (2,094)</b>	<b>5,873 (2,377)</b>	<b>3,359 (935)</b>	<b>5,100 (1,984)</b>	<b>2,345 (1,278)</b>	<b>1,372 (1,001)</b>	<b>21,617 (4,222)</b>

Table 9– Estimated harvest, catch per hour, and fishing pressure for shore. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Walleye	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Northern pike	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Smallmouth bass	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Yellow Perch	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Bluegill	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Rock bass	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Black crappie	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
<b>TOTAL HARVEST</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
<b>RELEASED</b>									
Walleye	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Northern pike	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Largemouth bass	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Smallmouth bass	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Yellow Perch	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Bluegill	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Rock bass	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Black crappie	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Common white sucker	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Carp	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
<b>TOTAL RELEASED</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
<b>TOTAL CATCH</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
<b>ANGLER HOURS</b>		1,365	976	1,635	989	977	472	190	6,604
		(816)	(640)	(679)	(465)	(931)	(383)	(187)	(1,674)
<b>ANGLER TRIPS</b>		311	221	369	222	221	108	43	1,494
		(187)	(145)	(155)	(106)	(212)	(88)	(42)	(382)

Table 10– Estimated harvest, catch per hour, and fishing pressure for Hardy Impoundment. Two standard errors are given in parentheses.

Species	C/H	April	May	June	July	August	September	October	Season
<b>HARVEST</b>									
Walleye	0.0157 (0.0098)	20 (40)	505 (615)	160 (165)	306 (383)	55 (121)	112 (245)	365 (461)	1,523 (917)
Northern pike	0.0076 (0.0075)	0 (0)	46 (95)	278 (542)	70 (154)	0 (0)	112 (219)	234 (382)	740 (721)
Smallmouth bass	0.0017 (0.0026)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	112 (230)	56 (103)	168 (252)
Yellow Perch	0.0356 (0.0336)	1,811 (2,907)	189 (399)	278 (533)	0 (0)	841 (1,075)	0 (0)	336 (508)	3,455 (3,210)
Bluegill	0.0297 (0.0298)	0 (0)	0 (0)	1,116 (1,497)	1,363 (2,380)	183 (324)	112 (219)	112 (229)	2,886 (2,848)
Rock bass	0.0096 (0.0106)	0 (0)	159 (259)	663 (952)	0 (0)	0 (0)	112 (230)	0 (0)	934 (1,013)
Black crappie	0.0064 (0.0113)	0 (0)	38 (70)	581 (1,086)	0 (0)	0 (0)	0 (0)	0 (0)	619 (1,088)
<b>TOTAL HARVEST</b>	<b>0.1063 (0.0516)</b>	<b>1,832 (2,907)</b>	<b>936 (786)</b>	<b>3,076 (2,221)</b>	<b>1,739 (2,416)</b>	<b>1,079 (1,129)</b>	<b>558 (511)</b>	<b>1,104 (824)</b>	<b>10,325 (4,696)</b>
<b>RELEASED</b>									
Walleye	0.0582 (0.0363)	82 (108)	625 (673)	2,221 (1,959)	919 (911)	248 (277)	1,115 (2,450)	440 (534)	5,650 (3,391)
Northern pike	0.1329 (0.0702)	676 (729)	1,856 (1,473)	4,932 (4,899)	1,410 (1,552)	509 (581)	2,008 (2,987)	1,513 (1,832)	12,903 (6,459)
Largemouth bass	0.0127 (0.0123)	0 (0)	235 (385)	343 (650)	0 (0)	46 (81)	611 (896)	0 (0)	1,234 (1,175)
Smallmouth bass	0.1588 (0.0836)	655 (957)	5,495 (4,947)	3,111 (3,036)	1,181 (1,038)	2,861 (4,345)	1,896 (2,074)	224 (342)	15,423 (7,680)
Yellow Perch	0.0505 (0.0392)	20 (40)	46 (98)	329 (602)	141 (285)	3,149 (3,322)	446 (676)	771 (1,361)	4,904 (3,715)
Bluegill	0.0982 (0.1258)	61 (123)	0 (0)	1,111 (1,780)	376 (554)	6,719 (11,801)	335 (486)	935 (1,905)	9,536 (12,108)
Rock bass	0.0413 (0.0415)	20 (42)	92 (178)	2,778 (3,663)	331 (537)	122 (180)	669 (1,405)	0 (0)	4,013 (3,968)
Black crappie	0.0062 (0.0108)	527 (1,034)	0 (0)	79 (121)	0 (0)	0 (0)	0 (0)	0 (0)	606 (1,041)
Common white sucker	0.0003 (0.0005)	0 (0)	0 (0)	26 (52)	0 (0)	0 (0)	0 (0)	0 (0)	26 (52)
Carp	0.0019 (0.0031)	0 (0)	0 (0)	184 (297)	0 (0)	0 (0)	0 (0)	0 (0)	184 (297)
<b>TOTAL RELEASED</b>	<b>0.5611 (0.1998)</b>	<b>2,043 (1,596)</b>	<b>8,349 (5,224)</b>	<b>15,114 (7,385)</b>	<b>4,357 (2,234)</b>	<b>13,653 (13,024)</b>	<b>7,080 (4,763)</b>	<b>3,883 (3,039)</b>	<b>54,478 (17,056)</b>
<b>TOTAL CATCH</b>	<b>0.6674 (0.2145)</b>	<b>3,874 (3,316)</b>	<b>9,285 (5,283)</b>	<b>18,190 (7,711)</b>	<b>6,096 (3,291)</b>	<b>14,732 (13,073)</b>	<b>7,638 (4,791)</b>	<b>4,987 (3,149)</b>	<b>64,803 (17,691)</b>
<b>ANGLER HOURS</b>		<b>6,272 (3,076)</b>	<b>15,567 (10,725)</b>	<b>22,231 (6,801)</b>	<b>13,194 (2,406)</b>	<b>20,386 (7,278)</b>	<b>12,639 (5,361)</b>	<b>6,812 (3,664)</b>	<b>97,100 (16,483)</b>
<b>ANGLER TRIPS</b>		<b>1,233 (615)</b>	<b>2,868 (2,099)</b>	<b>6,242 (2,382)</b>	<b>3,581 (941)</b>	<b>5,320 (1,996)</b>	<b>2,453 (1,281)</b>	<b>1,415 (1,002)</b>	<b>23,111 (4,239)</b>

## **Survey 65 Survey Report for Hubbard Lake, Alcona County, Summer, 2006**

<b>Waterbody</b>	Hubbard Lake
<b>Year</b>	Summer, 2006
<b>County</b>	Alcona County
<b>Sites</b>	Hubbard
<b>Survey period</b>	April 30 to September 30
<b>Survey design</b>	Roving-roving (roving counts and roving interviews)
<b>Interview type/mode</b>	roving/boat and shore
<b>Count type/mode</b>	progressive/boat and shore
<b>Clerk time</b>	Full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Notes**

Survey followed a roving- roving (roving counts and roving interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angling data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. aerial, progressive counts of boat and shore anglers were made once per day. Survey period for both counts and interviews was April 30 to September 30. Months were estimated separately. Estimates are given in Tables 2-4.

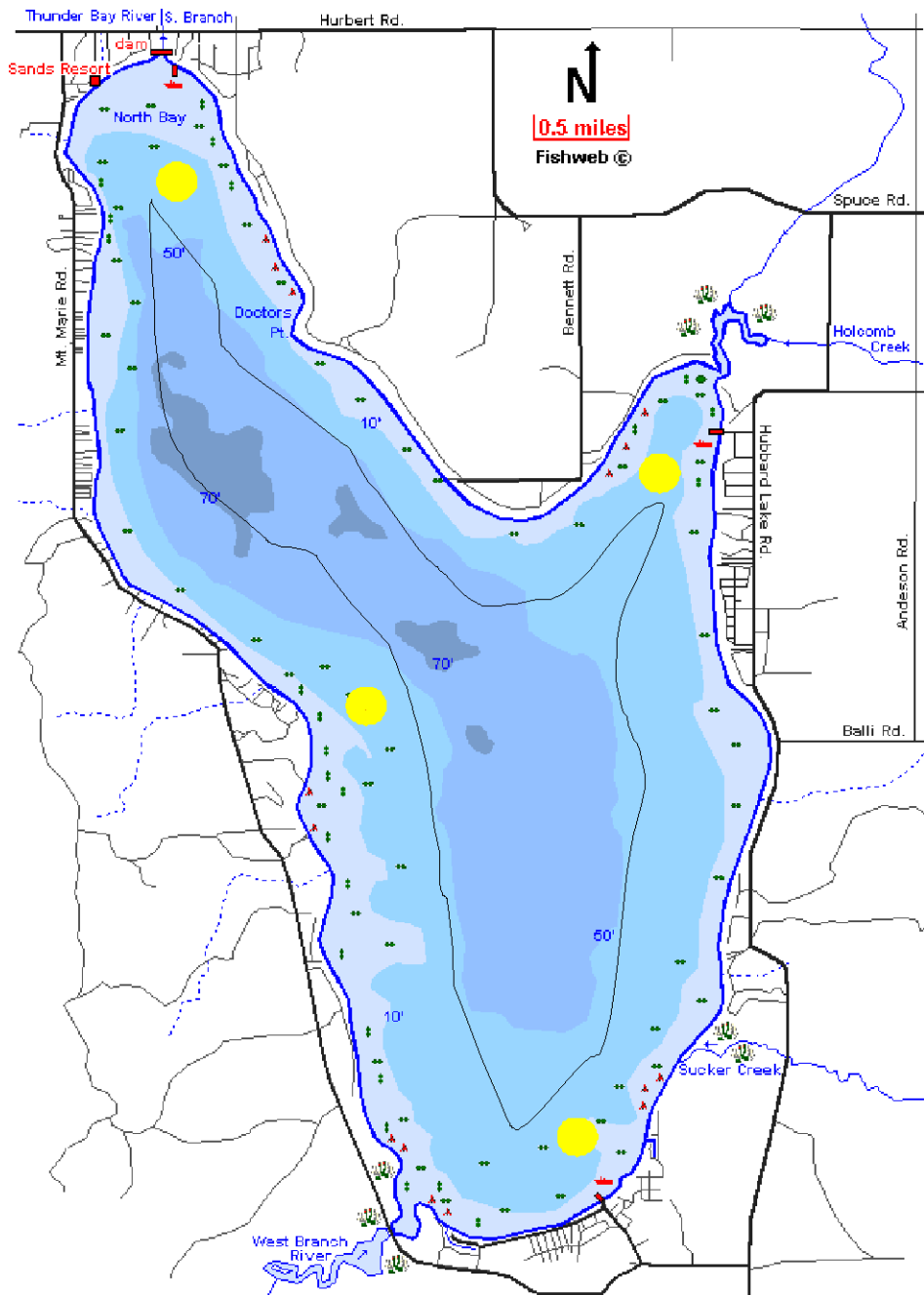


Table 1—Work shifts used to estimate catch and effort at Hubbard Lake, April 30 to September 30, Summer, 2006

	Year	Month	F
1	2006	4	14
2	2006	5	15
3	2006	6	16
4	2006	7	16
5	2006	8	16
6	2006	9	16

Table 2—Estimated harvest, catch per hour, and fishing pressure for boat angling. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.0671 (0.0220)	147 (163)	400 (271)	362 (225)	700 (377)	663 (371)	2,272 (656)
Northern pike	0.0012 (0.0024)	40 (80)	0 (0)	0 (0)	0 (0)	0 (0)	40 (80)
Smallmouth bass	0.0140 (0.0077)	40 (80)	220 (198)	68 (67)	92 (79)	54 (74)	474 (248)
Yellow Perch	0.2557 (0.1075)	0 (0)	48 (68)	543 (372)	1,541 (759)	6,523 (3,273)	8,655 (3,381)
Channel catfish	0.0010 (0.0020)	0 (0)	0 (0)	0 (0)	0 (0)	34 (68)	34 (68)
<b>TOTAL HARVEST</b>	<b>0.3390 (0.1149)</b>	<b>227 (199)</b>	<b>668 (342)</b>	<b>973 (439)</b>	<b>2,333 (851)</b>	<b>7,274 (3,295)</b>	<b>11,476 (3,455)</b>
<b>RELEASED</b>							
Walleye	0.0544 (0.0217)	47 (71)	42 (62)	405 (253)	390 (214)	960 (582)	1,843 (676)
Northern pike	0.0049 (0.0055)	7 (14)	84 (167)	8 (16)	0 (0)	68 (73)	166 (184)
Largemouth bass	0.0004 (0.0008)	0 (0)	0 (0)	0 (0)	0 (0)	13 (28)	13 (28)
Smallmouth bass	0.1878 (0.0564)	538 (555)	1,366 (650)	336 (290)	2,142 (1,053)	1,974 (864)	6,356 (1,634)
Yellow Perch	0.2206 (0.0952)	0 (0)	0 (0)	685 (456)	941 (547)	5,840 (2,922)	7,466 (3,007)
Bluegill	0.0020 (0.0024)	15 (23)	0 (0)	0 (0)	0 (0)	55 (78)	69 (82)
Pumpkinseed	0.0034 (0.0037)	0 (0)	0 (0)	0 (0)	14 (29)	102 (122)	117 (125)
Rock bass	0.0003 (0.0006)	0 (0)	0 (0)	0 (0)	10 (19)	0 (0)	10 (19)
Rainbow trout	0.0003 (0.0006)	0 (0)	0 (0)	0 (0)	10 (20)	0 (0)	10 (20)
Channel catfish	0.0004 (0.0008)	0 (0)	0 (0)	0 (0)	0 (0)	13 (28)	13 (28)
Carp	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL RELEASED</b>	<b>0.4746 (0.1269)</b>	<b>607 (561)</b>	<b>1,491 (674)</b>	<b>1,434 (597)</b>	<b>3,507 (1,206)</b>	<b>9,024 (3,106)</b>	<b>16,064 (3,497)</b>
<b>TOTAL CATCH</b>	<b>0.8136 (0.1926)</b>	<b>834 (595)</b>	<b>2,160 (756)</b>	<b>2,407 (741)</b>	<b>5,840 (1,476)</b>	<b>16,299 (4,529)</b>	<b>27,540 (4,915)</b>
<b>ANGLER HOURS</b>		<b>2,940 (2,444)</b>	<b>5,778 (1,627)</b>	<b>6,337 (1,671)</b>	<b>8,915 (2,594)</b>	<b>9,881 (3,089)</b>	<b>33,850 (5,261)</b>
<b>ANGLER TRIPS</b>		<b>1,216 (1,079)</b>	<b>1,730 (618)</b>	<b>2,039 (627)</b>	<b>2,476 (1,096)</b>	<b>2,112 (785)</b>	<b>9,572 (1,938)</b>

Table 3—Estimated harvest, catch per hour, and fishing pressure for shore angling. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.0118 (0.0244)	11 (21)	0 (0)	0 (0)	0 (0)	0 (0)	11 (21)
Yellow Perch	0.0866 (0.1787)	0 (0)	78 (156)	0 (0)	0 (0)	0 (0)	78 (156)
Channel catfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.0985 (0.1817)</b>	<b>11 (21)</b>	<b>78 (156)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>89 (158)</b>
<b>RELEASED</b>							
Smallmouth bass	0.1189 (0.1527)	96 (125)	11 (22)	0 (0)	0 (0)	0 (0)	107 (127)
Carp	0.0118 (0.0244)	11 (21)	0 (0)	0 (0)	0 (0)	0 (0)	11 (21)
<b>TOTAL RELEASED</b>	<b>0.1308 (0.1569)</b>	<b>107 (127)</b>	<b>11 (22)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>118 (129)</b>
<b>TOTAL CATCH</b>	<b>0.2293 (0.2532)</b>	<b>118 (128)</b>	<b>89 (158)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>207 (204)</b>
<b>ANGLER HOURS</b>		278 (258)	213 (161)	135 (137)	215 (298)	62 (71)	903 (453)
<b>ANGLER TRIPS</b>		75 (77)	57 (47)	36 (39)	58 (83)	17 (20)	243 (130)

Table 4—Estimated harvest, catch per hour, and fishing pressure for Hubbard Lake. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Walleye	0.0657 (0.0214)	158 (165)	400 (271)	362 (225)	700 (377)	663 (371)	2,283 (656)
Northern pike	0.0011 (0.0023)	40 (80)	0 (0)	0 (0)	0 (0)	0 (0)	40 (80)
Smallmouth bass	0.0136 (0.0074)	40 (80)	220 (198)	68 (67)	92 (79)	54 (74)	474 (248)
Yellow Perch	0.2513 (0.1046)	0 (0)	126 (170)	543 (372)	1,541 (759)	6,523 (3,273)	8,733 (3,385)
Channel catfish	0.0010 (0.0020)	0 (0)	0 (0)	0 (0)	0 (0)	34 (68)	34 (68)
<b>TOTAL HARVEST</b>	<b>0.3328 (0.1116)</b>	<b>238 (200)</b>	<b>747 (376)</b>	<b>973 (439)</b>	<b>2,333 (851)</b>	<b>7,274 (3,295)</b>	<b>11,565 (3,458)</b>
<b>RELEASED</b>							
Walleye	0.0530 (0.0211)	47 (71)	42 (62)	405 (253)	390 (214)	960 (582)	1,843 (676)
Northern pike	0.0048 (0.0053)	7 (14)	84 (167)	8 (16)	0 (0)	68 (73)	166 (184)
Largemouth bass	0.0004 (0.0008)	0 (0)	0 (0)	0 (0)	0 (0)	13 (28)	13 (28)
Smallmouth bass	0.1860 (0.0550)	634 (569)	1,377 (650)	336 (290)	2,142 (1,053)	1,974 (864)	6,463 (1,639)
Yellow Perch	0.2148 (0.0925)	0 (0)	0 (0)	685 (456)	941 (547)	5,840 (2,922)	7,466 (3,007)
Bluegill	0.0020 (0.0024)	15 (23)	0 (0)	0 (0)	0 (0)	55 (78)	69 (82)
Pumpkinseed	0.0034 (0.0036)	0 (0)	0 (0)	0 (0)	14 (29)	102 (122)	117 (125)
Rock bass	0.0003 (0.0006)	0 (0)	0 (0)	0 (0)	10 (19)	0 (0)	10 (19)
Rainbow trout	0.0003 (0.0006)	0 (0)	0 (0)	0 (0)	10 (20)	0 (0)	10 (20)
Channel catfish	0.0004 (0.0008)	0 (0)	0 (0)	0 (0)	0 (0)	13 (28)	13 (28)
Carp	0.0003 (0.0006)	11 (21)	0 (0)	0 (0)	0 (0)	0 (0)	11 (21)
<b>TOTAL RELEASED</b>	<b>0.4656 (0.1231)</b>	<b>714 (575)</b>	<b>1,502 (674)</b>	<b>1,434 (597)</b>	<b>3,507 (1,206)</b>	<b>9,024 (3,106)</b>	<b>16,182 (3,499)</b>
<b>TOTAL CATCH</b>	<b>0.7984 (0.1864)</b>	<b>951 (608)</b>	<b>2,249 (772)</b>	<b>2,407 (741)</b>	<b>5,840 (1,476)</b>	<b>16,299 (4,529)</b>	<b>27,747 (4,920)</b>
<b>ANGLER HOURS</b>		<b>3,218 (2,457)</b>	<b>5,990 (1,635)</b>	<b>6,472 (1,677)</b>	<b>9,129 (2,611)</b>	<b>9,943 (3,090)</b>	<b>34,753 (5,280)</b>
<b>ANGLER TRIPS</b>		<b>1,290 (1,082)</b>	<b>1,787 (620)</b>	<b>2,076 (628)</b>	<b>2,533 (1,099)</b>	<b>2,128 (785)</b>	<b>9,815 (1,943)</b>



## **Survey 66 Survey Report for Lake Mitchell and Lake Cadillac, Wexford County, Summer, 2006**

<b>Waterbody</b>	Lake Mitchell and Lake Cadillac
<b>Year</b>	Summer, 2006
<b>County</b>	Wexford County
<b>Sites</b>	Cadillac, Mitchell
<b>Survey period</b>	April 29 to October 31
<b>Survey design</b>	Roving-roving (roving counts and roving interviews)
<b>Interview type/mode</b>	roving/boat, shore
<b>Count type/mode</b>	progressive/boat and shore
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Notes**

Survey followed a roving- roving (roving counts and roving interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angling (interview and count) data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. Mitchell Cadillac was divided into 2 sections: Cadillac, Mitchell. Each section was sampled per day. Starting location within a section and direction of travel were randomized for both counting and interviewing. aerial, progressive counts of anglers were made once per day. Survey period for both counts and interviews was April 29 to October 31. Months were estimated separately. Estimates are given in Tables 2-10.

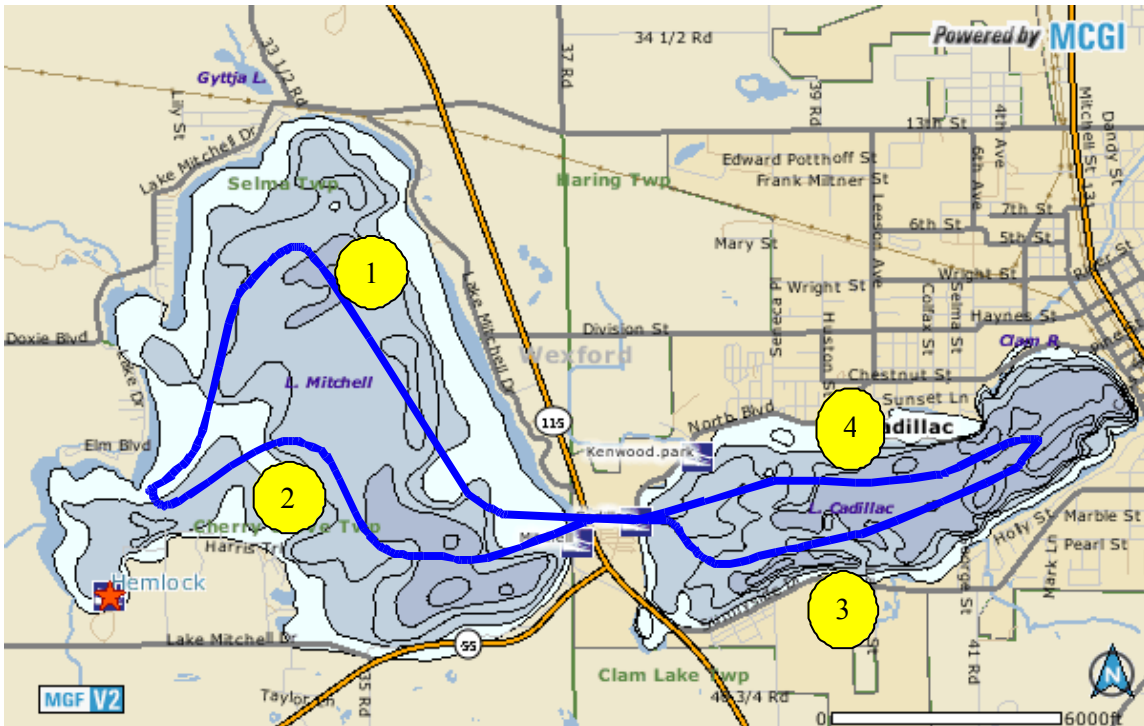


Table 1–Work shifts used to estimate catch and effort at Mitchell Cadillac, April 29 to October 31, Summer, 2006

	Year	Month	F
1	2006	4	14
2	2006	5	15
3	2006	6	16
4	2006	7	16
5	2006	8	16
6	2006	9	15
7	2006	10	14

Table 2—Estimated harvest, catch per hour, and fishing pressure for Lake Cadillac, boat. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	October	Season
<b>HARVEST</b>								
Walleye	0.0015 (0.0021)	39 (56)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	39 (56)
Northern pike	0.0117 (0.0083)	161 (167)	21 (43)	82 (119)	30 (59)	21 (32)	0 (0)	315 (220)
Largemouth bass	0.0043 (0.0063)	0 (0)	0 (0)	0 (0)	115 (170)	0 (0)	0 (0)	115 (170)
Yellow Perch	0.0357 (0.0278)	192 (385)	43 (86)	654 (615)	17 (25)	0 (0)	55 (93)	961 (737)
Bluegill	0.4990 (0.1647)	142 (244)	5,911 (2,940)	5,856 (2,595)	1,351 (1,233)	154 (191)	0 (0)	13,415 (4,123)
Pumpkinseed	0.0581 (0.0517)	0 (0)	530 (631)	343 (294)	653 (1,187)	36 (73)	0 (0)	1,562 (1,378)
Rock bass	0.0053 (0.0056)	0 (0)	67 (99)	6 (12)	52 (103)	18 (36)	0 (0)	143 (148)
Black crappie	0.6745 (0.2067)	2,702 (2,266)	11,263 (4,173)	1,487 (794)	1,474 (1,588)	1,144 (621)	60 (119)	18,132 (5,109)
Brown bullhead	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>1.2902 (0.2956)</b>	<b>3,236 (2,318)</b>	<b>17,836 (5,145)</b>	<b>8,429 (2,801)</b>	<b>3,692 (2,344)</b>	<b>1,375 (656)</b>	<b>115 (151)</b>	<b>34,684 (6,756)</b>
<b>RELEASED</b>								
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0.0454 (0.0176)	426 (293)	274 (179)	103 (147)	128 (171)	264 (177)	26 (36)	1,221 (449)
Largemouth bass	0.0409 (0.0224)	249 (238)	332 (241)	122 (203)	282 (427)	70 (54)	46 (57)	1,101 (587)
Smallmouth bass	0.0464 (0.0187)	137 (133)	306 (197)	187 (205)	237 (221)	223 (151)	158 (242)	1,248 (479)
Yellow Perch	0.1169 (0.0660)	275 (385)	949 (848)	1,227 (1,235)	658 (781)	34 (69)	0 (0)	3,144 (1,734)
Bluegill	0.9260 (0.3342)	113 (123)	11,107 (5,334)	10,112 (5,340)	3,133 (3,796)	424 (564)	6 (13)	24,895 (8,468)
Pumpkinseed	0.1595 (0.1555)	15 (23)	490 (591)	1,880 (1,777)	1,901 (3,700)	0 (0)	0 (0)	4,287 (4,147)
Rock bass	0.0146 (0.0108)	14 (29)	247 (251)	68 (102)	34 (69)	29 (57)	0 (0)	393 (287)
Black crappie	0.7556 (0.2658)	1,278 (1,212)	15,675 (6,128)	599 (489)	1,969 (2,299)	791 (717)	0 (0)	20,312 (6,713)
<b>TOTAL RELEASED</b>	<b>2.1054 (0.5052)</b>	<b>2,508 (1,339)</b>	<b>29,383 (8,202)</b>	<b>14,298 (5,792)</b>	<b>8,342 (5,853)</b>	<b>1,835 (947)</b>	<b>236 (252)</b>	<b>56,601 (11,740)</b>
<b>TOTAL CATCH</b>	<b>3.3956 (0.6493)</b>	<b>5,744 (2,677)</b>	<b>47,219 (9,682)</b>	<b>22,727 (6,434)</b>	<b>12,034 (6,305)</b>	<b>3,209 (1,152)</b>	<b>351 (293)</b>	<b>91,284 (13,545)</b>
<b>ANGLER HOURS</b>		<b>3,766 (1,662)</b>	<b>8,374 (1,685)</b>	<b>7,232 (1,634)</b>	<b>4,946 (1,295)</b>	<b>2,021 (518)</b>	<b>544 (541)</b>	<b>26,883 (3,242)</b>
<b>ANGLER TRIPS</b>		<b>729 (335)</b>	<b>3,011 (837)</b>	<b>2,644 (991)</b>	<b>1,193 (INF)</b>	<b>779 (273)</b>	<b>138 (141)</b>	<b>8,495 (INF)</b>

Table 3—Estimated harvest, catch per hour, and fishing pressure for Lake Cadillac, shore. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	October	Season
<b>HARVEST</b>								
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0.0008 (0.0016)	0 (0)	0 (0)	0 (0)	20 (41)	0 (0)	0 (0)	20 (41)
Largemouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	0.0721 (0.0511)	309 (391)	630 (1,142)	357 (349)	205 (245)	137 (274)	263 (232)	1,901 (1,329)
Bluegill	0.5317 (0.2286)	204 (241)	6,698 (4,969)	4,489 (2,604)	1,570 (935)	1,017 (1,183)	37 (52)	14,014 (5,814)
Pumpkinseed	0.0629 (0.0420)	12 (24)	114 (228)	584 (753)	810 (704)	137 (274)	0 (0)	1,657 (1,091)
Rock bass	0.0043 (0.0056)	58 (94)	57 (114)	0 (0)	0 (0)	0 (0)	0 (0)	114 (148)
Black crappie	0.4258 (0.1610)	938 (804)	3,237 (2,441)	1,388 (1,284)	4,342 (2,745)	1,133 (755)	185 (224)	11,223 (4,051)
Brown bullhead	0.0047 (0.0093)	0 (0)	0 (0)	123 (246)	0 (0)	0 (0)	0 (0)	123 (246)
<b>TOTAL HARVEST</b>	<b>1.1022 (0.3035)</b>	<b>1,520 (931)</b>	<b>10,735 (5,658)</b>	<b>6,941 (3,029)</b>	<b>6,947 (2,995)</b>	<b>2,424 (1,456)</b>	<b>486 (327)</b>	<b>29,053 (7,297)</b>
<b>RELEASED</b>								
Walleye	0.0010 (0.0020)	0 (0)	0 (0)	0 (0)	27 (53)	0 (0)	0 (0)	27 (53)
Northern pike	0.0165 (0.0190)	53 (92)	315 (481)	42 (83)	0 (0)	0 (0)	25 (39)	434 (498)
Largemouth bass	0.0458 (0.0316)	296 (315)	214 (255)	468 (655)	0 (0)	222 (284)	6 (12)	1,207 (821)
Smallmouth bass	0.1008 (0.0434)	154 (150)	174 (245)	473 (420)	1,747 (972)	95 (116)	12 (25)	2,656 (1,103)
Yellow Perch	0.1945 (0.0918)	278 (294)	1,829 (1,451)	1,516 (1,281)	609 (589)	44 (65)	851 (1,156)	5,126 (2,349)
Bluegill	1.3554 (0.5746)	630 (504)	13,928 (12,360)	13,356 (6,554)	6,450 (3,936)	1,329 (1,304)	37 (73)	35,729 (14,600)
Pumpkinseed	0.0250 (0.0213)	187 (364)	159 (246)	0 (0)	107 (156)	206 (305)	0 (0)	659 (557)
Rock bass	0.0409 (0.0427)	273 (388)	683 (1,022)	123 (246)	0 (0)	0 (0)	0 (0)	1,079 (1,120)
Black crappie	0.6482 (0.3096)	650 (866)	8,456 (6,526)	189 (332)	4,755 (3,954)	3,036 (1,950)	0 (0)	17,086 (7,930)
<b>TOTAL RELEASED</b>	<b>2.4281 (0.6969)</b>	<b>2,521 (1,226)</b>	<b>25,759 (14,104)</b>	<b>16,166 (6,736)</b>	<b>13,695 (5,696)</b>	<b>4,930 (2,387)</b>	<b>931 (1,159)</b>	<b>64,002 (16,890)</b>
<b>TOTAL CATCH</b>	<b>3.5302 (0.8037)</b>	<b>4,041 (1,540)</b>	<b>36,494 (15,197)</b>	<b>23,107 (7,386)</b>	<b>20,642 (6,435)</b>	<b>7,355 (2,796)</b>	<b>1,416 (1,204)</b>	<b>93,055 (18,399)</b>
<b>ANGLER HOURS</b>		<b>2,078 (645)</b>	<b>7,457 (2,019)</b>	<b>7,732 (1,411)</b>	<b>6,071 (1,371)</b>	<b>2,321 (657)</b>	<b>700 (233)</b>	<b>26,359 (2,974)</b>
<b>ANGLER TRIPS</b>		<b>978 (327)</b>	<b>3,509 (1,037)</b>	<b>3,639 (795)</b>	<b>2,753 (758)</b>	<b>1,124 (636)</b>	<b>329 (116)</b>	<b>12,332 (1,676)</b>

Table 4—Estimated harvest, catch per hour, and fishing pressure for Lake Mitchell, boat. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	October	Season
<b>HARVEST</b>								
Walleye	0.0023 (0.0033)	9 (19)	48 (81)	0 (0)	0 (0)	0 (0)	0 (0)	58 (83)
Northern pike	0.0204 (0.0125)	424 (286)	0 (0)	41 (83)	31 (62)	19 (26)	0 (0)	516 (305)
Largemouth bass	0.0054 (0.0075)	43 (86)	0 (0)	0 (0)	94 (168)	0 (0)	0 (0)	136 (188)
Yellow Perch	0.0038 (0.0045)	0 (0)	30 (60)	0 (0)	67 (95)	0 (0)	0 (0)	97 (112)
Bluegill	0.1968 (0.0860)	126 (185)	1,554 (897)	2,176 (1,554)	245 (254)	882 (909)	0 (0)	4,982 (2,036)
Pumpkinseed	0.1422 (0.0869)	11 (21)	754 (851)	79 (130)	2,615 (1,938)	140 (152)	0 (0)	3,599 (2,127)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Black crappie	0.0542 (0.0384)	465 (495)	444 (434)	339 (635)	125 (249)	0 (0)	0 (0)	1,372 (948)
Brown bullhead	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.4250 (0.1397)</b>	<b>1,078 (608)</b>	<b>2,829 (1,315)</b>	<b>2,635 (1,686)</b>	<b>3,176 (1,981)</b>	<b>1,041 (922)</b>	<b>0 (0)</b>	<b>10,759 (3,117)</b>
<b>RELEASED</b>								
Walleye	0.0066 (0.0131)	0 (0)	0 (0)	166 (331)	0 (0)	0 (0)	2 (3)	167 (331)
Northern pike	0.1019 (0.0417)	1,353 (854)	228 (170)	253 (248)	387 (304)	329 (203)	29 (26)	2,580 (977)
Largemouth bass	0.1722 (0.0615)	1,398 (780)	1,447 (970)	392 (418)	350 (324)	655 (345)	119 (131)	4,361 (1,402)
Smallmouth bass	0.0538 (0.0251)	440 (253)	368 (393)	96 (134)	295 (302)	146 (175)	15 (16)	1,361 (599)
Yellow Perch	0.0720 (0.0453)	106 (130)	176 (197)	0 (0)	825 (666)	715 (859)	2 (4)	1,823 (1,112)
Bluegill	0.5944 (0.2582)	407 (604)	4,173 (3,692)	5,252 (3,886)	3,807 (2,657)	1,410 (1,050)	0 (0)	15,049 (6,104)
Pumpkinseed	0.1791 (0.1373)	99 (129)	78 (108)	926 (1,118)	3,320 (3,209)	112 (126)	0 (0)	4,535 (3,405)
Rock bass	0.0114 (0.0111)	113 (117)	139 (241)	0 (0)	37 (74)	0 (0)	0 (0)	288 (278)
Black crappie	0.0698 (0.0891)	737 (1,178)	79 (112)	950 (1,901)	0 (0)	0 (0)	0 (0)	1,767 (2,239)
<b>TOTAL RELEASED</b>	<b>1.2612 (0.3602)</b>	<b>4,652 (1,789)</b>	<b>6,688 (3,857)</b>	<b>8,034 (4,509)</b>	<b>9,021 (4,254)</b>	<b>3,368 (1,430)</b>	<b>167 (134)</b>	<b>31,931 (7,653)</b>
<b>TOTAL CATCH</b>	<b>1.6862 (0.4185)</b>	<b>5,731 (1,889)</b>	<b>9,517 (4,075)</b>	<b>10,669 (4,814)</b>	<b>12,197 (4,692)</b>	<b>4,409 (1,702)</b>	<b>167 (134)</b>	<b>42,690 (8,263)</b>
<b>ANGLER HOURS</b>		<b>7,717 (3,229)</b>	<b>5,383 (1,218)</b>	<b>4,528 (1,122)</b>	<b>4,467 (1,208)</b>	<b>2,844 (885)</b>	<b>378 (253)</b>	<b>25,317 (3,934)</b>
<b>ANGLER TRIPS</b>		<b>2,098 (1,169)</b>	<b>1,452 (585)</b>	<b>1,485 (572)</b>	<b>956 (459)</b>	<b>478 (210)</b>	<b>71 (53)</b>	<b>6,539 (1,514)</b>

Table 5—Estimated harvest, catch per hour, and fishing pressure for Lake Mitchell, shore. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	October	Season
<b>HARVEST</b>								
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0.0037 (0.0074)	27 (54)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	27 (54)
Largemouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bluegill	0.1714 (0.2504)	0 (0)	414 (705)	839 (1,678)	0 (0)	0 (0)	0 (0)	1,253 (1,820)
Pumpkinseed	0.0347 NAN	0 (0)	0 (0)	0 (0)	253 NAN	0 (0)	0 (0)	253 NAN
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Black crappie	0.0189 (0.0380)	0 (0)	138 (277)	0 (0)	0 (0)	0 (0)	0 (0)	138 (277)
Brown bullhead	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	0.2287 NAN	27 (54)	552 (758)	839 (1,678)	253 NAN	0 (0)	0 (0)	1,672 NAN
<b>RELEASED</b>								
Walleye	0.0189 (0.0380)	0 (0)	138 (277)	0 (0)	0 (0)	0 (0)	0 (0)	138 (277)
Northern pike	0.0095 (0.0190)	0 (0)	69 (138)	0 (0)	0 (0)	0 (0)	0 (0)	69 (138)
Largemouth bass	0.0413 NAN	27 (54)	138 (277)	0 (0)	0 (0)	136 NAN	0 (0)	302 NAN
Smallmouth bass	0.0788 (0.0873)	71 (98)	113 (164)	280 (559)	0 (0)	112 (225)	0 (0)	576 (632)
Yellow Perch	0.1242 NAN	35 (71)	0 (0)	0 (0)	760 NAN	112 (225)	0 (0)	908 NAN
Bluegill	0.6761 NAN	35 (71)	1,725 (1,082)	2,797 (3,381)	0 (0)	385 NAN	0 (0)	4,942 NAN
Pumpkinseed	0.0116 (0.0233)	0 (0)	85 (170)	0 (0)	0 (0)	0 (0)	0 (0)	85 (170)
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Black crappie	0.3381 (0.2518)	0 (0)	2,471 (1,802)	0 (0)	0 (0)	0 (0)	0 (0)	2,471 (1,802)
<b>TOTAL RELEASED</b>	1.2984 NAN	169 (150)	4,740 (2,155)	3,077 (3,427)	760 NAN	746 NAN	0 (0)	9,492 NAN
<b>TOTAL CATCH</b>	1.5271 NAN	196 (159)	5,293 (2,284)	3,916 (3,816)	1,014 NAN	746 NAN	0 (0)	11,164 NAN
<b>ANGLER HOURS</b>		451 (209)	1,858 (479)	2,053 (593)	2,090 (643)	746 (435)	112 (79)	7,310 (1,111)
<b>ANGLER TRIPS</b>		100 (51)	411 (145)	454 (167)	462 (179)	165 (103)	25 (19)	1,615 (308)

Table 6—Estimated harvest, catch per hour, and fishing pressure for Lake Cadillac. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	October	Season
<b>HARVEST</b>								
Walleye	0.0007 (0.0011)	39 (56)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	39 (56)
Northern pike	0.0063 (0.0042)	161 (167)	21 (43)	82 (119)	50 (72)	21 (32)	0 (0)	336 (224)
Largemouth bass	0.0022 (0.0032)	0 (0)	0 (0)	0 (0)	115 (170)	0 (0)	0 (0)	115 (170)
Yellow Perch	0.0537 (0.0289)	501 (549)	673 (1,145)	1,011 (707)	222 (246)	137 (274)	318 (250)	2,862 (1,520)
Bluegill	0.5152 (0.1405)	345 (343)	12,609 (5,773)	10,345 (3,676)	2,921 (1,547)	1,172 (1,198)	37 (52)	27,429 (7,127)
Pumpkinseed	0.0605 (0.0334)	12 (24)	644 (671)	927 (808)	1,463 (1,380)	173 (284)	0 (0)	3,219 (1,758)
Rock bass	0.0048 (0.0040)	58 (94)	124 (151)	6 (12)	52 (103)	18 (36)	0 (0)	258 (209)
Black crappie	0.5513 (0.1307)	3,640 (2,404)	14,500 (4,834)	2,876 (1,510)	5,816 (3,172)	2,277 (978)	246 (253)	29,355 (6,520)
Brown bullhead	0.0023 (0.0046)	0 (0)	0 (0)	123 (246)	0 (0)	0 (0)	0 (0)	123 (246)
<b>TOTAL HARVEST</b>	<b>1.1971 (0.2114)</b>	<b>4,756 (2,498)</b>	<b>28,571 (7,648)</b>	<b>15,370 (4,126)</b>	<b>10,639 (3,803)</b>	<b>3,799 (1,597)</b>	<b>601 (360)</b>	<b>63,737 (9,944)</b>
<b>RELEASED</b>								
Walleye	0.0005 (0.0010)	0 (0)	0 (0)	0 (0)	27 (53)	0 (0)	0 (0)	27 (53)
Northern pike	0.0311 (0.0129)	479 (307)	589 (513)	144 (169)	128 (171)	264 (177)	50 (53)	1,655 (671)
Largemouth bass	0.0433 (0.0193)	545 (395)	547 (351)	590 (686)	282 (427)	292 (289)	52 (58)	2,308 (1,009)
Smallmouth bass	0.0733 (0.0234)	291 (201)	481 (314)	659 (468)	1,984 (997)	318 (191)	171 (243)	3,904 (1,203)
Yellow Perch	0.1553 (0.0563)	554 (484)	2,778 (1,681)	2,743 (1,779)	1,267 (979)	78 (94)	851 (1,156)	8,270 (2,920)
Bluegill	1.1386 (0.3307)	743 (519)	25,035 (13,462)	23,468 (8,454)	9,583 (5,468)	1,752 (1,421)	43 (74)	60,624 (16,879)
Pumpkinseed	0.0929 (0.0790)	202 (364)	649 (641)	1,880 (1,777)	2,009 (3,703)	206 (305)	0 (0)	4,946 (4,184)
Rock bass	0.0276 (0.0218)	287 (389)	930 (1,052)	191 (266)	34 (69)	29 (57)	0 (0)	1,472 (1,156)
Black crappie	0.7024 (0.2036)	1,928 (1,490)	24,132 (8,952)	788 (591)	6,724 (4,573)	3,826 (2,078)	0 (0)	37,399 (10,390)
<b>TOTAL RELEASED</b>	<b>2.2652 (0.4293)</b>	<b>5,029 (1,816)</b>	<b>55,141 (16,315)</b>	<b>30,464 (8,884)</b>	<b>22,037 (8,167)</b>	<b>6,765 (2,568)</b>	<b>1,167 (1,186)</b>	<b>120,603 (20,570)</b>
<b>TOTAL CATCH</b>	<b>3.4623 (0.5158)</b>	<b>9,785 (3,088)</b>	<b>83,713 (18,019)</b>	<b>45,834 (9,796)</b>	<b>32,676 (9,009)</b>	<b>10,564 (3,024)</b>	<b>1,768 (1,240)</b>	<b>184,339 (22,848)</b>
<b>ANGLER HOURS</b>		<b>5,844 (1,783)</b>	<b>15,831 (2,629)</b>	<b>14,964 (2,159)</b>	<b>11,018 (1,886)</b>	<b>4,342 (836)</b>	<b>1,244 (589)</b>	<b>53,243 (4,400)</b>
<b>ANGLER TRIPS</b>		<b>1,707 (468)</b>	<b>6,521 (1,332)</b>	<b>6,283 (1,271)</b>	<b>3,946 (INF)</b>	<b>1,904 (692)</b>	<b>467 (182)</b>	<b>20,827 (INF)</b>

Table 7—Estimated harvest, catch per hour, and fishing pressure for Lake Mitchell. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	October	Season
<b>HARVEST</b>								
Walleye	0.0018 (0.0026)	9 (19)	48 (81)	0 (0)	0 (0)	0 (0)	0 (0)	58 (83)
Northern pike	0.0166 (0.0097)	451 (291)	0 (0)	41 (83)	31 (62)	19 (26)	0 (0)	543 (310)
Largemouth bass	0.0042 (0.0058)	43 (86)	0 (0)	0 (0)	94 (168)	0 (0)	0 (0)	136 (188)
Yellow Perch	0.0030 (0.0034)	0 (0)	30 (60)	0 (0)	67 (95)	0 (0)	0 (0)	97 (112)
Bluegill	0.1911 (0.0871)	126 (185)	1,968 (1,141)	3,015 (2,287)	245 (254)	882 (909)	0 (0)	6,235 (2,731)
Pumpkinseed	0.1181 NAN	11 (21)	754 (851)	79 (130)	2,869 NAN	140 (152)	0 (0)	3,852 NAN
Rock bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Black crappie	0.0463 (0.0308)	465 (495)	582 (515)	339 (635)	125 (249)	0 (0)	0 (0)	1,511 (988)
Brown bullhead	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	0.3810 NAN	1,105 (610)	3,382 (1,517)	3,474 (2,379)	3,429 NAN	1,041 (922)	0 (0)	12,431 NAN
<b>RELEASED</b>								
Walleye	0.0094 (0.0133)	0 (0)	138 (277)	166 (331)	0 (0)	0 (0)	2 (3)	306 (432)
Northern pike	0.0812 (0.0319)	1,353 (854)	297 (219)	253 (248)	387 (304)	329 (203)	29 (26)	2,649 (986)
Largemouth bass	0.1429 NAN	1,425 (782)	1,585 (1,009)	392 (418)	350 (324)	791 NAN	119 (131)	4,662 NAN
Smallmouth bass	0.0594 (0.0277)	511 (271)	481 (426)	375 (575)	295 (302)	259 (285)	15 (16)	1,937 (871)
Yellow Perch	0.0837 NAN	141 (148)	176 (197)	0 (0)	1,585 NAN	827 (888)	2 (4)	2,731 NAN
Bluegill	0.6127 NAN	442 (608)	5,898 (3,847)	8,049 (5,151)	3,807 (2,657)	1,795 NAN	0 (0)	19,991 NAN
Pumpkinseed	0.1416 (0.1060)	99 (129)	163 (202)	926 (1,118)	3,320 (3,209)	112 (126)	0 (0)	4,620 (3,409)
Rock bass	0.0088 (0.0086)	113 (117)	139 (241)	0 (0)	37 (74)	0 (0)	0 (0)	288 (278)
Black crappie	0.1299 (0.0896)	737 (1,178)	2,551 (1,805)	950 (1,901)	0 (0)	0 (0)	0 (0)	4,238 (2,874)
<b>TOTAL RELEASED</b>	1.2696 NAN	4,821 (1,795)	11,428 (4,418)	11,111 (5,663)	9,782 NAN	4,114 NAN	167 (134)	41,422 NAN
<b>TOTAL CATCH</b>	1.6506 NAN	5,926 (1,896)	14,810 (4,671)	14,585 (6,143)	13,211 NAN	5,155 NAN	167 (134)	53,854 NAN
<b>ANGLER HOURS</b>		8,167 (3,235)	7,241 (1,309)	6,582 (1,270)	6,558 (1,369)	3,590 (986)	490 (265)	32,627 (4,088)
<b>ANGLER TRIPS</b>		2,198 (1,170)	1,862 (603)	1,938 (595)	1,417 (493)	642 (234)	96 (56)	8,154 (1,545)



Table 8—Estimated harvest, catch per hour, and fishing pressure for boat. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	October	Season
<b>HARVEST</b>								
Walleye	0.0019 (0.0019)	49 (59)	48 (81)	0 (0)	0 (0)	0 (0)	0 (0)	97 (100)
Northern pike	0.0159 (0.0074)	585 (331)	21 (43)	124 (145)	61 (86)	40 (41)	0 (0)	831 (377)
Largemouth bass	0.0048 (0.0049)	43 (86)	0 (0)	0 (0)	209 (238)	0 (0)	0 (0)	252 (253)
Yellow Perch	0.0203 (0.0144)	192 (385)	73 (104)	654 (615)	84 (98)	0 (0)	55 (93)	1,058 (745)
Bluegill	0.3524 (0.0946)	268 (306)	7,465 (3,074)	8,032 (3,025)	1,596 (1,259)	1,036 (929)	0 (0)	18,396 (4,598)
Pumpkinseed	0.0989 (0.0495)	11 (21)	1,284 (1,060)	422 (322)	3,268 (2,273)	176 (169)	0 (0)	5,161 (2,534)
Rock bass	0.0027 (0.0029)	0 (0)	67 (99)	6 (12)	52 (103)	18 (36)	0 (0)	143 (148)
Black crappie	0.3736 (0.1060)	3,167 (2,319)	11,707 (4,195)	1,826 (1,017)	1,599 (1,608)	1,144 (621)	60 (119)	19,504 (5,196)
Brown bullhead	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL HARVEST</b>	<b>0.8705 (0.1660)</b>	<b>4,315 (2,396)</b>	<b>20,665 (5,311)</b>	<b>11,064 (3,269)</b>	<b>6,868 (3,069)</b>	<b>2,415 (1,131)</b>	<b>115 (151)</b>	<b>45,443 (7,440)</b>
<b>RELEASED</b>								
Walleye	0.0032 (0.0064)	0 (0)	0 (0)	166 (331)	0 (0)	0 (0)	2 (3)	167 (331)
Northern pike	0.0728 (0.0218)	1,780 (903)	502 (246)	356 (288)	515 (349)	593 (269)	55 (44)	3,801 (1,075)
Largemouth bass	0.1046 (0.0309)	1,646 (816)	1,779 (999)	513 (465)	632 (536)	726 (349)	165 (143)	5,461 (1,520)
Smallmouth bass	0.0500 (0.0155)	577 (286)	675 (440)	282 (245)	532 (374)	370 (231)	173 (243)	2,609 (767)
Yellow Perch	0.0951 (0.0405)	381 (406)	1,125 (871)	1,227 (1,235)	1,483 (1,027)	749 (861)	2 (4)	4,967 (2,060)
Bluegill	0.7652 (0.2135)	520 (616)	15,280 (6,487)	15,363 (6,604)	6,940 (4,633)	1,834 (1,192)	6 (13)	39,944 (10,439)
Pumpkinseed	0.1690 (0.1041)	114 (132)	568 (601)	2,806 (2,099)	5,221 (4,898)	112 (126)	0 (0)	8,822 (5,366)
Rock bass	0.0131 (0.0078)	127 (120)	386 (348)	68 (102)	72 (101)	29 (57)	0 (0)	681 (400)
Black crappie	0.4230 (0.1417)	2,015 (1,690)	15,755 (6,129)	1,550 (1,963)	1,969 (2,299)	791 (717)	0 (0)	22,079 (7,076)
<b>TOTAL RELEASED</b>	<b>1.6960 (0.3154)</b>	<b>7,160 (2,235)</b>	<b>36,070 (9,063)</b>	<b>22,332 (7,340)</b>	<b>17,363 (7,236)</b>	<b>5,203 (1,715)</b>	<b>403 (285)</b>	<b>88,531 (14,014)</b>
<b>TOTAL CATCH</b>	<b>2.5665 (0.3940)</b>	<b>11,475 (3,277)</b>	<b>56,735 (10,505)</b>	<b>33,397 (8,036)</b>	<b>24,231 (7,860)</b>	<b>7,618 (2,055)</b>	<b>518 (323)</b>	<b>133,974 (15,867)</b>
<b>ANGLER HOURS</b>		<b>11,483 (3,631)</b>	<b>13,757 (2,079)</b>	<b>11,760 (1,982)</b>	<b>9,414 (1,771)</b>	<b>4,865 (1,025)</b>	<b>921 (597)</b>	<b>52,200 (5,098)</b>
<b>ANGLER TRIPS</b>		<b>2,827 (1,216)</b>	<b>4,463 (1,021)</b>	<b>4,129 (1,144)</b>	<b>2,149 (INF)</b>	<b>1,257 (344)</b>	<b>209 (150)</b>	<b>15,033 (INF)</b>

Table 9—Estimated harvest, catch per hour, and fishing pressure for shore. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	October	Season
<b>HARVEST</b>								
Walleye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Northern pike	0.0014 (0.0020)	27 (54)	0 (0)	0 (0)	20 (41)	0 (0)	0 (0)	48 (68)
Largemouth bass	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yellow Perch	0.0564 (0.0398)	309 (391)	630 (1,142)	357 (349)	205 (245)	137 (274)	263 (232)	1,901 (1,329)
Bluegill	0.4535 (0.1859)	204 (241)	7,112 (5,019)	5,328 (3,098)	1,570 (935)	1,017 (1,183)	37 (52)	15,268 (6,092)
Pumpkinseed	0.0567 NAN	12 (24)	114 (228)	584 (753)	1,064 NAN	137 (274)	0 (0)	1,910 NAN
Rock bass	0.0034 (0.0044)	58 (94)	57 (114)	0 (0)	0 (0)	0 (0)	0 (0)	114 (148)
Black crappie	0.3374 (0.1247)	938 (804)	3,376 (2,457)	1,388 (1,284)	4,342 (2,745)	1,133 (755)	185 (224)	11,362 (4,060)
Brown bullhead	0.0037 (0.0073)	0 (0)	0 (0)	123 (246)	0 (0)	0 (0)	0 (0)	123 (246)
<b>TOTAL HARVEST</b>	0.9125 NAN	1,547 (933)	11,288 (5,709)	7,780 (3,463)	7,200 NAN	2,424 (1,456)	486 (327)	30,725 NAN
<b>RELEASED</b>								
Walleye	0.0049 (0.0084)	0 (0)	138 (277)	0 (0)	27 (53)	0 (0)	0 (0)	165 (282)
Northern pike	0.0149 (0.0154)	53 (92)	384 (501)	42 (83)	0 (0)	0 (0)	25 (39)	503 (517)
Largemouth bass	0.0448 NAN	323 (320)	353 (376)	468 (655)	0 (0)	358 NAN	6 (12)	1,508 NAN
Smallmouth bass	0.0960 (0.0388)	225 (179)	287 (294)	752 (700)	1,747 (972)	208 (253)	12 (25)	3,232 (1,272)
Yellow Perch	0.1792 NAN	314 (302)	1,829 (1,451)	1,516 (1,281)	1,369 NAN	156 (234)	851 (1,156)	6,034 NAN
Bluegill	1.2079 NAN	665 (509)	15,653 (12,407)	16,153 (7,375)	6,450 (3,936)	1,713 NAN	37 (73)	40,671 NAN
Pumpkinseed	0.0221 (0.0174)	187 (364)	244 (299)	0 (0)	107 (156)	206 (305)	0 (0)	744 (582)
Rock bass	0.0320 (0.0334)	273 (388)	683 (1,022)	123 (246)	0 (0)	0 (0)	0 (0)	1,079 (1,120)
Black crappie	0.5809 (0.2477)	650 (866)	10,928 (6,770)	189 (332)	4,755 (3,954)	3,036 (1,950)	0 (0)	19,558 (8,132)
<b>TOTAL RELEASED</b>	2.1828 NAN	2,690 (1,235)	30,499 (14,268)	19,243 (7,558)	14,455 NAN	5,676 NAN	931 (1,159)	73,494 NAN
<b>TOTAL CATCH</b>	3.0953 NAN	4,237 (1,548)	41,787 (15,367)	27,023 (8,313)	21,656 NAN	8,100 NAN	1,416 (1,204)	104,219 NAN
<b>ANGLER HOURS</b>		2,529 (678)	9,315 (2,075)	9,786 (1,531)	8,162 (1,514)	3,067 (788)	812 (246)	33,670 (3,175)
<b>ANGLER TRIPS</b>		1,077 (331)	3,920 (1,047)	4,092 (813)	3,215 (779)	1,289 (645)	354 (118)	13,947 (1,704)

Table 10—Estimated harvest, catch per hour, and fishing pressure for Lake Mitchell and Lake Cadillac, all fishing modes combined. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	October	Season
<b>HARVEST</b>								
Walleye	0.0011 (0.0012)	49 (59)	48 (81)	0 (0)	0 (0)	0 (0)	0 (0)	97 (100)
Northern pike	0.0102 (0.0045)	612 (336)	21 (43)	124 (145)	81 (95)	40 (41)	0 (0)	879 (383)
Largemouth bass	0.0029 (0.0030)	43 (86)	0 (0)	0 (0)	209 (238)	0 (0)	0 (0)	252 (253)
Yellow Perch	0.0345 (0.0179)	501 (549)	702 (1,146)	1,011 (707)	289 (264)	137 (274)	318 (250)	2,958 (1,524)
Bluegill	0.3920 (0.0930)	471 (390)	14,576 (5,885)	13,360 (4,330)	3,165 (1,568)	2,054 (1,504)	37 (52)	33,664 (7,633)
Pumpkinseed	0.0824 NAN	23 (32)	1,398 (1,084)	1,006 (819)	4,332 NAN	313 (322)	0 (0)	7,072 NAN
Rock bass	0.0030 (0.0024)	58 (94)	124 (151)	6 (12)	52 (103)	18 (36)	0 (0)	258 (209)
Black crappie	0.3594 (0.0808)	4,105 (2,455)	15,083 (4,862)	3,215 (1,638)	5,941 (3,181)	2,277 (978)	246 (253)	30,866 (6,594)
Brown bullhead	0.0014 (0.0029)	0 (0)	0 (0)	123 (246)	0 (0)	0 (0)	0 (0)	123 (246)
<b>TOTAL HARVEST</b>	0.8870 NAN	5,862 (2,571)	31,953 (7,797)	18,844 (4,763)	14,069 NAN	4,839 (1,844)	601 (360)	76,168 NAN
<b>RELEASED</b>								
Walleye	0.0039 (0.0051)	0 (0)	138 (277)	166 (331)	27 (53)	0 (0)	2 (3)	332 (435)
Northern pike	0.0501 (0.0143)	1,832 (907)	886 (558)	398 (300)	515 (349)	593 (269)	79 (59)	4,304 (1,193)
Largemouth bass	0.0812 NAN	1,970 (876)	2,132 (1,068)	982 (803)	632 (536)	1,084 NAN	172 (143)	6,970 NAN
Smallmouth bass	0.0680 (0.0179)	802 (337)	962 (529)	1,035 (742)	2,279 (1,041)	577 (343)	185 (244)	5,841 (1,485)
Yellow Perch	0.1281 NAN	695 (506)	2,953 (1,692)	2,743 (1,779)	2,852 NAN	905 (893)	853 (1,156)	11,001 NAN
Bluegill	0.9388 NAN	1,185 (799)	30,933 (14,001)	31,516 (9,900)	13,390 (6,080)	3,547 NAN	43 (74)	80,615 NAN
Pumpkinseed	0.1114 (0.0633)	301 (387)	813 (672)	2,806 (2,099)	5,329 (4,900)	318 (330)	0 (0)	9,566 (5,397)
Rock bass	0.0205 (0.0139)	400 (406)	1,069 (1,079)	191 (266)	72 (101)	29 (57)	0 (0)	1,760 (1,189)
Black crappie	0.4849 (0.1300)	2,665 (1,899)	26,682 (9,133)	1,739 (1,991)	6,724 (4,573)	3,826 (2,078)	0 (0)	41,637 (10,780)
<b>TOTAL RELEASED</b>	1.8869 NAN	9,850 (2,553)	66,569 (16,903)	41,575 (10,536)	31,818 NAN	10,879 NAN	1,333 (1,194)	162,025 NAN
<b>TOTAL CATCH</b>	2.7739 NAN	15,712 (3,624)	98,522 (18,615)	60,420 (11,562)	45,887 NAN	15,719 NAN	1,934 (1,247)	238,193 NAN
<b>ANGLER HOURS</b>		14,011 (3,694)	23,072 (2,937)	21,546 (2,505)	17,575 (2,330)	7,932 (1,293)	1,733 (646)	85,870 (6,006)
<b>ANGLER TRIPS</b>		3,904 (1,260)	8,383 (1,462)	8,221 (1,403)	5,363 (INF)	2,546 (731)	563 (191)	28,981 (INF)

## Survey 67 Survey Report for Sucker River, Alger County, Summer, 2006

<b>Waterbody</b>	Sucker River
<b>Year</b>	Summer, 2006
<b>County</b>	Alger
<b>Sites</b>	Sucker River
<b>Survey period</b>	April 7 to May 10
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access/shore
<b>Count type/mode</b>	roving/shore
<b>Clerk time</b>	full time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### Notes

Survey followed a roving-access (roving counts and access interviews) design. All funding was provided through Fisheries Division. One clerk worked full time to collect angler-creel data. Both weekend days and 3 randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. Progressive counts of shore anglers were made once per day. Survey period for both counts and interviews was April 17 to May 10, 2006. Months were estimated separately. Estimates are given in Table 2.

Table 1. Expansion values (referred to as “*F*” in Lockwood et al. 1999) used to estimate catch and effort at Sucker River, April 7 to May 10, Summer, 2006

	<b>Year</b>	<b>Month</b>	<b>F</b>
1	2006	4	14
2	2006	5	15

Table 2. Estimated harvest, catch per hour, and (shore) fishing pressure for Sucker River, shore. Two standard errors are given in parentheses.

<b>Species</b>	<b>C/H</b>	<b>April</b>	<b>May</b>	<b>Season</b>
<b>HARVEST</b>				
Rainbow trout	0.1173 (0.1506)	68 (65)	60 (120)	128 (136)
Common white sucker	0.0021 (0.0044)	2 (5)	0 (0)	2 (5)
<b>TOTAL HARVEST</b>	<b>0.1193</b> <b>(0.1515)</b>	<b>71</b> <b>(65)</b>	<b>60</b> <b>(120)</b>	<b>131</b> <b>(136)</b>
<b>RELEASED</b>				
Rainbow trout	0.0811 (0.0828)	89 (64)	0 (0)	89 (64)
<b>TOTAL RELEASED</b>	<b>0.0811</b> <b>(0.0828)</b>	<b>89</b> <b>(64)</b>	<b>0</b> <b>(0)</b>	<b>89</b> <b>(64)</b>
<b>TOTAL CATCH</b>	<b>0.2005</b> <b>(0.1997)</b>	<b>159</b> <b>(91)</b>	<b>60</b> <b>(120)</b>	<b>219</b> <b>(151)</b>
<b>ANGLER HOURS</b>		<b>784</b> <b>(488)</b>	<b>310</b> <b>(620)</b>	<b>1,094</b> <b>(789)</b>
<b>ANGLER TRIPS</b>		<b>225</b> <b>(146)</b>	<b>131</b> <b>(264)</b>	<b>355</b> <b>(302)</b>

## **Survey 68 Survey Report for Dowagiac Creek, Cass County, Summer, 2006**

<b>Waterbody</b>	Dowagiac Creek
<b>Year</b>	Summer, 2006
<b>County</b>	Cass County
<b>Sites</b>	Dowc
<b>Survey period</b>	April 29 to September 30
<b>Survey design</b>	Roving-access (roving counts and access interviews)
<b>Interview type/mode</b>	access/boat, non-fishing, shore
<b>Count type/mode</b>	roving/shore and non-fishing
<b>Clerk time</b>	1/2 time
<b>Survey purpose</b>	Characterize general effort and catch aspects of the fishery

### **Notes**

Survey followed a roving-access (roving counts and access interviews) design. All funding was provided through Fisheries Division. One clerk worked 1/2 time to collect angling data. One weekend day and one or two randomly selected weekdays were selected for sampling during each week of the survey season. No holidays were sampled. Clerk followed a randomized count and interview schedule. One of two shifts was selected each sample day. The entire water body was sampled each day. Starting location within the waterbody and direction of travel were randomized for both counting and interviewing. roving counts of shore and non-fishing anglers were made once per day. Survey period for both counts and interviews was April 29 to September 30. Months were estimated separately. Estimates are given in Table 2.

Interview sites for 2006 Dowagiac Creek Creel- Cass County T5,6S R13,14W

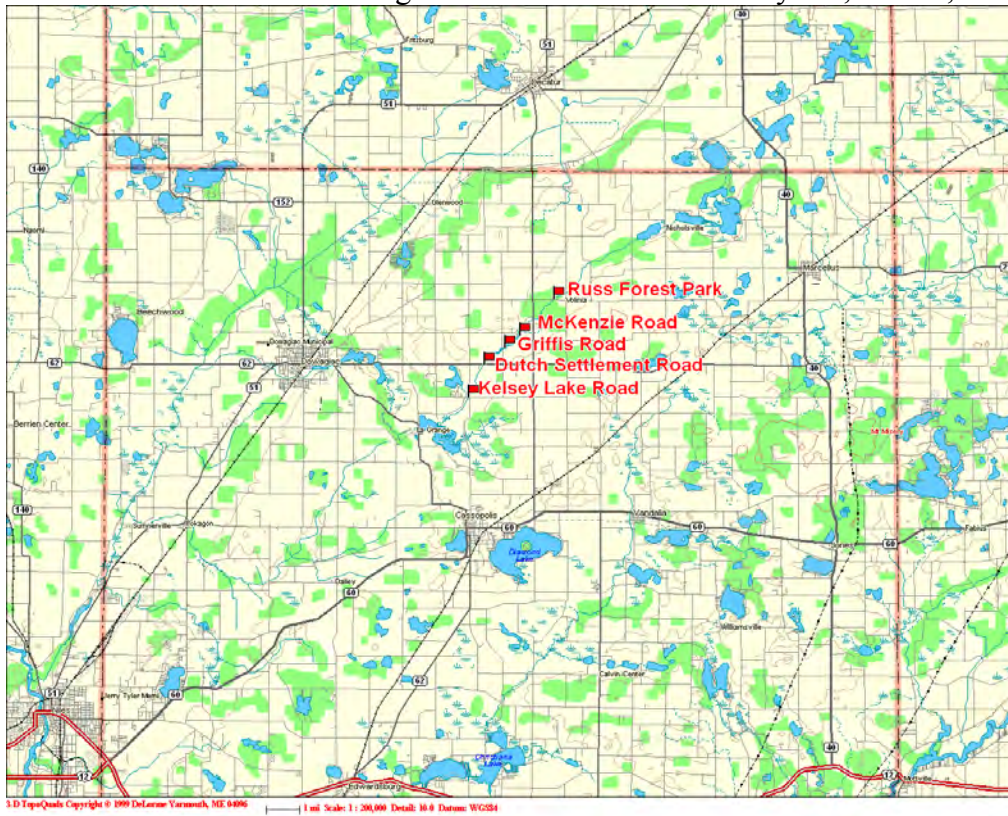


Table 1—Expansion values (F) used to estimate catch and effort at Dowagiac Creek, April 29 to September 30, Summer, 2006

	Year	Month	F
1	2006	4	14
2	2006	5	16
3	2006	6	17
4	2006	7	17
5	2006	8	15
6	2006	9	14

Table 2– Estimated harvest, catch per hour, and fishing pressure for shore for Dowagiac Creek. Two standard errors are given in parentheses.

Species	C/H	April-May	June	July	August	September	Season
<b>HARVEST</b>							
Brown trout	0.0125 (0.0221)	16 (26)	0 (0)	0 (0)	0 (0)	0 (0)	16 (26)
TOTAL HARVEST	0.0125 (0.0221)	16 (26)	0 (0)	0 (0)	0 (0)	0 (0)	16 (26)
<b>RELEASED</b>							
Brown trout	0.5793 (0.6733)	519 (667)	22 (37)	130 (133)	64 (73)	14 (19)	750 (686)
TOTAL RELEASED	0.5793 (0.6733)	519 (667)	22 (37)	130 (133)	64 (73)	14 (19)	750 (686)
TOTAL CATCH	0.5919 (0.6792)	535 (668)	22 (37)	130 (133)	64 (73)	14 (19)	766 (686)
ANGLER HOURS		832 (910)	93 (79)	96 (74)	190 (135)	84 (61)	1,294 (929)
ANGLER TRIPS		321 (354)	70 (62)	47 (40)	64 (49)	34 (37)	535 (367)