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Abstract.—A creel survey was carried out on Kent and White lakes in Oakland County from January through October 15, 1987. Kent Lake anglers caught an estimated 282,240 fish during an estimated 231,000 hours of fishing. Bluegill and crappie dominated the catch. Overall catch per hour was high at 1.22, as was angling pressure at 231 hours per acre. White Lake anglers fished an estimated 40,257 hours to catch 18,030 fish, a catch per hour of 0.45 fish. White Lake experienced angling pressure of 75 hours per acre. Catch-and-release data for selected game fish species were also recorded at both lakes. This creel survey suggests that further documentation of the production and survival of northern pike fingerlings from the Kent Lake rearing marsh is needed. Walleye plants at both lakes have failed to produce substantial fisheries. Future walleye stocking efforts need to follow the guidelines recommended by the Region III Walleye Management Plan.

Fish managers have long used creel survey as an effective method of evaluating fish populations and fisheries management programs. During 1987, fisheries personnel from the District #14 Office (formerly in Pontiac, now in Livonia) of the Michigan Department of Natural Resources (MDNR) carried out an intensive creel survey on Kent and White lakes. The objectives of the creel survey were to: (1) evaluate angler success, (2) determine angling pressure, (3) evaluate benefits of current stocking programs at each lake, and (4) assess the potential for improving fishing opportunities in the lakes.

Study Sites

Kent Lake.—Kent Lake is located west of the Village of Milford, on the Oakland-Livingston County line. The lake was created in 1948 when a dam was completed on the Huron River near the present I-96 freeway. The impoundment is 1,000 acres in surface area. A maximum depth of 38 feet is reached in a small basin near the south end. Overall, it is quite shallow with approximately 90% less than 10 feet deep. The lake contains several islands and many shallow bays. Two bridges, I-96 and Buno Road, divide it into three sections.

All of Kent Lake is contained within public lands. Much of it lies within Kensington Metropark, operated by the Huron-Clinton Metropolitan Authority (HCMA). The Kensington Metropark recorded an attendance of 2,419,438 visitors in 1987 (personal communication, Richard Shafer, HCMA). Access for anglers is excellent in the Metropark and includes two large boat ramps, a boat rental, and abundant shore-fishing opportunities. The southernmost

portion of the lake, including the dam, is contained in the Island Lake State Recreation Area. Additional shore-fishing opportunities are available in this area as well.

Nutrient loading from both point and non-point sources in the watershed have resulted in a eutrophic impoundment. This condition is reflected in dense macrophyte growth over much of the lake, hypolimnetic oxygen depletion during stratified periods, and abundant bluegill, crappie, largemouth bass, and carp populations. Weed control efforts by the Metropark have included chemical and physical methods.

Fisheries management efforts at Kent Lake have included stocking of northern pike and walleye during recent years (Table 1). HCMA officials lower the water level in Kent Lake each fall in an effort to protect shoreline structures and to control macrophyte growth. Water levels do not rebound early enough in spring to provide sufficient habitat for northern pike spawning. In an effort to enhance the northern pike population, a rearing marsh is operated cooperatively by the Fisheries Division and the Metropark. Northern pike fry are stocked in the flooded marsh in April and the fingerlings produced are released into Kent Lake in late May. The estimate of fingerling production for this marsh is of uncertain accuracy.

All walleyes stocked since 1980 have been fingerlings. The size and number of walleyes stocked have been variable.

White Lake.—White Lake is a natural lake of glacial origin in Oakland County, 11 miles west of Pontiac. The lake is 540 surface acres with several dredged upland canals and two islands. Maximum depth is 32 feet, with approximately 50% less than 10 feet deep. There are no inlets or outlets. An association of riparians owns a well and pump which is used to maintain lake levels during dry summers.

Access to the lake is through a MDNR boat access site. A private boat rental operation is located adjacent to the public access site. The rest of the shoreline is developed with private residences.

Aquatic macrophyte growth is considered a problem in most shallow areas of the lake. Both chemical and mechanical weed control have been attempted and are ongoing.

Recent fisheries management efforts have been limited to fish surveys and walleye stocking (Table 1). The size and number of walleye fingerlings stocked have been variable. Since the late 1970s, White Lake bluegill populations have been characterized by large numbers of small, slowly growing fish.

Methods

Biologists, technicians, and temporary workers conducted the survey based on a semi-random stratified sampling schedule developed with the aid of Research and Assessment Section personnel. The survey consisted of interviewing anglers to determine how long they fished and what they caught, and of making periodic counts of anglers to determine fishing pressure. The general methodology follows Ryckman (1981). The period covered, January 1 to October 15, 1987, included virtually all the fishing which occurred on these lakes during 1987. The survey was conducted during daylight hours, 5 days a week, at both lakes. All weekend days and holidays were surveyed. The order of lakes sampled, the sampling period (morning and afternoon), and the time of counts were semi-randomly determined to insure a representative sampling of angling at the lakes.

Angler interviews were made at public access sites and offshore with the aid of snowmobiles and boats. Clerks recorded fish they observed in possession as "harvested". In some cases, several species were grouped together. For example, clerks totalled all black and white crappie together and recorded a total harvest of crappie. In addition, anglers were asked how many legal and sublegal game fish (northern pike, smallmouth bass, largemouth bass, and walleye) they caught and released. Clerks recorded these as "released". The minimum legal size limits in effect were: northern pike—20 inches, bass—12 inches, and walleye—15 inches. The statistics on released fish are less reliable because they depend on the angler's recall and his ability to correctly identify fish. Total catch refers to

the total of the catch estimates for each species or species group; catch-and-release data are not available for some species. Catch-and-release data are discussed separately.

The total economic benefit generated from angling on Kent and White lakes was estimated by dividing the number of angler trips by the average number of trips per day (Table 3), and assuming that each angler spent an average of $35.47 per fishing day. This dollar value is the average day-trip expenditure (including at-home, travel, and local expenses) of all Michigan anglers targeting yellow perch, bass, panfish, and walleye (Mahoney et al. 1986). Local expenses alone probably averaged $6.25 per trip, the statewide average developed by Mahoney et al. (1986).

Results

Kent Lake

A total of 2,339 anglers were interviewed by creel clerks. Based on these interviews, anglers caught an estimated 282,240 fish, comprising 12 species, and harvested 276,906 (±42,562) fish (Table 2, Appendix 1). The catch per acre for the entire survey period was 282 (±43) (Table 3).

Bluegill was the most abundant species creeled at Kent Lake, accounting for 50% of the catch. Crappie were caught nearly as frequently, accounting for 45%. The remaining 5% of the catch was divided among the other 10 species (Table 2).

Anglers reported releasing 5,334 (±2,367) large game fish. Sublegal largemouth bass accounted for 51% of this total. Northern pike and walleye were reported released at rates of 0.4 fish per acre and 0.3 fish per acre, respectively.

Anglers made an estimated 74,706 (±10,576) trips in 1987 (Table 3). They fished a total of 231,000 (±23,006) hours (3.1 hours/trip) with an overall catch per hour of 1.22 (±0.22) fish. Angling pressure over the survey period was 231 (±23) hours per acre.

Ice anglers accounted for 45% of the total catch and 18% of the annual fishing hours. Bluegill and crappie dominated the winter fishery.

Shore-fishing activity was intense, accounting for 50% of the total angler hours. The estimated shore-fishing catch was 94,456 fish or 34% of the total estimated catch. This represents a shore-fishing catch per effort rate of 0.81 fish per hour.

Anglers from 23 counties and one other state were interviewed. The five major counties of residence of anglers were Wayne, Oakland, Washtenaw, Livingston, and Genesee (Table 4). These anglers primarily sought bluegill and/or crappie, anything, northern pike, and largemouth bass (Table 5).

White Lake

Creel clerks interviewed 770 anglers. Based on these interviews, anglers caught an estimated 18,030 fish, comprising 10 species, and harvested 15,692 (±4,780) fish (Table 2, Appendix 2). Total catch per acre for the entire survey period was 33.4 (±9.5) fish (Table 3).

Bluegill were the most abundant species caught, accounting for 39% of the total. Yellow perch were second, at 17%. Other species accounting for major portions of the catch included largemouth bass, rock bass, northern pike, and sunfish.

Anglers reported releasing 2,338 (±1,281) large game fish. Largemouth bass were the major species reported caught and released. Anglers released as many largemouth bass as were harvested during the survey. Nearly 42% of the largemouth bass released were reported to exceed the legal minimum size limit.

Anglers made 13,023 (±2,053) trips, accumulating 40,257 (±5,422) hours of fishing pressure (Table 3). Angling pressure for the survey period was 74.5 (±10.0) hours per acre. Annual estimated catch per hour was 0.45 (±0.14) fish.

Ice fishing accounted for 25% of the annual total catch and 23% of the total angler hours in 1987. Important species in the winter fishery were yellow perch, bluegill, and northern pike.

Shore-fishing activity was minimal, accounting for only 10% of the total angler hours. The estimated shore-fishing catch was 2,362 fish or 15% of the total estimated catch. This represents a shore-fishing catch per effort rate of 0.58 fish per hour.

Anglers from nine counties and two other states were interviewed. The four major counties of residence of White Lake anglers were Oakland, Wayne, Livingston, and Macomb (Table 4). These anglers primarily sought northern pike, largemouth bass, anything, bluegill and/or crappie, and yellow perch (Table 5).

Discussion

Kent Lake

The Kent Lake fishery reflects the highly productive nature of the impoundment. The lake's reputation as a consistent producer of bluegill and crappie is well deserved. This reputation attracted anglers from 23 counties of residence in 1987. Excellent access at the Metropark's boat ramps, boat rental, and shore-fishing areas, combined with this productive fishery, results in intense angling pressure and high catch rates. This is not a new phenomenon. A 1980 survey at the lake estimated angler hours at 191,134 for the period from May 15 to October 31 (Goudy 1981). Anglers hours for approximately the same time period in 1987 were 141,000. Based on the high catch rates, it appears that this extended pressure and harvest have not negatively impacted the panfish populations in the lake. However, age and growth data for bluegill and crappie are lacking for recent years. This information should be collected to more thoroughly assess the effects of this intense harvest. In this eutrophic situation, continuing high levels of harvest may prevent panfish overabundance and reduced growth rates. Conversely, cropping of bluegill and crappie at 6 to 7 inches in length may prevent an accumulation of larger panfish.

Bass fishing in Kent Lake has remained consistent since 1980. A creel survey of three southern Michigan lakes in 1980 included an evaluation of the bass fishery in Kent Lake (Goudy 1981). Harvest of bass at Kent Lake has increased from 0.8 fish per acre from May 15-October 31, 1980, to 1.8 (±1.0) fish per acre for the same period in 1987. Numbers of bass reported caught and released were estimated to be 5.5 per acre in 1980 and 4.4 per acre in 1987, which is not a significant difference.

At least 79,900 walleye fingerlings were stocked by the MDNR in 1980, 1983, and 1984. Efforts to establish walleye in the impoundment during the 1960s and 1970s had produced sparse numbers of adult fish. This survey indicates that the recent stocking efforts have also failed to establish a substantial walleye fishery. MDNR fisheries managers in southern Michigan recently developed a Regional Walleye Management Plan. It includes recommended fingerling stocking intervals and rates based on fingerling and lake size. It also established a recommended fingerling survival evaluation methodology. Adherence to these recommendations will allow comparison across the region of walleye stocking efforts. This will assist managers in determining if it is feasible to establish a walleye fishery in Kent Lake and the stocking rates needed to do so.

Yearly plants of northern pike fingerlings from the rearing marsh may be helping to maintain a fishery for this species. Since little northern pike spawning habitat exists in Kent Lake, the northern pike population is probably dependent on the fingerling plants. Anglers harvested nearly 0.7 (±0.7) northern pike per acre during the 1987 survey period. This estimate is not significantly lower than the 1.0 harvest figure estimated by Goudy (1981) for the period May 15 to October 31, 1980, which did not include an ice fishery. Reports by anglers and creel survey clerks indicate that several northern pike exceeding 10 pounds were harvested during the 1987 winter fishery. However, few anglers reported catching and releasing sublegal northern pike (Table 2). Further documentation of the contribution of the rearing marsh production to northern pike fishing in Kent Lake is needed.

White Lake

Anglers at White Lake focused their effort on predator species. Over 50% of the anglers interviewed sought northern pike and/or largemouth bass (Table 5). This relatively low interest in panfish is probably an effect of the lake's recent history of small, slowly growing panfish and minimal public shore-fishing opportunities.

Total catch per acre of northern pike and largemouth bass was probably higher at White Lake than at Kent Lake (Table 6). The estimated average northern pike catch per acre at White Lake was more than three times that at Kent Lake, however, this is not a statistically significant difference. Largemouth bass average catch per acre at White Lake was twice that at Kent Lake, but again, this difference in estimates is not significantly different.

Yellow perch were harvested at a rate of nearly 5 (±2.9) per acre. Over 88% of the perch were taken by ice anglers. This yellow perch harvest is one of the highest documented for public waters in Oakland County (Waybrant and Thomas 1988; Goudy 1981).

Since 1980, the Fisheries Division has stocked 43,677 walleye fingerlings in White Lake. This survey indicates that a viable walleye fishery has not yet developed. Future walleye stocking efforts should closely follow the suggested stocking rates, schedules, and evaluation methods as outlined in the Region III Walleye Management Plan.

Creel survey statistics—such as catch per acre, angler hours per acre, and catch per hour—vary widely between lakes, regions, and years (Ryckman and Lockwood 1985; Schneider and Lockwood 1979). A statewide summary of on-site creel surveys between 1975 and 1982 indicated that the largest lakes tended to have the lowest average catch per acre, angler hours per acre, and catch per effort (Ryckman and Lockwood). Kent and White lakes do not fit this pattern.

Comparison with recent survey results for three southern Michigan lakes (Waybrant and Thomas 1988) accents the extremely high estimates of catch per acre, pressure, and catch per effort for Kent Lake (Table 7). In fact, Kent Lake estimates of angler hours per acre and catch per acre were higher than those reported for 64 of the 65 inland lake surveys summarized in Ryckman and Lockwood (1985). White Lake estimates are within the range of recent southern Michigan estimates (Table 7). Fishing pressure on White Lake is much higher than that recorded for Cass and Orchard lakes in the 1986 survey.

Kent Lake, with its highly productive fishery and heavy angler use, accumulated an estimated $2,466,087 (±$361,900) in economic benefit (Table 3). White Lake anglers spent an estimated $461,925 (±$72,820). Annual local expenditures are estimated to have been $434,538 (±$63,769) for Kent Lake anglers, and $81,393 (±$12,831) for White Lake anglers.

Conclusion

Kent Lake is clearly one of the most heavily fished inland lakes in Michigan. Top quality fishing access provided by the Kensington Metropark combined with exceptionally productive bluegill and crappie populations attracts anglers from across southern Michigan. Economic impacts from this intense fishery are substantial for an inland lake. Maintenance or enhancement of this panfish fishery requires recent age and growth analysis. Northern pike harvest at Kent Lake appears similar to recent years. Few sublegal northern pike were reported caught and released. Since seasonal water level fluctuations minimize northern pike spawning opportunities, the efficient and successful operation of the existing northern pike rearing marsh in cooperation with the Metropark is critical. Fisheries managers should pursue improved production of northern pike fingerlings from this marsh. If necessary, plants of northern pike fingerlings from another rearing pond or state hatchery should be requested.

Efforts to establish walleye fisheries at Kent and White lakes have not been successful. Future fingerling stocking must follow the stocking rates and evaluation methods estab-

lished in the Region III Walleye Management Plan.

White Lake provides local anglers with good fishing opportunities for largemouth bass and northern pike. It also provides better yellow perch fishing opportunities than most other Oakland County public access lakes.

Bluegill and crappie fishing opportunities at White Lake are limited. Recent surveys have documented an abundance of small, slowly growing bluegill since the late 1970s. This problem is not unusual among southern Michigan lakes. While no single solution is known, riparian efforts to limit nutrient input to the lake, increased voluntary catch and release of large predator fish, and continued weed control efforts by the lake association could help improve panfish growth rates.

Acknowledgments

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Table 1.—Numbers of walleye and northern pike stocked in Kent and White lakes, Oakland County, from 1980-87.

Species	Lake	Year							
		1980	1981	1982	1983	1984	1985	1986	1987
Northern pike	Kent	3,000	2,000	2,000	2,000	3,300	4,500	2,000	2,000
Walleye	Kent	3,000	0	0	64,900	12,000	0	0	0
Walleye	White	2,169	1,273	10,150	0	12,000	16,585	0	0

Table 2.—Estimated number of fish harvested and fish caught and released (both legal and sublegal), by species, for the period of January-October 15, 1987, for Kent and White lakes, Oakland County (two standard errors in parentheses).

Species	Lake	
	Kent	White
Harvested Catch		
Northern pike	671 (670)	1,215 (1,454)
Yellow perch	2,671 (1,503)	2,691 (1,574)
Walleye	386 (301)	61 (98)
Smallmouth bass	97 (100)	71 (103)
Largemouth bass	1,808 (1,002)	2,062 (1,749)
Bluegill	138,200 (31,141)	6,060 (3,505)
Rock bass	63 (128)	1,411 (1,158)
Sunfish spp.	5,382 (3,031)	1,168 (1,116)
Crappie spp.	125,538 (28,746)	476 (338)
Common carp	1,805 (1,512)	0 (0)
White sucker	70 (135)	0 (0)
Bullhead spp.	215 (295)	477 (436)
Total Harvested Catch	276,906 (42,562)	15,692 (4,780)

Table 2.—Continued:

Species	Lake	
	Kent	White
Released Catch[1]		
Largemouth bass		
Legal	1,658	897
	(1,169)	(769)
Sublegal	2,699	1,248
	(1,864)	(1,001)
Smallmouth bass		
Legal	0	0
	(0)	(0)
Sublegal	287	34
	(479)	(71)
Northern pike		
Legal	330	52
	(581)	(92)
Sublegal	56	12
	(113)	(25)
Walleye		
Legal	34	12
	(69)	(25)
Sublegal	270	83
	(419)	(178)
Total released	5,334	2,338
	(2,367)	(1,281)

[1]Released catch applies to largemouth bass, smallmouth bass, northern pike, and walleye. Catch-and-release data for other species were not recorded.

Table 3.—Summary of fishing pressure, success, and angler expenses for the period of January-October 15, 1987, for Kent and White lakes, Oakland County (two standard errors in parentheses).

Characteristic	Lake	
	Kent	White
Angler trips	74,706	13,023
	(10,576)	(2,053)
Angler trips/day	1.075	1.00
	(0.035)	(0.00)
Angler hours	231,000	40,257
	(23,006)	(5,422)
Hours/acre		
Ice fishing	40.65	17.36
	(8.48)	(3.62)
Open-water fishing		
Boat	73.68	49.71
Shore	116.66	7.48
Total	231.00	74.55
	(23.01)	(10.04)
Total catch	276,906	15,692
	(42,627)	(4,948)
Catch/acre	282.2	33.4
	(42.7)	(9.5)
Catch/hour	1.22	0.45
	(0.22)	(0.14)
Angler expense/year[1]	$2,466,087	$461,925
	($361,900)	($72,820)
Amount spent locally[2]	$434,538	$81,393
	($63,769)	($12,831)

[1]Assumes that each angler spent $35,47 per fishing day (Mahoney et al. 1986).

[2]Assumes that local expenses were $6.25 per trip (Mahoney et al. 1986).

Table 4.—Counties of residence, in percent, for anglers fishing at Kent and White lakes, Oakland County, during the period January-October 15, 1987.

County	Lake	
	Kent	White
Genesee	2.1	0.7
Livingston	4.0	1.9
Macomb	1.6	1.4
Oakland	21.9	75.7
Washtenaw	4.1	0.8
Wayne	59.0	16.9
Other	7.3	2.6

Table 5.—Species sought by anglers (in percent) at Kent and White lakes, Oakland County, during period of January-October 15, 1987.

Species	Lake	
	Kent	White
Northern pike	5.8	34.0
Yellow perch	0.8	5.6
Walleye	0.5	2.7
Largemouth bass	5.3	20.9
Bluegill	16.9	3.4
Crappie spp.	12.6	0.9
Bluegill/crappie spp.	21.9	5.3
Common carp	2.0	0.0
Northern pike/perch	0.4	3.8
Northern pike/panfish spp.	4.3	4.7
Anything	28.3	18.1
Other	1.2	0.6

Table 6.—Fish caught per acre, by species, from January-October 15, 1987, for Kent and White lakes, Oakland County (two standard errors in parentheses).

Species	Lake	
	Kent	White
Northern pike	0.67 (0.67)	2.25 (2.69)
Yellow perch	2.67 (1.50)	4.98 (2.92)
Walleye	0.39 (0.30)	0.11 (0.18)
Smallmouth bass	0.10 (0.10)	0.13 (0.19)
Largemouth bass	1.81 (1.00)	3.82 (3.24)
Bluegill	138.20 (31.14)	11.22 (6.49)
Rock bass	0.06 (0.13)	2.61 (2.14)
Sunfish spp.	5.38 (3.03)	2.16 (2.07)
Crappie spp.	125.54 (28.75)	0.88 (0.63)
Common carp	1.81 (1.51)	0.00 (0.00)
White sucker	0.07 (0.13)	0.00 (0.00)
Bullhead spp.	0.21 (0.29)	0.88 (0.81)
All species	276.91 (42.56)	29.06 (8.85)

Table 7.—Comparison of angler catch rates, pressure, and success at Kent and White lakes, Oakland County, with other southern Michigan lakes (two standard errors in parentheses). The 1986 estimates derived from Waybrant and Thomas (1988).

Lake	Acres	Year	Catch per acre	Angler hours per acre	Catch per hour
Cass	1,280	1986	13.9 (2.9)	30.6 (3.8)	0.45 (0.11)
Kent	1,000	1987	282.2 (42.7)	231.0 (23.0)	1.22 (0.22)
Orchard	788	1986	11.0 (2.5)	31.0 (5.3)	0.35 (0.10)
White	540	1987	33.4 (9.5)	74.5 (10.0)	0.45 (0.14)
Maceday & Lotus	419	1986	96.1 (16.0)	88.3 (10.0)	1.09 (0.22)

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Appendix 1.—Estimated catch per hour, number of fish harvested or released and fishing pressure, by month and season in 1987, for Kent Lake, Oakland County (two standard errors in parentheses).

Species	Total catch per hour	Month										Season
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Northern pike	0.0029	253	336	0	0	24	0	0	7	51	0	671
	(0.0029)	(344)	(561)	(0)	(0)	(48)	(0)	(0)	(14)	(115)	(0)	(670)
Yellow perch	0.0116	332	538	10	289	292	279	477	230	224	0	2,671
	(0.0066)	(277)	(705)	(18)	(415)	(343)	(480)	(966)	(306)	(370)	(0)	(1,503)
Walleye	0.0017	13	16	1	23	56	109	72	0	96	0	386
	(0.0013)	(26)	(33)	(3)	(52)	(81)	(131)	(146)	(0)	(202)	(0)	(301)
Smallmouth bass	0.0004	0	0	0	0	33	64	0	0	0	0	97
	(0.0004)	(0)	(0)	(0)	(0)	(68)	(73)	(0)	(0)	(0)	(0)	(100)
Largemouth bass	0.0078	0	0	0	0	596	192	721	299	0	0	1,808
	(0.0044)	(0)	(0)	(0)	(0)	(575)	(232)	(704)	(351)	(0)	(0)	(1,002)
Bluegill	0.5983	13,601	66,010	12,539	13,323	2,624	2,117	7,696	8,215	11,989	86	138,200
	(0.1474)	(6,730)	(22,900)	(6,202)	(9,898)	(1,532)	(1,937)	(6,751)	(5,594)	(13,439)	(150)	(31,141)
Rock bass	0.0003	0	0	0	56	0	0	0	7	0	0	63
	(0.0006)	(0)	(0)	(0)	(127)	(0)	(0)	(0)	(14)	(0)	(0)	(128)
Sunfish spp.	0.0233	339	1,502	42	1,386	180	169	843	805	116	0	5,382
	(0.0133)	(350)	(1,407)	(69)	(2,333)	(219)	(183)	(938)	(779)	(259)	(0)	(3,031)
Crappie spp.	0.5435	4,384	23,138	1,491	21,977	25,307	17,173	21,615	8,182	2,271	0	125,538
	(0.1357)	(3,853)	(11,441)	(926)	(16,117)	(11,669)	(7,605)	13,486)	(6,156)	(2,497)	(0)	(28,746)
Common carp	0.0078	0	0	7	94	188	369	671	476	0	0	1,805
	(0.0066)	(0)	(0)	(15)	(200)	(209)	(369)	(1,355)	(480)	(0)	(0)	(1,512)
White sucker	0.0003	0	0	0	63	0	0	0	7	0	0	70
	(0.0006)	(0)	(0)	(0)	(134)	(0)	(0)	(0)	(14)	(0)	(0)	(135)
Bullhead spp.	0.0009	5	0	0	0	132	0	0	78	0	0	215
	(0.0013)	(11)	(0)	(0)	(0)	(269)	(0)	(0)	(122)	(0)	(0)	(295)
Largemouth bass												
Released: legal	0.0072	0	0	0	0	0	0	339	1,033	258	28	1,658
	(0.0051)	(0)	(0)	(0)	(0)	(0)	(0)	694)	(863)	(370)	(49)	(1,169)
sublegal	0.0117	0	0	0	0	0	159	774	1,621	89	56	2,699
	(0.0082)	(0)	(0)	(0)	(0)	(0)	(322)	(997)	(1,532)	(150)	(90)	(1,864)
Smallmouth bass												
Released: legal	0.0012	0	0	0	0	0	0	226	61	0	0	287
	(0.0021)	(0)	(0)	(0)	(0)	(0)	(0)	(462)	(126)	(0)	(0)	(479)
Northern pike												
Released: legal	0.0014	0	0	0	0	0	0	0	0	330	0	330
	(0.0025)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(581)	(0)	(581)
sublegal	0.0002	0	0	0	0	56	0	0	0	0	0	56
	(0.0005)	(0)	(0)	(0)	(0)	(113)	(0)	(0)	(0)	(0)	(0)	(113)
Walleye												
Released: legal	0.0001	0	0	0	0	0	0	0	34	0	0	34
	(0.0003)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(69)	(0)	(0)	(69)
sublegal	0.0012	0	0	0	0	194	20	56	0	0	0	270
	(0.0018)	(0)	(0)	(0)	(0)	(401)	(42)	(114)	(0)	(0)	(0)	(419)
Total	1.2218	18,927	91,540	14,090	37,211	29,682	20,651	33,490	21,055	15,424	170	282,240
	(0.2210)	(7,775)	(25,653)	(6,271)	(19,064)	(11,803)	(7,884)	(15,274)	(8,565)	(13,696)	(182)	(42,627)
Angler hours		20,986	18,166	1,502	24,440	36,653	31,377	45,657	31,940	19,448	833	231,000
		(5,167)	(6,703)	(497)	(11,981)	(8,048)	(6,605)	(7,590)	(8,111)	(8,991)	(603)	(23,006)
Angler trips		6,247	5,548	465	8,670	11,315	6,742	15,335	13,560	6,590	226	74,706
		(1,613)	(1,954)	(165)	(4,831)	(2,891)	(1,585)	(2,952)	(6,713)	(4,170)	(152)	(10,576)

Appendix 2.—Estimated catch per hour, number of fish harvested or released and fishing pressure, by month and season in 1987, for White Lake, Oakland County (two standard errors in parentheses).

Species	Total catch per hour	Month										Season
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Northern pike	0.0302	369	89	0	0	11	746	0	0	0	0	1,215
	(0.0363)	(215)	(98)	(0)	(0)	(24)	(1,434)	(0)	(0)	(0)	(0)	(1,454)
Yellow perch	0.0669	1,923	447	12	25	0	45	0	239	0	0	2,691
	(0.0401)	(1,409)	(514)	(34)	(57)	(0)	(76)	(0)	(468)	(0)	(0)	(1,574)
Walleye	0.0015	61	0	0	0	0	0	0	0	0	0	61
	(0.0024)	(98)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(98)
Smallmouth bass	0.0017	0	0	0	19	0	8	0	44	0	0	71
	(0.0026)	(0)	(0)	(0)	(41)	(0)	(16)	(0)	(93)	(0)	(0)	(103)
Largemouth bass	0.0503	0	0	0	0	940	745	76	301	0	0	2,062
	(0.0440)	(0)	(0)	(0)	(0)	(1,612)	(463)	(139)	(477)	(0)	(0)	(1,749)
Bluegill	0.1505	771	133	0	1,041	260	821	1,986	1,048	0	0	6,060
	(0.0894)	(822)	(174)	(0)	(1,713)	(305)	(763)	(2,422)	(1,450)	(0)	(0)	(3,505)
Rock bass	0.0351	8	0	0	644	319	314	0	126	0	0	1,411
	(0.0291)	(18)	(0)	(0)	(1,010)	(436)	(308)	(0)	(189)	(0)	(0)	(1,150)
Sunfish spp.	0.0290	17	22	0	0	39	308	422	360	0	0	1,168
	(0.0280)	(22)	(27)	(0)	(0)	(81)	(389)	(884)	(553)	(0)	(0)	(1,116)
Crappie spp.	0.0119	53	67	0	81	29	13	56	177	0	0	476
	(0.0109)	(66)	(93)	(0)	(122)	(60)	(21)	(118)	(261)	(0)	(0)	(338)
Bullhead spp.	0.0119	0	0	0	8	0	286	112	71	0	0	477
	(0.0109)	(0)	(0)	(0)	(19)	(0)	(335)	(236)	(149)	(0)	(0)	(436)
Largemouth bass												
Released: legal	0.0223	0	0	0	0	0	0	41	175	681	0	897
	(0.0193)	(0)	(0)	(0)	(0)	(0)	(0)	(89)	(373)	(666)	(0)	(769)
sublegal	0.0310	0	0	0	0	0	0	436	125	617	70	1,248
	(0.0252)	(0)	(0)	(0)	(0)	(0)	(0)	(494)	(169)	(842)	(144)	(1,001)
Smallmouth bass												
Released: legal	0.0008	0	0	0	0	0	0	34	0	0	0	34
	(0.0018)	(0)	(0)	(0)	(0)	(0)	(0)	(71)	(0)	(0)	(0)	(71)
Northern pike												
Released: legal	0.0013	0	0	0	0	0	0	41	0	11	0	52
	(0.0023)	(0)	(0)	(0)	(0)	(0)	(0)	(89)	(0)	(23)	(0)	(92)
sublegal	0.0003	0	0	0	0	0	0	0	0	12	0	12
	(0.0006)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(25)	(0)	(25)
Walleye												
Released: legal	0.0003	0	0	0	0	0	0	0	0	12	0	12
	(0.0006)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(25)	(0)	(25)
sublegal	0.0021	0	0	0	0	0	0	83	0	0	0	83
	(0.0044)	(0)	(0)	(0)	(0)	(0)	(0)	(178)	(0)	(0)	(0)	(178)
Total	0.4479	3,202	758	12	1,818	1,598	3,286	3,287	2,666	1,333	70	18,030
	(0.1369)	(1,650)	(559)	(34)	(1,993)	(1,701)	(1,794)	(2,652)	(1,776)	(1,074)	(144)	(4,948)
Angler hours		6,466	2,841	68	3,198	5,091	8,760	5,039	4,941	3,593	259	40,257
		(1,482)	(963)	(104)	(1,734)	(2,116)	(2,745)	(2,257)	(2,144)	(1,241	(137)	(5,422)
Angler trips		2,039	1,258	19	944	1,223	2,488	2,634	1,478	854	86	13,023
		(564)	(467)	(31)	(541)	(513)	(877)	(1,347)	(647)	(339)	(61)	(2,053)