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STATUS OF SELECTED FISH STOCKS IN LAKE ERIE AND RECOMMENDATIONS FOR COMMERCIAL HARVEST

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FOREWARD

In 1967 the Michigan Department of Natural Resources established the State's first Great Lakes Fisheries Station at Charlevoix on Lake Michigan. Similar stations were subsequently established at Marquette for Lake Superior, at Alpena for Lake Huron, and at Mount Clemens for lakes St. Clair and Erie. These stations are now fully operative and are staffed and equipped to meet a variety of resource management objectives on the Great Lakes including the conduct of fisheries investigations, fisheries surveillance, research, and water quality monitoring.

This report on the Status of Selected Fish Stocks in Lake Erie, and similar ones for lakes Superior, Huron, and Michigan, was prepared to meet a specific requirement, namely, to provide guidelines for management of Michigan's Great Lakes commercial fisheries. Recommendations expressed herein should be viewed as tentative, but largely representative of the direction set for future management of the commercial fisheries.

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AND RECOMMENDATIONS FOR COMMERCIAL HARVEST

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OVERVIEW

Michigan has jurisdiction over approximately 16% of 1,265 square miles of the western basin of Lake Erie. This part of Lake Erie is shallow, has a mean depth of 24', and contains many shoals. Cultural enrichment has rapidly accelerated eutrophication and the western basin is one of the most productive areas of the Great Lakes.

Many papers have been written discussing general trends in the biology and commercial fishery of Lake Erie. For detailed accounts see Applegate and VanMeter (1970); Hartman (1972); and Regier, Applegate and Ryder (1969). Most authors have reported serious degradation of the environment in the western basin and a wide-spread decline of the valuable fish resources. One of the most serious environmental problems appears to be the disappearance of dissolved oxygen during periods of summer stagnation which has resulted in the loss of the burrowing mayfly population (Carr and Hiltunen, 1965).

There has been a long history of debate over causes for the decline in fish populations in Lake Erie, some favoring environmental stresses and others placing major responsibility on over-exploitation. Recent increases in walleyes following curtailment of the fishery lends support to the greater significance of overfishing as the principal cause. At any rate, the commercial fishery has essentially been unregulated and has relentlessly sought species of good market value without regard for abundance.

Commercial fishing became significant in the western basin of Lake Erie around 1850 with the introduction of pound nets (Applegate and VanMeter, 1970). Since that time many different types of gear have been used with trap nets, gill nets and seines being most widely used. Gill nets are now the principal gear fished in Canadian waters of the western basin while trap nets and seines are the major gear fished in Ohio and Michigan waters.

About 20 species of fish have, at one time or another, contributed to the commercial production. Many of them are still around but only the low-valued ones are abundant. Early reports indicated that muskellunge were the first commercial species to become rare, followed closely by northern pike and sturgeon. Lake whitefish, sauger and lake herring were reduced to commercial insignificance by 1920 in the western basin. Since then there has been a gradual but relentless shift of effort towards the walleye, yellow perch and white bass.

Walleye landings reached a peak during the 1950's when the commercial fisheries of the western basin were all highly developed. A maximum harvest of 15.5 million lbs. in 1956 represented peak landings for both the Ontario and U.S. waters. The walleye fishery started to decline in 1957 and by 1960 production had dropped to 1.8 million lbs. The mercury ban halted commercial production of walleyes in 1970 in the western basin, possibly preventing complete collapse of the population. A status report

on walleyes is not included in this report because of the 'mercury' closure and tentative approval of its addition to the list of sport species in Michigan. However, a summary of the Michigan commercial catch for 1930-1972 is presented in Appendix A.

Historically, Michigan's commercial catch has only averaged about 3% of the total Lake Erie harvest. The mercury ban in 1970 further curtailed the fishery which has still not recovered in 1973. The larger operators have continued to apply for licenses but effort for most species is down from traditional levels by a factor of 4 or 5. It is difficult to assess the impact of this relatively small fishery upon fish stocks which move freely between the various jurisdictional waters and are heavily exploited wherever they go. Quota recommendations are summarized in Table 1.

TABLE 1. - COMMERCIAL FISHERIES RECOMMENDATIONS FOR LAKE ERIE

Species	Gear	Year	Quotas	Minimum length (inches)
Channel catfish	Trap, Seines	1974	15,000	15.5
		1977	35,000	15.5
		1980	50,000	15.5
Yellow perch	Trap	19[illegible]	50,000	8.0
		1977	50,000	8.0
		1980	50,000	8.0
White bass	Trap	1974	60,000	9.0
		1977	60,000	9.0
		1980	60,000	9.0
Freshwater drum	Trap, Seines	1974	20,000[1]	---
		1977	50,000[1]	---
		1980	50,000[1]	---
Carp	Trap, Seines	1974	100,000[1]	---
		1977	250,000[1]	---
		1980	250,000[1]	---

1./ Anticipated landings without any limitations

CHANNEL CATFISH

Channel catfish harvest from all of Lake Erie has been sporadic and fluctuated between 300,000 and 2 million lbs. since 1915. The catch from Michigan's waters has been a little more stable over the years term and averaged about 31,000 lbs. (Appendix A). During the period 1954-1967, there was an increase in which catfish harvest in Michigan waters averaged 61,000 lbs. annually. This increase probably can be attributed to a greater amount of effort for catfish due to declines in some of the higher-valued species and the influx of greater amounts of gear such as seines and set lines. There has been a subsequent decline in landings since the mid-1960's which suggests a change in the harvestable population. A similar decrease, although occurring earlier, also was evident in Ohio's landings. According to the 1967 Ohio report to the Lake Erie Committee of the Great Lakes Fishery Commission, the decreased catfish landings since the late 1950's probably was due to lower trap net effort and to decreases in the age and size structure of the population. Increased seine and set line effort was responsible for the decreased abundance.

The mercury scare in the spring of 1970 severely limited Michigan's landings of catfish in both 1970 and 1971 but, by 1972, landings had moved back up to 11,000 lbs. However, the future of the fishery still remains very tenuous.

It is felt that the western basin fishery for catfish has been over-exploited since about 1950 and caused a rather severe reduction in the mature stock. Changes in the size limit and restrictions on allowable harvest will be recommended in an attempt to rebuild a population of older and larger fish.

Channel catfish in Lake Erie grow at a slower rate than either the Saginaw Bay or the Lake St. Clair populations. This is evident particularly after age IV (Tables 2 and 4). The mean back-calculated lengths and weights are various ages for catfish samples combined from both experimental trap nets in Michigan waters and commercial trap nets in Ohio waters of western Lake Erie during 1972 are shown in Table 3. The commercial samples were obtained from Ohio in lieu of adequate commercial samples from Michigan waters. Separate calculations (with corresponding mean lengths at capture) for the August experimental trap-net catches are also given in Table 2. Catfish lengths reported by the State of Ohio (Table 3) indicate moderately slower growth rates for their waters. However, a wide variation between samples rules out any rigorous comparisons. Back-calculated lengths for Saginaw Bay (1971) and Lake St. Clair (1969-70) catfish captured in experimental trap nets are presented in Table 4. The relatively high, selective, fishing mortality on faster-growing fish in Lake Erie is probably responsible for underestimation of their real growth potential. Protection of fish larger than the present minimum size of 14.0" would definitely be advantageous in terms of increase biomass of the population.

TABLE 2. - AVERAGE CALCULATED LENGTHS (INCHES) AND WEIGHTS (POUNDS) OR MEAN LENGTH AT CAPTURE FOR CHANNEL CATFISH FROM WESTERN LAKE ERIE, TAKEN FROM SEVERAL SOURCES IN 1972

	COMBINED EXPERIMENTAL AND COMMERCIAL TRAP NETS* (1972)			AUGUST EXPERIMENTAL TRAP NETS			
Age Group	Number of fish	Mean calc. length	Mean calc. weight	Number of fish	Mean length at capture	Mean calc. length	Mean calc. weight
I	495	6.7	.10				
II	489	8.7	.22	5	8.8	8.7	.23
III	479	10.4	.38	15	11.4	10.1	.38
IV	413	12.0	.56	42	13.0	11.7	.55
V	339	13.4	.75	49	13.9	13.0	.73
VI	231	14.7	.99	59	14.7	14.1	.91
VII	79	15.4	1.14	19	15.4	14.8	1.05
VIII	29	16.4	1.38	4	15.4	14.8	1.08
IX	5	17.8	1.80	--	--	--	--
X	3	19.9	2.52	--	--	--	--
XI	1	21.6	3.27	--	--	--	--
Totals	2,563	--	--	193	--	--	--

* Commercial trap-net samples from Ohio waters of Lake Erie.

TABLE 3. - BACK-CALCULATED MEAN LENGTHS (INCHES) AND MEAN LENGTHS AND WEIGHTS (POUNDS) AT CAPTURE FOR CHANNEL CATFISH TAKEN IN OHIO WATERS OF LAKE ERIE BOTH IN 1968 AND 1972

	October, 1968*		October, 1972**	
Age Group	Back-Calculated Mean Length	Mean Length at Capture	Mean Length at Capture	Mean Weight at Capture
I	4.0	--	--	--
II	6.5	--	8.3	.17
III	8.8	11.6	8.7	.23
IV	11.0	12.7	10.2	.34
V	12.5	13.4	11.1	.44
VI	14.0	14.6	13.5	.81
VII	15.3	15.6	15.3	1.40
VIII	--	16.6	17.6	1.94

* Data from Seward (1968)

** Date from Van Vooren (1972)

TABLE 4. - BACK-CALCULATED MEAN LENGTHS (INCHES) FOR CHANNEL CATFISH TAKEN EITHER IN SAGINAW BAY (1971) OR LAKE ST. CLAIR (1969-70) BY EXPERIMENTAL TRAP NETS

Age Group	Saginaw Bay	Lake St. Clair
I	[illegible].7	3.0
II	6.2	8.2
III	10.0	8.9
IV	13.2	10.7
V	15.9	13.8
VI	19.3	15.1
VII	22.1	17.1
VIII	22.4	19.1
IX	23.2	20.9
X	23.9	22.2
XI	24.8	23.8
Number of fish	253	507

Most catfish caught in experimental gear were immature. There seemed to be a great amount of variation in the size at maturity, however. Approximately 50% of the fish were mature at 14.0" (age V) and nearly 100% at 16.0" (age VII). This agrees with data presented by DeRoth (1965) for western Lake Erie catfish. He found about 70% were mature at age V and 90% were mature at age VII. Sexual maturity appears to be more closely associated with age than with size in catfish. The Saginaw Bay and Lake Erie catfish mature at identical ages but, due to faster growth, the Saginaw Bay fish are several inches longer.

Catches in experimental trap nets in Lake Erie indicate that fish older than age V (only 11% of the sample) are relatively rare in the population (Table 5). The percent age distribution of all, landed-run, commercial samples, as reported by the State of Ohio, are also shown in Table 5. There were few fish older than age V comprising about 20% of these samples. Eighty-six percent of the fish from Lake St. Clair were age VI and older. Evidently the survival rate after recruitment to the Lake Erie fishery is very low, probably on the order of 30%. This is poor survival compared to estimates of 90% for Lake St. Clair (no fishery) and 51% for Saginaw Bay. Mortality estimates for the Lake Erie population are not reliable enough to make a meaningful yield-per-recruit analysis. However, it can be assumed that a substantial improvement in long-term yield could be achieved by increasing minimum size and decreasing the rate of fishing.

The commercial fishery for catfish in Michigan waters has been in a disrupted state since 1970. In 1969, when 21,000 lbs. of catfish were landed, 59% was taken by trap nets, 29% by seines and the remainder by fyke nets, gill nets and set lines (Table 6). Similar percentages were caught by the gear during 1967 and 1968. Trap nets and seines are the only gear that have been fished since 1969 and it is doubtful that set lines, fyke net and gill nets will be used in the future.

It is difficult to formalize recommendations for the catfish fishery on Lake Erie because of its recent sporadic nature. However, a future long-term annual harvest of 50,000 lbs. seems possible based on the traditional harvest and an increased minimum size. The legal size in 1974 probably should be increased to 15.5". This would provide protection for the majority of the fish and well over 50% would have an opportunity to spawn before becoming available to the fishery. Ohio adopted a 15.5" size restriction in 1973 for similar reasons. According to R. Scholl (pers. comm.), 85% of the catfish in net-run trap net samples in Ohio in April 1973, were sub-legal. He also estimated that the April catch was only about 25% of that in April, 1972.

A quota of 15,000 lbs. should be set for 1974 in Michigan waters even though yields under a 15.5" size limit would be low. This would help insure good survival of fish into older age groups. The sport fishery for catfish on Lake Erie is fairly well developed and an increase in number and average size for catfish would improve the fishery significantly. By 1977, the quota could be raised to 35,000 lbs.; possibly to 50,000 lbs. in 1980.

TABLE 5. - PERCENTAGE AGE COMPOSITION OF CHANNEL CATFISH SAMPLES FROM LAKE ERIE AND LAKE ST. CLAIR, CAUGHT EITHER BY EXPERIMENTAL OR COMMERCIAL TRAP NETS

	Percentage					
	Michigan Experimental Trap Net		Ohio Fall Landed-Run Commercial Samples [1]			
Age Group	Lake Erie (1972)	Lake St. Clair [2] (1970)	1968 [3]	1969	1970	1972
I	3	--	--	--	--	--
II	8	--	--	--	--	--
III	22	1	--	--	--	4
IV	25	9	42	63	27	39
V	31	4	27	16	41	46
VI	9	10	20	20	19	4
VII	2	28	--	1	8	4
VIII	--	10	--	--	--	4
IX	--	17	--	--	--	--
X	--	11	--	--	--	--
XI	--	7	--	--	--	--
XII	--	3	--	--	--	--
Number of fish	193	887	--	--	--	--

(1) Data from Ohio Reports to Lake Erie Committee of Great Lakes Fishery Commission, 1969-71 and 1973.

(2) Data from Michigan Report to Lake Erie Committee of Great Lakes Fishery Commission, 1971.

(3) Incomplete sample reported.

TABLE 6. - PERCENTAGE OF THE ANNUAL CATCHES OF CHANNEL CATFISH TAKEN IN VARIOUS KINDS OF GEAR (1967-1969)

Item	Year 1967	1968	1969
Trap net	57	72	59
Seine	36	25	29
Set line	3	3	2
Fyke net	4	--	5
Gill net	--	--	5
Total catch (lb.)	30,682	22,311	20,810

YELLOW PERCH

Yellow perch have made a very significant contribution to the Lake Erie commercial fishery since the first records were kept. The average annual catch since 1897 has been 10 million lbs., with peak harvests occurring in recent years (Appendix). The loss of most high-value species by the 1950's greatly enhanced the value of perch to the fishery. According to Hartman (1972), the expanded effort coupled with strong consecutive year-classes of perch in the late 1950's raised production to extremely high levels. Annual landings since averaged 22.5 million lbs. since 1956. Ontario and Ohio have produced the bulk of the landings, as with most other commercial species in Lake Erie. Ontario alone has accounted for 80% of the total perch landings since 1961. Their fishery is primarily a gill-net operation while the Ohio and Michigan fisheries are trap-net operations.

Growth of perch in the western basin is relatively fast and is reported to be even greater in the central and eastern basins. Back-calculated mean lengths for perch captured in index trawl surveys by Michigan and Ohio are shown in Table 7. The Ohio lengths are slightly larger at the oldest ages which probably is due to the inclusion of fish from the central basin where growth is faster. If these data are representative of actual growth, female perch reach a commercially vulnerable size (assumed to be 8.0") sometime early in their fourth growing season, on the average. Males reach it approximately one year later. The U.S. Bureau of Sport Fisheries and Wildlife reported that a fall, landed-run commercial sample from the western basin in 1972 was composed of 44% age-II perch (1970 year class), attesting to their early vulnerability (Minutes of Lake Erie Committee Meeting, 1973).

Yellow perch have been sampled during fall index surveys in Michigan waters since 1970. The trawl samples have been dominated by ages I-III every year (Table 8). The 1970 year class appears to be relatively strong compared to the 1971 and 1972 year classes by virtue of its larger contribution as both age 0 and I. Furthermore, biologists at the federal laboratory in Sandusky also reported finding fair to poor perch reproduction for 1970-1972, with 1970 showing the highest success (Lake Erie report, 1973). Hartman (1972) reported that since the late 1950's, strong year classes only have occurred in 1962, 1965 and 1970. Data presented in Table 9 for 1970-1972 show that the commercial catch depended upon two year classes for the bulk of the landings. There is also an indication that the fishery is becoming dependent upon smaller and younger fish. It should be remembered that these data pertain mainly to the Ohio and Michigan impoundment-gear fishery. The Ontario gill-net fishery, which produces the bulk of the landings, is very possibly taking fish even younger and smaller. The aforementioned poor reproductive success is expected to cause drastic declines in future perch production.

TABLE 7. - AVERAGE CALCULATED LENGTHS (INCHES) FOR LAKE ERIE YELLOW PERCH CAPTURED BY TRAWL IN MICHIGAN (1971) AND OHIO (1968-1970) WATERS OF THE WESTERN BASIN

Age group	Michigan		Ohio*	
	♂	♀	♂	♀
I	3.7	3.4	2.7	2.7
II	5.7	5.7	5.1	5.1
III	7.1	7.4	6.8	7.2
IV	7.7	8.5	7.7	8.3
V	8.1	9.3	8.5	9.5
VI	8.3	10.2	--	10.5
Number of fish	277	165	524	531

*Data from Baker (1971).

TABLE 8. - PERCENTAGE AGE COMPOSITION OF PERCH IN TRAWL CATCHES FROM MICHIGAN WATERS OF LAKE ERIE, 1970-1972

Age group	1970	1971	1972
0	31	13	16
I	4	33	28
II	45	19	19
III	13	23	27
IV	5	9	8
V	2	3	2
Number of fish	325	1,721	402

TABLE 9. - PERCENTAGE AGE DISTRIBUTION SAMPLES OF LANDED COMMERCIAL PERCH CATCHES IN LAKE ERIE, 1970-1972 [1]

Age Group	1970		1971		1972	
	Spring	Fall	Spring	Fall	Spring	Fall
II	--	11	--	13	--	44
III	12	24	26	58	14	43
IV	41	48	41	22	49	11
V	46	16	19	6	29	2
VI	2	1	13	1	7	--
VII	--	--	--	--	1	--
Number of fish	354	275	288	300	294	351

[1] Data from U.S. Bureau of Sport Fisheries and Wildlife reports to the Lake Erie Committee, Great Lakes Fish. Comm., 1971-1973.

Michigan's commercial fishermen harvest a very small portion of the total perch landings (Appendix A). Limitations on harvest seemingly would have little effect upon the western Lake Erie perch population. However, there is general agreement among fishery biologists working on this lake that controls on exploitation are needed to protect the brood stock and restore more uniform production. It is, therefore, recommended that a quota of 50,000 lbs. be set for Michigan commercial fishermen in 1974 with the hope that it will encourage other jurisdictions on Lake Erie also to establish quotas.

An 8.5" size limit is also recommended to help assure that the fishery does not continue to depend on young fish if the stocks decline.

WHITE BASS

The white bass in western Lake Erie is characterized by a short life span, rapid growth and relatively successful reproduction from year to year. Commercial catch records for the early part of the fishery were sporadic and incomplete until 1952. Landings reached prominence about 1953 following a period of low abundance (Regier, Applegate and Ryder, 1969). Since then, total lake landings have averaged 3.7 million lbs. but recently declined to about 1.7 million lbs. annually. Ohio and Ontario accounted for the bulk of the white bass catch with Michigan contributing only 3% since 1960. The majority of Ontario's harvest comes from the gill-net fishery; Ohio's catch is taken by trap nets and seines.

White bass have been caught during regular index surveys but no special attempt has been made to study the population. Usual catches during index trawling and gill netting are too small to provide much information. However, experimental trap nets fished in August, 1972 took over 1,000 fish and their percent age distribution and mean lengths are shown in Table 10. Mean lengths at capture for white bass taken in index gill nets in the fall also are included in Table 10. The fast growth rate of white bass is evident, with the minimum legal length of 9.0" being reached sometime late in the second growing season.

Male white bass mature in the first year; females at age II. All yearling males and 86% of age-one females taken in fall gill nets in 1971 were mature. VanVooren (1972) reported that all males and 65% of the 1-year-old females from fall gill-net samples in Ohio waters also were mature. Although a portion of the females are not mature until age II, they are vulnerable to the commercial fishery before their first spawning.

White bass reproduction probably is limited in Michigan waters since index trawl catches of young of the year have been very small. Baker (1971) reported fairly high trawl catches of young-of-the-year fish since 1967, indicating good reproduction in Ohio waters.

Information on the percentage age composition of white bass in Ohio spring and fall net-run commercial samples is presented in Table 11. Commercial samples from Michigan waters would have approximately the same distribution in view of the age composition of the August index trap-net samples. It appears that the commercial fishery is dependent upon one year class - yearlings in the fall and 2-year-olds in the spring. Hence the population is very vulnerable to commercial over-exploitation as long as there are no controls on the amount of effort.

Trap nets have accounted for 96-100% of Michigan's white bass landings since 1967 (Table 12). Michigan's commercial production of white bass is so small that it hardly seems worthwhile to recommend a quota (Appendix A). However, the total Lake Erie fishery has a very real potential for over-exploiting this resource, especially in view of the vulnerability of all fish except young-of-the-year. If commercial catches

TABLE 10. - PERCENTAGE AGE DISTRIBUTION AND MEAN LENGTH AT CAPTURE FOR WHITE BASS TAKEN IN EXPERIMENTAL GEAR IN LAKE ERIE, 1970-1972

Age Group	Trap Nets (August, 1972)		Gill Nets (fall, 1970-1971)	
	Percentage	Mean Length	Mean Length	Number of Fish
0	--	--	4.8*	18
I	97.0	7.6	10.1	40
II	2.5	10.7	11.6	26
III	0.4	11.3	12.3	6
IV	0.1	--	13.6	3
Number of fish	1,010	--	--	93

* Trawl catch

TABLE 11. - PERCENTAGE AGE DISTRIBUTION OF WHITE BASS IN NET-RUN OHIO COMMERCIAL CATCHES, 1969-1970, AND MEAN LENGTH AT CAPTURE (INCHES) IN THE FALL, 1970[1]

Age Group	Mean Length At Capture (fall, 1970)	Percent Age Distribution			
		Spring (1969)	Fall (1969)	Spring (1970)	Fall (1970)
I	10.1	--	83	--	82
II	11.8	77	15	73	24
III	12.6	18	--	24	--

[1] Data taken from 1970 and 1971 Ohio Reports to the Lake Erie Committee, Great Lakes Fishery Commission

TABLE 12. - PERCENTAGE OF THE ANNUAL CATCHES OF WHITE BASS TAKEN IN VARIOUS KINDS OF GEAR (1967-1969, 1972)

Item	Year			
	1967	1968	1969	1972
Trap Net	97	96	97	100
Seine	1	1	1	--
Gill Net	1	3	--	--
Fyke Net	1	--	2	--
Total Catch (pounds)	61,055	50,470	59,603	60,121

of some other species like perch decline as anticipated, more and more effort will be directed at white bass. Controls on harvest are needed by all jurisdictions to protect against severe over harvest. Therefore, Michigan should attempt to encourage achievement of this goal by establishing a quota. An annual production of 60,000 lb. would not severely curtail the Michigan white bass fishery and insure that harvests do not become excessive.

FRESHWATER DRUM

Commercial records suggest that the drum always has been fairly abundant in Lake Erie and the commercial catch fairly stable since 1940, averaging about 4 million lb. annually. According to Applegate and VanMeter (1970), catch records do not reflect true abundance because markets for drum have traditionally been poor and fish were usually landed only when a buyer was assured.

Small numbers of drum have been captured during regular index surveys in Michigan waters but no attempt has been made to specifically study this species. The majority (88%) of the drum caught in experimental trap nets in August, 1972, were age III or younger (Table 13). Fall net-run commercial samples from Ohio waters show approximately the same age distribution with slightly more fish in the older age groups (Table 13).

The growth rate of drum as indicated by the lengths at capture in the fall is relatively slow. Maturity is not reached until age VI for males and age VII for females (Lake Erie Committee Report, 1971). Estimates of abundance of young of the year reported by the Bureau of Sport Fisheries and Wildlife (Lake Erie Committee Report, 1973) indicate that reproduction and survival were generally high during the period 1959-70 but declined by about 50% in 1971 and 1972.

Michigan's commercial harvest of drum averaged about 85,000 lb. during the period 1930-69 (Appendix A) and trap nets have caught over 95% of the fish. Landings have been exceptionally low since 1970 because of the curtailed fishery.

The drum population is relatively stable, being composed of fish of numerous ages. The fishery is certainly not over-exploiting the stocks. Therefore, no limitation on landings is recommended. In fact, a decline to 25,000 lb. from the usual level of harvest is anticipated in 1974.

TABLE 13. - PERCENTAGE AGE DISTRIBUTION FOR DRUM TAKEN IN EXPERIMENTAL MICHIGAN TRAP NETS (AUGUST, 1972), AND 1972 COMMERCIAL NET-RUN SAMPLES IN OHIO

Age Group	Michigan Trap Nets	Ohio Commercial Nets	
		Percent	Mean Length (inches)
I	33	14	7.9
II	34	38	9.0
III	21	24	10.5
IV	8	15	12.1
V	2	5	13.6
VI	--	3	15.1
VII	2	1	15.5
Number of Fish	676	199	

CARP

Michigan's commercial carp production has averaged 709,000 lb. since 1930 (Appendix A). Between 70 and 80 percent of the carp landings were taken by seine, the remainder in trap nets. There are two seine operators presently active (1973) in Michigan and both are part-time fishermen.

Fall index catches (CPE) of carp in experimental gill nets have been high compared to Saginaw Bay and Lake St. Clair, as shown below:

	Erie	Saginaw Bay	St.Clair
1970	52.2	1.6	6.2
1971	67.3	8.5	25.8
1972	104.7	6.1	--

Carp must be very abundant since they are very difficult to catch in this type of gear.

Michigan's carp fishery is very marginal and the catch probably would remain very low under a quota-management program. If the part-time seine fishermen dropped out and landings came from trap nets only, the anticipated catch would be around 100,000 lb. With a seine operation, the anticipated yield would be about 250,000 lb.

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APPENDIX A. COMMERCIAL HARVEST OF FIVE SPECIES OF FISH IN THE MICHIGAN WATERS OF LAKE ERIE, 1930-72[1]

(thousands of pounds)

Year	Carp	Freshwater Drum	Yellow Perch	Channel Catfish	White Bass
1930	631	63	34	7	--
31	931	57	72	10	--
32	1,093	62	97	16	--
33	779	138	87	9	--
34	527	72	48	10	10
35	658	68	54	15	12
36	679	93	17	12	6
37	577	75	16	11	26
38	709	133	25	22	23
39	586	168	13	18	22
1940	461	123	14	28	17
41	655	119	25	21	35
42	764	169	36	40	42
43	598	155	23	63	21
44	599	121	20	35	55
45	484	92	29	44	74
46	539	82	46	37	53
47	444	110	49	41	45
48	534	80	17	27	33
49	555	65	32	27	29
1950	465	73	52	24	71
51	672	81	42	25	36
52	893	32	41	28	65
53	1,183	19	65	19	42
54	1,138	29	88	33	136
55	900	28	57	76	120
56	711	44	72	86	93
57	620	65	109	57	45
58	997	41	228	73	52
59	1,042	65	174	89	35
1960	1,341	108	118	93	99
61	1,298	95	104	86	159
62	1,276	82	97	52	210
63	833	71	90	41	126
64	636	100	37	48	100
65	806	93	69	50	72
66	929	94	137	32	65
67	485	96	112	31	61
68	347	83	171	22	50
69	431	40	114	21	57

Appendix A, continued

Year	Carp	Freshwater Drum	Yellow Perch	Channel Catfish	White Bass
		(thousands of pounds)			
1970	332	4	53	2	4
71	115	*	*	0	48
72	261	7	19	11	60

[1] Sources of data: 1930-68: Baldwin and Saalfeld (1962) plus Supplement
1969-71: U. S. Department of Commerce leaflets
1972: Great Lakes Laboratory, Ann Arbor

* Less than 1,000 lb.