FISH DIVISION

REPRINT FROM
FOURTH BIENNIAL REPORT
OF
THE DEPARTMENT OF CONSERVATION
1927-1928

FISH DIVISION

ARE SMILES LIKE THIS WORTH WHILE?

FISH DIVISION

DIRECTION, FRED A. WESTERMAN

HATCHERY STAFF

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WM. LOBDELL, Overseer, *Bay Port*

STANLEY SHUST, Overseer, *Thompson*

GUY LINCOLN, Overseer, *Oden*

P. G. ZALSMAN, Overseer, *Grayling*

CLAUD LYDELL, Overseer, *Hastings*

WALTER HUGHES, Overseer, *Benton Harbor*

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ROBERT BYRNES, Overseer, *Sidnaw*

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Michigan's interest in fishing was never keener than it is today. The reason for it is not difficult to trace. Love of the sport of angling may be said to be almost inherent in every normal person. The right to fish has long been recognized as a sovereign one. The need for fishing was never more apparent with the present day trend of specialization, organization and high pressure production in every line of human endeavor. What can be more restful to jaded nerves and tired bodies than to spend a few days, or hours even, on some sparkling stream or placid lake away from the cares of the world, angling. It has a pecuniary interest, too, for aside from the great commercial fishing industry of this state, the recreational possibilities are almost unlimited. Governor Green is author of the statement that Michigan's tourist business means more to its people financially than has the great wealth of its timber resources. Without question fishing is one of the magnets that attracts pleasure-seeking people from within and without our borders. Fish in our lakes and streams are conceded to belong to the state. It follows that the state has a responsibility in regulating the taking of fish and in providing for their reproduction and distribution in all of the public waters.

Fish in common with other wild life constantly retreat before the advance of civilization. In former reports attention has been called to the increased demands on our piscatorial resources, due to the present day conditions. I mention this merely to direct attention toward the need for careful regulation of seasons, and for increased activity in the propagation of fish, if we are going to continue to enjoy satisfactory fishing.

The answer to the question "What becomes of the millions of fish that are annually planted?" is that we are actually catching many more fish in the aggregate than is generally realized. How many? We don't know, but the day is coming when we will have a fair estimate of the number. We do know that Nature makes abundant provision for the reproduction of fishes. Our job is to husband these to insure that a maximum number reach maturity. Hatcheries, nurseries and feeding ponds are dedicated to that task. They are safety zones as it were, working hand in hand with Nature. The present trend in advanced fish culture is not only to increase the size of the output, in fact that is secondary, but to develop the individual fish to a more advanced stage before thrusting him out in the world, as it were, to take his place in the fight for existance and development to that sizable stage that is the pride of the angler.

It seems pertinent to repeat that while hatcheries are helpful they will not alone solve our piscatorial problems. The conservation of timber, the prevention of forest fires, control of stream pollution, control of predatory animals and birds and careful regulation of seasons and creel limits are also of tremendous importance.

HATCHERY PROGRAM

Some revisions have been made in the policy of operating a number of our present hatcheries. After a careful consideration of the various factors involved, we have reached the conclusion that at most of our hatcheries propagating brook trout it is not practical or economical, nor in fact physically possible, to maintain a stock of mature fish sufficient to meet our production requirements. In such instances, eggs will be transferred from other state hatcheries or purchased from commercial hatcheries. We are dedicated to the task of developing each of our hatcheries to its maximum capacity for the particular species of fish that it is best adapted for, consistent with requirements.

We are more concerned with such factors as increasing the average size of the fish that are planted, with increasing the efficiency of our planting crews to the end that fish shall be carefully and properly deposited in waters for which they are definitely known to be suitable for than with increasing the number of fish that are planted. In conjunction with present hatcheries, fingerling rearing ponds for bass and bluegills, and trout feeding stations are being established to provide additional facilities for the production of fingerling fish. This program is now definitely established and will be added to as suitable sites are found which can be acquired by the state.

In addition to Bay City and Bay Port the Sault Ste. Marie Hatchery is now engaged in the propagation of commercial species of fish and Thompson Hatchery is partially used for that purpose.

HATCHERY REPORT

PARIS STATION

ESTABLISHED 1881

J. P. MARKS, Assistant Superintendent Hatcheries

The pioneer in our system of state hatcheries, this station occupies an important position in the propagation of trout. The state's requirements for brown trout are now practically all produced here. It is also the administration center for the

operation of numerous field stations for the collection of rainbow trout spawn and the rearing of fingerling fish. Ponds and buildings are in good repair. Practically no new construction work has been undertaken as the pond system is well developed. Paving trunkline U. S. 131, which bisects the grounds, during the year 1928 has brought a splendid improvement. Thirty-six foot wide pavement with concrete walks for pedestrians on either side through the hatchery grounds have been provided. Thousands of tourists visit this hatchery annually. Convenient camp and picnic grounds are maintained.

SAULT STE. MARIE STATION

ESTABLISHED 1891

M. J. DEBOER, Overseer

The production at this station is now confined entirely to the hatching of so-called commercial species, lake trout and whitefish, the distribution of which is confined to Northern Lake Huron, the Straits of Mackinaw and Whitefish Bay, with a small distribution of lake trout into the few Upper Peninsula lakes that are adapted for them. The hatchery building has been painted during the past summer and additional trout fry troughs provided.

LYDELL STATION—COMSTOCK PARK

ESTABLISHED 1897

A. E. HOST, Overseer

This station continues to be the major station for the production of small mouth bass. Large mouth bass, bluegills, perch, wall-eyed pike and brook trout are also propagated.

Improvements during the biennial period include the building of two additional rearing ponds on the west side of the Pere Marquette railroad right of way which divides the state property, and the laying of an 8" pipe line 4,900' long which provites a gravity flow of water to the hatchery building from Strawberry Creek, a spring fed tributary of Mill Creek. This was necessary on account of a diminished flow of spring water from the original line due to the increased number of wells put down by surrounding residents. This pipe line also furnishes water to the nearby bass rearing pond that has been built by the Lydell Chapter of the Izaak Walton League of Grand Rapids which contributed 20% of the cost of this job. It will eliminate the future use of the steam pump during the incubation of perch and wall-eyed pike eggs.

The general appearance of the grounds has been improved by the removal of the old residence that formerly stood at the south entrance to the grounds.

DRAYTON PLAINS STATION

ESTABLISHED 1901

A. T. STEWART, Overseer

This station has been developed to the limit of its capacity on present state property. Additional ponds might be built through acquisition of land immediately below the present grounds. Many millions of perch fry are annually hatched in the battery of 264 Chase jars. Most of the out-door ponds are now used for the propagation of bluegill fingerlings for which they seem best adapted. The production of bass fingerlings is being carried on in nearby controlled or leased lakes.

HARRIETTA STATION

ESTABLISHED 1901

A. J. WALCOTT, Overseer

Harrietta station has a well developed pond system for the propagation and rearing of brook trout and continues to produce its own supply of eggs. The output during the season of 1927 was disappointing in that heavy losses resulted in attempting to hold more fish for development to the fingerling stage than facilities at hand permitted. This condition has been relieved by the building of four additional ponds and a nursery section at the hatchery and by the establishment of fingerling stations on Bear Creek in Manistee County and Platte River in Benzie

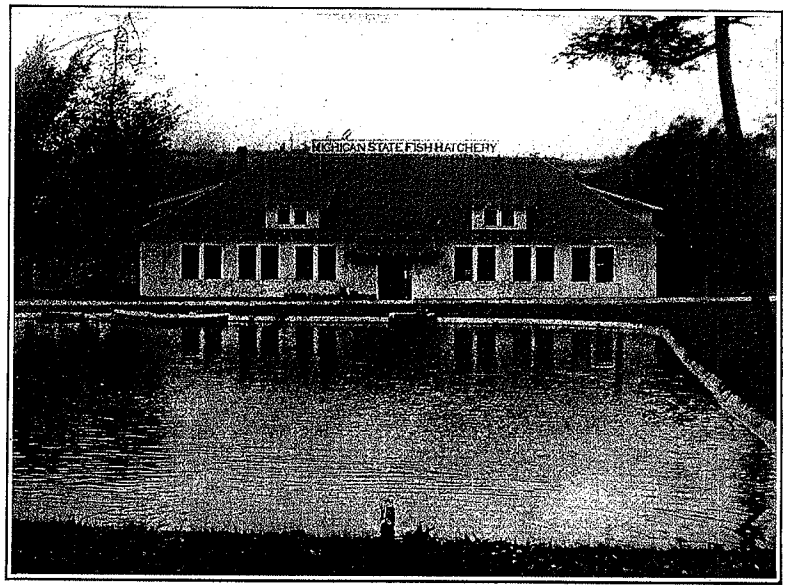
County. A third station will be built on the North Branch of the Tobacco River in Clare County. While the propagation of brown trout has been successfully carried on at this station the present policy calls for handling only brook trout in the pond system at Harrietta, with such rainbow and brown trout as may be handled at seasons of the year when they will not interfere with the brook trout.

BAY PORT STATION

ESTABLISHED 1916

WM. LOBDELL, Overseer

Bay Port hatchery with its battery of 288 jars is also engaged in hatching the so-called commercial species, whitefish and wall-eyed pike spawn secured by fishermen operating in that immediate locality. To insure a better water supply the intake has been extended 600′ and a substantial crib built over the intake. A new boiler was installed a year ago to replace worn out equipment.



TROUT REARING HOUSE AND POND—HARRIETTA

THOMPSON STATION

ESTABLISHED 1919

STANLEY SHUST, Overseer

This hatchery presents a number of problems. Our experience in attempting to develop a stock of mature trout for spawning purposes has not been successful. This is due largely to the low water temperatures that prevail during the season when trout spawn. This also interferes somewhat with the normal development of brook trout eggs that are shipped in. Some experiments are being made to utilize a warmer source of water supply. This hatchery is now partially devoted to the propagation of lake trout and whitefish for which the present water supply seems well suited. A battery of 128 Chase hatchery jars was installed in the year 1927. Some wall-eyed pike eggs were handled here during the season of 1928 and it is

planned to extend the scope of this work. Living quarters for the overseer have been established on the second floor of the hatchery building for convenience in carrying on the work.

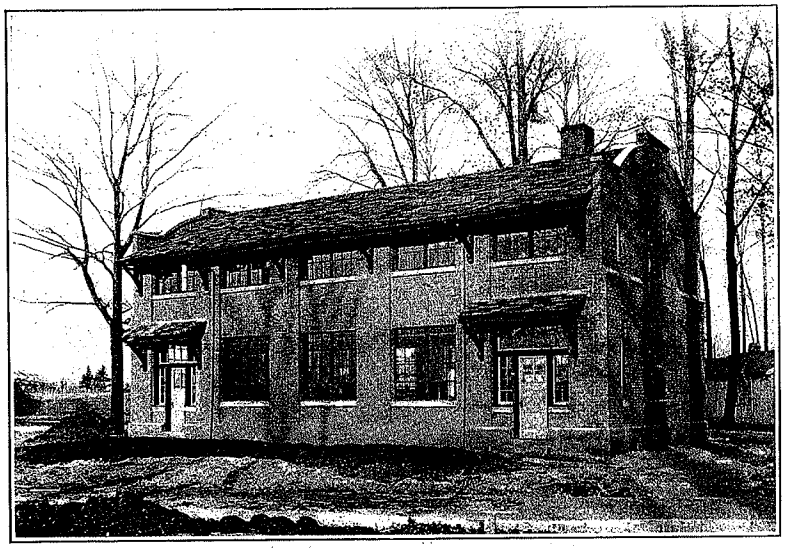
ODEN STATION

ESTABLISHED 1920

GUY LINCOLN, Overseer

This hatchery, with a liberal supply of spring water and a system of artesian wells that can be added to as needed, presents splendid possibilities for the early development of brook trout as the winter and early spring water temperatures are relatively high. To provide for this a building 36′ x 80′ has been provided to house feeding troughs and a platform of similar size has been built nearby to permit carrying additional troughs that are needed as the fish increase in size and before they are ready for transfer to outside feeding stations where the fish will be fed several months to develop them to the fingerling stage under higher water temperatures than prevail at Oden during the summer months.

The rearing of trout to the adult stage for spawning is not proving successful to a degree that warrants future development along this line.



STATE FISH HATCHERY AT HASTINGS
BUILT 1928

HASTINGS STATION

ESTABLISHED 1920

CLAUD LYDELL, Overseer

This hatchery has well demonstrated its adaptability for the several species of lake fish propagated here; namely, large mouth bass, small mouth bass, bluegills and perch and warrants development to the limit of its capacity. A three acre pond has been built on Mr. Cook's farm, upstream from the hatchery; also a two acre pond has been built at the source of the springs that feed the pond system and hatchery building; and another large pond is under construction at the present time.

A two car garage was built in the year 1927 and a two story hatchery building 26′ x 52′ of buff brick construction is under completion at a cost of $15,000.00 for building, pipe-line and equipment, which includes a 200 Chase jar battery.

BENTON HARBOR STATION

ESTABLISHED 1920

WALTER HUGHES, Overseer

The rearing of fingerling trout was undertaken in the season of 1927 and has proven very satisfactory with an increased production in 1928. One and six-tenths acres of land on which the "upper dam" is located has been bought and on which twelve nurseries for trout rearing have been completed this year. A building 18′ x 24′ has been provided for ice storage and refrigeration of fish food supplies. A three car garage with workshop and storage on second floor was built this year. Forty-eight Chase jars have been added to the perch battery increasing its former capacity 50%. This station is now practically developed to its limit with the possible exception of providing additional trout feeding troughs.

Bluegill and large mouth bass fingerlings are also produced in the system of rearing ponds.

HARRISVILLE STATION

ESTABLISHED 1920

F. A. TUBBS, Overseer

The hatching of brook, brown and rainbow trout eggs transferred from other hatcheries has been quite successfully carried on here. The facilities for the rearing of fingerlings are somewhat limited due to the supply of water available. To overcome this a trout feeding station was established during the year 1928 in the National Forest near Tawas City with splendid results and an extension of this program is planned. In co-operation with the Federal Bureau of Fisheries 2,000,000 lake trout eggs were handled during the season of 1927.

The propagation of small mouth black bass at this station meets with rather indifferent success and the future work along this line will depend much on the hatch secured during the season of 1929.

Improvements made during the biennial period include:

1. Installation of a hot water heating system in the hatchery.
2. Installation of a bathroom and an additional bedroom in overseer's residence.
3. Erection of a building which is used for
   (a) Ice storage
   (b) Fish food storage
   (c) Fuel storage
   (d) One car garage
4. Construction of a trout rearing nursery on north side of and parallel to Mill Creek.

WOLVERINE STATION

ESTABLISHED 1922

OLIVER PALMER, Overseer

This hatchery has been fairly successful in developing trout to the fingerling stage, but the water supply is too limited and summer water temperatures are not well suited for extensive fingerling production. To carry out our program of fingerling planting plans are under way to establish a feeding station on the Sturgeon River.

No improvements have been made at this station during the past two years.

MARQUETTE STATION

ESTABLISHED 1922

C. A. MONTAGUE, Overseer

Marquette Hatchery on Cherry Creek six miles southeast of Marquette seems to have the best potential possibilities of any Upper Peninsula hatchery for the rearing of trout. The present program is directed toward the production of all fingerling trout possible. Extensions to the pond system have been made to provide for this during the present biennium, fifteen raceways and ponds being completed. Other improvements include the building of a combined ice house and refrigeration plant for fish food storage and the installation of a hot water heating plant in the hatchery.

SIDNAW STATION

ESTABLISHED 1922

ROBERT BYRNES, Overseer

This is the most northerly located of the state's system of hatcheries. Severe freezing with deep snows during the winter, and a rather inadequate water supply do not favor the development of a stock of mature fish for spawn taking purposes. The station has been fairly successful in developing brook trout to the feeding stage with a limited development of fingerlings which holds possibilities of additional improvement.

The propagation of small mouth bass fingerlings has been undertaken during the past two seasons in the experimental pond built for that purpose in the year 1926. About 10,000 young bass were secured from Crystal Lake nearby in the year 1927 from which 4,900 fingerlings were reared to a satisfactory stage. During the year 1928 the level of this lake was about one foot higher and the spawning of bass was unusually late. In fact, at no time were any schools of young bass observed on the lake. Young bass were shipped from Lower Michigan to stock the pond from which an interesting comparison was possible revealing that the rate of growth was materially reduced in this pond as compared with similar ponds in the Lower Peninsula. The commission realizes the pressing demand for more bass in the Upper Peninsula and feels justified in attempting to further this work at present hatcheries if possible, or at a new location if the right site is found.

Improvements at Sidnaw include the installation of a hot water heating system in the hatchery and the building of a substantial dam at the intake to hatchery water supply line.

WATERSMEET STATION

ESTABLISHED 1922

JAY G. MARKS, Overseer

Watersmeet hatchery was established for the propagation of brook trout to the advanced fry or feeding stage for restocking the numerous trout streams of that section of the state.

This hatchery, in common with several others of the Upper Peninsula hatcheries, is confronted with a rather limited water supply and severe winter weather conditions. These conditions handicap considerably the extensive rearing of fingerlings. A big problem seems to be to provide satisfactory water temperatures at the time feeding should begin. Some experiments in using well water will be undertaken at Watersmeet.

Improvements include the building of two additional ponds, the installation of a hot water heating system in the hatchery, and the building of a fuel storage house.

BAY CITY STATION

ESTABLISHED 1923

CHARLES CRAIG, Overseer

Located on Saginaw Bay this hatchery with its complement of 760 Chase jars is well equipped to handle wall-eyed pike and whitefish spawn secured by commercial fishermen in this locality. Some problems confront us in the operation of this hatchery as the output of wall-eyed pike has not been satisfactory. Raw or untreated water is now available, an electrically operated pump being installed at the Bay City waterworks which delivers unchlorinated water at the hatchery.

GRAYLING STATION

ESTABLISHED BY GRAYLING FISH HATCHERY CLUB 1914

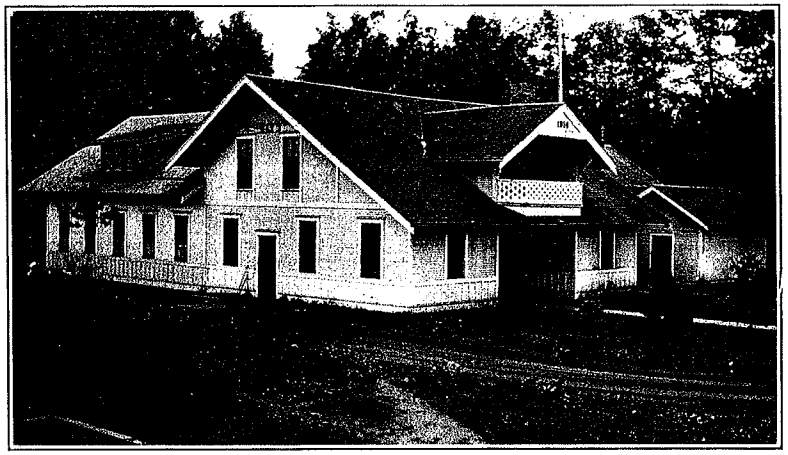
ACQUIRED BY STATE 1926

P. G. ZALSMAN, Overseer

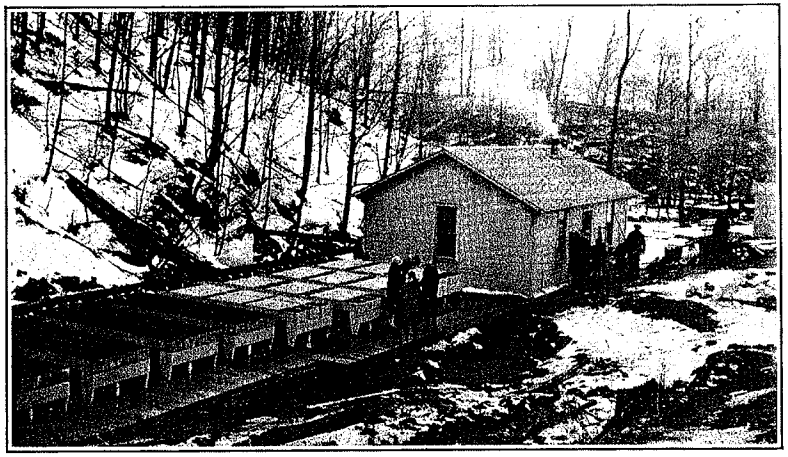
Since the acquisition of this hatchery by the state a splendid stock of adult brook trout has been developed which permits the taking of sufficient eggs to stock this hatchery. A limited number of brown trout eggs are also produced, but it is planned to discontinue carrying adult brown trout here and devote the entire facilities to propagating brook trout. Brown trout and rainbow trout for stocking streams in this vicinity will be transferred from other hatcheries.

Located on the East Branch of the famous AuSable River this hatchery is annually visited by hundreds of fishermen and tourists.

Extensive additions have been made to the pond system. Nine rearing ponds and sixteen fingerling trout-rearing nurseries have been built during the biennium.



STATE FISH HATCHERY AT GRAYLING



EXPERIMENTAL STATION AT HART

OTHER FISH CULTURAL ACTIVITIES

WOLF LAKE REARING PONDS—VAN BUREN COUNTY

ESTABLISHED 1928

During the year 1928 the state acquired title to 78 acres on Wolf Lake, Alamo Township, Van Buren County, ten miles west of the City of Kalamazoo, for the building of bass and bluegill rearing ponds. A splendid flow of spring water has its source on the property at an elevation of 35' above Wolf Lake. Two-thirds of the purchase price was raised by subscription in Kalamazoo through the efforts of Mr. Henry A. Pierce. Five thousands dollars has been expended to date in building ponds. Three are practically completed; two others are well under construction and all will be available for use next year. There is ample opportunity here for the ultimate development of a very extensive pond system which it is recommended to be built as rapidly as conditions will permit.

TROUT FEEDING STATION AT BALDWIN

TROUT NURSERIES

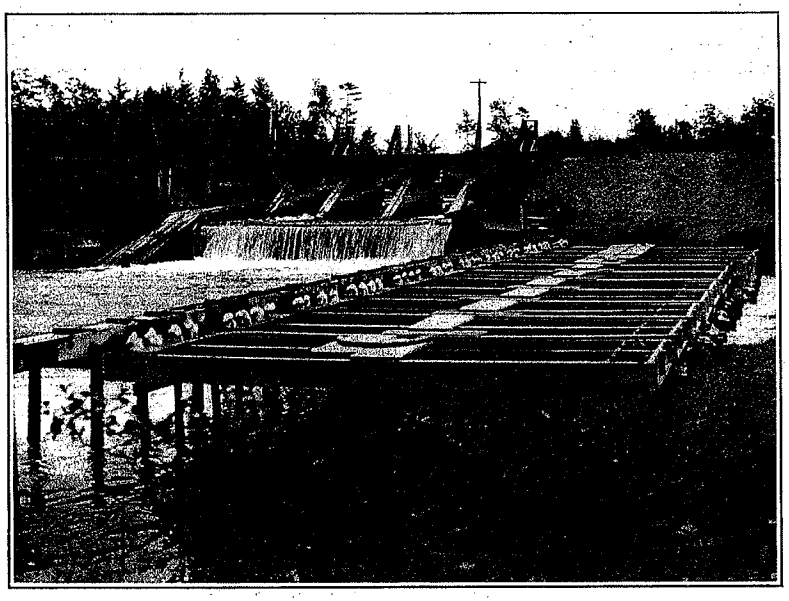
In carrying out our hatchery policy of rearing trout to the fingerling stage it has been found necessary to extend our activities beyond the hatcheries where the young trout are hatched and carried through the early feeding period. In many instances there is lack of sufficient room at present hatcheries or water temperatures are not found satisfactory during the season of the year when feeding is done.

The best results have been secured on streams where the summer temperature averages 55° to 60° F. and the most practical plan calls for streams affording an abundant supply of water with a topography that permits of making provision for carrying surplus and flood waters around the section of the stream that is screened off for the rearing of young trout. The water supply must be absolutely under control and of course feeding is done regularly. Such nurseries must be of sufficient size to permit carrying at least 100,000 fish and a caretaker is regularly employed

during the season of operation. Fish are transferred to such nurseries during latter May or early June and should be ready for distribution as fingerlings three to six inches long by October.

Nurseries have been established as follows:

1927 Baldwin Creek, Lake County, Section 3 T17N R13W
1928 Hart, Oceana County, Section 17 T15N R17W
North Branch Pentwater River, Oceana County Section 1 T15N R17W
White River, Newaygo County, Section 21 T14N R12W
Bear Creek, Manistee County, Section 29 T24N R14W
Platte River, Benzie County, Section 7 T26N R13W
North Branch Boardman River, Kalkaska County, Sections 20, 21, T27N R7W
Advance Creek, Charlevoix County, Section 31 T33N R6W



TROUT REARING TROUGHS AT BALDWIN

Maple River, Emmet County, Sections 25, 36 T37N R4W
Townline Creek, Emmet County, Section 18 T35N R4W
Silver Creek, Iosco County Section 20 T23N R7E
Hunt Creek, Montmorency County, Section 17 T29N R3E
Escanaba River, Marquette County, Section 28 T45N R28W

Two or three of these may eventually be discontinued and relocated on more suitable streams.

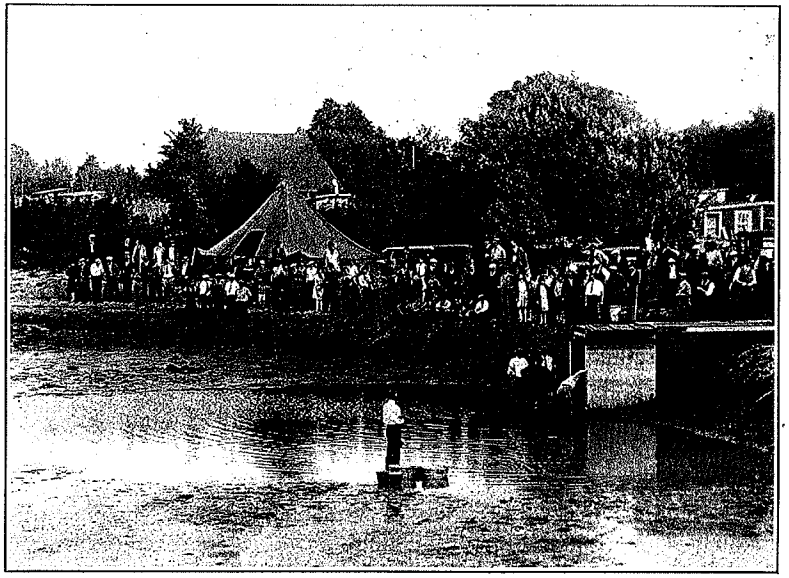
A feeding station is under construction on the East Branch of the Tahquamenon River, Section 22, T46N R6W, Chippewa County.

A number of other sites are being considered at the present time. A report of the output at stations operated this year is included in the statistical report.

The Division of Fisheries has co-operated closely with the Izaak Walton League Chapters and other sportsmen's associations in the establishment of fingerling rearing ponds in numerous localities. The service includes:

1. The investigation of prospective sites.
2. The giving of technical advice as to construction of ponds.
3. The furnishing of fry for stocking the ponds.
4. The furnishing of men and equipment to assist in the removal of fish for distribution to waters to be stocked.

FINGERLING TROUT REARING STATION UNDER CONSTRUCTION



THE HARVEST—THIS POND PRODUCED 20,000 BASS FINGERLING IN 1928

REARING PONDS.

A part time man is employed to supervise this work and trained hatchery men are charged with the administration of ponds in their respective districts.

A report giving the location of ponds and their production during the years 1927-1928 will be found in the statistical report of the division.

FIELD STATIONS

Field stations for the collection of wild rainbow trout spawn have been operated at Junction Dam on the Manistee River and Pine Creek, a tributary to the Manistee River, both in Manistee County and at Foxes Bridge on the Little Manistee River in Lake County. The trapping of fish begins about March 20th and spawning a month later, the entire operation extending over a sixty-day period. All fish are returned to the stream after the spawn has been secured. The number of eggs available at these locations has been ample for the stocking of streams that are believed to be suitable for rainbows and it is no longer necessary to carry a stock of mature rainbow trout in hatchery ponds. More or less criticism has been directed against this work, particularly on the Little Manistee River, but it should be understood that many of these fish pass up that stream before the traps are installed. Investigation this summer indicates that the stream was carrying probably all the young rainbow trout it could support. At Junction Dam there is little opportunity for the fish to find suitable spawning grounds. On Pine Creek much the same condition prevails since the sportsmen interested in that stream prefer not to have the rainbow trout ascend that stream.

7,376,000 eggs were secured during the season of 1927.

7,514,000 eggs were secured during the season of 1928.

RECLAMATION WORK.

The collection of fingerling perch on the Lower Boardman River at Traverse City migrating from Grand Traverse Bay of Lake Michigan has been carried on during the Autumn of 1928, the fish being planted principally in inland lakes in the vicinity where they are taken.

The collection of mature black bass on certain bays of the Great Lakes for distribution to inland lakes has been carried on with fair success. The distribution is confined to a range within the immediate vicinity of the port where the fish are taken. Such investigation as has been possible leads to the conclusion that it is not advisable to transport these mature bass long distances for the best results.

NOTES ON SPECIES OF FISH

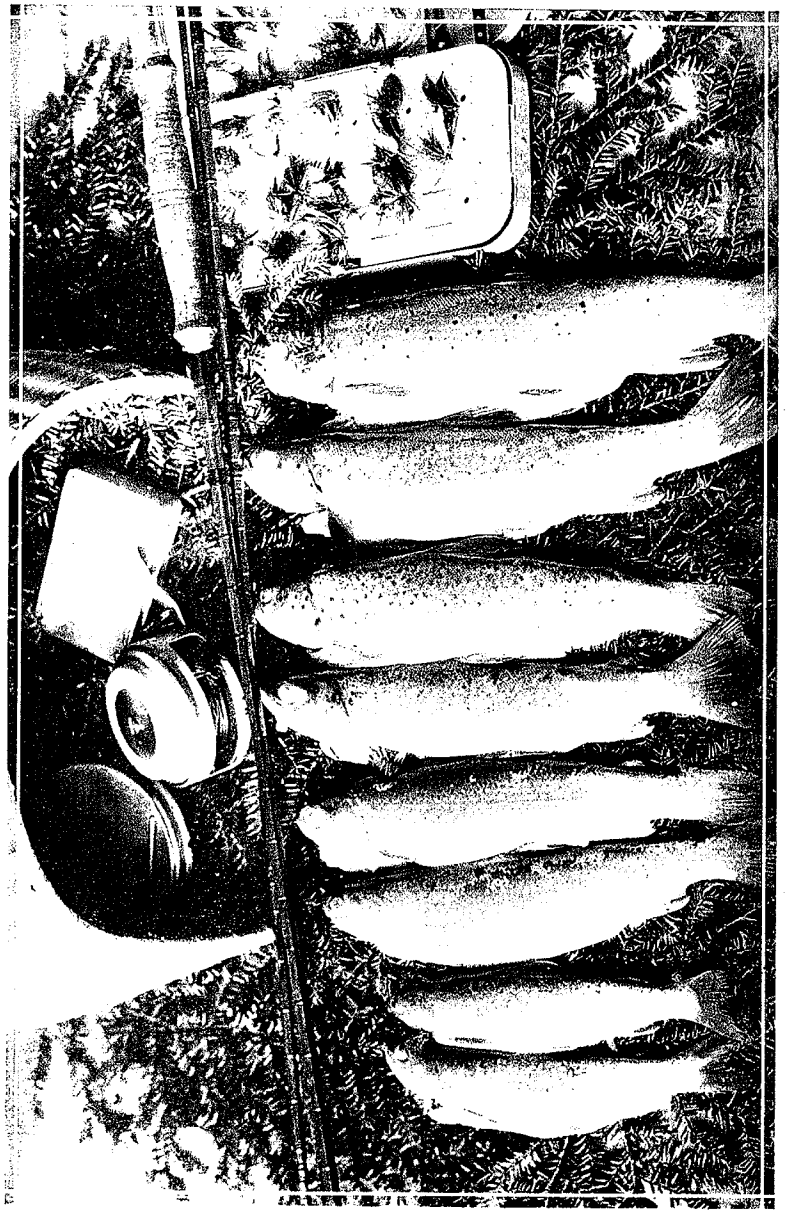
Brook Trout

The brook trout continues to be the peer among the game fishes of Michigan. His habitat is widely distributed over the state and is closely associated with the best type of stream that we enjoy. The range of this fish has been restricted somewhat in certain streams of the state due to changing conditions, but it is safe to say the species probably occurs in fully as many streams today as ever in the history of Michigan, for it must be borne in mind that originally brook trout occurred in only a few streams in the Lower Peninsula, being introduced through planting and migration to the others. This is one of the interesting chapters in the artificial propagation of fish.

The Division of Fisheries is more intensively engaged in the propagation of brook trout in its system of hatcheries than any other species of fish. The species seems to be maintaining itself in streams that are adapted for it in spite of intensive fishing.

Brown Trout

The Brown trout, introduced from Europe forty-five years ago, has become firmly established in many of our streams. While not so popular as the brook trout this fish is certainly gaining favor among many of the sportsmen of the state, chiefly perhaps because of its size, for without question, this fish averages larger than the speckled trout. They appear to withstand intensive fishing better than either brook trout or rainbow trout and thrive in some streams that are not well suited for brook trout. Admittedly they compete with the latter in many streams, their spawning season and general habits being identical. Their introduction is not recommended into any stream where brook trout are well established, but they do have a place in the economy of our Michigan streams.



BROWN TROUT

Rainbow Trout

The rainbow trout, also an introduced species, is well established in certain sections of the state. He is the most migratory of our trout, probably of all the fishes inhabiting Michigan waters, and is not favored by many because of the habit of retreating from many popular trout streams as he increases in size, returning only during the spawning season. Many of them migrate to the Great Lakes, and it is a rather popular notion that they may become of commercial importance eventually. They are probably the gamiest fish, the most spectacular in their rushes when hooked, of all our fish. They are charged with carnivorous tendencies by many sportsmen. This charge is not borne out however by the rather intensive investigation of food habits made by Dr. Jan Metzelaar during the fishing season of 1927. It is recommended that the planting of rainbow trout be confined to streams where they now occur and that their range be expanded only after careful investigation.

Large and Small Mouth Black Bass

Among the game fishes occurring in inland lakes, the large mouth and small mouth black bass probably takes first rank with the sportsmen. One or the other of these species inhabits practically all of our lakes, and many of the Bays of the Great Lakes. There is a constant demand for more bass from our state hatcheries for stocking purposes testifying to the interest with which these fish are regarded. Hatchery propagation without doubt has been responsible for their introduction into many lakes and in replenishing lakes where for any reason depletion occurs. It probably never will be possible to rear sufficient bass in hatchery ponds to meet the demand, but additional bass fingerling ponds are being provided as suitable sites become available. In this connection it must be understood that the propagation of bass is an entirely different procedure than the propagation of trout and the bass culturist's "crop" is much more susceptible to the vagaries of weather conditions and water temperatures during the spawning season.

It is urgently recommended that the catching of bass be prohibited during their spawning and guarding season.

Bluegills

The bluegill is a very popular pan fish which estimation seems justly warranted by its fine food qualities and the fact that they may be termed everybody's fish. Man, woman and child catches bluegills. They are successfully developed to the fingerling stage in rearing ponds and the facilities for handling them are constantly being expanded. They do extremely well in most of the Lower Peninsula lakes and good results have followed plantings in the Upper Peninsula.

Perch

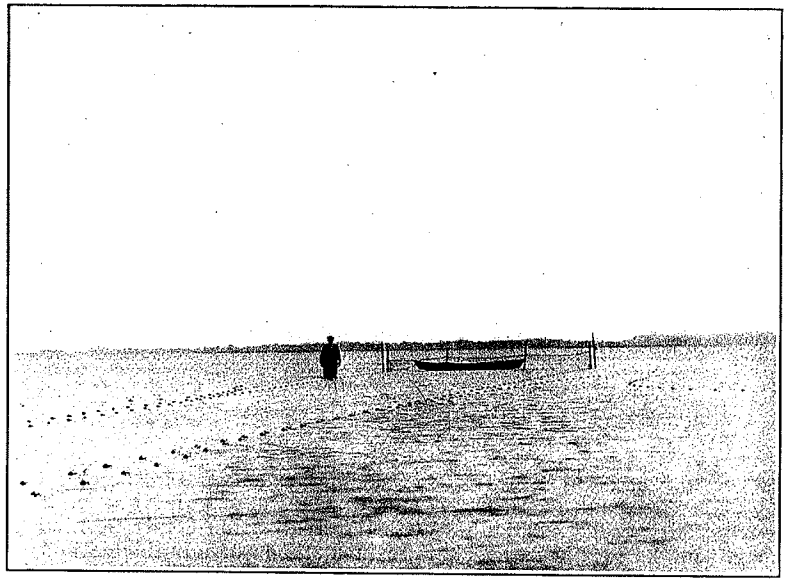
This is another excellent pan fish that is widely distributed in both the inland lakes and the great lakes, being taken both by means of hook and line fishing and the commercial fishermen's nets.

Wall-Eyed Pike

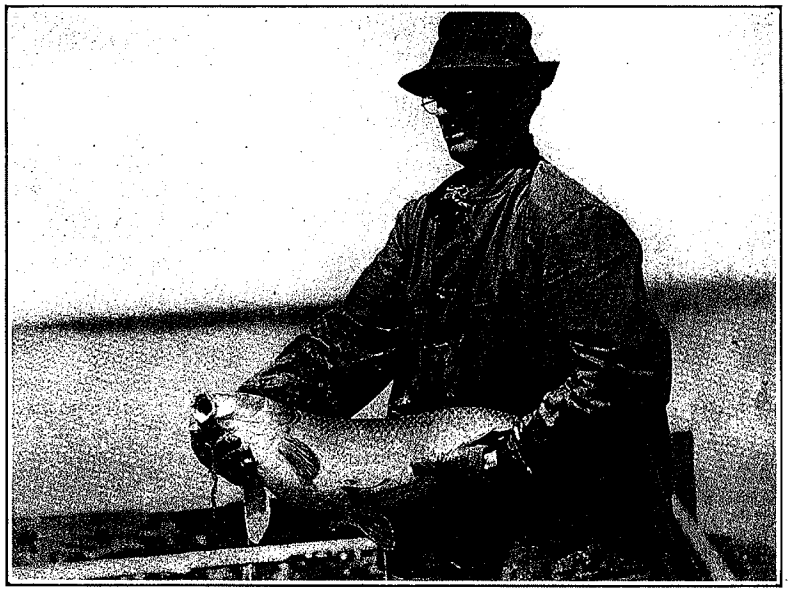
In certain localities the wall-eyed pike or pike-perch is of considerable importance both commercially and for hook and line fishing. Their propagation is carried on at the two hatcheries located on Saginaw Bay, the most prolific grounds in the state for the taking of these fish.

Grayling

The Department's latest attempt to re-establish Michigan grayling, Thymallus tricolor in Lower Michigan streams seems doomed to failure. Three years ago 125 were transferred from the Otter River in Houghton and Baraga Counties where the species is still found, to the Grayling Fish Hatchery and the headwaters of the Tittabawassee in Gladwin County. Earlier experiences have been repeated in that little, if any, reproduction has occurred and the parent stock has dwindled to a remnant. In a further effort to establish grayling, eggs of the Montana grayling, Thymallus Montanus have been brought to Michigan through the courtesy of the Montana Fish and Game Department during each of the past three years. It has been found practical, in fact not difficult, to secure and develop the spawn of the



NOXIOUS FISHING OPERATIONS—THE HAUL.



NOXIOUS FISHING OPERATIONS—THE CATCH

Montana species, but no success has been achieved in artificial feeding. The fry and eyed eggs have been planted in streams where the Michigan grayling occurred. If any success has resulted from these plantings some fish should appear during the next year or two.

The only hope of saving the Michigan grayling seems to be in keeping the principal section of the Otter river where they occur closed to all fishing. This section of the stream has been closed for the past three years and the taking of grayling is illegal at any place or time.

Minnows

The uncontrolled taking of minnows for sale as bait from the public waters of the state is a vexatious problem confronting the Conservation Commission. A number of local acts prohibiting the taking of minnows from the waters of certain counties are at present in effect, complicating the situation. It is recognized that minnows are a necessary and legitimate bait, but it is believed the commercial taking of minnows should be subject to regulation by the Department of Conservation. The importance of minnows as food for game fish deserves attention. Without question the day is not far distant when the propagation of minnows for commercial purposes will be undertaken.

COMMERCIAL FISHING

The Department of Conservation realizes the importance of so-called commercial fish, first,—as a large item in the food supply of the people of a nation; second,—as a business and a means of gaining a livelihood for many citizens of Michigan. With this realization firmly in mind, the department has made many changes in methods of administration, and is establishing a general policy which it is hoped will give the fish greater protection and result to the advantage of the industry as a whole.

A real effort has been made to standardize the commercial fishing laws of the Lake States and the Dominion of Canada. Three meetings which were attended by representatives of the States involved, Canada, the United States Bureau of Fisheries, and the commercial fishermen have been held at Lansing pursuant to calls by Governor Green and substantial progress has been made.

Satisfactory and earnest cooperation is being received from the great majority of the fishermen, all concerned realizing that everything within reason must be done, if possible, to increase and perpetuate this industry.

Some of the more important policies adopted are:—a fair but rigid enforcement of all the laws, particularly in relation to unlicensed foreign fishermen fishing in Michigan waters; the prevention of the taking of undersized white fish and trout in nets intended by law for the taking of other kinds of fish; the establishment of a new system for obtaining biological statistical information which is of value in determining the trend of the fisheries, thereby laying the foundation for all corrective measures; the establishment of an improved system for the taking and delivery of spawn by the use of experienced hatchery crews wherever available; the closing of certain distant, inaccessible or small spawning grounds, having in mind the policy of taking with the minimum number of fish, the maximum amount of spawn and also its fertilization and delivery in best possible condition; more careful planting and selection of suitable grounds, and a wider distribution of fish.

This department appreciates the wholehearted cooperation and assistance given by the United States Bureau of Fisheries.

COMMERCIAL FISHERIES
MICHIGAN WATERS OF THE GREAT LAKES 1926
AMOUNT AND VALUE OF NETS, LINES, BOATS AND BUILDINGS USED

NETS USED.	Lake Michigan.			Lake Superior.			Lake Huron.			Lake Erie.			Saginaw Bay.			Grand Totals.		
	No.	Length, Ft.	Value.	No.	Length, Ft.	Value.	No.	Length, Ft.	Value.	No.	Length Ft.	Value.	No.	Length, Ft.	Value.	No.	Length, Ft.	Value.
Gill	30,519	11,578,660	$401,343 88	6983	3,337,109	$29,680 50	15,029	4,743,194	$201,500 99	34	8,840	$545 04	865	343,960	$18,630 00	53,430	20,011,763	$651,700 41
Pound	604		119,860 00	136		17,285 00	1,190		203,716 33	452		30,230 00	2,009		250,880 50	4,391		621,971 83
Seines	5	479	54 00	11	18,805	611 00	4	3,135	325 00	48	38,082	7,995 00	36	41,300	9,025 00	104	101,801	18,010 00
Hooks and Lines	283,001	4,076,600	21,498,00	230,939	3,640,004	$13,400 05	174,300	1,693,780	13,646 55	1,716	13,700	110,75	10,900	140,440	1,663,00	700,856	9,564,524	50,318 35
Totals	314,129	15,655,739	$542,755 88	238,069	6,995,918	$60,976 55	190,523	6,440,109	$419,188 87	2,250	60,622	$38,880 79	13,810	525,700	$280,198 50	758,781	29,678,088	$1,342,000 59
BOATS USED.																		
Steam	37			14			19						1			71		
Gas	240			142			145			28			105			660		
Sail	4			2			4									10		
Row	144			71			89			59			58			421		
Totals	425		$429,331 00	229		$10,016 00	257		$246,276 00	87		$10,980 00	164		$470,650 50	1,162		$1,167,253 50
BUILDINGS																		
Totals			$224,740 00			$99,314 50			$158,727 00			$54,225 00			$395,265 00			$932,272 00

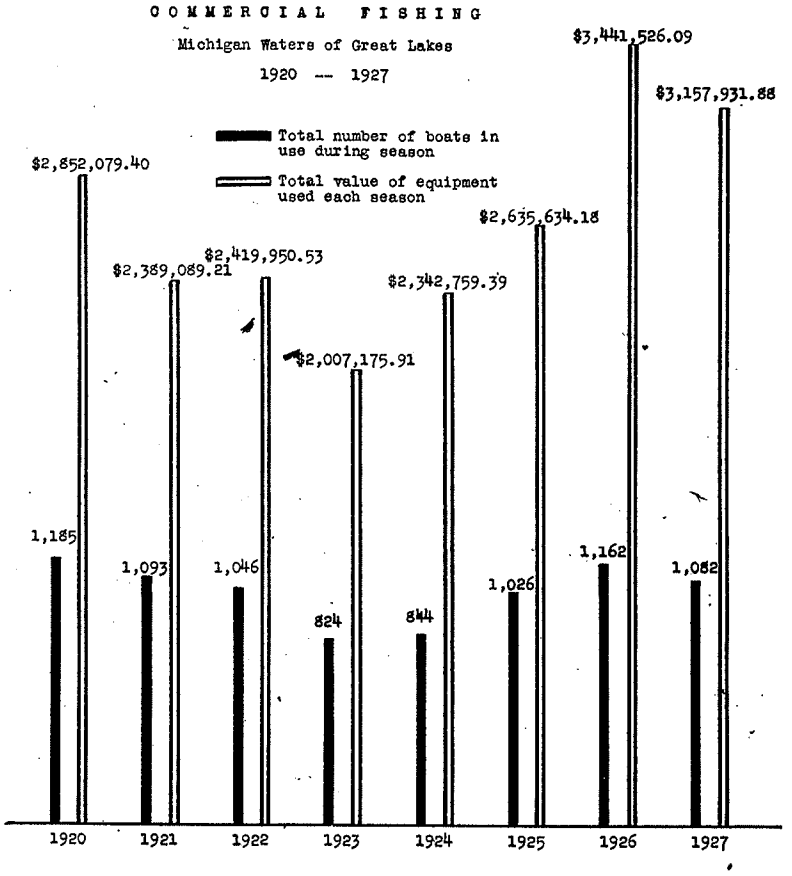
COMMERCIAL FISHERIES
MICHIGAN WATERS OF THE GREAT LAKES 1927
AMOUNT AND VALUE OF NETS, LINES, BOATS AND BUILDINGS USED

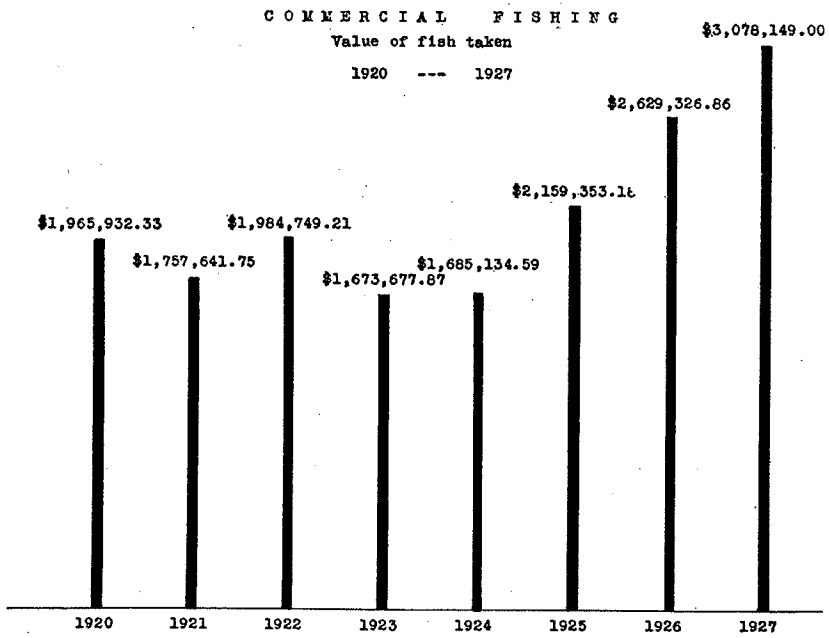
NETS USED.	Lake Michigan.			Lake Superior.			Lake Huron.			Lake Erie.			Saginaw Bay.			Grand Totals.		
	No.	Length, Ft.	Value.	No.	Length, Ft.	Value.	No.	Length, Ft.	Value.	No.	Length Ft.	Value.	No.	Length, Ft.	Value.	No.	Length, Ft.	Value.
Gill	32,357	10,718 322	$290,560 35	7,908	3,675,463	$169,044 51	9,407	4,439,130	$200,403 45	4	950	$66 50	801	353,277	$29,131 80	50,477	19,187 142	$689,206 61
Pound	706		137,941 83	157		18,620 00	2,189		207,125 75	460		27,291 00	1,103		195,599 50	4,615		586,578 08
Seine	1	330	30 00	9	36,184	565 00	8	6,732	695 00	47	63,970	6,734 00	44	50,259	9,680 00	109	157,475	17,704 00
Hooks and Lines	356,092	3,224,026	16,062 84	217,149	3,119,090	12,704 65	116,304	1,422,480	7,549 75	402	3,000	50,00	2	2,000	20 00	689,949	7,770,596	36,387 24
	389,156	13,942,678	$444,595 02	225,223	6,830,737	$200,934 16	127,908	5,868,342	$415,773 95	913	67,920	$34,141 50	1,950	405,536	$234,431 30	745,150	27,115,213	$1,329,875 93
BOATS USED.																		
Steam	60			14			23						1			98		
Gas	223			148			144			24			119			658		
Sail	4			1			1						1			7		
Row	117			64			48			53			37			319		
Totals	404		$373,458 60	227		$131,141 00	216		$249,327 75	77		$10,155 00	158		$80,987 00	1,082		$845,069 35
BUILDINGS																		
Totals			$263,231 00			$86,767 00			$178,628 00			$80,185 00			$374,175 60			$982,986 60

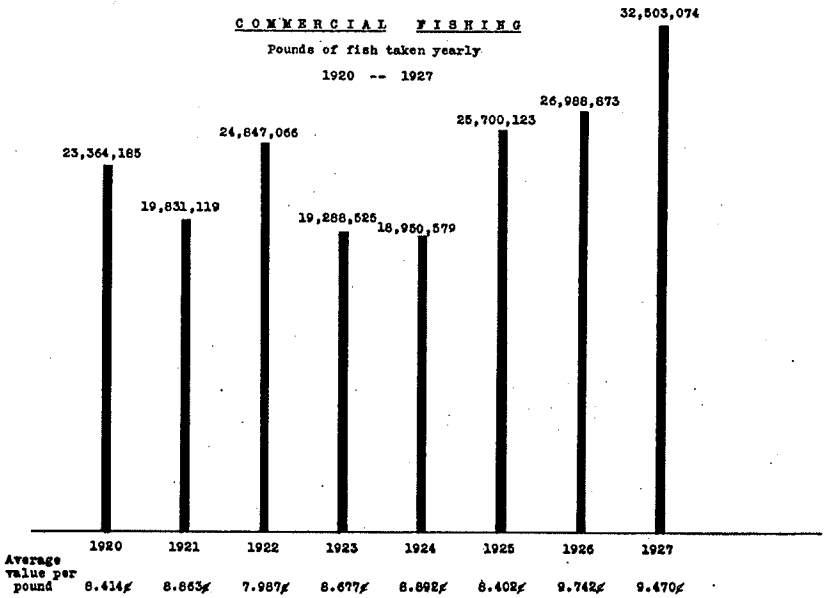
COMMERCIAL FISHING

Michigan Waters of Great Lakes

1920 — 1927







CREEL CENSUS

Beginning July 1, 1927 a creel census has been undertaken in Michigan to provide information as to the average size of fish taken and the average time required to catch a fish, kind of bait used, etc. It is hoped in this way to get an index over a period of years as to how well game fish are being maintained, and whether there is an increase or a decrease. It is impossible of course to gather from this report what relation it bears to the total amount of fishing done, but some interesting comparisons may be made from the census for the year 1928. Outstanding is a rather surprising contradiction to the prevalent notion that brown trout and rainbow trout are replacing the brook trout.

A check of 2707 reports show:

12,556 brook trout taken	85.15%
1,799 rainbow trout taken	12.20%
390 brown trout taken	2.65%
14,745	100 %

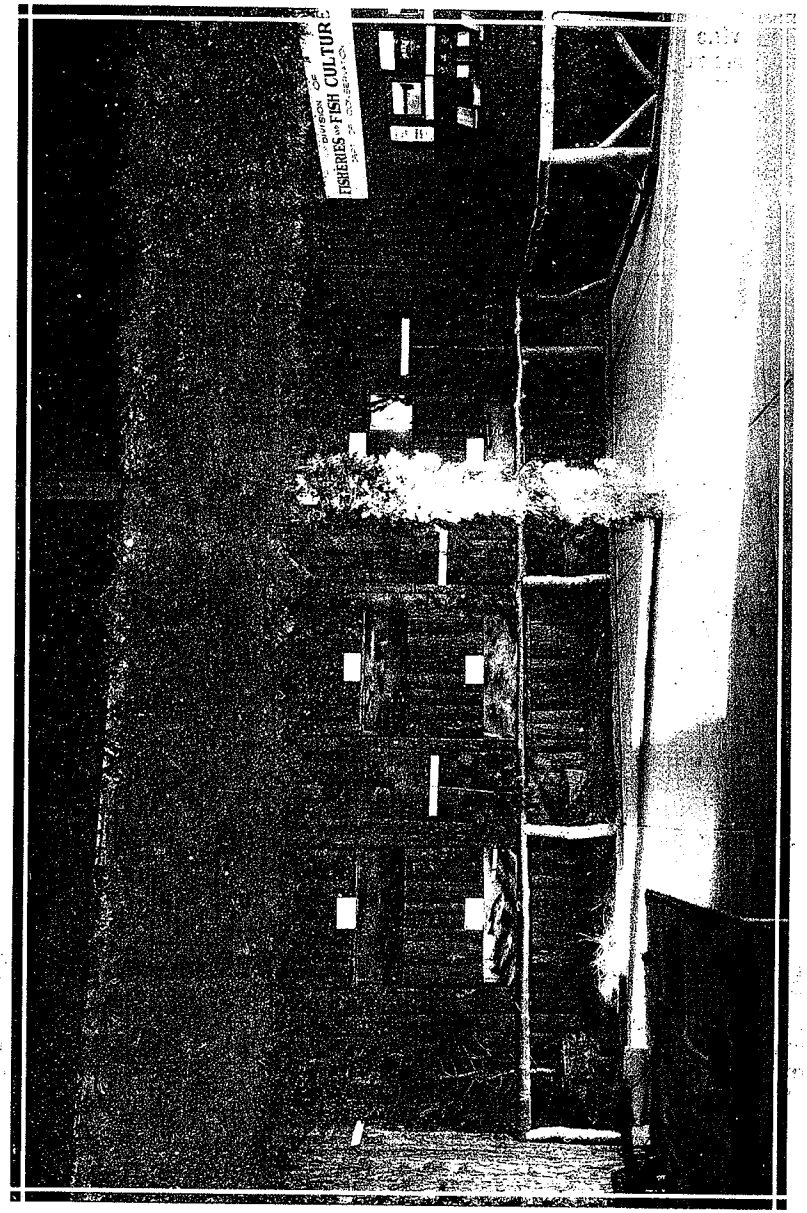
A summary of the census for the years 1927 and 1928 follows:

CREEL CENSUS DATA YEARS 1927-1928

	YEAR 1927	YEAR 1928
Number of cards used in tabulation	4,437	8,722
Total number of hours spent fishing	26,491	48,352.5
Total number legal-sized fish taken	30,562	52,677
Legal sized fish taken per hour (all species)	1.048	1.089
Under sized fish put back	19,255	33,908
Number of reports on trout fishing		2,707
Number of hours spent fishing for trout		12,274.5
Number legal sized brook trout taken	3,374	12,556
Number legal sized brown trout taken	207	390
Number legal sized rainbow trout taken	869	1,799
Number of legal sized trout taken	4,450	14,745
Legal sized trout taken per hour		1.20
Under sized trout taken (all species)		13,153
Number reports other fish than trout		6,015
Number hours spent fishing for fish other than trout		36,078
Number legal sized fish taken other than trout		37,932
Legal sized fish taken per hour other than trout		1.05
Undersized fish put back other than trout		20,755

EXHIBITIONS

The Fish Division has co-operated very closely with other Departmental Divisions in placing aquarial exhibits at fairs throughout the state. These exhibits have an educational value and do make a very strong appeal to the average person. The size of the exhibit has been varied to suit conditions, from six to twenty-five aquariums being shown. Eleven exhibitions were placed during the year 1927 and fifteen during the year 1928.



TYPICAL EDUCATIONAL DISPLAY BOOTH

COURTESIES

The Fish Division again acknowledges its appreciation of the many courtesies that have been extended by the railroads of the state in furnishing transportation for the Department's distributing car "Wolverine", for its messengers, cans and equipment in the transportation of fish for the distribution to the lakes and streams of the state.

The Pere Marquette Railway Company has also made a splendid contribution in advancing the Fish Division's program in leasing to this Department for the consideration of one dollar its property across which Baldwin Creek flows at Baldwin.

The Department of Conservation also appreciates the cordial relations that prevail with the U. S. Bureau of Fisheries. Exchange of eggs and fry are frequently made and equipment has been used interdepartmentally.

The State of Montana has provided Grayling eggs to permit carrying out the state's experiment to re-establish Grayling in Michigan waters.

PRACTICAL RESNAGGING—RECOMMENDED FOR TROUT STREAMS

Splendid co-operation has attended the Fish Division's program for establishing trout feeding stations and fingerling rearing ponds, property owners generally granting the use of sites that are found to be suitable.

SCIENTIFIC

The scientific work of the Fish Division has been carried on by two full-time men and one part-time man. The survey of lakes and streams has made considerable progress although there are many interruptions in this work, due to special investigations, etc. John N. Lowe, Biological

Adviser, made an extensive survey of Menominee County lakes and streams in the year 1927, supplementing the Land Economic Survey of the County.

Jan Metzelaar, fisheries expert, conducted investigations in the food habits of Rainbow trout during the summer of 1927. During the year 1928 this has been extended to include brown trout and brook trout. In this work he has received splendid co-operation from the public generally who have provided most of the material he has had to work with.

This year he has also carried on experimental resnagging operations on two of the major trout streams in an attempt to determine to what degree resnagging may be beneficial in improving trout fishing.

He is also carrying on trout tagging experiments to check on the migration of trout and their rate of growth in our Michigan streams. It is planned to tag 10,000 rainbow brook and brown trout in various stages of maturity during the present year.

Biological Investigations
By T. H. Langlois, Fish Pathologist:

1. Lake and stream fish survey of Newaygo County in the year 1926.
2. Survey to determine the fish resources of the lakes of Lenawee, Hillsdale, Branch, St. Joseph Counties, in the year 1927.
3. Study of the possible correlation between the growth rate of the small mouthed bass and helminth infection, with growth curves for the species from various Michigan waters.
4. The breeding behavior of the Northern Dace in certain Michigan streams.
5. Parasites and diseases of fish in state fish hatcheries in 1928.
6. A preliminary trout stream survey in Oceana, Muskegon and Ottawa counties.
7. An experiment to determine the advisability of introducing small mouthed bass from the Great Lakes into small inland lakes of Michigan.

Joint Biological Inquiry by Jan Metzelaar and T. H. Langlois

1. Report on Michigan bass and bluegills, their nesting seasons and lengths at maturity, with recommendations as to open season dates and legal lengths.
2. The biology of the smelt in the Crystal Lake region, Benzie county, Michigan.

Prof. Charles W. Creaser has also made an extensive investigation of the smelt in Michigan.

RECOMMENDATIONS

Continued expansion of facilities for rearing of fingerling fish.

Careful regulation of seasons based on protection of all valuable species of fish during their respective spawning seasons.

Keep feeder or nursery trout streams closed.

The acquisition by the state of fishing rights on private streams.

Promote the protection of our fish by conservation of timber, by reduction of the fire hazard, by control of stream pollution, by the destruction of noxious fish and predatory birds, and by an intensive educational campaign.

Continue the survey of inland waters to secure an accurate inventory of our aquatic resources.

LEGISLATIVE

The Fish Division favors the enactment of legislation for the following:

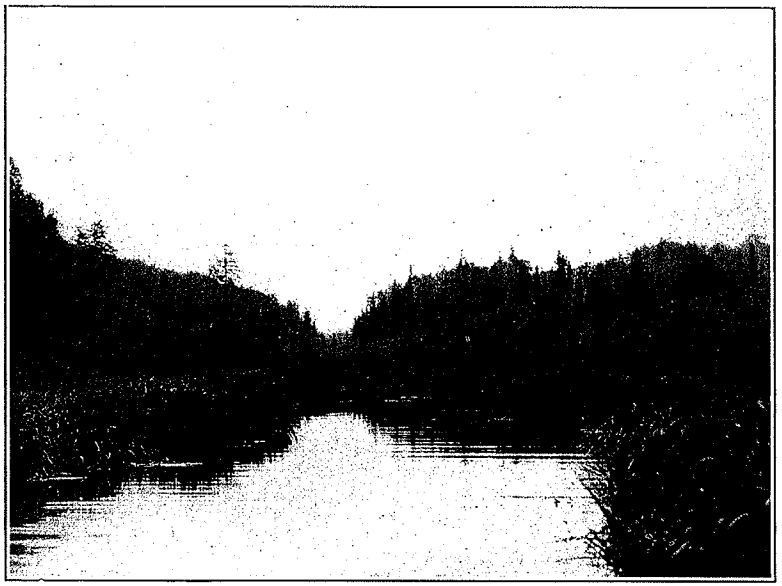
A general resident angler's license for all persons over 17 years of age

Reduction in creel limit on pan fish.

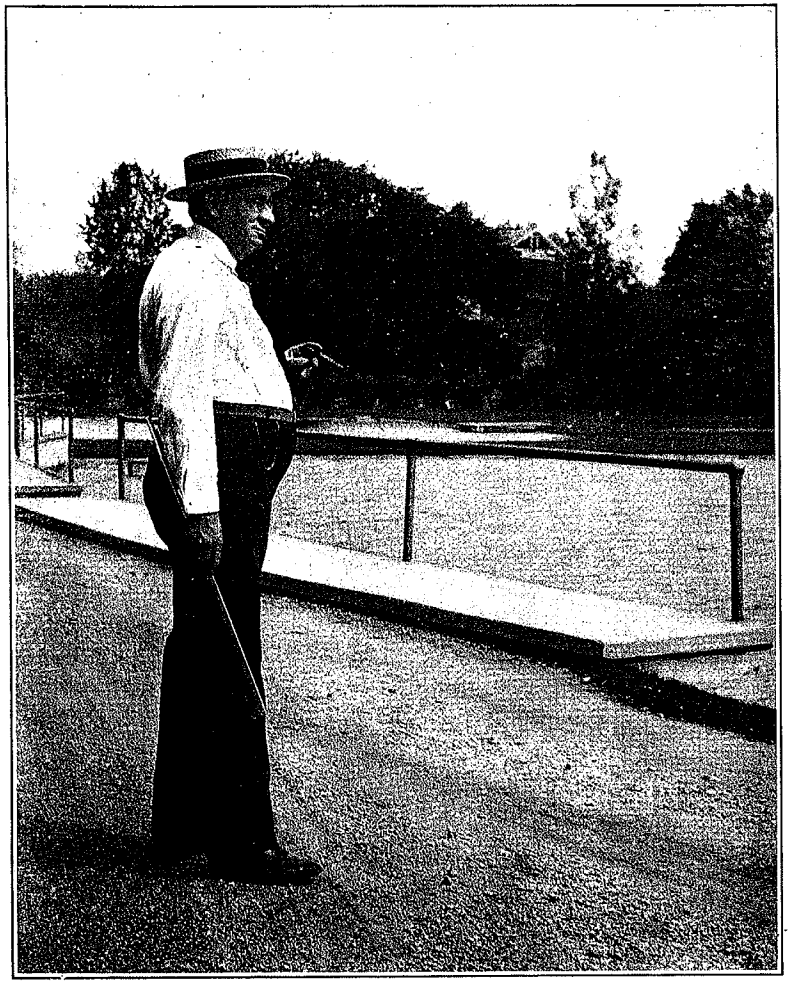
Closed season for all fishing on lakes during the spawning season for lake species of fish, with division of state into three zones on account of difference in spawning season throughout the state.

Prohibit the use of spear on trout streams.

Prohibit spearing of bluegills.



ISLE ROYALE



DWIGHT LYDELL
IN MEMORIAM

Dwight Lydell died at Comstock Park, Michigan, on February 8, 1927. He was a recognized authority in the propagation of small mouthed black bass and widely known among fish culturists not only throughout the state but the entire nation. Entering the employ of the state at an early age Lydell had much to do with establishing the state's present system of fish hatcheries. Through the American Fisheries Society he contributed numerous articles for the advancement of practical fish culture.

The Conservation Commission fittingly adopted the following motion at the July 1928 meeting: "That the name of the Comstock Park hatchery be changed and hereafter be known as the Lydell hatchery to commemorate the memory of Mr. Dwight Lydell in connection with his commendable work as a pioneer in the rearing of bass in the state of Michigan."

DIVISION OF FISHERIES, STATISTICAL REPORTS.

Statistical Report of output of fish from State Fish Hatcheries, for six months, July 1, 1926, to December 31, 1926, Year Ending December 31, 1927, and year ending December 31, 1928.

	1926.	1927.	1928.
Brook Trout:			
Fry and adv. fry		18,052,500	6,082,000
Fingerlings	123,100		
No. 1 and 1 month		3,746,500	1,479,500
2 months		119,850	1,238,500
3 months		50,400	513,250
4 months		3,000	329,500
5 months		18,970	126,450
6 months		47,700	360,478
7 months		6,610	259,836
8 months		9,350	203,625
9 months		8,000	87,400
10 months		250	
Yearlings		1,897	10,595
2 year old		1,146	973
Adults	185	14	189
Total	123,285	22,066,187	10,692,296
Brown Trout:			
Fry and advanced fry		3,881,500	2,776,500
Fingerlings	43,000		
No. 1 and 1 month		1,600,500	1,047,000
2 months		26,500	625,000
3 months			192,500
4 months		252,000	137,500
5 months		79,900	25,000
6 months		61,530	12,160
7 months			251,333
8 months			12,875
9 months		1,275	
Yearlings		20	
Adults		134	
Total	43,000	5,903,359	5,079,868
Rainbow Trout:			
Fry and advanced fry	2,154,000	573,000	324,750
Fingerlings	1,541,600		
No. 1 and 1 month		2,290,750	
2 months		221,000	112,500
3 months		434,000	180,800
4 months		293,750	1,219,278
5 months		260,680	175,700
6 months		238,771	104,600
7 months			30,000
8 months			10,000
9 months		6,700	
Yearlings		7,110	2,100
Adults		825	409
Total	3,695,600	4,326,586	2,160,137
Lake Trout:			
Fry		3,375,000	5,392,000
Fingerlings		38,000	986,000
2 months			30,000
6 months			15,000
Yearlings and 16 months			229,250
Adults		1,690	
Total		3,414,690	6,652,250
Small Mouth Bass:			
Fry	57,500	186,000	
Fingerlings	80,000		
1 month	119,000	57,400	2,000
2 months		80,600	18,900
3 months	32,000	31,575	21,900
4 months		11,050	21,700
5 months		3,625	14,200
Yearlings			150
2 year old			200
Adults	5,370	1,055	2,012
Total	293,870	371,305	81,062

DIVISION OF FISHERIES, STATISTICAL REPORTS—Continued

	1926.	1927	1928.
Large Mouth Bass:			
Fry		24,500	57,500
Fingerlings	546,525		
1 month	30,900	537,000	168,500
2 months	62,400	79,400	148,000
3 months		29,075	37,775
4 months	25,845	16,000	38,285
5 months		4,400	1,350
Yearlings		2,895	12,160
2 year old			300
Total	665,670	693,270	463,870
Perch:			
Eyed eggs and fry		93,238,000	35,190,000
Fingerlings	18,350		
1 month		326,500	285,150
2 months		3,100	
3 months			500
4 months		14,650	150
5 months			650,900
6 months		250	1,000
Yearlings		2,475	200
Adults			460
Total	18,350	93,584,975	35,128,360
Bluegills:			
Fingerlings	258,750		
1 month		8,500	
2 months	74,400	135,150	1,625
3 months		589,600	287,000
4 months		144,750	157,700
5 months			142,600
6 months			110,000
Yearlings	975	2,125	2,000
Total	334,125	880,125	700,925
Wall-eyed Pike:			
Fry		58,625,000	21,000,000
Fingerlings	1,300		
Adults			469
Total	1,300	58,625,000	21,000,469
Whitefish:			
Fry, Total		20,395,000	56,010,000
Grayling:			
Eyed eggs and fry, Total		731,500	775,000
Rock Bass, Total	2,486		
Calico Bass, Total		10,000	
Crayfish, Total		40	
Cut Throat Trout:			
Fingerlings, Total	75,000		
Herring:			
Fry, Total		7,000,000	140,000
GRAND TOTAL	5,252,686	218,002,037	139,884,237

FISH PLANTED FROM STATE TROUT FEEDING STATIONS.

	1927.	1928
Brook Trout:		
5 months		18,000
6 months		228,203
7 months		141,637
8 months		45,500
Brown Trout:		
6 months	37,530	
7 months		200,526
Rainbow Trout		
3 months		2,300
4 months		343,778
5 months		116,500
6 months	35,071	1,000
Total	72,601	1,097,444

FINGERLINGS PLANTED — 3 MONTHS TO 10 MONTHS OLD

	1926.	1927.	1928.
Brook trout	123,100	144,280	1,880,539
Brown trout	43,000	394,795	631,368
Rainbow trout	1,541,600	1,233,901	1,720,378
Lake trout		38,000	15,000
Small mouth bass	112,000	46,250	57,800
Large mouth bass	572,370	49,475	77,410
Perch	18,350	14,900	652,505
Bluegills	258,750	734,350	697,300
Total	2,669,170	2,655,861	5,732,345

U. S. BUREAU OF FISHERIES
Fish Plants in Michigan Waters.

Species.	1927.	1928.
Catfish		500
Chub	240,000	
Whitefish	31,400,000	37,498,000
Cisco	7,000,000	875,000
Rainbow trout	187,950	185,000
Loch Leven trout	10,500	
Lake trout	23,090,500	23,217,000
Brook trout	658,550	684,050
Crappie		520
Large mouth black bass	6,000	1,960
Small mouth black bass	119,803	43,070
Sunfish	600	4,040
Yellow perch		150
Pike perch	25,800,000	4,200,000
Total	88,513,903	66,709,290

REMOVAL OF GARFISH, DOGFISH AND CARP, SEASON OF 1927.

Number Days Fished.	Number Fish.			
	Dogfish	Garfish.	Lbs., Carp.	Others, Lbs.
381	658	2,238	146,709	8,853
SEASON OF 1928.				
438	59	1,836	219,948	17,001

OUTSIDE REARING PONDS UNDER STATE SUPERVISION

	SEASON, 1927.				SEASON, 1928.				
	S. M. Bass.	L. M. Bass.	Perch.	Bluegills.	S. M. Bass.	L. M. Bass.	Perch.	Bluegills.
Adrian Chapter I. W. L. Pond		14,000 4 months		86,800 4 months		14,950 3 months		11,500 3 months
Battle Creek Chapter I. W. L. Pond	2,000 4 months	7,150 4 months				2,400 3 months		
Beulah Chapter I. W. L. Pond					1,000 3 months			
Cadillac Chapter I. W. L. Pond					1,000 3 months			
Charlotte Chapter I. W. L. Pond				4,800 3 months				
Dwight Lydell Chapter I. W. L. (Grand Rapids)						2,490 3 months		
Gun Lake Protective Association Pond	6,000 4 months	5,000 4 months	50,000 4 months		5,300 3 months	4,500 3 months		20,000 3 months
Holland Game & Fish Protective Association Pond						20,500 3 months		
Ludington Chapter I. W. L. Pond		1,768 5 months				650 3 months		
Saugatuck Chapter I. W. L. Pond						2,650 3 months		
Schuil Acres Pond				29,000 3 months	2,000 3 months.			
Sparta Chapter I. W. L. Pond						1,025 3 months		
Union City Pond								264,500 2 months
Total, all ages	8,000	27,918	50,000	120,600	9,300	49,165		305,000

OUTSIDE REARING PONDS UNDER STATE SUPERVISION (Continued)

	Season 1927.			Season 1928.
	Brook Trout.	Brown Trout.	Rainbow Trout.	Brook Trout.
Bear Creek Pond				2,000
Dowagiac Chapter I. W. L Pond	896 9 months			
Onekema Pond				3,000
Pine Creek Pond				1,000
Schuil Acres Pond	1,250 8 months			
Slagle Pond	3,000 6 months	7,000 6 months		
Sparta Pond			405 5 months	
Total, all ages	5,146	7,000	405	6,000

COMMERCIAL FISHERIES
MICHIGAN WATERS OF THE GREAT LAKES 1926
CATCH IN POUNDS AND VALUE

	Lake Michigan.	Lake Superior	Lake Huron.	Lake Erie.	Saginaw Bay.	Total Pounds.	Value.
Lake Trout	3,352 439	2,506,492	1,584,009		101,058	7,543,998	$957,408 43
Whitefish	1,537,554	184,757	1,225,346	80	497,411	3,445,148	589,081 19
Perch	278,863	3,095	116,194	62,721	341,848	802,721	87,770 21
Suckers and Mullet	966,543	111,149	971,809	89,166	855,154	2,993,821	176,002 38
Yellows—Pike-Perch	58,144	4,325	226,846	81,817	588,875	960,007	193,868 16
Grass Pike	8,153	2,343	10,020	3,525	5,954	29,995	3,424 70
Buffalo	102		5,851	600	8,000	14,553	568 03
Catfish	395		465	10,159	117,252	128,271	19,502 19
Black and Blue Fins	18,624	652	265,498			284,774	19,464 75
Chubs and Longjaws	1,305,722	152,610	1,268,035			2,726,367	270,564 70
Herring	970,471	668,269	985,269		3,326,008	5,950,465	197,531 28
Sturgeon	5,692	464	2,273		1,297	9,726	4,116 84
Caviare	676	9	120		354	1,159	416 93
Burbots—Lawyers	10,616	331		6,819	1,022	18,788	929 25
Carp	6,653		65,458	1,150,401	348,898	1,571,410	76,125 31
Menominees	190,953	9,762	81,340		5,977	288,032	20,377 57
Sheepshead	19,725		39,173	45,406	51,998	156,302	6,994 38
Rock Bass		5		4,112		4,117	411 70
Bullheads			1,933	20,000		21,933	284 64
Saugers			40	6,101	28,083	34,224	4,024 92
Totals	8,731,325	3,644,711	6,849,679	1,480,907	6,279,189	26,985,811	$2,628,867 56

COMMERCIAL FISHERIES
MICHIGAN WATERS OF THE GREAT LAKES 1927
CATCH IN POUNDS AND VALUE

	Lake Michigan.	Lake Superior.	Lake Huron.	Lake Erie.	Saginaw Bay.	Total Pounds.	Value.
Lake Trout	2,900,036	2,193,602	1,639,158	.....	52,539	6,785,335	$1,064,651 36
Whitefish	2,254,623	249,253	1,151,521	.....	525,354	4,180,751	751,575 01
Perch	417,712	11,877	90,831	32,399	112,711	665,530	51,804 33
Suckers and Mullet	812,667	146,775	878,282	71,137	1,582,293	3,491,154	240,096 83
Yellows—Pike-Perch	24,055	10,635	280,526	71,296	620,875	1,007,387	221,122 12
Grass Pike	9,887	2,617	11,512	15,420	24,225	63,661	5,793 17
Buffalo	16	.....	.....	.....	1,975	1,991	396 00
Catfish	12	.....	1,791	18,068	175,500	195,371	26,943 56
Black and Blue Fins	7,313	8,788	238,008	1,187	.....	255,296	25,099 03
Chub and Longjaws	1,374,402	387,485	587,478	.....	.....	2,349,365	212,568 77
Herring	3,932,068	387,091	1,599,145	.....	4,005,228	9,923,532	316,993 94
Sturgeon	3,078	210	1,166	.....	725	5,179	2,230 15
Caviare	1,540	.....	282	.....	5,860	7,682	1,803 00
Burbots—Lawyers	11,447	370	165	700	2,852	15,534	582 11
Carp	6,487	.....	46,792	959,662	1,891,968	2,904,909	123,810 51
Menominees	201,372	1,582	102,610	.....	9,897	315,461	22,941 96
Sheepshead	1,960	.....	6,455	218,922	33,887	261,224	3,999 93
Rock Bass	.....	20,432	.....	.....	.....	20,432	928 01
Bullheads	275	.....	2,044	.....	427	2,746	185 01
Saugers	.....	12	1,370	23,618	25,264	50,264	4,621 01
Shiners	.....	.....	.....	255	.....	255	2 55
Dogfish	.....	.....	.....	.....	15	15	64
Totals	11,958,950	3,420,729	6,639,136	1,412,664	9,071,595	32,503,074	$3,078,149 00

FINANCIAL STATEMENT—FISH DIVISION

	1926-1927.	1927-1928.		
Personal Service:				
Balance, June 30, 1926	*($7,968 35)	June 30, 1927		
Refunds	37 23			
Appropriation	113,500 00		$115,000 00	
Total Available	$105,670 88		$125,000 00	
Disbursements	104,054 98	June 30, 1928	125,688 27	*($688 27)
Balance, June 30, 1927	$1,615 90	June 30, 1928	*($688 27)	
Supplies, Materials, Cont.:				
Balance, June 30, 1926	*($1,899 51)	June 30, 1928	$432 27	
Refunds	668 38			
Appropriation	76,000 00		76,000 00	
Total Available	$74,769 87		$76,432 27	
Disbursements	75,818 16		73,062 60	
Balance, June 30, 1927	*($1,048 29)	June 30, 1928	$3,369 67	
Equipment:				
Balance, June 30, 1926	$8,385 51	June 30, 1927		
Refunds				
Appropriation	8,500 00		$7,000 00	
Total Available	$13,885 51		$7,000 00	
Disbursements	4,102 09		5,097 97	
Balance, June 30, 1927	$9,783 42	June 30, 1928	$1,902 03	
Spent from Appropriation Fund:				
Total Balance June 30, 1926	*($4,380 35)			
Total Refunds	706 61		$432 27	
Total Appropriation	193,000 00		208,000 00	
Total Available	$194,326 26		$208,432 27	
Disbursements	183,975 23		203,848 84	
Total Balance	$10,351 03		$4,583 43	
Expenditure from Fund:				
Extension			$56,141 58	
Noxious Fishing			1,702 45	
Scientific			8,768 74	
Commercial Spawn			3,434 98	
Total	$70,950 81		$70,047 75	
Total Expenditure:				
License Funds	$70,950 81		$70,047 75	
Appropriation	183,975 23		203,848 84	
Total	$254,926 04		$273,896 59	

* Overdrafts.

INVENTORY, JUNE 30, 1928.
Division of Fisheries

	Project.	Acres.	Valuation.	Buildings.	Equipment.	Ponds.	Total.
Bay City	Hatchery	State Park		$22,132 74	$9,430 02	No ponds	$31,562 76
Bay Port	Hatchery	Leased Land		5,650 00	3,247 00	No ponds	8,897 00
Benton Harbor	Hatchery	15	1,500 00	13,615 00	5,236 52	25,450 00	45,801 52
Drayton Plains	Hatchery	19¼	7,350 00	17,375 00	4,360 02	15,000 00	44,085 02
Grayling	Natchery	58	2,200 00	7,475 00	3,764 19	12,000 00	25,439 19
Harrietta	Hatchery	100	2,600 00	15,365 00	3,986 82	35,000 00	56,951 82
Harrisville	Hatchery	20	2,000 00	17,933 50	7,353 64	12,859 15	40,146 29
Hastings	Hatchery	53	5,000 00	6,400 00	3,013 10	9,000 00	23,413 10
Lydell	Hatchery	73	17,000 00	21,625 00	9,565 28	29,125 00	77,315 28
Marquette	Hatchery	32	1,800 00	21,140 85	2,997 28	10,074 15	36,012 28
Oden	Hatchery	129	4,515 00	18,190 00	6,879 05	18,753 00	48,337 05
Paris	Hatchery	158	6,320 00	24,110 00	7,737 06	27,710 00	65,877 06
Sault Ste. Marie	Hatchery	Government Land		7,903 00	5,873 55	No ponds	13,776 55
Sidnaw	Hatchery	560	4,400 00	14,535 00	3,101 49	1,000 00	23,036 49
Thompson	Hatchery	80	4,000 00	22,900 0	4,760 00	8,095 00	39,755 00
Watersmeet	Hatchery	40	600 00	15,585 00	11,232 62	2,000 00	29,417 62
Wolverine	Hatchery	127	1,905 00	10,230 00	3,999 34	1,250 00	17,384 34
Wolf Lake	Rearing ponds	78	6,500 00	600 00	400 00		7,500 00
Baldwin	Rearing ponds	15	Leased			1,000 00	1,000 00
Hart	Station		Option	500 00	500 00		1,000 00
Silver Creek	Feeding Station		Leased			750 00	750 00
No. Br. Pentwater	Feeding Station		Leased			1,000 00	1,000 00
State Fish Car	Wolverine			4,000 00	300 00		4,300 00
Totals		1,557½	67,690 00	267,265 09	97,736 98	210,066 30	642,758 37