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**FISH DIVISION**

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A STORY WITHOUT WORDS

## FISH DIVISION

Fred A. Westerman, In Charge

The activities of the Fish Division have been considerably broadened and expanded during the years 1929 and 1930 which are covered by this report. The work has been more extensive than over any similar period since the organization of the Michigan Fish Commission in 1873.

The fingerling trout program is no longer an experiment, rather it is an established fact. It is true there are still many problems to be worked out and extensions to be made, but the ground work has been done. It is now a matter of extending this program to reach all trout streams and must take into consideration the many factors that enter into determining the answer to the question—"How many trout do we need and what species are best adapted to our various types of streams?"

Thirteen major trout feeding stations have been operated during the season just past, also extensions made at several of the established hatcheries where this was practical.

The development of more rearing ponds for fingerling bass and bluegill production, both cooperative and state-owned, have increased the facilities for carrying more of these fish to several months of age before planting.

There is a tremendous call for more bass for our inland lakes. Rearing ponds and hatcheries alone can never hope to produce an adequate number of fish to stock the great number of inland lakes in Michigan. Careful regulation of seasons, based on furnishing maximum protection during the spawning seasons, sane creel limits, control of so-called noxious species and pollution control are all factors of vital importance in maintaining good fishing.

Much effort has been directed toward a codification of the laws governing fishing. Two general acts known as the Commercial Fishing Law and the Inland Fishing Law were approved by the legislature of 1929, and a total of 157 acts relating to fishing were repealed.

The conflicting issue of public and private fishing rights on the inland waters is becoming more acute with the increased posting of privately owned lands. The Fish Division strongly endorses the department's policy of retaining title to all state land on which there may be valuable fishing waters. It also encourages the acquisition in perpetuity of camp sites or park sites for public use on inland waters, by townships, counties, the state or public spirited organizations.

Biological investigations and fisheries research work was continued by Jan Metzelaar and T. H. Langlois during the year 1929.

Following the death of Dr. Jan Metzelaar, an arrangement was made with the University of Michigan in February, 1930, whereby the fishery research work of the state was taken over by that institution. The Regents of the University established a new unit for this purpose, known as the Institute for Fisheries Research under the direction of Dr. Carl L. Hubbs. The funds for the operation of the institute are provided largely by the Department of Conservation. Additional financial assistance for special work on the productivity of inland lakes has been furnished the institute by the Izaak Walton League of America.

## HATCHERY PROGRAM

In order to accommodate the present fingerling program, a number of revisions and extensions have been made in the hatchery system. We find it highly desirable to carry brook trout eggs and fry in spring water having a fairly stable temperature. This means a relatively high winter temperature which induces early hatching and development so that strong and healthy fry are available for the outdoor nurseries or feeding stations much earlier than when hatched in water having a low winter temperature.

The policies outlined in our previous biennial report still hold. Briefly stated, these are developing each of our hatcheries to its maximum



SECTION OF A TROUT FEEDING STATION—BALDWIN, LAKE COUNTY

capacity with the species of fish that it is best adapted for; increasing the average size of the fish that are planted; improving the efficiency of our planting crews to the end that fish shall be carefully and properly deposited in waters that are definitely known to be suitable; extending the program of planting by state crews so that many of the bluegills, bass and perch are handled in this manner.

During the year 1929 the hatcheries located at Bay Port on Saginaw Bay, and Sault Ste. Marie in Chippewa county, were closed because the water supplies were not well adapted for their operation and because

other hatcheries have ample capacity to handle the eggs taken in those districts.

The use of the hatcheries located near Wolverine in Cheboygan county, and near Sidnaw in Houghton county, for the hatching of trout eggs will be discontinued as the water temperature and the volume is not satisfactory.

Splendid extensions have been made at Thompson, Oden, and Watersmeet hatcheries, at Wolf Lake Rearing Ponds and at Baldwin, White River, Silver Creek and the Tahquamenon River Trout Feeding Stations. These are more specifically covered in the report on the several stations which follows.

## HATCHERY REPORT

### PARIS STATION—MECOSTA COUNTY

ESTABLISHED 1881

J. P. MARKS, Assistant Superintendent of Hatcheries

This hatchery now produces the brown trout eggs for all the state hatcheries. The eyed eggs and advanced fry are transferred to other hatcheries and feeding stations as needed. No new work has been undertaken at Paris except current repairs to the buildings. This hatchery, picturesquely situated on trunk-line US-131, continues to be visited by thousands annually. An adjacent public picnic and camp grounds is liberally patronized.

The trout feeding stations established on Baldwin Creek, Lake county; White River, Newaygo county; North Branch Pentwater River, Oceana county; and the experimental trout hatchery at Hart, Oceana county, are administered from Paris. Also the field station established at Junction Dam, Manistee county, for the collection of rainbow trout eggs.

At the Baldwin Trout Feeding Station, a caretaker's cottage, equipped with a modern electric refrigerator for the storage of fish food, was completed during the summer of 1930. Twelve trout raceways were added this year, making a total of sixteen. A concrete dam and fish chute were built in the year 1929 to supply water to these raceways. This station, located on one of Lake county's finest trout streams, is now the largest and most complete fingerling trout feeding station in the state. It is operated only during the spring, summer and early fall months, all fish being planted before November 1st and the station closed during the winter months.

At the White River Station, title has been acquired to land across which the stream flows. A new channel was dug this year and four additional ponds provided. This station will furnish all trout needed for stocking streams in Newaygo and adjoining counties.

### SAULT STE. MARIE STATION—CHIPPEWA COUNTY

This hatchery was closed November 30, 1929 and the building, which stands on lands belonging to the U. S. War Department, was turned over to the Ira D. McLachlan Post of the American Legion. The hatchery equipment was transferred to Thompson Hatchery.

### LYDELL STATION—COMSTOCK PARK—KENT COUNTY

ESTABLISHED 1897

CLAUD LYDELL, Overseer

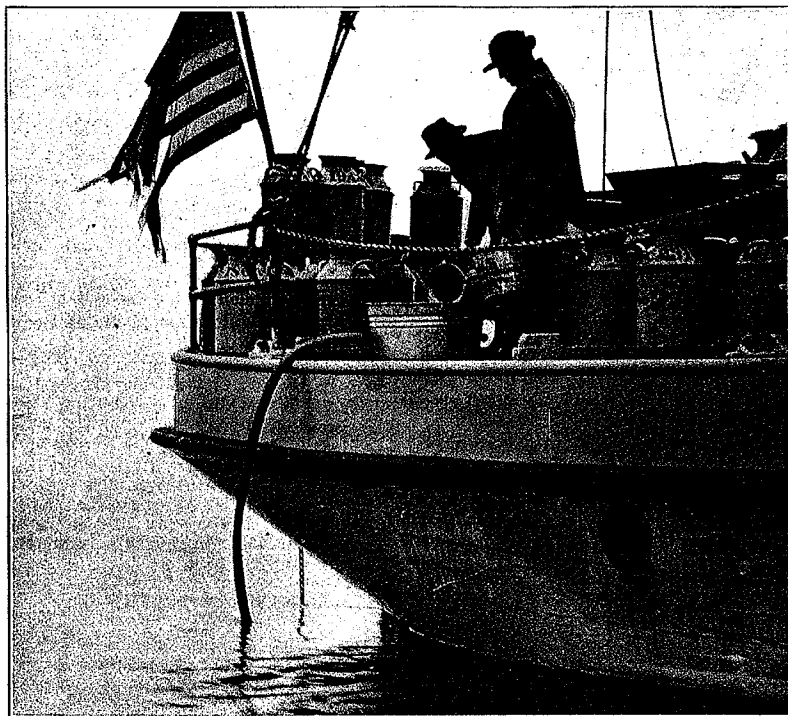
The operations have been confined to the propagation of small-mouth and large-mouth bass, bluegills, perch and pike-perch (wall-eyed pike). This hatchery furnishes fry for stocking many of the co-operative rearing ponds that have been built. The hatching and rearing of brook trout at this station has been discontinued. Improvements have been confined to current repairs.

#### DRAYTON PLAINS STATION—OAKLAND COUNTY

ESTABLISHED 1901

A. T. STEWART, Overseer

This hatchery has had a satisfactory output of bluegills and large-mouth bass fingerlings. Several outside bass and bluegill ponds are administered from this station. Extensions have been confined to current repairs.



MICHIGAN PATROL BOAT PLANTING WHITEFISH FRY

#### HARRIETTA STATION—WEXFORD COUNTY

ESTABLISHED 1901

A. J. WOLCOTT, Overseer

This station is continuing to produce its full supply of brook trout eggs and during the year 1929 it furnished eyed eggs to other hatcheries. Some rainbow trout are also developed to the fingerling stage. In addition to the fingerling trout raceways and ponds, operated at the hatchery, trout feeding stations are being administered from Harrietta on the Bear Creek in Manistee county, the Platte River in Benzie county, and on the Tobacco River in Clare county. The latter station was established in 1928 and has four large raceways. The stations on Bear Creek and Platte River should be enlarged for more efficient operation.

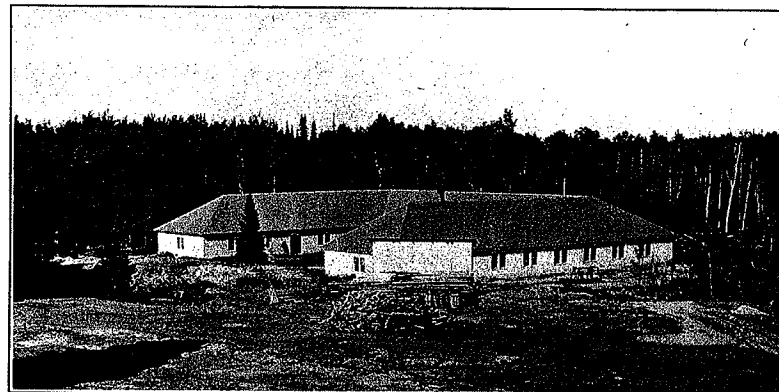
#### THOMPSON STATION—SCHOOLCRAFT COUNTY

ESTABLISHED 1919

STANLEY SHUST, Overseer

Due to the low water temperatures that prevail at Thompson during the winter months, a new brook trout hatchery house was built about a mile from the old hatchery building at a cost of \$17,000.00 in the year 1929. A splendid spring of crystal clear water, with a flow of 1,375 gallons per minute and a temperature of 45° F., supplies the 352 standard troughs, the arrangement utilizing the water a second time. This building, with a capacity of 3,500,000 brook trout to three months old, probably combines in a single unit the largest number of troughs of any hatchery in the United States. It will furnish trout for a number of feeding stations in the Upper Peninsula.

The old hatchery building is now used entirely for the hatching of lake trout and whitefish for distribution in the north end of Lake Michigan and certain parts of Lake Huron and Lake Superior. The colder water is well adapted for this purpose. Experimental operations also indicate that pike-perch can be successfully hatched, following the distribution of the whitefish. No adult fish are carried at either building.



RECENTLY COMPLETED UNIT, THOMPSON HATCHERY, SCHOOLCRAFT COUNTY.  
350 STANDARD HATCHERY TROUGHES HOUSED IN THIS BUILDING.  
FEEDING CAPACITY 3,500,000 TROUT

The trout feeding station on the East Branch of the Tahquamenon River in Chippewa county, which is administered from Thompson Hatchery, was enlarged during the year 1930 and has proven a very efficient unit for carrying brook trout from May until October.

Additional trout feeding stations in the territory serviced by Thompson Hatchery are needed. Also more suitable living quarters for the hatchery overseer and completion of the new hatchery building.

#### ODEN STATION—EMMET COUNTY

ESTABLISHED 1920

GUY LINCOLN, Overseer

Oden station has fully justified the confidence that was placed in its possibilities of hatching and advancing brook trout. An additional shelter house was built in 1929 and more wells were driven to increase the water supply. The 224 troughs will handle 2,500,000 trout to three months of age. The water temperature is 45° F. The feeding of lake trout until several months of age for stocking the several inland lakes of that locality, which are suitable for them, has been highly successful.

Trout feeding stations on Moyer Creek, Charlevoix county; Jordan River, Antrim county; and Rapid River, Grand Traverse county, are administered from the Oden Hatchery. Certain changes will be effected to increase the efficiency of these stations.

### HASTINGS STATION—BARRY COUNTY

ESTABLISHED 1920

FRED DIMOND, Acting Overseer

This station is now expanded to nearly the limit of the water supply. There is a possibility of adding one more pond. Good results are being secured with large-mouth and small-mouth bass and bluegills.

Several outside bass and bluegill rearing ponds are serviced from Hastings and any additional development must be in that direction.

### BENTON HARBOR STATION—BERRIEN COUNTY

ESTABLISHED 1920

WALTER HUGHES, Overseer

No new work has been undertaken at this station during the present biennium. The rearing of fingerling brook and brown trout has been carried on for stocking the numerous smaller trout streams in the southwestern part of the state.

The development of bluegill fingerlings continues. Ponds available for bass production are limited and will be entirely devoted to bluegills as Wolf Lake Hatchery is developed.



TRUCKS PLAY AN IMPORTANT PART IN PRESENT DAY FISH PLANTING

### HARRISVILLE STATION—ALCONA COUNTY

ESTABLISHED 1920

FRANK A. TUBBS, Overseer

The hatching of brook, brown and rainbow trout has continued quite successfully. Also a limited number of small-mouth black bass are produced. The efficiency of this station is handicapped by a limited water supply. Certain changes have been effected to increase production.

The Silver Creek Trout Feeding Station in Iosco county, was enlarged during the year 1930 and is serviced from Harrisville Hatchery. This station enjoys a unique setting at "Headquarters" in the Huron National Forest.

### WOLVERINE STATION—CHEROYGAN COUNTY

ESTABLISHED 1922

OLIVER PALMER, Overseer

Brook trout eyed eggs and a limited number of rainbow trout eggs have been hatched and reared at this station with fair success. In the interest of efficient operation, the activities of this station will be transferred to Oden Hatchery, which will supply the trout for the Sturgeon River and Hunt Creek Feeding Stations that are now serviced by the Wolverine Hatchery.

### MARQUETTE STATION—MARQUETTE COUNTY

ESTABLISHED 1922

JAY G. MARKS, Overseer

This station, with an abundant supply of spring water, has, as yet, not fully measured up to its seeming potential possibilities. Brook trout and a limited number of brown trout eggs are being hatched here and the production of fingerlings has been extended to the full capacity of the present facilities. No improvements have been made during the past two years, but there is an opportunity to enlarge the trout rearing facilities, if after further study conditions seem to justify such development.



TRANSFERRING FISH TO PAILS FOR PLANTING

### SIDNAW STATION—HOUGHTON COUNTY

ESTABLISHED 1922

ROBERT BYRNES, Overseer

After two additional years operation of this station, it becomes apparent that the extreme low winter temperature prevailing will not permit normal development of brook trout eggs. The winter operation of this station will be discontinued and the work limited to rearing fingerling trout in the outdoor feeding station, which will either be enlarged or an additional trout feeding station for servicing the streams of that territory will be established on some other stream. Trout for stocking of feeding stations within this district will be supplied from the new large hatchery at Thompson.

WATERSMEET STATION—GOGEBIC COUNTY

ESTABLISHED 1922

RALPH MARKS, Overseer

Extreme low winter temperatures handicap the development of brook trout at this station. To overcome this an auxiliary hatchery is under construction on a large spring about two miles distant from the present hatchery and where a much higher winter water temperature is secured.

An increased trout fingerling production has been made possible by the construction of a feeding station on the Ontonagon River on which the hatchery is located.

BAY CITY STATION—BAY COUNTY

ESTABLISHED 1922

CHARLES CRAIG, Overseer

This hatchery is devoted entirely to the hatching of whitefish and pike-perch spawn secured in connection with commercial fishing on Saginaw Bay. Untreated water and a pump established in the Bay City Waterworks has materially improved the efficiency.



PLANTING TROUT FINGERLINGS

The season of 1930 has been the most successful of any since the station has been built.

A new six-inch cast iron water main is being laid a distance of approximately 4,200 feet from the waterworks. This also services the State Park in which the hatchery is located and which shares equally in the cost. The hatchery building has been used as a bathhouse during the summer season of the past two years pending the construction of a suitable building in the park.

GRAYLING STATION—CRAWFORD COUNTY  
ESTABLISHED BY GRAYLING FISH HATCHERY CLUB 1914  
ACQUIRED BY THE STATE 1926  
P. G. ZALSMAN, Overseer

Many of the ponds at Grayling have been devoted to rearing adult brook trout for the production of eggs. There is some question as to whether this policy should be continued due to certain problems that have been encountered.

The water is well adapted for the rearing of fingerling trout and there is a possibility that the entire facilities of this station may eventually be devoted to fingerling production exclusively.

A retaining wall has been built along the south bank of the river and construction of the trout nursery section, on the south side of the stream, completed. A new boiler for heating the hatchery was installed in the year 1929. Several wells were put down to increase the supply of spring water. General repairs have been undertaken as needed.

WOLF LAKE REARING PONDS—VAN BUREN COUNTY

ESTABLISHED 1928

WILLARD HALL, Acting Overseer

Development of this splendid site has continued with the building of new blue-gill and bass rearing ponds, nine in all are now complete. These have been put into operation during the season of 1930. Two more are under construction at the present time.



CO-OPERATIVE BASS REARING POND—WEXFORD COUNTY

The acquisition of an additional twenty-five acres of land will insure complete protection to the water supply of approximately 2,000 gallons per minute.

A two-story frame hatchery building 36' x 96' is under construction at the present time, which will provide for ninety-six trout troughs, equipped with electric refrigeration for food supplies. The second floor will be used for storage shop and office. An additional 150 troughs will be set up outdoors and provision will be made for

more troughs as they may be needed. Trout hatched here will be transferred into feeding stations during May and June and fed until planted in September and October.

A caretaker's residence is also under construction.

Trunkline M-43 has been projected past this site and improved during the year 1930.

#### HART EXPERIMENTAL STATION—OCEANA COUNTY

ESTABLISHED 1927

ERVIN MOODY, In Charge

The operation of this small hatchery has continued with quite satisfactory results developing brook trout for transfer to feeding stations during May and June. The water supply comes from three artesian wells of excellent quality and with a very satisfactory temperature. The village of Hart, however, requires additional water and it appears that they must also draw on the same source of supply. When completed, the new unit at Wolf Lake will provide trout for the feeding stations which are now supplied by Hart.



BLACK BASS OR BLUEGILL REARING POND, WITH WATER LOWERED—  
HARVESTING THE "CROP"

#### OTHER FISH CULTURAL ACTIVITIES

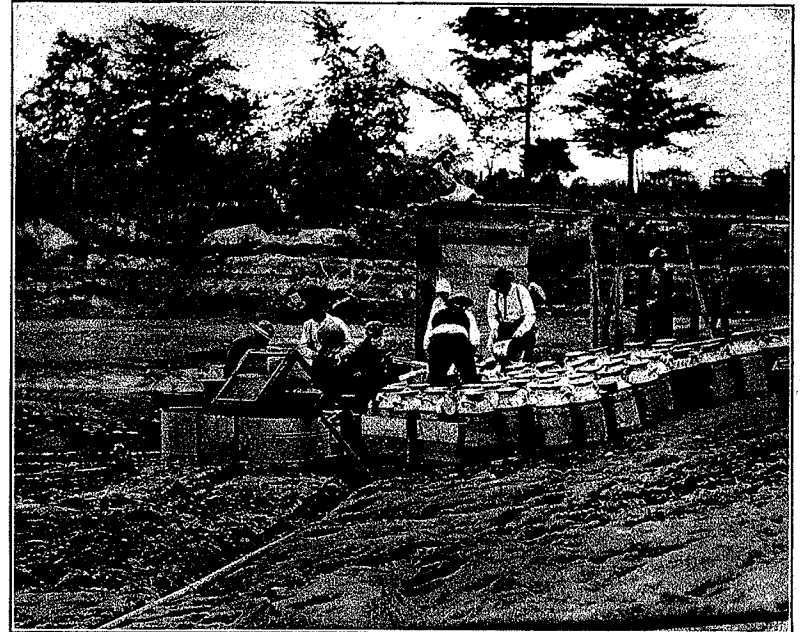
##### Rearing Ponds

To increase the output of bass and bluegill fingerlings three to five months old, a number of additional rearing ponds have been established and others are projected under two general plans: One state-owned and operated, the other cooperative, that is, the Fish Division has cooperated closely with Izaak Walton League Chapters and other organizations in

the establishment of fingerling rearing ponds in numerous localities. The service includes:

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

In addition to pond construction work at Wolf Lake, the state acquired title, during the year 1930, to the Almena Mills site, 48.7 acres in sections 27 and 28, T. 2 S., R. 13 W., Almena township, Van Buren county, including the mill pond of eight acres and providing sites for several additional ponds. This unit is about three miles southwest of the Wolf Lake Rear-



LOADING BLUEGILL FINGERLINGS FOR DISTRIBUTION TO INLAND LAKES.  
UNION CITY POND—BRANCH COUNTY

ing Ponds and will be operated in conjunction therewith. This property was secured for \$2,500.00 of which the Kalamazoo sportsmen contributed \$1,000.00 through the efforts of Henry A. Pierce, President.

The state has acquired title through purchase to the two ponds that were established in the city of Adrian by the Adrian Chapter of the Izaak Walton League.

The Hillsdale County Chapter of the Izaak Walton League, at a cost of \$5,000.00, secured title for the state, in the year 1930, to the Emery

Mills Site, about one mile east of Hillsdale with the understanding that the state will develop it as soon as possible. This property consists of 84 acres most of which is adapted for pond construction to the limit of the water supply.

A survey was also made of a site for two large rearing ponds at Argentine, Genesee county, which is contingent on Argentine township, securing title for the state to lands needed and to water rights.

A number of prospective cooperative sites are also being considered.

(See statistical report for output of cooperative ponds during the biennium.)

#### Fish Refuges

In the interest of providing more complete protection for black bass and bluegills during their spawning season, which often extends beyond the closed season regulating the taking of these fish, "Fish Refuges" were established on fifty lakes located in eight counties of the Lower Peninsula during the season of 1929. The plan involved posting the areas where these fish spawn against fishing for a suitable time following the opening of the season.

To A. G. Baumgartel of the Lydell Chapter of the Izaak Walton League of America, Grand Rapids, belongs the credit for focusing attention to this plan already tried in several other states, and to Henry A. Schuil, Supervisor of Rearing Ponds, for the organization work.

The idea was enthusiastically received and, apparently, was well observed on the lakes that were posted.

The 1929 Inland Fishing Act included a provision for extending the closed season by posting bodies of water affected whenever spawning or guarding extends beyond the date of the closed season. The 1930 season was quite a normal one so that posting of spawning areas was confined to only a few lakes.

#### Noxious Fishing

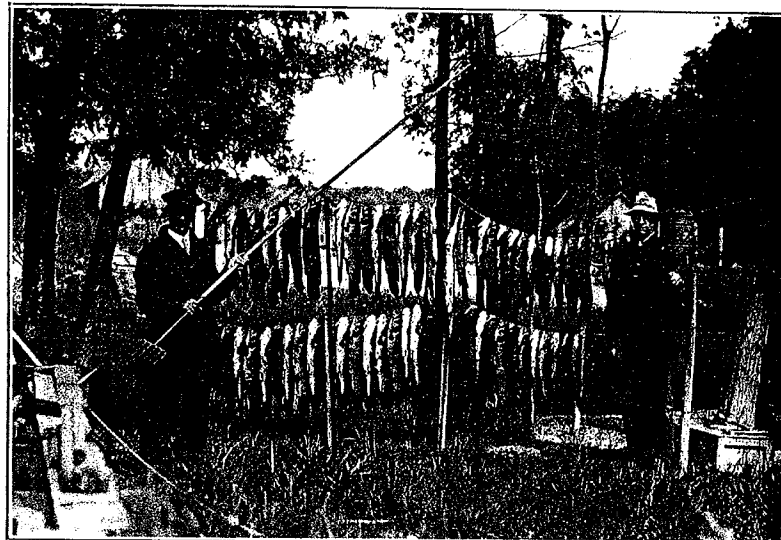
The removal of so-called noxious fish from the inland waters has been quite vigorously pursued during the biennium under the program of

- (a) Permits to take carp, etc., with seines or trammel nets;
- (b) Employment of crew to remove gar pike with gill nets;
- (c) Organizing spearing parties under the direction of conservation officers.

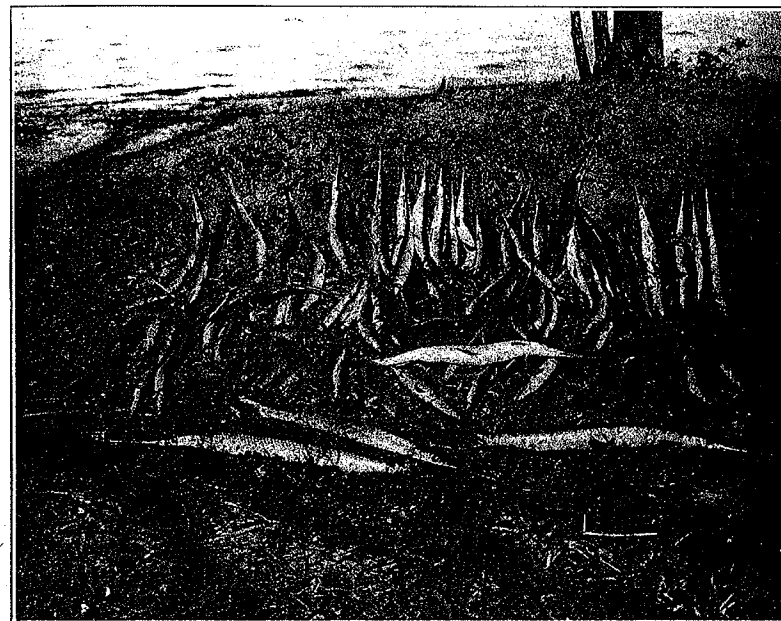
(The number of fish taken will be found under the statistical report.)

#### Reclamation Work

1,500,000 perch fingerlings were secured during the fall of 1929 on the Boardman River at Traverse City and 3,750,000 during the fall of 1930. Over 4,000,000 were taken on the St. Joseph River at Berrien Springs. A considerable number were also secured at the outlet of VanEttan Lake in Iosco county, and at the Cass River at Frankenmuth. These fish, ranging from two to three inches in length, migrate from the Great Lakes and are carefully seined and transferred to suitable inland lakes. At the

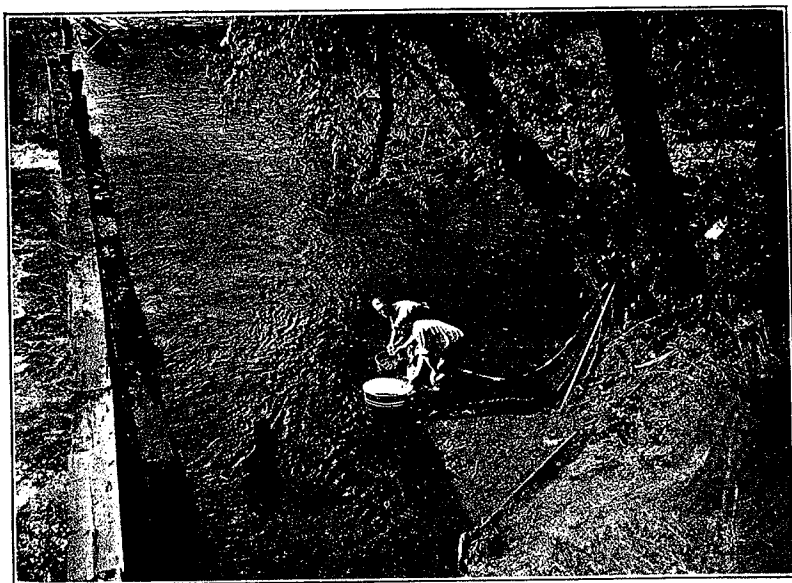


NOXIOUS FISH CONTROL—ONE NIGHT'S CATCH. CONSERVATION OFFICERS AUTHORIZED TO ORGANIZE SPEARING PARTIES UNDER SUPERVISION



NOXIOUS FISH CONTROL. A NIGHT'S CATCH OF GAR-PIKE WITH GILL NETS





RECLAMATION WORK—COLLECTING FINGERLING PERCH. BOARDMAN RIVER, TRAVERSE CITY

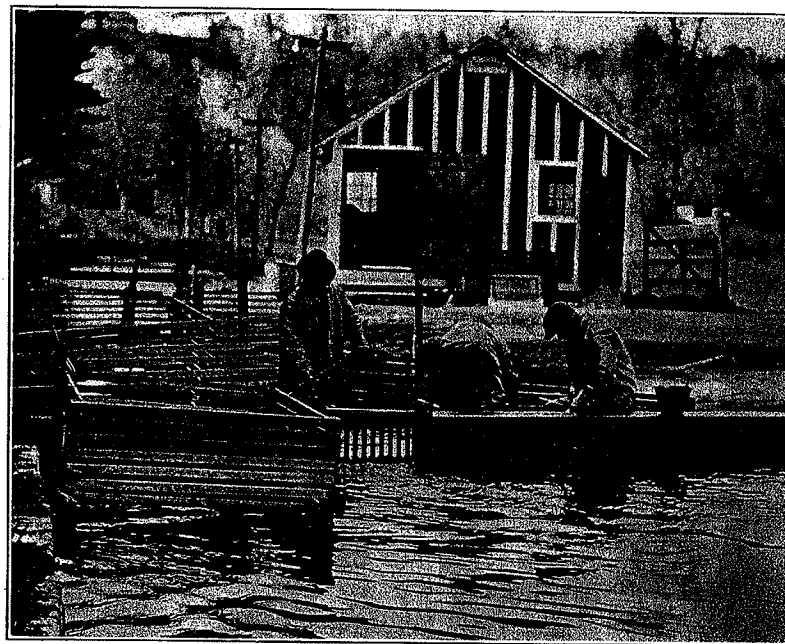


FINGERLING PERCH RECLAMATION WORK—BOARDMAN RIVER. THESE FISH ARE PLANTED IN INLAND LAKES

Boardman River they congregate in tremendous numbers. The problem is solely one of providing distribution facilities to handle them.

Below the Newaygo Dam on the Muskegon River at Newaygo 3,680 pike-perch and 1,024 rainbow trout were taken in dip nets during March and April, 1929, and 8,327 pike-perch and 1,712 rainbow trout in the year 1930. These fish were transferred over the several dams on this river. Rainbow trout were also transferred over Junction Dam on the Manistee River. 1,119 rainbow trout were transferred in the year 1929 and 2,278 rainbow trout in the year 1930. The power company, which operates the dams, also cooperates in this work.

Similar operations were carried on at the outlet of Hamlin Lake, Mason county, under the supervision of the Mason County Chapter of the



COLLECTING WILD RAINBOW TROUT EGGS. JUNCTION DAM FIELD STATION

Izaak Walton League—1,319 fish were transferred in the year 1929 and 272 in 1930 which included practically all lake species and rainbow trout.

The Division of Fisheries also provided equipment and assistance for the rescue of fish in instances where water supplies were cut off or failed.

#### Field Stations

The collection of rainbow trout eggs from wild fish has not been pursued as vigorously as formerly. Under the present policy of feeding brook trout through the summer months, there is more or less conflict.

The rainbow trout distribution has mainly been limited to suitable streams that are barred to the spawning migration due to dams or other inaccessible barriers. The transfer of rainbow trout and other desirable species of fish over some of the dams when the fish congregate in considerable numbers has been undertaken by mechanical means and is favored as a general policy.

In 1929 field stations were operated at Foxes Bridge on the Little Manistee River in Lake county, Pine Creek and Junction Dam in Manistee county. In 1930 two stations were discontinued, and the rainbow trout spawn taking operations were confined to the Junction Dam Field Station on the Manistee River in Manistee county.

9,764,000 eggs were taken at the field stations during the season of 1929. 3,522,000 eggs were taken at Junction Dam during the season of 1930.

In the interest of providing pike-perch fry for stocking Upper Peninsula lakes, an experimental field station was also operated during April and May, 1930, at the mouth of Day's River near Rapid River, Delta county. A temporary battery of 100 Chase hatchery jars was set up and the fish hatched and distributed from this point. The work proved quite successful though the catch of fish was less than anticipated. All fish were returned to the water after securing the spawn.

25,000,000 eggs were taken at this station during the season of 1930.

#### Mussel Investigations

Fresh-water mussels or clams have been taken by various methods from the larger rivers in the southwestern part of Michigan for a number of years. The shells are extensively used in the manufacture of buttons. The meats form a by-product which are disposed of in various ways not the least important of which is drying them for preservation as fish food. Pearls and slugs of considerable value are occasionally found.

From five hundred to twenty-five hundred persons are engaged in clamming and shucking during the season of collection which extends from July 1st to about October 1st. The value of the output probably exceeds \$500,000 annually.

Intensive operations have evidently seriously interfered with the natural propagation and in a reduction of the reserve supplies, which means that the future of this industry is imperiled unless regulations are adopted to afford better protection.

The fact that mussels develop slowly, requiring five to six years to reach a marketable size, is important.

A survey was made of the principal streams during the latter part of the 1930 season. The report indicates that operators, generally, are in full sympathy with the movement for added protection. It is urgently suggested that legislative action be taken.



DR. JAN METZELAAR 1891-1929

The following resolution was adopted unanimously by the Conservation Commission, December 6th, 1929:

WHEREAS, Dr. Jan Metzelaar was for many years a valued employe of the Department of Conservation, and a scientist in the study of fish, and

WHEREAS, during those years his contributions to the Science of Ichthyology were of incalculable value both to the benefit of the State of Michigan and to the world at large, and

WHEREAS, his work has resulted in rapid strides in the conservation of aquatic life, and

WHEREAS, he met his untimely death while in the active pursuance of his duties,

THEREFORE, BE IT RESOLVED, That this Commission, representing the Department of Conservation, and the sentiment of the people of the State of Michigan, does express its sorrow at his loss, a loss which this Commission feels can only less adequately be replaced, and

BE IT FURTHER RESOLVED, That this resolution be spread on the minutes of this meeting, and that the Secretary be instructed to send a copy to his bereaved family.

COMMISSION OF CONSERVATION

WM. H. LOUITT,  
Chairman.

RAY. E. COTTON,  
Secretary.

## Scientific

A very extensive survey of Lake Michigan has been undertaken by Dr. John VanOosten of the U. S. Bureau of Fisheries, to assist in determining what kinds of gear can be best employed without exhausting the supply of fish available to commercial fishermen and to gather other data on the trend of the Great Lakes fisheries. The Department of Conservation is assisting in financing this survey.

During the year 1929 T. H. Langlois investigated diseases affecting fish, especially in the hatcheries; assisted the U. S. Bureau of fisheries in an investigation of the effects of fishing gear in Saginaw Bay; arranged for an analysis of the water supplies at various fish hatcheries; studied the development of pike-perch eggs at the Bay City Hatchery; and continued the lake and stream survey.

Dr. Metzelaar's work during the year covered a thorough study of the food and inter-relations of the three species of trout; the migration of trout by tagging experiments; the pike-perch during the spawning season at Bay Port; the improvement of trout streams by the introduction of snags, and a continuation of the lake and stream survey of the state.

## Fisheries Research By Dr. Carl L. Hubbs

The fish and fishery investigations in Michigan have been materially expanded since the organization of the Institute for Fisheries Research of the University of Michigan under the direction of Dr. Carl L. Hubbs. The work of the institute may be briefly summarized under several headings.

1. Hatchery Diseases. Much attention has been given to an investigation of the diseases of fish in the various fish hatcheries and rearing stations. The epidemics which have developed have been diagnosed, and some progress made in determining methods of treatment. Several new fish diseases, of a bacterial nature, have been discovered. This work has been done by Wendell H. Krull, Fish Pathologist.

2. Death of Fishes in Natural Waters. Numerous investigations have been made to determine the cause of fish mortality in nature, by Mr. Krull and Dr. Hubbs.

3. Health Conditions in Hatcheries and Rearing Stations. Some time has been available for observations on the chemical, sanitary and productive and operative conditions of existing, proposed and possible hatcheries or hatchery sites, and rearing stations. This work has also been done by Mr. Krull and Dr. Hubbs.

4. Lake and Stream Survey. A more detailed lake survey was conducted in 1930 than in previous years. A party of three to eight men, under the immediate charge of R. W. Eschmeyer, made a study during the summer of all the lakes in Kalkaska County. This work was made possible by the very substantial financial support given by the Michigan Chapter of the Izaak Walton League of America. Maps were prepared showing the depths, the vegetation and the bottom material of each lake. The water was investigated at different depths as to temperature, color,

transparency, dissolved gases, alkalinity, hardness, etc. The fish life and fishing conditions were determined for the present season and, as far as possible, for previous years. From these data, recommendations for the fish management of the lakes is to be made. The several men trained in this work will be available for further lake surveys and for more detailed investigations of means to increase the fish productivity of lakes. Similar work, developing into the special problems, is being continued over the winter about Ann Arbor. A survey was made by Dr. Koelz of all the lakes in Isle Royale.

Some stream survey work was also done in Lake, Manistee, Kalkaska, Livingston, Washtenaw and other counties, by Dr. Hubbs and Dr. Greeley.

5. Species of Ciscoes. The investigation of Walter Koelz on the species of ciscoes or lake herring inhabiting the inland lakes was completed during the short period when Dr. Koelz acted as Ichthyologist of the Institute.

6. Fish Predators. Much work has been done on the food of fish enemies, and their effect on the fish supply. The investigation of the effect of the terns and gulls on the commercial fisheries of Saginaw Bay was continued and carried well toward a conclusive end by Cannto Manuel. The services of J. Clark Salyer have been obtained to study the effects of enemies of trout and other game fishes and the need for and possibilities of the control of fish predators.

7. Trout Migrations. The experimental investigation of the movement of trout, by the tagging method, has been actively continued. Further returns indicate the free crossing of Lake Michigan by the rainbow trout spawning in the Manistee River, but show little movement for the brook trout. An extension of this work has been made to determine the movements of trout into and from nursery waters—a matter of special import in relation to the closing of nursery streams. This work has been done under the direction of Dr. Hubbs since Dr. Metzelaar's death.

8. The Dwarfing of Fishes, Especially Perch. A start has been made on this problem of prime importance in the development of the inland lake fisheries. Samuel N. Jones will carry on this study.

9. Growth and Age and Size at Maturity of Game Fishes. Much material for these studies has been collected by the several field parties. Related experimental work, on the production of the seasonal marks on the scales, has been done by Dr. Hubbs.

10. Forced Growth of Fish over Winter and Increased Growth in Fish Hybrids. Studies of these subjects, of possible importance in increasing the growth of game fishes, have been continued by Dr. Hubbs.

11. Environmental Control. Investigative work has been carried on also on the promising possibilities of environmental control in increasing the fish productivity of our lakes and streams. Most progress was made on the attempt started by Dr. Metzelaar, of increasing trout production by resnagging the streams. More than 200 hole-producing barriers were made in the Little Manistee River. These and nearly 300 others, either naturally placed or put in by Dr. Metzelaar, were carefully studied and tagged with numbered plates for future observation. The effects of the

barriers on the stream and on the food and the fish supply is being investigated by Clarence Tarzwell.

12. Creel Census. The creel census has been markedly expanded, and the returns for the past as well as the present are being analyzed in detail, so as to obtain a better measure of the increase or depletion of the game fish supply, both generally and locally.

Other lines of work of the Institute for Fisheries Research include:

- (a) A study of bait minnows, in relation to their depletion, and to the possible effects of the use of carp minnows;
- (b) Co-operation in the clam investigations;
- (c) General educational work on fish and fishing subjects;
- (d) Co-operation in determining and listing lake and stream names, and in correcting maps as to lake outlines, etc.;
- (e) Investigation of the problems of size limits for game fish;
- (f) Determination of parasites in market fish, for the Board of Health, and parasites in game fish, for the general public.

By these many lines of investigations carried on by the Institute for Fisheries Research, it is expected that the game fish supply of the waters of Michigan can be greatly increased.



"MAY DAY" IN MICHIGAN



## NOTICE

This stream  
closed to fishing  
above this point

By Order of  
CONSERVATION COMMISSION  
STATE OF MICHIGAN

**NURSERY  
STREAM  
FISHING  
PROHIBITED**  
BY ORDER OF  
THE STATE  
CONSERVATION  
COMMISSION

## NOTICE

This stream and  
all its feeders  
closed to fishing

By Order of  
CONSERVATION COMMISSION  
STATE OF MICHIGAN

## NOTICE

These Premises Are Being Used  
By The Conservation Department  
For The Propagation Of  
Fish. All Persons Are Warned  
Against Fishing Or Committing  
Any Nuisance Thereon.

**MICHIGAN**  
Department Of Conservation  
LANSING, MICHIGAN

## NOTICE

NON-RESIDENT ANGLERS  
Buy a License  
Fee \$3.00

WEAR YOUR BUTTON

ALL NON-RESIDENTS OVER  
18 YEARS OF AGE MUST HAVE A  
LICENSE TO FISH IN INLAND  
WATERS.

ONLY HOOK AND LINE FISHING  
IS PERMITTED BY LAW THIS IN-  
CLUDES STILL FISHING, CASTING  
AND TROLLING. PENALTY FOR  
VIOLATION, FINE OR IMPRISON-  
MENT OR BOTH.

Department of Conservation

## NOTICE!

SPAWNING AREA  
AND  
FISH REFUGE  
**NO FISHING**  
WITHIN ENCLOSED LIMITS

UNTIL AFTER \_\_\_\_\_ 193

Under Authority of Public Act 165, 1929

Department of Conservation

## NOTICE!

Under authority of Public Act No. 165,  
1929, certain areas of this water have been  
set aside as a **FISH REFUGE** during  
the natural spawning and guarding season.

**NO FISHING**

Allowed within posted limits

Until \_\_\_\_\_ 193 under  
penalty of law.

Department of Conservation

## NOTES ON SPECIES OF FISH

### Brook Trout

The brook or speckled trout easily takes foremost rank among the game fishes in the hearts of Michigan sportsmen. This is attested to by the interest that the opening of the trout season arouses each May day. Abundant proof is also furnished through the medium of the creel census that the brook trout is the outstanding leader among the trout family in point of numbers, the tabulation for the year 1929 indicating that 89.64% of the trout taken were of this variety.

The department is encouraged in its present program of feeding brook trout for several months before planting them through the reports of catches made during the season recently closed and the claim that the brook trout is being restored in certain streams where they had seemingly become scarce.

### Brown Trout

This splendid fighter is, without question, gaining in favor with sportsmen as they better learn to understand the habits of the brown trout. They thrive in some streams that do not appear well suited for brook trout. In many other streams they, undoubtedly, compete more or less with them. The department does not favor their introduction into streams where the brook trout continues to do well, but recognizes them as a big asset especially in the larger trout streams of the Lower Peninsula.

### Rainbow Trout

The migratory habits of this fish have brought on much discussion. Their reaction to different stream conditions seems to vary widely. A common complaint is that the larger fish leave the streams during the open season to retreat to Lake Michigan and return only to spawn in the early spring months. This condition has been particularly true of the Little Manistee which teems with small rainbows throughout the year and spawning fish in the spring, a veritable nursery stream as it were and yet one of the most attractive of our trout streams. Tagging experiments have revealed these adult fish moving from the Manistee River to the Wisconsin side of Lake Michigan in about six weeks.

Rainbow trout spawn is taken entirely from wild fish that are trapped and afterward returned to the water. The planting is limited mostly to suitable sections of streams that are locked against the annual upstream migration.

### Large-mouth and Small-mouth Black Bass

These splendid game fishes are very widely distributed over the state in nearly all of the inland lakes, in many artificial ponds, in many of the rivers, and in many of the bays and channels of the Great Lakes. Their range has been extended in the state through artificial planting.

Hatchery propagation has continued with good success and the system of bass rearing ponds has been expanded, but the demands for bass far exceed our present facilities to supply them.

Hatcheries and rearing ponds can help to increase the supply of these fish in depleted waters and serve to introduce them into suitable waters in which they do not now occur but nature must be depended upon to supply the tremendous numbers which are required to meet the present day demand of the angling thousands. This will be accomplished if the catching or taking of these fish is prohibited during the spawning and guarding season.

### Bluegills

This splendid pan fish is very popular with thousands of people. Increasing numbers are being developed in rearing ponds and a wide distribution is made to the inland lakes of the state each year.

### Perch

This fish is perhaps more widely distributed and taken in greater numbers than any other fish found in our lakes and ponds. It is of commercial importance in many sections of the Great Lakes.

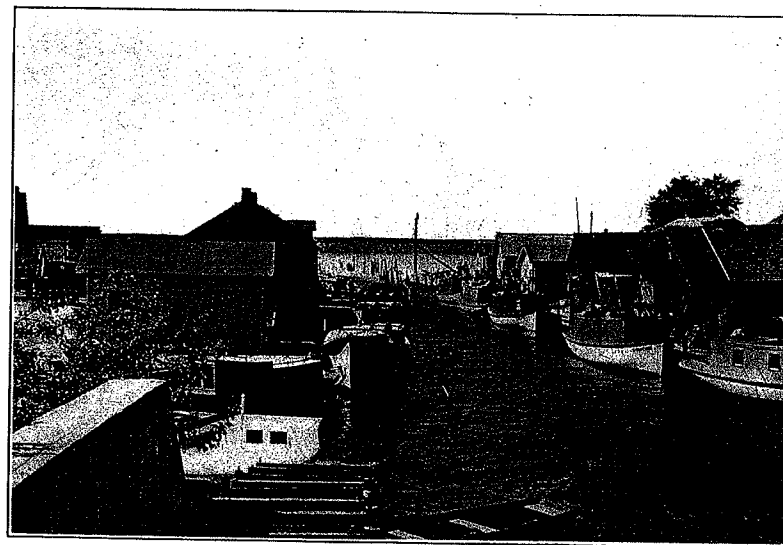
Perch have been distributed as "fry" from several of the hatcheries, also as fingerlings collected at Traverse City and other locations where they congregate from Great Lakes waters during the fall months.

### Pike-Perch

This splendid food fish is taken in considerable numbers in certain of the inland lakes by hook and line fishing. It also forms an important part of the commercial catch in Saginaw Bay. There the collection of spawn is vigorously carried on and large numbers of advanced fry are returned to the spawning grounds each year, also the source of supply for restocking suitable inland lakes.

### Grayling

The remnant of Michigan Grayling (*Thymallus tricolor*) is, apparently, continuing to survive in a section of the Otter River in Baraga and Houghton counties.



"MAIN STREET" IN A MICHIGAN FISHING VILLAGE

The last attempts to re-establish it in other streams of its former range have resulted in utter failure. It seems only a matter of time when this pioneer and peer of Michigan's game fish will be only history.

Apparently too, the attempted transplantation of Montana Grayling has been unsuccessful; at least not a single specimen has been reported to the department, following the planting of advanced fry and eyed eggs in the years 1926, 1927 and 1928 into several localities.

### Mackinaw Trout

This fish continues to occupy a high rank in the point of value of the catch taken from the Great Lakes by commercial fishing. In many sections of the Great Lakes the catch is holding up well; in some others lessened catches are the rule. Care is

necessary in the taking of these highly prized fish that over-fishing does not result in depletion.

Trolling for Mackinaw trout in the few large inland lakes where they occur and in the more protected areas of the Great Lakes furnishes an interesting and exciting sport.

#### Whitefish

The most highly prized of all the fish taken from the Great Lakes, the whitefish takes first rank in value of the catch during this biennium and occupies first place in the year 1929 for total amount of the catch from the Michigan waters of the Great Lakes with 6,775,046 pounds reported. Reference to the accompanying chart reveals that the catch has increased each year during the past decade. This increase has been confined to Lake Michigan and in a lesser degree to Lake Huron. In Lake Superior there has been an appreciable decrease, in fact, serious depletion, which is just cause for alarm.

We are unable to say whether this increase may be largely due to more intensive fishing, or whether, as we hope, an actual increase in the supply. The depletion of whitefish in Lake Erie, however, should remind us that we must guard against over-fishing if we hope to maintain the catch at a stable level.



GREAT LAKES FISHING POUND NET BEING LIFTED

#### COMMERCIAL FISHING

The Department of Conservation has maintained a very active interest in Great Lakes fishing, both game fishing and the commercial fisheries through both the Fish and the Law Enforcement Division.

The department realizes its obligation in fairly administering the complex problems that arise. All regulations should be predicated on the general principal of taking a maximum number of mature fish with a minimum injury or loss of immature fish and allow a maximum number of fish to spawn at least once before being caught.

The fishermen as a whole have evidenced a spirit of cooperation in enacting legislation which adjusted the closed season for certain species to more nearly cover the spawning period. Also in the improvement that

has been shown in the quality and quantity of spawn delivered to state and federal hatcheries.

The present method of gathering daily statistics of the catch is functioning with reports from nearly all fishermen.

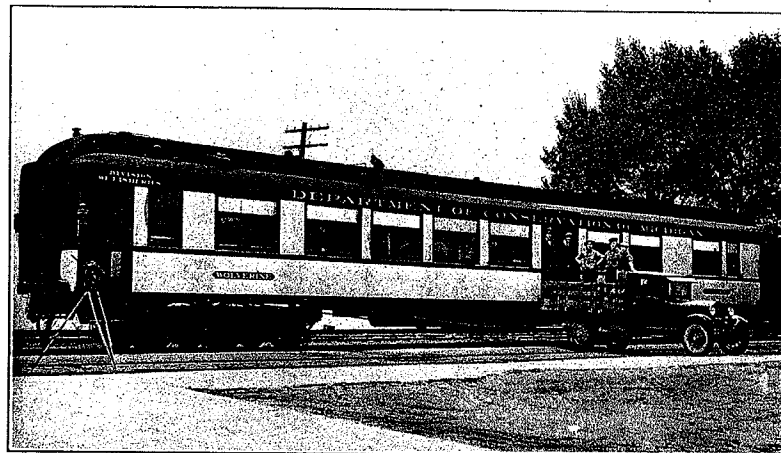
In December, 1929, a conference was held with the Canadian officials at Toronto, Ontario, relative to adopting uniform regulations on Lake Huron, which will be beneficial to the industry.

The department has cooperated closely with the U. S. Bureau in its biological investigations on Saginaw Bay and Lake Michigan, also in the collection of lake trout, whitefish and pike-perch spawn in planting the fish in Great Lakes waters.

(Attention is invited to the statistical report on commercial fishing for the years 1928-1929 which forms a part of this report.)

#### EXHIBITIONS

The Fish Division has continued to cooperate with the Educational Division in placing aquarial exhibits at fairs and sportsmen's shows throughout the state. The exhibits have varied in size from six to twenty-five aquaria, and thirty-six exhibitions were placed in the years 1929 and 1930.



STATE FISH CAR—"WOLVERINE"

#### COURTESIES

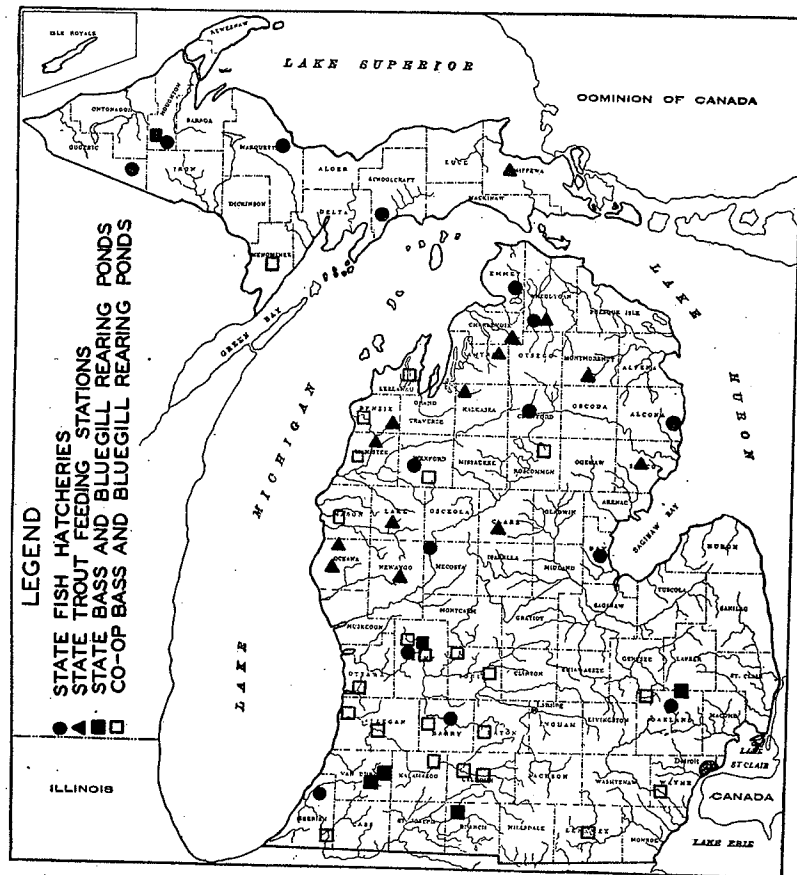
To the railroads of the state, the Division of Fisheries again acknowledges its appreciation for the many courtesies that have been extended in the movement of its state fish car "Wolverine" and in furnishing transportation for its messengers, cans and other equipment in the collection of spawn and the distribution of fish to the lakes and streams of the state.

The department is also appreciative of the friendly relations that exist with the U. S. Bureau of Fisheries. Eggs and fish are frequently ex-

changed, also equipment when needed. Close contact has been maintained with the investigation being carried on in the Great Lakes under the direction of Dr. John VanOosten. Bulletins and publications of the bureau have been freely supplied.

Very friendly relations exist with the Dominion of Canada and the states bordering on the Great Lakes in dealing with our common problems in the interest of the Great Lakes fisheries.

The Fish Division appreciates the land owners' and sportsmen's splendid cooperation, which has been extended in the expansion of the program of trout feeding stations and bass and bluegill rearing ponds.



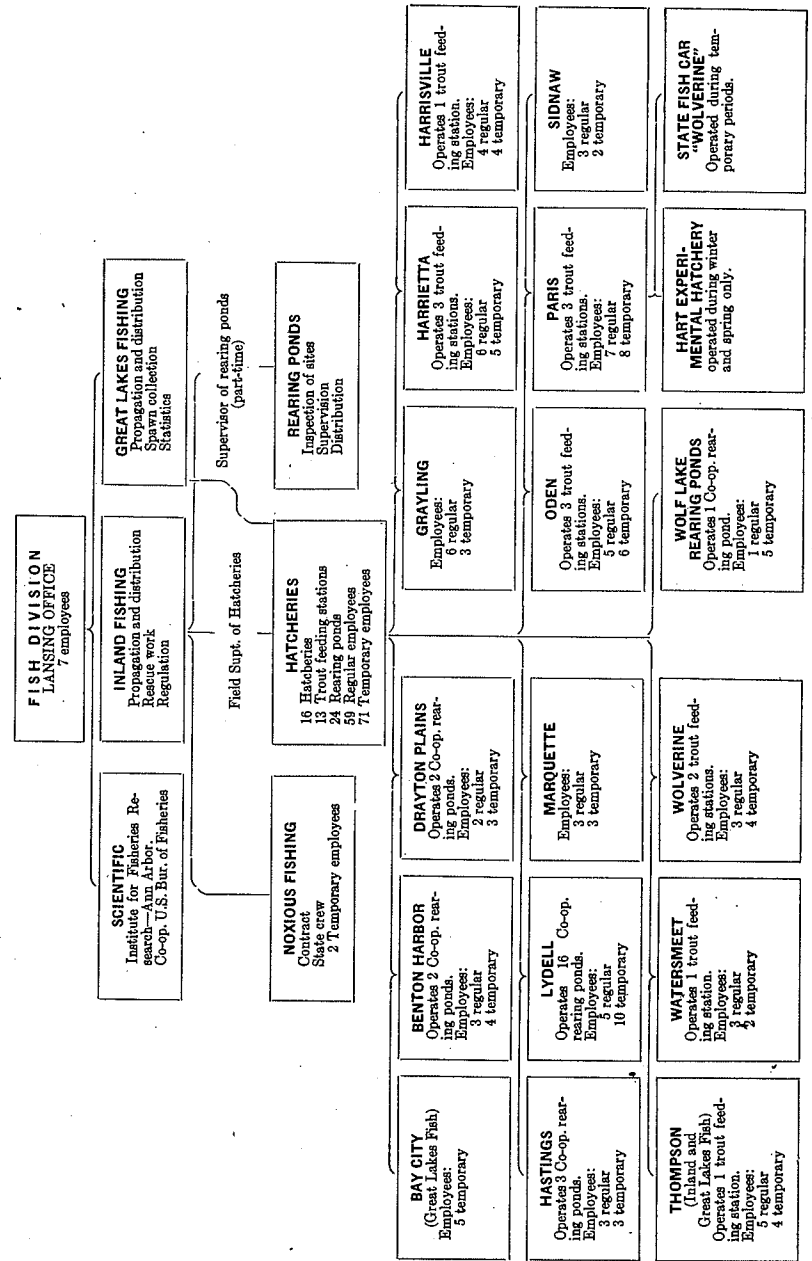
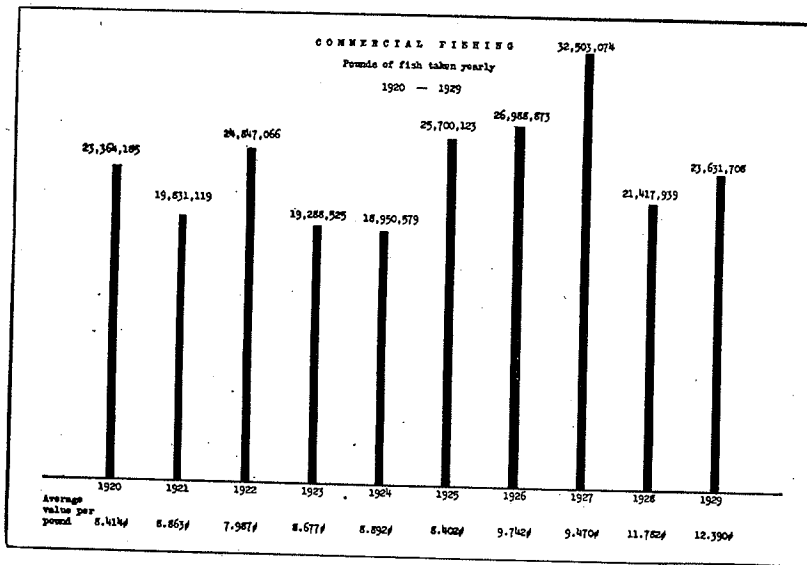
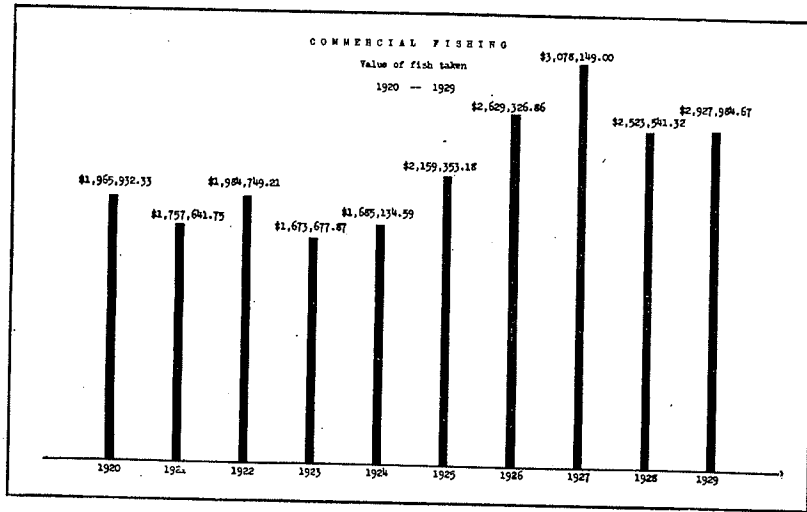
## RECOMMENDATIONS

- Provide additional rearing ponds for bass and bluegills.
- Provide additional trout feeding stations, with especial attention to the needs of the Upper Peninsula.
- Keep feeder or nursery trout streams closed.
- The acquisition, by the state, of fishing rights on streams and lakes.
- Base closed seasons to provide maximum protection to valuable species during spawning season.
- Endorse fire prevention, also control and reduction of stream pollution.
- Control of noxious fish and other predators.

## LEGISLATIVE

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

- A general resident angler's license for all persons over seventeen years of age.
- Reduce age limit on non-resident angler's license to seventeen years.
- Amend the act regulating the taking of mussels to provide better protection.
- Amend acts regulating the taking, propagation, and sale of frogs.
- Put rock bass and calico bass on non-game list.
- Allow "dipping" of smelt with hand nets March 1st to May 15th.





COMMERCIAL FISHERIES  
MICHIGAN WATERS OF THE GREAT LAKES—1928  
CATCH IN POUNDS BY LAKES AND VALUE

Kind.	Lake Erie.	Lake Huron.	Lake Michigan.	Lake Superior.	Saginaw Bay.	Total Pounds.	Value.
Lake Trout.....	925	1,582,521	1,831,127	2,279,823	15,330	5,708,801	\$913,408 16
Whitefish.....	4	1,233,406	2,956,146	228,603	235,395	4,554,475	930,895 00
Herring.....	4	1,971,223	532,535	843,503	737,818	4,085,083	163,403 32
Suckers.....	10,256	476,149	384,288	109,924	444,286	1,825,063	109,503 78
Chubs.....	40,519	269,341	86,832	19,249	66,097	1,313,234	131,323 40
Pike-Perch.....	568,385	27,443	11,082	2,785	255,149	860,844	43,273 20
Carp.....	33,429	138,058	71,341	33,712	474,400	690,940	41,456 40
Mullets.....	18,312	88,630	162,414	10,806	192,008	472,170	47,217 00
Perch.....	13,340	147,716	273,166	13,367	2,583	436,832	34,946 56
Menominee.....	10,458	1,315	68	50	161,645	176,418	17,641 80
Cardinal.....	31,724	7,994	1,602	1,772	41,678	33,317	1,842 72
Saugers.....	18,887	2,244	14,952	4,417	10,498	46,068	1,773 00
Shiners.....	85	10,363	13,457	163	8,884	28,975	2,295 44
Grass Pike.....		2,193	13,457		5,991	14,540	585 24
Bullheads.....			1,673		2,275	1,688	675 20
Lawyers-Eelpout.....			90			90	4 50
Dogfish.....							
Sturgeon.....							
Buffalo.....							
Totals.....	746,966	6,757,074	6,941,143	3,737,215	3,235,541	21,417,939	\$2,523,541 32

COMMERCIAL FISHERIES  
MICHIGAN WATERS OF THE GREAT LAKES 1929  
CATCH IN POUNDS AND VALUE

Kind.	Lake Michigan.	Lake Superior.	Lake Huron.	Lake Erie.	Saginaw Bay.	Total Number of Pounds.	Value.
Whitefish.....	4,840,139	119,462	1,290,688		524,757	6,775,046	\$1,355,009 20
Lake Trout.....	2,192,929	1,895,412	1,241,777		117,469	5,447,587	871,613 92
Herring.....	549,056	1,540,203	703,268		1,750,009	4,542,569	181,702 76
Suckers and Mullet.....	658,438	88,531	494,487	60,126	1,087,283	2,388,865	143,331 90
Chubs.....	876,106	130,983	287,380		123,123	1,294,481	129,448 10
Carp.....	5,257	3,074	4,195	508,574	383,948	902,491	45,124 55
Pike-Perch.....	106,021	23,793	181,770	35,509	443,283	669,701	66,970 10
Menominee.....	245,939	8,177	84,618	24,833	396,417	660,192	52,815 36
Catfish.....			6,216	42,588	198,777	245,566	27,623 88
Sheepshead.....	1,360		10,657	93,729	9,355	110,666	4,456 40
Saugers.....	14,401	3,803	6,216	6,465	33,082	68,408	8,208 96
Grass Pike.....	11,565	9,333		13,542	29,574	64,014	7,681 68
Bullheads.....	54		301	46,899	13,764	61,039	4,883 12
Dogfish.....	54		21	4,114	22,980	27,169	1,086 76
Rocky Bass.....	8,264		896	328	5,349	10,138	1,405 52
Shiners.....	557		2,895	701		10,026	1,002 60
Buffalo.....	271		890	1,310		3,596	35 96
Caviare.....	2,491					1,851	165 00
Sturgeon.....	778					4,778	1,311 20
Totals.....	9,547,450	3,823,554	4,397,001	838,798	5,024,905	23,631,708	\$2,927,984 67

COMMERCIAL FISHERIES

MICHIGAN WATERS OF THE GREAT LAKES—1930

Number of nets, hooks, boats and buildings and value of boats and buildings.

Nets used	Number
Gill nets 1½"—2" .....	1,445
Gill nets 2¼"—2½" .....	2,656
Gill nets 2¾"—2¾" .....	11,725
Gill nets 4½" and over .....	49,632
Pound nets .....	1,517
Trap nets .....	2,713
Hoop nets .....	362
Seines .....	154
Hooks .....	2,597,955
Trolling .....	19

Boats used	Number	Value
Steam .....	41	\$195,950 00
Oil screw .....	34	206,500 00
Gas .....	948	774,381 00
Sail .....	5	155 00
Row .....	224	9,498 50
<b>Totals .....</b>	<b>1,252</b>	<b>\$1,186,484 50</b>

Value of buildings and grounds ..... \$1,258,664 00

FISH PLANTED—GREAT LAKES

	1929.	1930.
<b>Lake Trout:</b>		
Advanced Fry .....	6,688,000	3,355,000
1 month .....	186,000	150,000
3 months .....	330,100	
5 months .....	21,300	
Yearlings .....	13,000	
<b>Total .....</b>	<b>7,238,400</b>	<b>3,535,000</b>
<b>Pike-Perch:</b>		
Advanced Fry .....	44,660,000	115,000,000
<b>Total .....</b>	<b>44,660,000</b>	<b>115,000,000</b>
<b>Whitefish:</b>		
Advanced Fry .....	69,235,000	83,620,000
<b>Total .....</b>	<b>69,235,000</b>	<b>83,620,000</b>
<b>GRAND TOTAL .....</b>	<b>121,133,400</b>	<b>202,155,000</b>

FISH PLANTED—INLAND WATERS

	1929.	1930.
<b>Brook Trout:</b>		
Advanced Fry .....	3,740,000	670,000
1 month .....	1,763,000	1,330,000
2 months .....	536,000	820,000
3 months .....	243,900	30,000
4 months .....	194,300	870,900
5 months .....	492,940	657,295
6 months .....	1,100,100	1,403,990
7 months .....	662,883	823,130
8 months .....	278,925	427,275
9 months .....	97,625	64,300
10 months .....	10,300	
Yearlings .....	4,335	7,285
Adults .....	6,061	2,645
<b>Total .....</b>	<b>9,129,369</b>	<b>7,106,820</b>
<b>Brown Trout:</b>		
Advanced Fry .....	2,070,000	325,000
1 month .....	1,514,500	540,000
2 months .....	242,500	814,000
3 months .....	189,500	35,000
4 months .....	15,750	56,000
5 months .....	142,700	349,900
6 months .....	176,300	482,600
7 months .....	62,862	66,150
8 months .....		91,300
9 months .....	72,100	
Yearlings .....	4,500	9,000
Adults .....	16	9,125
<b>Total .....</b>	<b>4,490,728</b>	<b>2,778,075</b>
<b>Rainbow Trout:</b>		
1 month .....	717,700	326,500
2 months .....	517,300	310,900
3 months .....	792,080	675,600
4 months .....	468,550	39,100
5 months .....	116,200	203,750
6 months .....		3,000
Yearlings .....	11,636	
Adults .....	282	
<b>Total .....</b>	<b>2,613,748</b>	<b>1,564,850</b>
<b>Lake Trout:</b>		
Advanced Fry .....	188,500	
2 months .....		90,000
3 months .....	121,500	
4 months .....		137,200
5 months .....	31,700	3,400
6 months .....	6,000	
8 months .....		11,450
Yearlings .....	12,125	13,000
Adults .....	100	
<b>Total .....</b>	<b>359,925</b>	<b>255,050</b>
<b>Small Mouth Bass:</b>		
Advanced Fry .....	157,500	10,000
1 month .....	5,800	59,000
2 months .....	15,000	53,950
3 months .....	11,100	9,000
4 months .....	20,700	48,695
5 months .....	5,090	6,175
6 months .....	600	12,300
Adults .....	47	57
<b>Total .....</b>	<b>215,837</b>	<b>199,177</b>

FISH PLANTED—INLAND WATERS (Concluded)

	1929	1930
<b>Large Mouth Bass:</b>		
Advanced Fry.....	5,200	
1 month.....	21,400	66,500
2 months.....	341,425	206,225
3 months.....	36,955	40,825
4 months.....	127,470	84,455
5 months.....	46,420	7,300
6 months.....	2,962	11,750
Yearlings.....	100	16,492
Adults.....	12	1,466
<b>Total.....</b>	<b>581,944</b>	<b>435,013</b>
<b>Perch:</b>		
Eyed Eggs.....		14,300,000
Advanced Fry.....	58,698,000	59,137,000
1 month.....	52,800	
2 months.....	86,100	7,800
3 months.....	400	15,550
4 months.....	14,000	
5 months.....	52,500	1,800
6 months.....	1,436,450	8,798,100
Yearlings.....	600	80,900
Adults.....	5,675	
<b>Total.....</b>	<b>60,346,525</b>	<b>82,341,150</b>
<b>Bluegills:</b>		
1 month.....	3,250	
2 months.....	4,800	139,500
3 months.....	391,350	158,300
4 months.....	1,707,000	1,670,950
5 months.....	468,300	1,173,350
6 months.....	5,000	
Yearlings.....	16,000	19,051
Adults.....		175
<b>Total.....</b>	<b>2,809,780</b>	<b>3,161,326</b>
<b>Pike-Perch:</b>		
Advanced Fry.....	9,410,000	29,115,000
Yearlings.....	350	
Adults.....	365	8,300
<b>Total.....</b>	<b>9,410,715</b>	<b>29,123,300</b>
<b>Calico Bass—Yearlings.....</b>		1,000
<b>Bullheads—4 months old.....</b>		14,500
<b>Bullheads—Yearlings.....</b>		1,025
<b>Sunfish—4 months old.....</b>		1,300
<b>Japanese Trout—Yearlings.....</b>	2,000	
<b>Land Locked Salmon.....</b>		7,600
<b>Total.....</b>	<b>2,000</b>	<b>17,825</b>
<b>GRAND TOTAL.....</b>	<b>89,960,571</b>	<b>126,990,086</b>

OUTSIDE REARING PONDS UNDER STATE SUPERVISION

	SEASON, 1929.				SEASON, 1930.			
	S. M. Bass.	L. M. Bass.	Perch.	Bluegills.	S. M. Bass.	L. M. Bass.	Perch.	Bluegills.
Adrian Chapter I. W. L. Pond.....		7,000 4 months		63,000 4 months		23,250 3 months		12,000 (Bullheads)
Allegan I. W. L. Pond.....						9,850 6 months		
Battle Creek Chapter I. W. L. Pond.....		4,000 4 months				8,200 3 months	100	52,500 3 months
Belding Sportsmans Club.....		4,630 4 months				11,600		
Beulah Chapter I. W. L. Pond.....					2,885			
Cadillac Chapter I. W. L. Pond.....		1,465 4 months						
Charlotte Chapter I. W. L. Pond.....		16,800 4 months				10,000		
Coldwater Chapter I. W. L. Pond.....								609,000 4 months 1,080 Yearlings
Davis Pond.....		4,000 5 months		527,250 3 months			18,900 4 months	
Dwight Lyvell Chapter I. W. L. Pond (Grand Rapids).....		15,900 4 months				9,900		
Gun Lake Protective Association.....		4,500 4 months		170 3 months			7,160 4 months	
Holland Fish and Game Protective Association.....		4,000 4 months		168,000 3 months			4,800 4 months	200,000
Leelanau Pond.....		10,902 4 months				5,000		
						7,250		

OUTSIDE REARING PONDS UNDER STATE SUPERVISION (continued)

	SEASON, 1929.				SEASON, 1930.			
	S. M. Bass.	L. M. Bass.	Perch.	Bluegilla.	S. M. Bass.	L. M. Bass.	Perch.	Bluegilla.
Ludington Chapter I. W. L. Pond.....		3,520 4 months		2,100 3 months				70,000 3 months
Marshall Chapter I. W. L. Pond.....		5,500 4 months			7,500			
Menominee Sportsmen Association.....		1,700 4 months						
Niles Chapter I. W. L. Pond.....		4,510 4 months						
Onokama Pond.....		4,500 4 months		10,800 5 months				
Saugatauck Chapter I. W. L. Pond.....								
Schuil Acres.....	1,000 4 months			244,600 4 months				583,000 5 months
St. Helen Resort Association.....								
Suterka Pond (Detroit Chapter I. W. L. Pond).....								
Vermontville Pond.....								

NOXIOUS FISH CONTROL  
SEASONS OF 1929, 1930

	Number of Fish.							
	Dogfish.		Garfish.		Carp.		Others.	
	1929	1930	1929	1930	1929	1930	1929	1930
Fish taken under contract with individuals by use of seines and trammel nets.....			22	240	11,341	34,981	8,280	16,805
Fish taken by Department employees by use of gill nets and seines.....	20	59	3,362	2,029			2,326	
Fish taken under Supervision of Conservation Officers by use of spears.....	475	1,861	369	1,548	410	397	31	

U. S. BUREAU OF FISHERIES  
FISH PLANTS IN MICHIGAN WATERS

SPECIES.	1929	1930	
Catfish.....			6,615
Chub.....			87,250,000
Whitefish.....	6,369,000		
Cisco.....			217,600
Rainbow Trout.....	199,972		
Loch Leven Trout.....			
Lake Trout.....	26,140,500	29,121,900	
Brook Trout.....	592,600	388,500	
Crappie.....		4,025	
Large Mouth Black Bass.....		20,335	
Small Mouth Black Bass.....	69,500	30,000	
Sunfish.....		8,650	
Yellow Perch.....		6,945	
Pike-Perch.....	3,710,000	2,040,000	
Landlocked Salmon.....	300	3,500	10,000 eggs
Steelhead Trout.....	29,800		50,000 eggs
Grand Total.....	37,111,672	119,098,070	60,000 eggs

CREEL CENSUS DATA YEARS 1927-1928-1929

	1927	1928	1929
Number of cards used in tabulation	4,437	8,722	10,326
Total number of hours spent fishing	26,491	48,352.5	55,498
Total number legal-sized fish taken	30,562	52,677	54,900
Legal-sized fish taken per hour (all species)	1.048	1.089	1.007
Under-sized fish put back	19,255	33,908	34,777
Number of reports on trout fishing	2,707	2,707	3,143
Number of hours spent fishing for trout	12,274.5	12,274.5	16,356
Number legal-sized brook trout taken	3,374	12,556	17,120
Number legal-sized brown trout taken	207	390	216
Number legal-sized rainbow trout taken	869	1,799	1,763
Number of legal-sized trout taken	4,450	14,745	19,099
Legal-sized trout taken per hour	1.20	1.20	1.16
Under-sized trout taken (all species)	13,153	13,153	18,563
Number reports other fish than trout	6,015	6,015	7,183
Number hours spent fishing for fish other than trout	36,078	36,078	38,142
Number legal-sized fish taken other than trout	37,932	37,932	35,801
Legal-sized fish taken per hour other than trout	1.05	1.05	.938
Under-sized fish put back other than trout	20,755	20,755	16,214
A check of 2,707 reports for the year 1928 shows:			
12,556 brook trout taken			85.15%
1,799 rainbow trout taken			12.20%
390 brown trout taken			2.65%
14,745		100	%
A check of 3,143 reports for the year 1929 shows:			
17,120 brook trout taken			89.64%
1,763 rainbow trout taken			9.23%
216 brown trout taken			1.13%
19,099		100	%

NOTE: During the season of 1930, 13,590 reports have been received to date, which will be tabulated by the Institute for Fisheries Research at the close of the year.

FINANCIAL STATEMENT—FISH DIVISION  
1928-1929

	Appropriations Current year	Balances from Last year	Administration Board Authorizations	Other Credits	Totals	Expenditures	Unexpended Balances
Personal Service	\$134,710 00	\$7,477 81	\$10 15	28 33	\$142,226 29	\$142,226 84	\$15 05
Supplies, Material, Contractual	76,950 00	19,630 14			96,580 14	93,710 31	1,869 83
Equipment	7,000 00	2,639 73			9,639 73	9,754 15	114 42
Structures and Improvements		180 00	310 15		490 15		490 15
Total	\$218,660 00	\$28,977 68		\$28 33	\$247,666 01	\$246,797 30	\$1,868 81
1929-1930							
Personal Service	\$130,000 00				\$130,000 00	\$110,973 48	\$21,522 52
Supplies, Material, Contractual	55,000 00		512 84		55,512 84	49,394 16	5,299 90
Equipment	5,000 00		316 34		5,316 34	4,890 87	425 47
Structures and Improvements (Unexpended but Encumbered)		490 15			490 15	408 80	81 35
Total	\$180,000 00	\$490 15			\$180,490 15	\$174,672 36	\$5,817 79

FINANCIAL STATEMENT (Continued)

GAME PROTECTION FUND

1928-1929

Receipts:	
Non-Resident Anglers Licenses.....	\$183,756 75
Resident Trout Licenses.....	64,554 50
Commercial Fishing Licenses.....	21,737 50
Confiscated Property, Sale of.....	1,002 00
Clam Licenses.....	1,098 70
Officers Fees.....	3,277 84
Noxious Fish, Sale of.....	1,694 20
Deputies Services, Noxious Fish.....	1,545 05
Spawning Licenses.....	1,249 87
Commercial, Sale of.....	2,203 07
Contribution and Aid.....	1,949 80
Various Credits.....	1,773 57
	<u>\$292,606 95</u>
Disbursements:	
Personal Service.....	\$54,700 77
Supplies, Material.....	29,733 74
Contractual.....	22,843 40
Equipment.....	7,860 66
Outlay for Lands.....	2,500 00
Scientific.....	12,159 87
Commercial Fishing.....	52,409 02
Noxious Fish.....	1,728 34
*Refunds on Licenses.....	2,330 45
	<u>\$186,298 05</u>
	\$106,308 90
	*

\*Approximate.  
 NOTE: Disbursements for 1928-1929 includes structures and improvements. Balance in Game Protection Fund each year to Law Enforcement and Administration.

1928-1930

Receipts:	
Non-Resident Anglers Licenses.....	
Resident Trout Licenses.....	
Commercial Fishing Licenses.....	
Confiscated Property, Sale of.....	
Clam Licenses.....	
Officers Fees.....	
Noxious Fish, Sale of.....	
Deputies Services, Noxious Fish.....	
Spawning Licenses.....	
Commercial, Sale of.....	
Contribution and Aid.....	
Various Credits.....	
	<u>\$330,476 82</u>
Disbursements:	
Personal Service.....	\$53,274 42
Supplies, Material.....	46,305 48
Equipment.....	5,505 16
Outlay for Lands.....	1,310 00
Structures and Improvements.....	68,141 81
Scientific.....	18,141 81
Commercial Fishing.....	30,045 88
Noxious Fish.....	2,335 02
Refunds on Licenses.....	1,522 08
	<u>\$239,178 42</u>
	\$91,297 80

DIVISION OF FISHERIES  
 INVENTORY YEAR ENDING JUNE 30TH, 1930

Project.	Acres.	Valuation.	Buildings.	Equipment.	Fonds, Etc.	Totals.
Bay City.....		\$3,500 00	\$15,485 25	\$10,282 03		\$29,267 28
Benton Harbor.....	State Park.....	1,822 00	5,149 99	2,857 45		79,660 21
Drayton Plains.....	Leased Land.....	7,320 00	17,550 00	4,261 76	\$25,000 00	31,752 39
Grayling.....	16.1	2,200 00	7,475 00	4,063 40	12,000 00	3,822 45
Harrisville.....	69 1/2	2,600 00	15,915 00	2,838 70	38,000 00	4,800 88
Hastings.....	100	2,600 00	17,583 50	6,978 87	12,582 18	729 75
Lydell.....	20	6,897 65	19,200 00	5,138 40	9,000 00	563 50
Marquette.....	53	42,775 00	17,640 00	8,810 58	39,225 00	1,249 87
Oden.....	32	9,430 00	23,210 00	7,144 26	8,000 00	4,840 16
Paris.....	129	16,848 00	22,700 00	7,144 26	8,000 00	30 30
Sidnaw.....	158	4,720 00	25,095 00	3,822 39	28,150 00	4,722 82
Thompson.....	560	4,400 00	14,025 00	15,105 38	5,310 00	
Watermead.....	40	3,565 00	14,890 00	7,449 17	3,650 00	63,845 38
Wolfville.....	127	2,340 00	10,800 00	1,536 67	15,000 00	23,536 67
1. Baldwin.....	15 1/2	6,500 00	3,400 00	1,992 70	30,000 00	35,392 70
2. Bear Creek.....	Leased		800 00	3,324 75	1,900 00	1,200 00
3. Hart.....	Leased			682 00	2,000 00	4,124 75
4. Jordan River.....	Leased			263 32	1,500 00	2,892 00
5. Junction Dam.....	Leased				1,733 32	500 00
6. Moyer Creek.....	Leased				2,000 00	1,500 00
7. Penitwater.....	Leased				2,000 00	2,000 00
8. State River.....	Leased				1,000 00	1,000 00
9. Silver Creek.....	Leased				4,000 00	4,000 00
10. Sugar Run.....	Leased				2,500 00	2,500 00
11. Tobacco River.....	Leased				500 00	500 00
12. Tobacco River.....	Leased				84 60	594 60
13. White River.....	Leased			300 00		4,300 00
14. State Car Wolverine.....	Leased					
Grand Totals.....		\$130,852 65	\$286,573 74	\$110,054 24	\$273,592 18	\$800,872 81