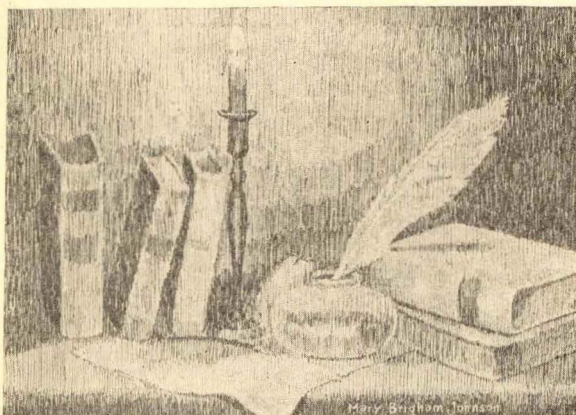


F
629
.D4
I86
1938

THE STORY OF IOWA'S FISH
by
WALTER W. AITKEN

9
334

IOWA
STATE LIBRARY



GENERAL DEPARTMENT

Class

Book

Volume

639 A:1932

THE STORY OF IOWA'S FISH

By

Walter W. Aitken

Iowa once had 106 lakes. There are now only 12 which are practical for fish life.

Why the fish resources have diminished.

What has been done and what can be done to restore these resources.

This brief review is compiled to answer the quandary in the mind of every sportsman and devotee of out-door recreation and to promote a clearer understanding of the problems which lie ahead.

J. N. DARLING

Bulletin No. 2

Issued by the

IOWA STATE CONSERVATION FEDERATION

J. D. LOWE, *State President*

J. N. DARLING, *General Wildlife Federation President*

FOREWORD

The writer feels that a synopsis of the progress made in the management of Iowa fish life since the time first attention was given to this phase of Iowa conservation would be of instructional interest and give helpful suggestions for the further improvement of fishing in a state that has at best a minimum amount of this kind of recreation.

The narration has been arbitrarily divided into three sections. The first portion deals with fisheries activities in Iowa from 1862 to 1931. The second part describes the work of the Fish and Game Commission which covers the period from April, 1931 to July, 1935. The third section covers the two and one-half years the State Conservation Commission has existed.

Respectfully submitted,

W. W. AITKEN,

*Biologist for the Iowa
Conservation Commission*

January 1, 1938

Iowa Fish Management

CHAPTER I

In order to present a clear and factual statement of the management of fish in Iowa, it seems appropriate to review briefly the records up to the present concerning major efforts that have been made to conserve fish life.

In 1858, the Senate of the 7th General Assembly considered a bill aiming to provide for a careful study of bird and animal life of Iowa, evidently with a view to making such a study the basis for determining a legislative program to perpetuate wildlife in Iowa.

The first Iowa law enacted with respect to fish was in 1863, which limited the taking of fish. Provision was made for artificial propagation and related expedients. These Acts were designed to increase the natural supply of fish in the state. Thus, we see at the beginning, a positive attitude to promulgate fisheries activities and produce more fish for Iowa waters.

In 1874, a law was enacted providing for a State Board of Fish Commissioners, whose duties were declared to be two-fold, "Fish Protection and Fish Propagation," which is evidence that the diminution of the fish supply in Iowa waters was already raised as a matter of concern.

The Fish Commission was of short duration. In 1876, a new act was passed which eliminated the Commission of three members and provided for one "competent person" to be known as a State Fish Commissioner.

An Assistant Commissioner was created by law in 1880 whose specific and primary duty was fish culture and who was also required to enforce the fish laws. It was further set out that he was to maintain a fish hatching house within easy access of Spirit Lake.

As we continue through the records of each succeeding General Assembly we find the people of the state interested in fish and their management submitting petitions to the Fish Commissioner and to their legislative assembly members to provide legislation regulating the fisheries activities of the state as they, as individuals, believed to be right. We see then, through the entire history of fish management, up to the formation of the Fish and Game Commission in 1931, that empirical methods shaped the policies of the Fish Commissioner, as it did later in many instances the policies of the State Game Warden.

Trout were the first fish to be granted protection by law. This law, of 1862, prescribed that trout must be taken by hook and line; their spawning time was also protected.

In 1874, a law was passed to provide fishways in dams. The same Act prohibited the use of other obstructions, such as seines, nets, or weirs, that might hinder fish migration. It also prohibited the poisoning of fish, and restricted fishing, except by hook and line, within certain distances of fishways.

It is apparent from the increasing number of acts passed by the successive Assemblies that the management of fish in Iowa was becoming more and more a problem of serious importance.

Further management practices were attempted. In 1884 the spearing and selling of fish was limited. A law was enacted in 1886 to construct dams across outlets on meandered lakes with the obvious purpose of preventing the escape of fish from the lake.

W162684

Page three

As time passed, closed seasons on trout and other species were lengthened, and many types of taking fish were declared illegal, including the use of dynamite and other explosives.

In 1902, the Warden was authorized to grant permits to whomsoever he might see fit to "take from certain designated portions of the waters of the state buffalo, carp, quillbacks, red-horse, suckers, and gar."

It is apparent then that rough fish control was now a definite problem of fish management.

Propagation activities in an early day consisted of rearing fish at a hatchery a few miles north of Anamosa on a small tributary of the Wapsipinicon River in Jones County. In 1874-5, 260,000 California salmon were hatched and the fry distributed in many streams of the state which included some of the Missouri River tributaries; the Nishnabotna River, at Atlantic in Cass County, received 6,000 of these fish.

Fish not native to the state were introduced in a vigorous attempt to improve fishing. California salmon, Atlantic salmon, sometimes called Penobscot salmon, land-locked salmon, lake trout, whitefish, rainbow and Loch Leven trout, were introduced. Environmental conditions in the state eliminated all of these foreign species. The introduction of foreign species was climaxed by the most successful emigrant that ever came to the United States—Edelkarpfen, the German Carp.

Fish rescue was early practiced on the Mississippi River, obviously to secure fish for inland stocking. A fish car was used to transport fish from Lansing, Iowa. Aquarium tanks were used on a freight car that traveled 4,000 miles in the state to 51 counties in September and October of 1876.

In 1896, the Fish Commissioner's office was abolished and a Fish and Game Warden was authorized by law. The responsibility of this office was becoming of greater magnitude due to increased agricultural activities, the changing conditions of the physical characteristics of the lakes and streams in the state, coupled with an increased interest in the taking of fish for sport and for food.

Up to 1931 the management of fish was dictated by the expedience of the times and the changing ideas from all quarters of the state that created "pressure" on the State Game Warden which materially affected his plans and policies.

For instance, for a number of years goldfish were hatched at Spirit Lake and distributed to applicants in every part of the state; also, privately owned ponds were stocked. However, the State Fish and Game Warden was able to inaugurate approved fish management work of commendable proportions.

Fish hatcheries were established with substantial buildings at Orleans, Dickinson County; Clear Lake in Cerro Gordo County; a yellow pike-perch stripping station was erected at the inlet of West Okoboji Lake in Dickinson County; and a trout hatchery adequate in size for the trout waters of Iowa, operated in the Backbone Park in Delaware County.

Rescue stations, with excellent equipment, were located at Lansing, Iowa, in Allamakee County, and Sabula in Jackson County. From these points a fish car, "The Hawkeye," was used to transport the collected fish to points inland for stocking. In the last few years, prior to 1931, trucks were recognized as more economical and feasible for inland distribution.

The pond propagation of fish was of negligible moment, although ponds had been built at Lansing, Cedar Rapids, the Palisades Park, Clear Lake and at the Spirit Lake (Orleans) station. Pond propagation had been

attempted with variable success in gravel pits and by using small lakes in Dickinson County as "nursery lakes" for yellow pike-perch. These efforts to produce larger fish were not highly successful yet pointed to the possibility of producing fingerling fish for stocking purposes rather than by securing them from the rescue operations on the Mississippi River.

In 1930 a research worker was employed to study Iowa lakes and cooperated with research workers at the State University of Iowa. The new Fish and Game Commission, a few months later, felt the need for more extensive fisheries investigations. Studies were initiated on pollution of lakes, diseases of fish, and other related fisheries activities. A staff of scientists from the State University of Iowa made an initial survey of some of Iowa's lakes to determine types of pollution present and potential quantity of plankton forms.

The State Game Warden acquainted the public with native Iowa fish and game forms by displaying them in the present Fish and Game Building on the State Fair Grounds. This building has enjoyed continuous use up to the present time for conservation displays.

Because of changing fish environment in the lakes and streams, the increased interest in taking fish, and various other pertinent factors, the management of the fish in the state did not satisfy the general demands made upon this phase of wildlife. By an Act of the Legislature in 1931, a Fish and Game Commission was created to manage the wildlife of the state. They held their first meeting April 23, 1931.

CHAPTER II

The Commission first cooperated with the Board of Conservation in having a 2-year survey made of Iowa's natural resources to formulate a 25-Year Conservation Plan. This report was accepted and published in 1933.

The consultant of the 25-Year Plan, Mr. Jacob L. Crane, asked Dr. Carl L. Hubbs, Director of the Institute for Fisheries Research, to suggest a 25-Year fisheries program. In April, 1931, Dr. Hubbs submitted such a plan titled "Increasing the Fish Supply of Iowa." In this plan

Dr. Hubbs says:

"Fish conservation and increase are intimately bound up with other conservation plans."

Under the heading "Methods for the Increase of Iowa's Fish Supply" he says:

"The program being proposed for the upbuilding of the fish supply in Iowa, while radical in a way, does not involve the casting aside of any of the existing means of fish conservation and development. It recognizes the need for protection against any lawless or uninformed elements which unfairly prey upon the fish supply. It acknowledges the need for protective, restrictive, legislation, and calls for the obtaining and coordinating of data which will make such laws sounder and more effective.

"As a basis for sound fish laws for Iowa, I recommend that the State sponsor natural history investigations. These should be made and coordinated by a technically competent official trained in the methods of modern fisheries research and by assistants, and by institutes of fellowships at one or more of the colleges or universities of the state."

This plan includes some of the following items: growth of different game fish, the percentage of fish maturing at different ages, weights and lengths, the usual and extreme limits of spawning seasons, the relation between catch, carrying capacity, and present fish population in various waters, location of natural spawning grounds in the lakes and streams, and the relation of coarse and obnoxious fish to game fish.

Dr. Hubbs continues to point out the need for fish cultural investigations and observations in Iowa and points out the phases such an investigation should include. One of the phases of fish management particularly stressed by Dr. Hubbs is that of a creel census for Iowa.

The entire plan stresses the need first of surveys and investigations of the different areas so that the management of fish in state waters will be on a sound and fundamental basis.

Later in the year of 1931, in July and August, Dr. Hubbs directed some field investigations in the state. These investigations were quite extensive for the short period they were pursued and the volume of this report was materially augmented by information gained from the Iowa Fish and Game Department. The survey was not statewide because of limited funds and was confined primarily to the lakes region in northwest Iowa and the trout stream section of northeast Iowa.

The report on the Iowa 25-Year Plan, prepared by Crane, in Chapter 10 (15 pages), is but a brief summary of Dr. Hubbs' management plan.

Crane sums up the chapter by saying:

"Here then in brief is an outline of the program to bring Iowa's fishing back to a point equalling or exceeding its original richness."

To further stress the importance of fish management in Iowa, Dr. Hubbs says,

"It strikes us as being vital to the effective development of Iowa's fish supply that a well-trained technical man be engaged on a full-time basis. The problems facing Iowa are so difficult, and are increasing so alarmingly in their seriousness, that technical help will continue to be needed, and will be increasingly important; more than that, a necessity. We refer to the problems of silting, of pollution, of algae nuisance and control, of diseases in nature and hatcheries and of over-fishing.

"We therefore suggest that a technically trained man be employed at the Commission's earliest convenience."

Dr. Hubbs suggests that this man

Should know the fish problems of the prairie regions from long experience;

He should know fish thoroughly both as an angler and as a scientist;

He should have primary interest in the conservation and upbuilding of the fish supply rather than in purely scientific work; yet

He should be capable of applying most approved and modern scientific methods in the solution of the problems confronting the state, and should be capable of cooperating with other investigators at the State College, State University, and other institutions, and of coordinating their work with his own and of applying these combined results in practice; and also

He should be mature enough and of proper character to succeed in public relations.

Dr. Hubbs continues:

"If the same man can serve in a similar capacity on the technical side of game research and game management, so much the better. If

fitted for educational work as well, both among children and adults, he would be an ideal person for the position. It is quite possible that a man of these many qualifications could be secured."

The Fish and Game Commission selected several points emphasized by Dr. Hubbs as expedient in an attempt to secure fisheries improvement on a gradual basis over a prolonged period of time so that neither extra help nor increased cost would be an issue. Some progress was made by this plan.

The most outstanding work of the Fish and Game Commission was stream improvement on some short stretches of the northeast Iowa trout streams, the expansion of pond propagation, and the construction of some of the new artificial lakes in southern Iowa for fishing areas. The first of these was started at Lake Wapello, Davis County, in September, 1932. The writer, as a fisheries technician, was employed to develop these lakes as fishing areas. Here in these new lakes brush, log, and rock shelters, tile and gravel spawning beds were installed to augment natural fish environment.

A large-mouth bass hatchery was constructed at Lake Wapello and other ponds were built at various places in the state to bring fingerling fish production to a par with other mid-western states practicing modern fish culture.

The lake-dredging program was started at Lake Manawa, Council Bluffs.

A small-mouth bass hatchery and trout rearing raceways were built at Decorah. This was a definite step in the best fish cultural practices under the Hubbs plan.

The newly established Federal work agencies accelerated the fisheries improvement program and several fairly large log and rock dams were placed in such rivers as the Cedar, the Shellrock, Upper Des Moines, Wapsipinicon, and some smaller streams.

One forward step in general management of stocking fish was the discontinuance of the old method of formal application for consignments of fish. A stocking program was set up by counties and no private waters were stocked.

Because of decentralized responsibility in fisheries activities, coordinate and concerted progress was slow. This was exhibited in stocking, collection and rescue from the Mississippi River, rough fish control, and fish census work.

To sum up the situation briefly, progress was made in improvement of streams and lakes and a demonstration made at the new bass hatchery at Lake Wapello that fingerling fish could be raised in large quantities very cheaply if modern fish cultural practices were followed.

The dredging program was started, the Decorah hatcheries at Twin Springs and Sievert Springs built, and several important sections of lake shore line secured. Notable was the acquisition of Pikes Point at West Okoboji where the public might enjoy free access to this finest and most valuable piece of state owned property; fish management took on new meaning.

CHAPTER III

When the consolidation of the Fish and Game Commission and the Board of Conservation was effected July 1, 1935, authority and responsibility was definitely placed on personnel.

This new Iowa State Conservation Commission, by the Director, Mr. M. L. Hutton, divided the conservation work into various sections, Fish and Game, Lands and Waters, and Administration.

The new Commission charged the Fisheries Technician, under the title of Biologist, with certain specific duties and requested the formulation of a fish management plan for the state.

The Iowa Fish Management Plan is herewith set forth as it appears in the "Proceedings of the First American Wildlife Conference" held in Washington, D. C., February, 1936. This plan points to the practical application of modern piscicultural methods and latest research in fisheries fields as suggested in the Iowa 25-Year Plan.

"IOWA FISH MANAGEMENT PLAN: To successfully manage fish in any state, a plan is of first importance. Of second moment is a recognition and knowledge of field conditions including both physical and biological factors with an appreciation of the practical and scientific phases of fisheries work.

"Wide variants of fish ecology are exhibited in Iowa. A classification of the state waters reveals a gamut of gradations in stream and lake characters, cold trout waters of northeast Iowa, rock-bottomed bass rivers of the upper mid-state, and warm turbid catfish streams of the southwest. The lakes range from shallow bullhead areas, pan fish and bass sections, to the sport fishing, pelagic Okoboji, each body of water demanding individual treatment in stocking, in improvement, and in management.

"These natural sequences establish a variety of propagation problems. Iowa fish culturists care for troughs of brook and rainbow trout, batteries of yellow pike-perch, raceways of artificially fed small-mouth bass, and pond units of bullhead, bluegill, crappie, and large-mouth bass, each group of fish requiring different methods of daily care and study.

"The various types of fishing areas, with their specific biotic factors, an increase in fishing interest, the lake building and restoration impetus of the 25-Year Conservation Plan, the probability of a diminishing supply of stock from the canalized Mississippi, the lower water levels in the state, the correlation of fisheries improvement with waterfowl management all coupled with limited faunal and ecological history necessitate the placing of a fish management plan on a fundamental basis.

"For these reasons the basic factors in such a plan as are here enumerated are fused into a working plan that is practical, scientific, and therefore reasonable.

"PROPAGATION: The propagation of fish includes trout and pike-perch hatcheries, pan fish, bullhead, bass, and forage minnow ponds; nursery lakes that are certain small lakes where fry are introduced and fingerling periodically removed to regular fishing areas; sportsmen's ponds where local groups under State supervision produce fish for local waters.

"COLLECTION: The collection of game fish from land-locked ponds in the flood plains of inland and border streams and their return to suitable fishing waters.

"RESCUE: The wholesale rescue of fish by federal, state, and sportsmen's groups from land-locked pools in flooded districts and their return to mother waters or their use for stocking barren waters.

"STOCKING: The stocking by state and U. S. Bureau of Fisheries of state owned lakes and privately owned areas, the stocking of rivers, smaller streams and reservoirs.

"OBNOXIOUS FISH CONTROL: The removal of carp, gar, dog-fish, and other rough fish from game fish waters, by department crews, by contract, by relief labor under a state-wide WPA project, by gill-netting through the ice, and by sportsmen's groups.

"WINTER AERATION: The mechanical and natural oxygenation of the shallow lakes that experience unusual oxygen depletion during the winter months. The work is pursued by the department, by WPA projects and by sportsmen.

"IMPROVEMENT—Streams: Major activities are erosion control and reforestation of watersheds; tree planting of stream banks; elimination of pollution directed by the State Board of Health; the installation of devices and dams by state and federal government and sportsmen's groups. Lakes: The reconditioning of natural lakes by restoring natural shore lines by excluding cattle and all agricultural practices from the immediate lake area; the introduction of suitable aquatic vegetation; the stabilization of levels by controlled inlets and outlets, the control of rough fish; planned stocking correlated with creel limits; and a dredging program of distinctive proportions. Artificial lakes: The building of fishing lakes. Lake Wapello, a typical example of fish management, with its lake bed prepared with fish shelters of rock and brush, and spawning areas of tile, gravel, and sand, aquatic vegetation plantings for fish and waterfowl, scheduled stocking and service facilities provided for the recreator. City and leased reservoirs: An improvement program outlined for municipal execution that approximates artificial lake development.

"ACQUISITION: The securing of trespass waivers along privately owned streams, access agreement for public use of deserted railroad reservoirs; the purchase of riparian rights along state lakes and the acquisition of areas suitable for pond propagation units.

"SURVEYS: Physical surveys by engineers of lake bed contours, and watershed topos, including geological data and wind and precipitation phenomena; biological surveys of aquatic fauna including records of biotic and chemical conditions, creel census of water stocked and the reconnaissance of streams and lakes for future improvement.

"BIOLOGICAL: The initiation of fundamental ecological studies with emphasis on fish distribution and controlling increments, the correlation of private and state scientific research work with pertinent fish problems, and the dissemination of information to fish and game workers who are not scientifically trained.

"ADMINISTRATION: The field execution of the program, the budgeting of funds, the care and purchase of equipment, the establishment of a record system to preserve field history, and all such duties that apply to execution of plans.

"Each section of the plan dovetails into each other to make a composite whole. Each phase of this plan is formulated in detail. All employees working in each particular section are apprised of the tentative plans made for their division. They are then asked for their criticism and suggestion.

"This method gives each fisheries worker a clear idea of the ultimate goal in view and tends to stimulate self interest, by giving each

worker a picture of his part in the general plan. Fisheries progress cannot be made unless the fisheries worker adds to and uses to the best advantage the knowledge he possesses. To insure the consummation of this fisheries program, the unstinted cooperation and whole-hearted interest of all employees are necessary.

"If proper cognizance is taken of all factors herein set out and prudent attention paid to the attendant details, aquatic resources will be re-established on a plane that will approach a natural optimum."

The following brief review presents the progress made after the Iowa Fish Management Plan has been in operation two and one-half years. For clarity and brevity each phase of the work will be dealt with separately.

Propagation

The areas of the state owned hatchery ponds total 129.5 acres. The area of ponds under lease or agreement is 48.25 acres and the total area of small lakes used for yellow pike-perch (Welch and Diamond in Dickinson County) is 200 acres. 65.5 acres of the state owned ponds have been added during the present period under discussion, while 14.5 acres of the total acreage of cooperative ponds now used were also added in the last two years. A series of bass ponds are now under construction at Chariton which will be ready for use in the 1938 season. Other hatchery units are also under construction at Bedford.

456,870 large-mouth bass, small-mouth bass, rock bass, war-mouth bass, crappie, bluegill and yellow perch were produced in the state owned ponds, having a total acreage of 120.75 acres, in 1936 and 415,611 of these same species were produced in these same ponds in 1937. 209,658 yellow pike-perch were produced in the nursery lakes in 1936 and 155,941 were produced in 1937. 279,549 bullheads were produced in these same nursery lakes in 1936 and 2,321,838 were produced in 1937.

The young bullheads are a by-product of the yellow pike-perch nursery lakes. In 1937 two and a quarter million bullheads were removed at the time the young pike-perch were seined from Diamond Lake. These bullheads are stocked in typical bullhead lakes that are heavily fished, such as Lost Island, Medium, and other areas.

Under the Fish Management Plan at present, as far as possible, fry are reared to fingerling size before liberating them in the fishing areas. (Trout are fed to legal size.)

The two years, ending 1934, show a total of 124,887,000 pike-perch fry hatched at the two pike-perch hatcheries. In 1936 and 1937 this number was increased to 180,500,000. This increased production has been accomplished at practically no increase in cost.

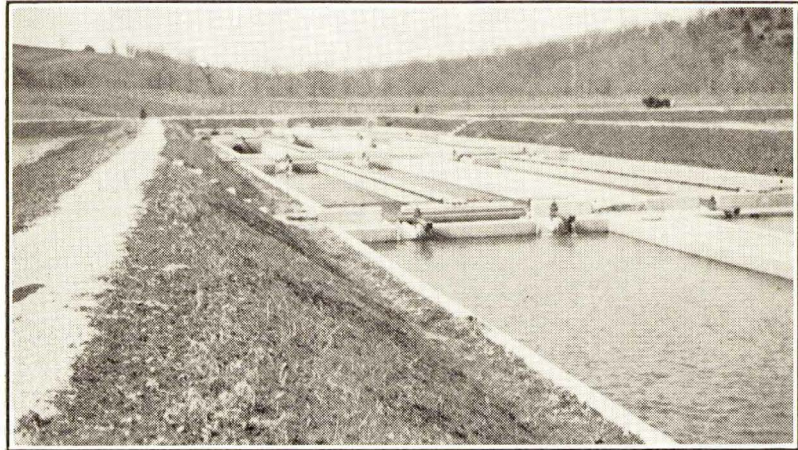
A change in trout management was inaugurated in the fall of 1935. Instead of keeping a surplus number of fingerling trout on hand to make monthly or stated interval stocking, which resulted in a steady supply of undersized fish being placed in the streams, a new plan was inaugurated to stock only legal size fish twice yearly; approximately 50,000 in number, combining brook, brown, and the rainbow species. This system proves more effective in providing a reasonable supply of takable fish. Under the present management adult trout cost 10.7 cents each with a feeding cost of 3.5 cents.

Propagation of fish by sportsmen on a cooperative basis is accomplished at Manchester, Davenport, Burlington, Marshalltown, Hopkinton, and other points. Advice and help in rearing and distributing the fish

is given by the Commission. By raising fish the sportsmen have a more tangible interest in the fish of the lakes and streams in their particular angling areas.

The sportsman must have a workable interest in his own sport if success attends the Commission's effort to improve state-wide fishing.

Of fundamental importance to good fish management is need for hatcheries located in geographical convenience to the stocking places. For this reason various species of fish are propagated in various sections of the state. Because biological factors differ in each case each major hatchery has a more or less individual status.



*Bass Raceways at Sievert Springs Hatchery, Decorah
(Demonstrates modern fish cultural practices)*

For these apparent reasons the propagation of fish in Iowa will always need continuous biological study if progress in this phase of fishery work is attained.

Hatchery records are kept that contain information on volume and cost of foods, weather conditions, chemical status of the water, weekly growth rate of the fish, mortality rates at various ages, and all information pertinent to modern fish culture.

Winter Aeration

During the winter, lakes in northern Iowa are covered with 18 to 40 inches of ice. If snow blankets the ice, sunlight is excluded. This condition retards plant activity and permits the accumulation of gases produced by the decomposition of organic matter in the bottom of the lake. During this process the dissolved oxygen supply in the water is gradually depleted until fish life cannot be sustained.

No state has been able to devise a method to replenish, by mechanical means, the supply of oxygen being dissipated.

In the winters of 1935 and 1936 several methods of aeration were tried on various lakes. Oxygen was forced under the ice by air compressors and blowers. Machines were employed to pump water out of the lakes onto the ice so that obnoxious gases might be eliminated and oxygen

might be mixed with the water before it re-entered the lake. Even out-board motors were used to agitate the water in an attempt to trap oxygen in the water. However, little success came from all these efforts.

Because mechanical methods by pumping air under the ice and by circulating water, and by opening long holes parallel to wind sweep, had questionable value, the Commission decided to try some experimental work the winter of 1936-37 to see if better methods might be discovered.

Two types of equipment were used for comparative purposes. One method was a direct pressure pump system, the other a system of lifting water above the ice, mixing with the atmosphere, and then returning to the lake. The latter method proved more effective but neither seemed practical for aerating large lakes.

On all the lakes where fish are stocked dissolved oxygen samples are taken at regular intervals from the time the lakes are frozen over until the spring thaw.

Every winter some fish die under the ice, but the heaviest loss of fish occurred in 1936. For many days the temperatures ranged far below normal, and deep snow covered the ice preventing natural aeration.

In addition to the regular Fisheries Department employees, several governmental agencies, including the State Planning Board, Works Progress Administration, Civilian Conservation Corps, and others, cooperated in opening holes and otherwise assisting in this work. The biological unit of the Planning Board furnished 38 men and supervisors on Lost Island Lake, Trumbull Lake, Silver Lake at Ayrshire, Storm Lake, and on lakes in Dickinson County. In addition several groups of WPA men were used on North Twin, Medium and some other Iowa lakes.

Long channels in the direction of wind sweep from 100 to 300 feet long by four to six feet in width were cut in the ice. Because federal agencies would not permit the men to work when the temperature went below zero, operations were seriously handicapped, when aeration was most urgent.

Although many fish died the winter of 1936 they were mostly carp, buffalo, and sheepshead whose loss was probably beneficial to the lakes.

The only sure method to aerate lakes will be to get vegetation re-established in the lakes in sufficient quantities to produce natural conditions. Aquatic vegetation not only produces oxygen, but uses those gases that are deleterious to aquatic animal life.

Stocking Fish

One of the most important phases of fish management is to augment, where needed, natural fish population by artificial methods. The most feasible method is to stock the necessary species and numbers.

A stocking program is formulated by classifying all the waters of the state as to suitability for given species and numbers. The particular habitats are ever-changing which necessitates up-to-date information and continual revision of stocking quotas.

By adding available number anticipated from river collection and propagation sources, a reasonable quota is assigned to each potential stocking area. The point where over-stocking might be a problem has not been reached. Each consignment serves as an activating nucleus necessary in much of our Iowa waters to compensate for the fisherman's take.

A total of 142,620,489 fish were stocked in the waters of the state during the biennium ending June 30, 1936. Of this number 3,925,489

were fingerlings, yearlings and adults; 139,695,000 were yellow pike-perch fry. With the exception of the brown and rainbow trout, every species stocked is native to the waters of the state.

The stocking of fish by the U. S. Bureau of Fisheries, upon application by private individuals, is first sanctioned by the Commission before the Federal Government forwards the fish to the applicant. By this cooperation with the U. S. Bureau of Fisheries, the State has knowledge of all fish stocked in Iowa. This method also assures the U. S. Bureau of Fisheries that the fish will go into suitable waters.

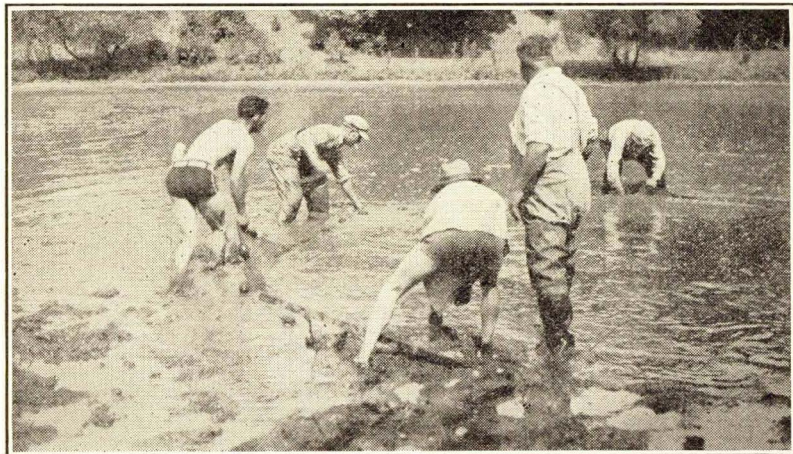
Fish used for stocking the inland waters are secured from the four fish hatcheries, the nursery pond units, and from fish salvaged from the overflow waters of the Mississippi River obtained in connection with the regular rescue operations. These fish are transplanted to the various streams and lakes by trucks equipped with steel tanks especially constructed for hauling fish.

Without artificial propagation fish for stocking inland waters must be taken from rescue operations. However, taking fish from one place in the state to another is not production nor fundamental conservation. The justification of this system in the past has been the idea that these fish might be lost anyway; therefore, it was a matter of a tax on the principal for handling the rescue business.

The fish collected for inland stocking probably go into better fish environment and might be considered "the predator's take" if they were returned to the river.

Rescue

INLAND RESCUE: This work is accomplished by Department crews and Conservation Officers and Sportsmen's groups.



Conservation Officer Klinge, with volunteer sportsmen rescuing fish along Cedar River flood plains

Five crews were operated by the Commission in 1937. These crews operated from centers where heaviest floods occurred. They cooperated with the Conservation Officers who had informed the Department where

the most urgent rescue work was needed. A "crew" consisted of local help secured by the departmental employee directing the work.

The volume of work on inland rescue is contingent largely upon weather conditions for the year.

The present plan to more efficiently handle rescue operations consists of departmental rescue supervisors with "pick-up" truck and seines to service particular districts that need experienced seiners.

MISSISSIPPI RIVER RESCUE: This work is pursued as in previous years. At the present time conjecture is rife as to what effect canalization of the river will have on the fisheries operations on the Mississippi River—whether or not there will be more or less fish to rescue.

One step forward in rescue work is the preparation of a complete daily record of the operations at each place seined. This record contains number, species, and size of fish rescued, with weather conditions and notes on environment. Over a period of years such information will have value in determining population ratios, spawning information, and other pertinent facts concerning fish and their management.

Obnoxious Fish Removal

Many of the lakes and streams in Iowa are infested with carp, gar, and dogfish, which are undesirable because of certain life habits. If buffalo become too numerous they, too, are removed.

A definite rough fish removal program is necessary and unceasing efforts should be made to control undesirable fish. It has been definitely proven that where heavy populations of "obnoxious" fish are present the natural environment for the desirable game fish is destroyed. A supervisor has charge of this work and uses departmental crews and equipment to pursue this work.

The carp is probably the most abundant "soft" fish found in the state. Since their introduction, the carp have increased until they are now found in nearly all state waters. They destroy aquatic vegetation which is a part of the environment needed by much of the aquatic life on which the game fish feed and which provides spawning places for the "pan" fish. Carp spawning habits also destroy large numbers of nests and eggs of the game fish.

The carp is a prolific spawner. A five or six pound carp may scatter a half-million eggs in a single season in the shallows throughout the up-rooted vegetation. On the other hand, a black bass only deposits from two to five thousand eggs in a nest which must have parental care. This difference in the spawning habits and reproductive ability of these two fishes demonstrates one reason why carp increase at a rapid rate and soon gain a preponderance in population over the game fish.

The condition of Lower Gar Lake, in Dickinson County, illustrates the destructive habits of the carp. A few years ago this lake contained heavy growths of aquatic vegetation which not only made this area a desirable place for game fish but also provided food for migratory waterfowl. Since the carp have infested this area the aquatic vegetation has almost completely disappeared and the area does not at this time have suitable environment for game fish nor food in sufficient quantity to attract migratory waterfowl in such numbers as in former years.

The old practice of drag seining the major lakes at the time of year when aquatic vegetation and the spawning areas of the game fish might be disturbed or destroyed has been discontinued.

During the past biennium "spot" seining methods were used to control the rough fish population. By this system, when carp attempt to con-

gregate in large numbers in certain bays or inlets previous to spawning, a short seine is used to quickly remove these undesirable species. By this method few game fish are disturbed and little harm is done to aquatic vegetation and other life phases that belong to game fish environment.

In the natural lakes, where carp or starved buffalo have gained an over-population, as is seen in Silver Lake at Lake Park, long drag seines are used. Often 5,000 feet of seine is pulled in a single haul.

Extensive work in rough fish control was also carried on during the biennium by sportsmen's groups, Conservation Officers, and WPA workers under the supervision of the Commission.

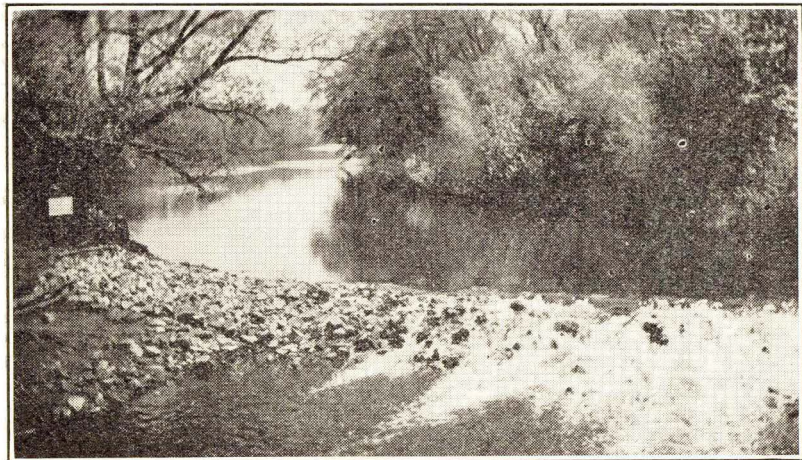
At West Okoboji, each winter for the past 20 years, residents of that locality are permitted to gill-net under the ice for carp and buffalo. These people are under contract with posted bonds and actually are designated agents of the Commission. By this method 48,984 pounds of buffalo and 10,260 pounds of carp were removed in 1935-36; and 86,723 pounds of buffalo and 23,385 pounds of carp were taken in 1936-37.

Few game fish are taken in these nets—a total of 41 was taken in 1935-36 and a total of 86 was taken in 1936-37; these were released as soon as they were found in the nets. Each fisherman is required to keep a daily record of take, species, size, and other pertinent information. The State received a percentage of the receipts from the sale of these fish to make the work self-supporting.

On the major seining projects the rough fish that are salable are sold to make the program as nearly self-supporting as possible. Many pounds of these obnoxious fish are given to relief agencies and needy people. 493,361 pounds were given away in 1936 and 236,241 pounds in 1937. The Commission has demonstrated that rough fish can be controlled if a definite program is followed.

Improvements

STREAMS: Stream improvement trends toward a goal where the work is of a permanent nature. Cross-dams of rock and logs provide improvement of long duration without heavy yearly up-keep. This work was made possible through Federal work agencies, although some stream improvement has been done by interested sportsmen.



Low-head dam across Des Moines River at Algona built by sportsmen under Conservation Commission supervision

Iowa streams flow through fertile fields with watersheds of eroding hills. The denuded hillsides permit virtually all the rainfall to become run-off water which quickly reaches the streams. The heavy suspensions of rich top soil in the water are deposited in the stream beds changing in drastic fashion the natural fish environment.

During the summer months when stream flows are decreased the fish migrate to the impounded waters above the power dams or to the deeper holes in the river bed. Low-head dams in the streams create a sufficient depth of water to carry fish through low-water stages.

Silt and sand deposits caused by spring floods destroy a considerable amount of aquatic vegetation that provides cover and hiding places for fish. Often the eggs of nesting fish are covered by the film of mud.

Stream improvement devices of rocks and logs are installed to furnish protection to game fish, and furnish a place where aquatic insect life, such as caddis, stone, dragon, and midge fly larvae can exist. Tree planting is also an important phase of stream improvement.

Some of the early devices installed in many of the Iowa streams were ineffective. Although these devices were satisfactory in other states the nature of the streams in Iowa is somewhat different and it was found that many of these devices were not applicable to our streams. However, after experimentation and study, devices were placed in the streams to meet the individual demands of each area.

To date sixteen streams in Iowa have been wholly or partially improved and public access has been secured on portions of forty-one non-meandered streams by agreements between the landowners and the Commission.

In addition to the regular improvement work, sixteen low-head dams have been constructed, or are in process of construction, to impound a sufficient depth of water to support fish life during the entire year. These dams vary in height from three to ten feet, the average being approximately six feet. Game fish are stocked in the backwaters behind these dams as part of the improvement plan.

LAKE IMPROVEMENT: The continuance of the artificial lake program, initiated by the Fish and Game Commission, has been one of the major efforts of the Conservation Commission the past biennium.

With the impetus gained from the efforts of the former commission, new artificial lakes have been built; the first dredged lake has been completed and the machinery moved to Black Hawk Lake in Sac County.

To improve, in a measure, some of the natural lakes, surveys were made of the particular areas to be improved, work that would prevent the immediate erosion of shore lines was outlined, spawning areas were re-established by the introduction of vegetation, and suitable bottom for the nest-building fish was provided. Inlets and outlets were properly screened to prevent obnoxious fish from entering the areas and likewise to prevent fish in the lake from escaping through the same channel. Silt dams and other devices were used to minimize direct siltation. Erosion control methods were directed on the watershed of certain lake areas through cooperation from federal agencies. In addition, the lakes were subjected to planned stocking, definite rough fish removal programs, and necessary regulation of the fish take.

Because of the stupendous amount of improvement work to be done and the limited amount of available labor and funds, a period of years must naturally elapse before all of the needed improvement is accomplished.

Improvement work on natural lakes consists of bank protection and other types of immediate improvement on the areas. A total of 10,400 feet

of lake shore has been rip-rapped on the following lakes: Silver Lake, Dickinson County; Silver Lake, Palo Alto County; Medium Lake, Palo Alto County; Crystal Lake, Hancock County.

The product of the work by WPA labor will be of tremendous importance in restoring Iowa's natural lakes.

Aquatic vegetation has been planted to improve Lower Gar Lake in Dickinson County, East Twin Lake in Hancock County, and Lake Cornelia in Wright County. Plans have been made and are under way



(North end of Lower Gar Lake)

Illustrates aquatic vegetation can be reestablished in natural lakes, under proper conditions

to make wholesale plantings in 1938 of suitable aquatic vegetation in certain of the natural lakes. The amount of vegetation to be planted will be dictated by availability of material, labor, and funds.

ARTIFICIAL LAKES: A specific part of the artificial lake construction is the preparation of the lake bed for fish environment. This work consists of the installation of log and brush shelters that offer a harbor for small fish, furnish a sub-stratum for small, crawling forms of life that are used as food by the smaller fish, serve as wave barriers to cut down bank erosion, and fill other biological needs of such an artificial area.

In addition to these types of improvement devices, rock shelters, and tile and gravel spawning beds are placed in the shallower reaches of the artificial lakes. This work has been done by volunteer labor and by labor furnished through federal agencies.



Lake beds are treated in this manner before water fills the area

A total of 2,275 log and brush devices have been installed in 10 artificial lakes. Except in Lake Wapello there is an average of about five rock shelters and spawning bed devices to each of the major log and brush devices in the above lakes here listed.

Twenty-two truck loads of aquatic vegetation was planted in these new lake areas. These plants were collected from Big Wall Lake in Wright County by WPA workers. The aquatic plantings will continue in 1938.

Before the water reaches the spillways of the artificial lakes, suitable fish screens are installed to prevent contamination of the area by obnoxious fish coming up-stream. These screens also restrict the fish stocked in the lake from leaving the area.

Because sections of the shore line of the artificial lakes are steep, log and rock rip-rap are installed along such sections before the area experiences maximum lake level.

The initial fish plantings were arranged in such order that species, size, and types of fish would be in harmonious cycles, and bring the area to a quicker biological balance than would be experienced if left to time and nature.

A creel census has been kept at Lake Wapello since it was first opened to public fishing, June 15, 1936. Help in making this census was received from the National Park Service CCC camp, located at Drakesville.

The following information was received from this census. In 1936, the average catch per fisherman was 7.4 fish per fishing effort. During the same period in 1937, the average catch per fisherman was 7.7 fish per fishing effort. Fifty-eight percent of the fish caught in 1937 were pan fish, the remainder were bullheads. Sixty-six thousand people attended Lake Wapello during the fishing season of 1936.

Sportsmen's groups have seen the value of lake improvement and have taken an active interest in this work by rip-rapping and installing fish shelters in city reservoirs.

At Crystal Lake, Hancock County, with the financial help of sportsmen, material is on hand for fish shelter construction on the ice. This work has been planned, initiated and supervised by the Commission. Sportsmen at Spirit Lake bought vegetation and planted it in East Okoboji Lake.

Where the same species once thrived, vegetation has been introduced into other areas. At Lower Gar Lake, 15 truck loads were planted the spring of 1937 by the aid of WPA labor. All of these plants grew and thrived.

Water levels were stabilized by dams. Improved screens were installed to control ingress and egress of fish of certain areas. Low dams were erected to hold water in the spawning grounds of Silver Lake, Palo Alto County; Tuttle Lake, Emmet County; and Spirit Lake, Dickinson County, until after the spawning seasons. Roads have been built to make fishing areas easily accessible.

Plans and help in improving city and railroad reservoirs for fishing have been a part of the Commission's fish program.

A boat fish census was set up on some of the natural lakes this year. By this census we learn what the take per man fishing hour is at given times. At Lost Island 3.35 fish were caught per man fishing hour. If this work is carried along for several years we will secure fundamental information for managing our lake.

Acquisition

Trespass waivers or easements to improve streams for fishing are taken as it is practicable to secure them. This will make more miles of fishing area for Iowa recreators.

Up to July 1, 1935, Iowa streams through 157 land sections were listed and preliminary surveys made on all but six sections. Since that time 129 stream miles have been listed for possible improvement.

The Shellrock River from Plymouth to Rock Falls, and the Winnebago River from Fertile to the "Red Mill," have been improved by low-head dams.

Forty-one different streams in Iowa have had attention from preliminary surveys to actual completion of dams or devices. Three hundred seventeen easements from landowners granting public access have been secured.

The first requisite for improving Iowa streams is to have them accessible to the public. Eight hundred miles of the streams flowing through Iowa are meandered. Fifteen thousand miles of Iowa streams have been named, but not all are continuously flowing. Our recent stream survey records approximately 4,000 miles of potential fishing miles in the state, including the 800 miles of meandered streams. This shows that about 3,200 miles of the best fishing areas are privately owned.

The major areas acquired during the two and one-half year period under discussion are the Lanesboro Hatchery pond of 30 acres in Carroll County, 27½ acres adjoining the Wapello Hatchery that has the two new ponds (three and six acres each), the area for the Beed's Lake Hatchery at Hampton, and the pond areas at Bedford in Taylor County.

Acquisition of lake shore either by purchase or easement has been secured on several of the natural lakes. Black Hawk Lake in Sac County has the greatest length of state owned shore line.

The excluding of cattle from the margins of our state lakes will be a great step forward in Iowa conservation. Cattle allowed to pasture lake and marsh areas destroy and permanently eliminate both fish and game environment. For these reasons all marginal lands belonging to the state should be fenced.

Surveys

A number of fish surveys have been made in Iowa covering certain sections or streams (Call's "Survey of the Des Moines River Basin," Iowa Academy of Science, 1887 and Larrabee's Survey of the Okoboji Region, Iowa Studies, 1926, are examples), yet no one has ever made a state wide survey to learn what species of fish exist in the state.

An inventory seems of prime importance in successfully operating any business; therefore, in order to better manage Iowa's fish fauna a state wide survey is being conducted that will take two or more years to complete if it is carried along "piece-meal" with other work. A fish survey is basic to any state fish management plan.

Briefly, the plan is—certain stations are designated in each county where collections are made at regular and stated intervals. All pertinent biological data is noted at the time fish are collected. By this method comparisons can be made from year to year on abundance of given species in relation to changing environment.

Forbes of Illinois set the Illinois Natural History Survey to repeat every decade; however, a three-year interval is more desirable for Iowa.

At the present time 60 counties are represented in the collection which have yielded two new species for Iowa, one has been reported in "Some Common Iowa Fishes," Aitken, 1936, the other *Hybonathus placitus*, is described in an unpublished paper "Iowa Minnows" (same author).

It is hoped that funds and help will be available the coming season to finish the remainder of the 99 counties.

We now have 132 native fishes described for the state with 30 on the hypothetical list. Any of these 30 species may be found at any time in the state as they have occurred in our neighboring waters.

Another technical survey is one made the past season of certain privately owned marsh areas adjacent to state lakes that are potential fish and game spawning and nesting areas.

When normal water levels exist many of these areas have sufficient water to be ideal for the above mentioned purposes, yet because they are privately owned they are open to cattle and other livestock pollution and grazing depredations. These swamp areas are to our natural lakes what the bedroom and kitchen are to the house. Under the present riparian status in Iowa we have control of the living room, but strangers, or the "visiting relatives," have possession of the other rooms, all of which is detrimental to domestic tranquility.

In each of these areas approximate acreage, fauna, flora, and other factors helpful to a fish and game area are described and listed.

A survey of fish take (creel census) has been established on several of the natural lakes and at Lake Wapello. The following account of this work was presented to the Midwest Fish and Game Conference at Madison, Wisconsin, November 11, 1937:

"The first requisite in the management of any business is to know how much stock you have on hand. It is a rather simple operation to secure an inventory of merchandise as it exists in the retail stores or

warehouses. It is even a simple process to count live stock, poultry, etc., even wild animals can be counted and we know that the Biological Survey counts the ducks, geese, and other migratory waterfowl. I am sure the pheasants, quail, rabbits, and other land forms of wild life can be counted without much error, but the counting of fish as they exist in any stream or lake has long been considered next to impossible. At least, few people have attempted such an undertaking.

"However, the man who would manage fish must have some fairly definite knowledge of the number and species that live in the area under treatment. No person could operate a shoe store and stay in business very long if he took over a store without any knowledge of the kind and number of shoes on the shelves, and retailed his merchandise and bought from the wholesale houses without any idea of the number of pairs of shoes he was selling. Yet this method of doing business is exactly the way many states are handling their fisheries operations. No fisheries department does this with total indifference to the facts, but rather because they think a fish census is either impossible or presents too many complications for practical untanglement.

"In the management of fish in Iowa we realize that if we would intelligently do our work and improve fishing for the angler we must know, not only what numbers and species are stocked and are being taken by the public, but what fish exists in each body of water.

"To attack this problem we have set up several types of census that give us both general and detailed information on given areas. This may be considered as supplemental biological work of value for comparative studies of certain areas in checking results of stocking, natural reproduction, and take.

"Our comprehensive census, the results of which will be reported at some later opportunity, is conducted on Lake Wapello, Davis County. Lake Wapello is an artificial lake that has been fished two seasons. The census card used is similar to the one Eschmeyer uses on Fife Lake, Michigan. The CCC boys, with some departmental help, collect the cards. The next problem is to get the cards handled voluntarily by the fisherman for our experience shows that information gained in a whole-hearted cooperative spirit is much more dependable than information that comes from a request bordering on the nature of a demand.

"One of our more general types of census, used for the first time this year, was tried on Lost Island Lake, a bullhead fisherman's paradise. This census is called a "boat census." We use a card 3x5 inches, which only requests date, number fishing from boat, total hours fished, and species and number of fish taken. This gives us a take per man fishing hour. Over a period of years reliable comparative information will be obtained on success of stocking and extent of natural reproduction. As an example, if 500 fishermen caught 4.5 bullheads per fishing hour throughout the month of June this year and in 1939, 500 fishermen, fishing the same month, caught 6.0 fish per fishing hour, it could be assumed that our stocking of over one and one-half million fingerling bullheads this year produced this increase providing natural reproduction was stable for this period.

"Each boat livery is asked to give these cards to its customers; one card to each boat. The success in getting these cards filled and returned seems to be due to their simplicity. We find that boat livery managers like this type much better than the more complicated form.

I think part of the hesitancy in using the complicated form is due to the request for signature; for, after all, who wants to acknowledge in writing that he is a poor fisherman. Signatures on cards also have a tendency to give you cards with fine fishing results to prove the angler is a good fisherman.

"Advantage is taken during the winter rough fish gill-net operations on West Okoboji Lake and on the gill-net operations in the spring when the pike-perch are taken for stripping to secure data on fish populations, movements under the ice, sex ratios on spawning beds, and other facts concerning fish and physical factors that might affect their behavior.

"Another type of census conducted by the Iowa Department, which is linked to our biological investigations in the big lakes, is an actual count of all fish taken in the seines in our rough fish removal operations. In this census we check number, species and size, as well as record acre feet of water seined. Weather data and other physical conditions are noted. Each haul is circumscribed on a map of the lake so that, as in the case of the complete seining of Silver Lake at Lake Park, we have a vivid picture of each haul at each location with all pertinent facts.

"With a boat census established at this lake next year and succeeding seasons we can formulate definite plans to best manage the fish and their take at this place.

"I believe the various fisheries departments of the country should first check their own activities to see where they may take advantage of their routine operations to secure information on fish populations and so collect and record this information that it may be used by the aquatic biologist in recommending improvement plans. It is my understanding that some work of this kind has been done by the Illinois Natural History Survey.

"In summarizing our census activities, we have at type areas the elaborate creel census card system; at several of the large natural fishing lakes we use the boat census method; on areas seined for rough fish we have our own departmental haul census; on the Mississippi River we have the commercial take reports which can stand a lot of improvement; and we have our own biological survey information to check against our layman's reports, which all brings us to conclude that census systems must be used which are simple to operate yet will give us accurate information.

"At this time I emphasize the need to improve census taking methods and to continually urge and point out to fisheries departments how much information will assist such departments in better supervising their work and help them to more efficiently manage their fisheries problems.

"After all, in Iowa a law has been passed which makes it compulsory for the Conservation Commission to know what the wildlife population is in any given area at seasonal periods. Therefore, in Iowa, at least, a fish census must be taken seriously by the fisheries worker and by the conservationist who is fish-minded."

The state wide fish survey, the marginal land survey adjacent to our lakes and streams and the creel census work, are the three major fish surveys under way at the present time.

Other biological investigations are those on yellow pike-perch (wall-eye) fingerling production, trout feeding experiments, bass propagation, inspection of new areas for suitability as fish producing areas, and year-

round observations on areas that have been established for fisheries purposes. The year 1938 will see studies made to determine best method or device for passing fish over dams or other similar stream barriers. The Institute for Hydraulic Research of the State University of Iowa is cooperating on this project.

Further Research and Educational Work

To secure help in fisheries work based on scientific knowledge, the volunteer aid of the state schools and other colleges and Junior colleges of the state was urged.

This appeal was made and suggestions for pertinent research recommended in an address before the General Session of the Iowa Academy of Science, meeting in Iowa City in April, 1936. (See Proceedings of Iowa Academy of Science, 1936, "Research vs. Conservation," Aitken.)

Later suggestions were made to the National Youth Administration in Iowa which were readily accepted. All of these problems suggested had practical application to Iowa fish plans. A number of the Iowa schools were interested and some research was inaugurated on conservation projects by NYA students.

Several biology students of Iowa Wesleyan College, under the direction of Prof. H. E. Jacques, made a worthwhile contribution. They studied the amount of insect food in a given length of Big Creek in Henry County.

Prof. C. C. Carter, at Parsons College, directed several NYA students on Iowa conservation problems relative to value of city water reservoirs as suitable for fishing areas.

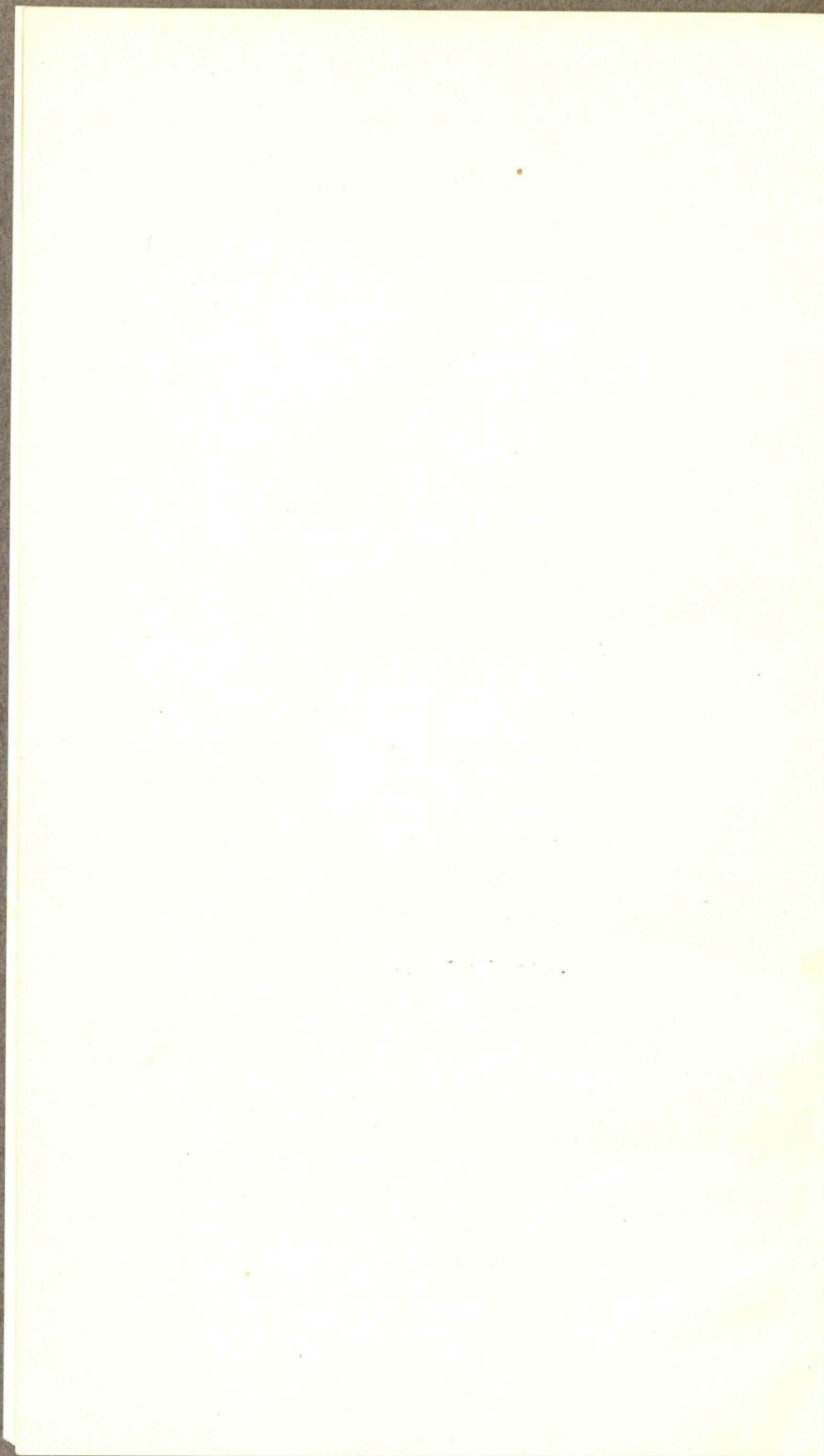
Students at Morningside College, sponsored by D. T. S. Stevens, are making certain bird studies in northwest Iowa.

The Lakeside Laboratory, formerly known as the Macbride Lakeside Laboratory, is open ten weeks each year on the west shores of West Okoboji Lake. Here graduate students of the State University of Iowa and research workers from other schools pursue problems concerning chemical status of the lake water, parasites of fish, effect of evaporation on vegetation, life histories of prairie plants and their relation to the Iowa natural lakes and other outdoor research. At this station the United States Biological Survey, in cooperation with the Conservation Commission, constructed a number of new stone buildings in 1936 and 1937 with modern equipped laboratories.

Educational work in fisheries fields has consisted of lectures to sportsmen and department groups and the preparation of fish questionnaires, radio talks, and printed and mimeographed reading material on fish management. In all, Iowa folk are becoming more fish-minded each year, yet a positive attitude must be maintained.

The success of improving the fishing for Iowa anglers will depend largely upon the support accorded this movement by the general public. To secure their unstinted cooperation we must face and recognize the fundamental principles that govern all life and educate the youth of Iowa to appreciate, preserve, and protect the heritage that is rightfully theirs.

[All pictures by the writer]



STATE LIBRARY OF IOWA



3 1723 02095 7684