Original: Fish Division
cc: Colonel John H. F. Bittner
Education-Game
Institute for Fisheries
Research
R. S. Marks
Max Hunt
R. G. Fortney
C. M. Taube

INSTITUTE FOR FISHERIES RESEARCH
DIVISION OF FISHERIES
MICHIGAN DEPARTMENT OF CONSERVATION
COOPERATING WITH THE
UNIVERSITY OF MICHIGAN

ALBERT S. HAZZARD, PH.D.
DIRECTOR

ADDRESS
UNIVERSITY MUSEUMS ANNEX
ANN ARBOR, MICHIGAN

February 19, 1953

Report No. 1359

FISHERIES SURVEY OF LAKES ON THE FORT CUSTER MILITARY RESERVATION

By

Clarence M. Taube

Abstract

Seven lakes on Fort Custer grounds, in Calhoun and Kalamazoo counties, were biologically surveyed in the summer of 1952. These waters range from 1.9 acres to 73 acres in area. Most of them are suited only for warm-water fish, of which 34 species were collected. The chief game fish are large-mouth bass, bluegill, black crappie and yellow perch. Except for crappies from one lake, the game species show average to above-average growth. According to the survey data and local reports, the majority of the lakes offer fair to good fishing. Fishing is limited to military personnel and civilians who have been steady employees on the Reservation.

Management recommendations are proposed for two of the lakes. These proposals include stocking of rainbow trout in Eagle Lake and brook trout in Lost Lake. Advised in addition for Eagle Lake are installation of a fish trap in the outlet stream prior to stocking with trout, a creel census, and brush shelters. Some management possibilities are outlined for Green Lake, a small pond which appears suited for trout.

Original: Fish Division
cc: Colonel John H. F. Bittner
Education-Game
Institute for Fisheries
Research
R. S. Marks
Max Hunt
R. G. Fortney
C. M. Taube

INSTITUTE FOR FISHERIES RESEARCH
DIVISION OF FISHERIES
MICHIGAN DEPARTMENT OF CONSERVATION
COOPERATING WITH THE
UNIVERSITY OF MICHIGAN

ALBERT S. HAZZARD, PH.D.
DIRECTOR

ADDRESS
UNIVERSITY MUSEUMS ANNEX
ANN ARBOR, MICHIGAN

February 19, 1953

Report No. 1359

FISHERIES SURVEY OF LAKES ON THE FORT CUSTER MILITARY RESERVATION

By

Clarence M. Taube

During the summer of 1952, a crew from the Institute for Fisheries Research, Fish Division, Michigan Department of Conservation made biological surveys of seven lakes on the Fort Custer Military Reservation which lies between the cities of Battle Creek and Kalamazoo. Two of these waters are in Calhoun County--Lawrence Pond, in Section 5 of Town 2 South, Range 8 West, and Harts Lake, in Sections 7 and 8 of the same township. The five lakes in the Kalamazoo County portion of the military area are all located in Town 2 South, Range 9 West. These lakes are Whitford in Sections 9 and 10, Lawler, Lost, and Jackson Pond all in Section 10, and Eagle in Sections 1 and 2. Six of the lakes had been mapped in February of 1952 by a crew* under Institute supervision. Another crew** made the biological survey during July and August of 1952, and also mapped Lost Lake. In addition, some observations were made on Green or Cemetery Lake (Section 15, T. 2 S., R. 9 W.).***

---

* Lyle Newton, leader; Emil Sniezek and Clarence Gilding, assistants

** Donald Peterson, leader; Henry Vondett and Richard Anderson, assistants

*** The biological study of these lakes, analysis of data, and preparation of the report were undertaken with Federal Aid to Fish Restoration funds under Dingell-Johnson Project Number F-2-R-1.

Several fishery investigations had been made previously of Reservation waters. One of these studies dealt chiefly with certain streams (I.F.R. Report No. 212, 1933). Hart and Eagle lakes were examined during the summer of 1945 (I.F.R. Report No. 1029), and other checks have been made on Eagle Lake since that time.

Because these waters are situated on military grounds, there have been restrictions on public access. At the present time fishing is limited to Army personnel and to civilians who have been steady employees on the Reservation.

Physical Characteristics

These lakes range in size from 1.9 acres for Jackson Pond to 73 acres for Eagle Lake. A large portion of their combined area is shoal (water less than 15 feet deep). Marl on the shoals and pulpy peat in the depths are the predominant bottom soil types. The surrounding land is rolling, partly wooded, and the soil is mostly of medium to low-grade fertility. Much of it formerly was used for agriculture.

Lawrence Pond is the only one of these waters that has neither an inlet stream nor an outlet. There are beaver dams in the outlets of Whitford and Lawler lakes and Jackson Pond. These dams are considered beneficial from the fisheries standpoint in that they provide additional shoal, the main food-producing area of lakes.

Compared with other Michigan lakes, the Reservation lakes range from about average to somewhat below average in transparency as shown by Secchi disk readings. Water transparency is an important factor in determining the greatest depth in which aquatic vegetation will be found, since sunlight is necessary for plant growth, and extent of light penetration of course depends much on transparency.

Table 1. Physical data on Fort Custer lakes

Lake	Area (acres)	Max. depth (feet)	Approx. % shoal	Bottom types		Color of water and (Secchi disk, ft.)		Inlets	Outlets
				Shoal	Depths				
Lawrence	6.2	12	100	fibrous peat	pulpy peat	brown	(11)	none	none
Harts	61	46	30	marl,	pulpy peat	clear		1	To Kalamazoo R.
				fibrous peat	fibrous peat, muck		(11-12)		
Whitford	24	25	70	marl	pulpy peat	clear	(7)	2	To Kalamazoo R.
Lawler	11.1	24	80	marl	pulpy peat	clear		1	To Whitford L.
				fibrous peat			(9-10)		
Jackson	1.9	16	100	fibrous peat	fibrous peat	clear		1	To Kalamazoo R.
					muck		(7-8)		
Lost	6.3	16	90	marl	pulpy peat	lt. brown		1	To Eagle L.
				pulpy peat			(6-7)		
Eagle	73	32	40	marl sand	pulpy peat	clear		3	To Kalamazoo R.
				pulpy peat			(7-8)		

Harts and Eagle lakes appear green when seen from a distance. This appearance is due to particles of marl in suspension and light-colored bottom which make the reflection vary from the typical blue.

Temperatures and Chemical Characteristics

Temperatures were taken at various depths on each of the seven lakes, and chemistry tests were run on the water. The tests were for dissolved oxygen, carbon dioxide, alkalinity, and pH. A primary value of the temperature-chemistry series is to learn whether a lake is suitable for trout, and for this purpose temperature and oxygen readings obtained in mid-summer are essential. The following table gives temperatures and dissolved oxygen values for Fort Custer lakes as found in 1952.

A maximum temperature of 70° Fahrenheit and a minimum of 4 parts per million of dissolved oxygen have been regarded as the minimum safe requirements for trout. Of the seven lakes studied in the summer of 1952, Lost Lake showed the best possibilities for trout. It had a 7-foot layer of cold water that contained a good supply of oxygen. There is considerable inflow of spring water into this lake.

Harts Lake at first glance also appears good for trout. However, the tests were run here early in the summer, and unquestionably conditions would not have been so good in August. Findings in August, 1945 support this view as standard requirements existed in only a 2-foot layer of water at that time.

Whereas eight feet of water deemed suitable for trout was found in Eagle Lake in August, 1945, there was only about half this much in August of 1952. A check made in September, 1948 revealed only two feet.

Table 2. Temperatures and dissolved oxygen in Fort Custer lakes, 1952 (Temperatures in degrees Fahrenheit and oxygen (O_2) in parts per million)

	Lawrence Pond August 1		Harts Lake July 17		Whitford Lake July 28		Lawler Lake July 28		Jackson Pond August 13		Lost Lake August 4		Eagle Lake August 5	
	Temp.	O_2	Temp.	O_2	Temp.	O_2	Temp.	O_2	Temp.	O_2	Temp.	O_2	Temp.	O_2
Air	75	...	81	...	85	...	85	...	74	...	84	...	66	...
Surface	74.5	5.7	78	8.0	80	7.2	80	6.8	66	4.6	69	9.9	74	7.2
2.5 feet	74	...	...	...	...	...	...	...	61	...	...	...	...	...
5	73	...	77	...	...	...	...	...	61	...	67	...	74	...
7.5	...	...	...	...	77	...	77	...	59.5	2.8	64	10.9	...	...
10	73	3.7	77	...	77	...	75	...	59.5	...	62	...	74	...
12	...	...	...	...	...	...	...	...	...	...	61	5.0	...	...
12.5	...	...	69	7.7	74	...	...	3.7	...	2.9	...	...	...	...
14	...	...	...	...	...	...	...	...	58	...	...	...	...	...
15	...	...	61	...	66	3.1	62	2.0	...	...	60	1.4	74	...
17.5	...	...	56	...	...	0.2	...	0.4	...	...	...	...	67	5.1
20	...	...	50	11.6	58	0.0	53	...	...	...	...	...	60	...
22.5	...	...	47.5	...	54	...	53	0.0	...	...	...	...	...	0.5
24	...	...	...	...	...	0.4	...	...	...	...	...	...	...	...
25	...	...	46	...	52	0.4	...	...	...	...	...	...	53	0.5
27.5	...	...	44	0.9	...	...	...	...	...	...	...	...	50	...
30	...	...	44	...	...	...	...	...	...	...	...	...	49	0.0
45	...	...	43	0.0	...	...	...	...	...	...	...	...	...	...

Temperature and chemical conditions were suitable for warm-water fish in all of the lakes at the time of the survey. However, Lawrence Pond appeared subject to severe oxygen depletion, for the survey crew found no game fish here. Shallow depth and dense growth of vegetation further suggest that this lake is subject to winterkill.

The waters of these lakes range from moderately hard to extremely hard as shown by the methyl orange alkalinity test. This is chiefly a test for dissolved calcium carbonate (lime). Harts and Eagle lakes and Lawrence Pond are of moderate hardness (alkalinity values from 65 to 189 parts per million) while Whitford, Lawler and Lost lakes and Jackson Pond are of greater hardness (alkalinity values of over 200 ppm). Water of at least moderate hardness is more productive biologically than soft water.

The pH. readings were all on the alkaline side rather than the acid. There were moderate quantitites of carbon dioxide near the bottoms of all the lakes. The values found for these tests had little significance for the well-being of the fish populations.

Biological Characteristics

Aquatic vegetation is fairly plentiful in all the Reservation lakes and is dense in Lawrence Pond. Submergent plants are the predominant type. Except for Lawrence Pond, musk grass (Chara) composes a large part of the flora.

Fish collecting was done with gill nets and seines. Table 3 lists the fishes that this gear took. Game, coarse, and obnoxious species found in each lake are indicated by the number taken, while records of forage species are merely shown by an "X". Since collecting activity was not exhaustive, lack of records for some fish does not necessarily mean that these species do not occur in a particular lake. Number of overnight sets

of gill nets (each 125 feet long and 6 feet deep, with mesh sizes ranging from 3/4 inch to 2 inches square) was as follows for each lake: Lawrence 3, Harts 14, Whitford 10, Lawler 7, Jackson 4, Lost 6, Eagle 12. One seine collection was made at each lake except Whitford, where two were made and Lawrence Pond, where no seining was done. A 100-foot bag seine was used on some lakes and a 25-foot "minnow" or common sense seine was used on others. Lawrence Pond is not listed in the table that follows because no fish were taken from it, although golden shiners were seen. As shown by the table, 34 species of fish were found altogether. Of the more desirable game fish, the largemouth bass, bluegill, black crappie, and yellow perch are the better represented kinds in Fort Custer lakes.

Scale samples were saved from game fish for age and growth study. The scales have been examined microscopically.* Comparison with averages compiled from numerous Michigan lakes shows that growth rates of the principle game fish of the Fort Custer lakes range from average to above average. A single exception is shown by four 5-year-old sub-average crappies from Harts Lake. Perch and bluegills from Lost Lake and rock bass and crappies from Eagle Lake have made especially good growth.

Age and growth figures for the four more common game species are given in Table 4. Roman numerals represent the number of annuli or age in years. Sizes under the age-group categories are average total lengths in inches. Figures in parentheses that follow these numbers give the number of fish that are involved in the average for each age-group. State-wide averages for each species are included for comparison.

---

*Age determinations made by John E. Williams

Table 3. List of fishes collected from Fort Custer lakes in 1952

Common name	Scientific name	Harts	Whitford	Lawler	Jackson	Lost	Eagle
Game fish:							
Grass pickerel	Esox vermiculatus	1	4	1	1	...	...
Northern pike	Esox lucius	1	...	...	3	...	6
Smallmouth bass	Micropterus d. dolomieui	...	1	...	...	...	1
Largemouth bass	Micropterus s. salmoides	9	16	55	4	3	24
Warmouth	Chaenobryttus coronarius	1	...	1	1	...	2
Green sunfish	Lepomis cyanellus	10	11	3	...	2	8
Pumpkinseed	Lepomis gibbosus	42	3	...	...	...	20
Bluegill	Lepomis m. macrochirus	46	7	16	...	1.	9
Longear sunfish	Lepomis megalotis peltastes	...	...	3	...	2	12
Rock bass	Ambloplites r. rupestris	...	...	...	...	...	9
Black crappie	Pomoxis nigromaculatus	3	8	9	1	...	11
Yellow perch	Perca flavescens	3	44	51	7	9	152
Coarse fish:							
Redhorse	Moxostoma sp.	...	...	...	...	...	10
White sucker	Catostomus commersoni	11	18	12	5	8	15
Lake chubsucker	Erimyzon sucetta	...	...	...	15	...	...
Brown bullhead	Ameiurus n. nebulosus	...	...	...	...	...	1
Yellow bullhead	Ameiurus natalis	...	6	20	...	...	1
Obnoxious fish:							
Longnose gar	Lepisosteus osseus oxyurus	...	...	...	...	...	2
Bowfin	Amia calva	2	...	...	...	...	...
Forage fish:*							
Golden shiner	Notemigonus crysoleucas	...	.X.	X	X	X	...
Creek chub	Semotilus a. atromaculatus	X	...	X	...	...	X
Hornyhead chub	Hybopsis biguttata	...	...	...	...	...	X
Common shiner	Notropis cornutus	...	.X.	.X.	...	...	X
Blackchin shiner	Notropis heterodon	X	...	...	...	...	...
Pugnose shiner	Notropis anogenus	X	...	...	...	...	...
Sand shiner	Notropis deliciosus	...	...	...	...	...	X
Blacknose shiner	Notropis L. heterolepis	...	...	.X.	X	...	X
Bluntnose minnow	Pimephales notatus	...	.X.	.X.	...	...	X
Tadpole madtom	Schilbeodes mollis	X	...	...	...	...	...
Banded killifish	Fundulus diaphanus menona	X	...	...	...	...	.X.
Brook silverside	Labidesthes s. sicculus	...	X	X	...	...	X
Johnny darter	Etheostoma nigrum	...	...	...	...	...	X
Iowa darter	Etheostoma exile	X	X	X	...	X	...
Least darter	Etheostoma microperca	X	...	...	...	...	...

* Identifications of forage species verified by W. R. Taylor.

Table 4. Age and growth of four species of fish from Fort Custer lakes

Lake	Age-group	Largemouth bass					
		I	II	III	IV	V	VI
Harts		5.6 (1)	...	9.5 (3)	12.3 (1)	...	...
Whitford		5.9 (14)	...	11.4 (3)	...	...	...
Lawler		6.4 (2)	9.7 (2)	10.9 (8)	11.1 (1)	...	...
Jackson		...	...	13.7 (2)	...	...	14.7 (1)
Lost		...	...	10.6 (1)	...	...	...
Eagle		7.1 (1)	...	...	...	...	...
	State average	6.1	8.7	10.0	12.1	13.7	15.1
		Bluegill					
		I	II	III	IV	V	
Harts		...	3.8 (1)	5.4 (22)	7.2 (4)	7.7 (3)	
Whitford		...	...	6.8 (1)	...	...	
Lawler		...	4.6 (1)	6.5 (7)	7.2 (4)	...	
Lost		...	...	7.4 (3)	...	...	
Eagle		...	5.0 (2)	6.3 (1)	...	9.0 (1)	
	State average	3.1	4.3	5.4	6.6	7.3	
		Black crappie					
		I	II	III	IV	V	
Harts		...	...	...	...	7.7 (4)	
Jackson		...	...	6.4 (1)	...	...	
Eagle		5.4 (8)	...	10.8 (3)	...	...	
	State average	...	5.9	8.0	9.0	9.9	
		Yellow perch					
		I	II	III	IV	V	
Harts		...	5.7 (1)	...	...	7.8 (1)	
Whitford		4.4 (8)	6.2 (6)	...	...	...	
Lawler		...	6.3 (2)	...	...	...	
Jackson		...	...	6.1 (5)	...	...	
Lost		...	...	7.3 (27)	8.6 (2)	...	
Eagle		4.4 (25)	6.2 (22)	6.7 (21)	6.8 (1)	9.1 (1)	
	State average	4.1	5.8	6.4	7.5	8.5	

Management Recommendations

Most of the Fort Custer lakes are suited for warm-water fish. Except for Lawrence Pond where no game fish were found by netting, the lakes examined in 1952 contain a wide variety of game species. Lawrence Pond appears to have little value for angling. Harts, Whitford, and Lawler lakes and Jackson Pond, according to the survey data and local reports, offer fair to good fishing. No practicable means of improving conditions in these waters are apparent at this time, and no management recommendations are made.

Stocking with trout and other management proposals are considered for two lakes and a pond. These waters will be discussed separately.

Eagle Lake

Though previous plantings of rainbow trout in Eagle Lake*/ evidently gave very small returns, and at the latest check there was only a small layer of well-oxygenated water in mid-summer, another trial with rainbows has been proposed. But before trout are planted here again, provision should be made to learn if the fish tend to leave the lake through the outlet. Therefore, installation of a wire-screen trap in the outlet to capture any trout that may try to leave the lake is recommended. If the planted rainbows should seem to disappear mysteriously from the lake and entry into the trap has been negligible, the inlet from Lost Lake might well be examined for the fish. Apparently summer temperatures in the lower reaches of this stream are suitable for trout.

The fish trap for the outlet can be built and installed by men stationed on the Reservation.

---

*/ 3,500 yearling rainbow trout were planted each year in 1946 and 1947

Following are general specifications on materials and construction. The trap consists of heavy, galvanized, 1/2-inch square-mesh wire mounted on wood framework. Dimensions should be about 5 feet in length, 4 feet in width, and 3 1/2 feet in height. A removable, pyramidal wire funnel, having a 4" x 4" opening, fits into the open, upstream end. The floor of the trap is of wood, and the top is a hinged, wood door that should be equipped with a clasp and padlock. It is advisable that the woodwork be protected with asphalt paint. A trap with funnel inserted is shown in Figure 1. The form of the funnel is illustrated by Figure 2.

Screen frames may be used for wings on the upstream, funneled end (wings are, of course, unnecessary on the downstream end of the one-way trap). Preferable over screen as material for wings is steel or wood grating. Wings of the latter construction are much less likely to clog with debris and are easier to clean. The space openings between the grating of such wings should be about 1/2 inch wide.

Sheet piling should be driven into the bottom of the stream parallel to the positions that the wings will have and also on the upstream end of the trap. The purpose of the piling is to counteract undercutting by current. Tongue-and-groove lumber is preferable for this construction, but other lumber can be used if made up into triple Wakefield sheeting. Care should be taken to see that the structure is fish-tight, and the piling should be driven into the bottom to a depth of at least 2 feet which will insure against undercutting. The wings and trap must be well anchored to the stream bed. Figure 3 shows a fish trap in functional position, including sheet piling and anchor posts, and the funnel not quite in functional position. The illustrated trap is the two-way type; for the one-way type herein described, wings on the downstream end are not required.

The trap may be installed at any one of several locations in the outlet. What appears to be one of the more suitable locations is situated about 150 yards down from the lake, or upstream a few feet from where the creek has been forded. Since the stream is relatively narrow at this point (about 12 feet wide), a minimum amount of work on the piling would be required. Provision should be made for enough water to make the trap effective--that is, so the opening of the funnel is under water. The piling at the wings may be made to exert a damming effect, and sand bags could be used if necessary during times of low water.

The trap should be tended often, especially at times of high flow when debris is likely to clog the screen, resulting in danger of it being torn out. A long-handled, stiff bristled brush can be used to clean the trap and wings. A dip net for removing fish from the trap is also a necessary piece of equipment.

Trout that may be trapped can be returned to the lake. It is urged that careful records be kept of all fish caught, as to the number taken and the dates of capture. Stocking of 2,000 legal-length (7 inches long or longer) rainbow trout, following installation of the trap, is recommended for Eagle Lake. The planting could be done in the spring of 1953 if the trap were ready by that time, otherwise the introduction might better be delayed until fall when the lake has cooled again. These fish should be provided by the U. S. Fish and Wildlife Service, but if none are available from this source they might be provided by the State.

It is highly desirable that the success of the planting be evaluated. One of the better means of evaluation is by creel census. It is suggested that someone be assigned to obtain rather complete catch records from fishermen. This same individual might also have the responsibility of looking after the fish trap. The Institute for Fisheries Research will gladly furnish forms and instructions for conducting a census.

Installation of brush shelters has also been recommended for Eagle Lake. The Commandant has indicated that personnel of the post can build and install these structures. Information on methods of construction and placement and the number to be provided can be given by the Regional office of the Conservation Department, Jackson. The chief function of the shelters appears to be that of concentrating fish about them in lakes that have limited amounts of natural cover, thereby making the fish more available to anglers. While natural cover in the form of aquatic vegetation is not scarce in Eagle Lake, it it thought that fish here will be attracted by artificially introduced cover.

Figure 1. Wire-screen fish trap.

Figure 2. Two views of the removable funnel for the fish trap.

Figure 3. A fish trap in functional position

Lost Lake

While this is a shallow lake, an appreciable volume of well-oxygenated cold water is present--apparently throughout the summer season because of considerable inflow from springs. Recommended is a planting of 300 legal-size brook trout at the time Eagle Lake is stocked. It would also be desirable if some records could be obtained on fishing in Lost Lake.

Raising the water level of Lost Lake might be considered for the future if stocking with trout should prove unproductive. There is an excellent site for a dam about 60 yards below the lake. Increasing the level by about three feet would flood a considerable area of surrounding marsh. The purpose of flooding would be to increase the productivity of the lake. However, it is thought that trout should be tried here first with the lake at the 1952 level. This consideration is based mainly on the likelihood that flooding would encourage northern pike. Trout do not thrive amid an abundance of pike.

Green or Cemetery Lake

A routine survey had not been planned for this small, shallow body of water. But since an officer of the Reservation's conservation club (Sergeant W. G. McAnany) mentioned during the time the survey on the other waters was in progress that there was interest in developing this pond as a fishing site for disabled war veterans, the survey crew made some observations on it. Management considerations that follow comprise an outline of possibilities rather than definite recommendations, since the kind of recreational use for which Reservation authorities may want to develop the pond will be of prime importance in determining what further action is taken.

The dam in the outlet had been broken open sometime before the time of examination (September 4, 1952), so the water was at a lower level than

it had been previously. Depths were approximately 4 to 5 feet opposite the outlet, 5 feet in the stream channel in the pond, and 2 feet in the main body of the pond. The area was estimated as about 2 1/2 acres. While the air temperature was 70° F., the water temperature of the pond was 64° and that of the inlet was 54°. Fish seen in the pond included largemouth bass, bluegills, suckers, pike, perch, green sunfish, and golden shiners.

The temperatures indicate that the pond is suitable for trout. However, if trout are introduced, the warm-water fish now present ought to be eliminated first--to avoid unfavorable competition from these species. Also, a barrier dam of more stable construction than the present dam of earth-fill and sand bags should be installed. The dam ought to have a concrete spillway with level-control provided by flash boards in the spillway. The level of the pond could be raised at least two feet higher than the present level (February 1953). Construction plans should include a generous allowance for more than a 2-foot increase in level in the event that maintenance of a higher level is found feasible. Should such development of Green Lake be contemplated, it might be regarded a worthwhile project for the post's engineers. If plans are made to develop fishing here for disabled veterans, provision of a pier or piers out over the pond perhaps should be included.

Prior to stocking with trout, the warm-water fish could be poisoned out with rotenone. Fish Division personnel could assist with this project. In view of the small size of this water, special regulations (take-home limit of 1 or 2 fish per angler per day, fishing with artificial fly only, etc.) such as are in effect on the State's special trout ponds, probably ought to be provided as a conservation measure if the pond is developed for trout, otherwise stocking would be a continual and expensive requirement.

Literature Cited

J. R. Greeley, G. P. Cooper and R. W. Eschmeyer

1933. Preliminary examination of two lakes and a stream on Camp Custer Reservation, Kalamazoo County. Report (unpublished), Institute for Fisheries Research, No. 212, May 23, 1933.

Cooper, G. P.

1945. Fisheries survey of Hart and Eagle lakes on the Fort Custer Reservation. Report (unpublished), Institute for Fisheries Research, No. 1029, December 31, 1945.

INSTITUTE FOR FISHERIES RESEARCH

Clarence M. Taube

Report approved by: A. S. Hazzard

Report typed by: M. C. Tait