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

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FISH COLLECTIONS IN THE ONTONAGON RIVER, ONTONAGON,  
HOUGHTON AND GOGEBIC COUNTIES, 1957 AND 1959

by

Wilbert C. Wagner

The main stream and the East and Middle branches of the Ontonagon River were surveyed for fish distribution and abundance on July 16-August 16, 1957 (Stations 1-22) and October 5-12, 1959 (Stations 23-69). These collections were made as a part of the program to inventory the fish fauna of the major stream systems in Michigan. The primary purpose of the 1957 collections was to determine the distribution and abundance of larval sea lampreys, but in 1959 emphasis was placed on the collection of game fish to facilitate future management programs.

The topography of the northern part of the watershed is predominantly steeply rolling, with mostly clay soils and frequent outcroppings of pre-Cambrian rock. Most of the southern part of the area is moderately rolling and has sandy soils. Hardwood timber is found over the entire area.

The East Branch of the Ontonagon River is perhaps the best trout stream in Conservation District I (northwestern Upper Peninsula) and provides good fishing for brook, brown and rainbow trout. The Middle Branch provides excellent fishing for all three species of trout, except for the "spreads" area near Watersmeet, which supports only a poor to fair brown trout

fishery. The Middle Branch also has a run of rainbow and brown trout from Lake Superior; the spring fishing for rainbow trout is excellent. Northern pike and walleyes provide good fishing in the slower waters of the main stream near Ontonagon. Large brook trout are sometimes caught in some of the numerous beaver ponds located in minor tributaries of the streams.<sup>1</sup>

#### Methods

The 1957 collections were made by a sea lamprey survey crew (M. J. Hansen, P. Pristas and J. McMullen) from the Marquette Fisheries Research Station. In 1959, the field party included District Fisheries Supervisors L. R. Anderson, T. B. Durling, C. F. Long and F. J. Warren; and Institute for Fisheries Research biologists G. P. Cooper, K. G. Fukano, M. G. Galbraith, M. J. Hansen, F. F. Hooper and the author.

In 1957, sampling was confined to the lower portion of the stream, where sea lamprey larvae would be more likely to occur than in upstream areas. Within the limits imposed by accessibility, stations in 1959 were selected to sample the fish population in various types of habitat in the headwaters of the stream. The locations of the collecting stations are shown in Figure 1.

At each collecting station, a three-man crew operated a 220-volt, direct-current shocker for 7 to 75 minutes. The only exceptions were at Station 46, where two 125-foot experimental gill nets were fished for 21 hours, and at Stations 64 and 65, where collections were made with a 110-volt, alternating-current, battery-powered shocker. Physical conditions affecting the overall efficiency of the collecting at each station are listed in Table 1. Generally, collecting was most efficient in small

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<sup>1</sup> Personal communication from District Fisheries Supervisor T. B. Durling.

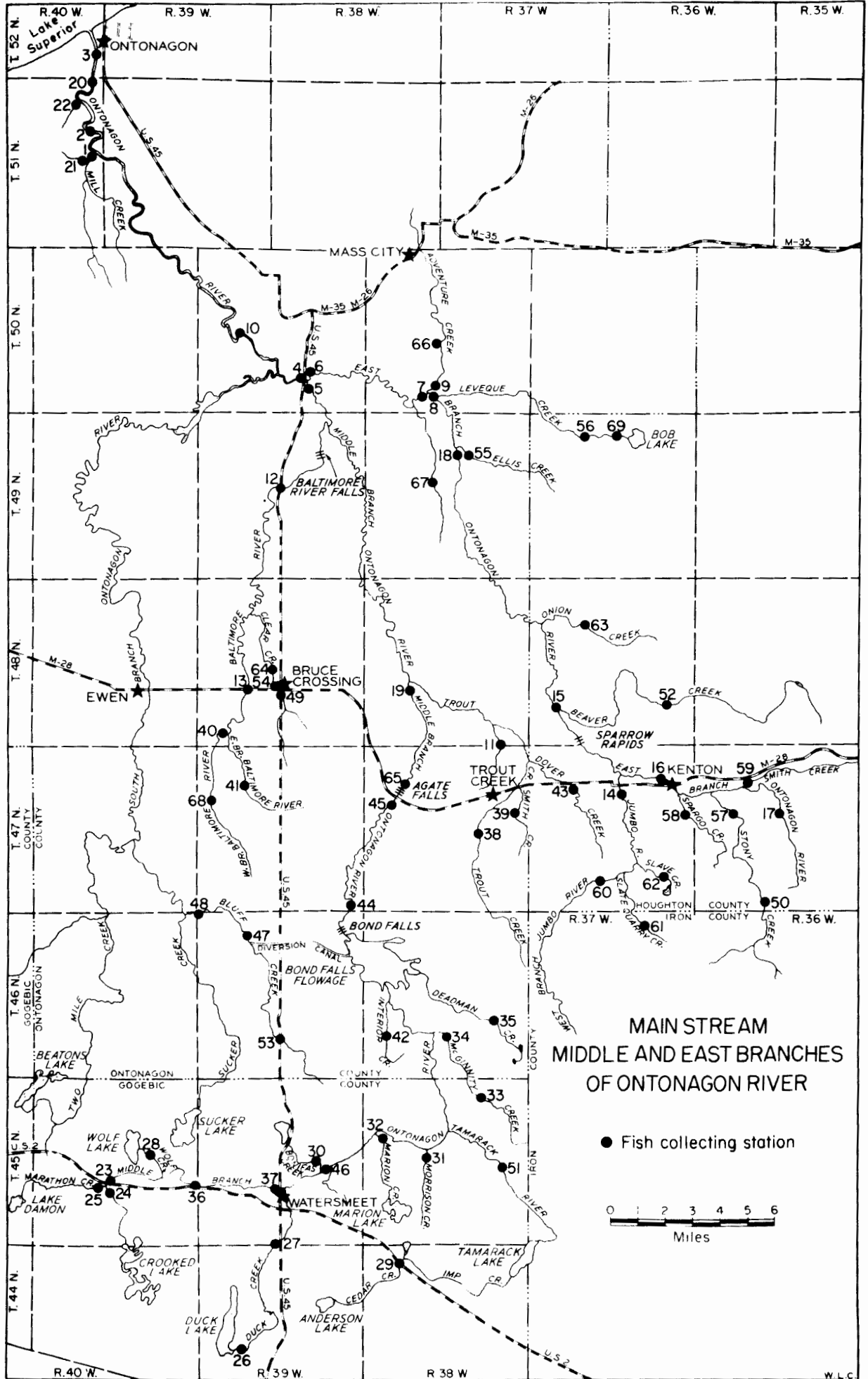


Figure 1

Table 1.--Physical conditions affecting the efficiency of collecting at stations in the main stream and East and Middle branches of the Ontonagon River

Stream <sup>1</sup>	Station		Water level	Vol- ume <sup>2</sup>	Water color <sup>3</sup>	Turbid- ity	Bottom type <sup>4</sup>	Cover	Veloc- ity <sup>5</sup>	CE <sup>6</sup>
	Num- ber	Location T(N) R(W)								
Ontonagon River	3	52 40	-	>30	B	muddy	S-C	fair	S	poor
	20	51 40	low	>30	B	muddy	C	poor	-	poor
	2	51 40	-	>30	B	muddy	CS	good	S	poor
	10	50 39	low	>30	-	muddy	G	poor	R	poor
	4	50 39	-	35	B	muddy	CS	poor	S	poor
	5	50 39	-	20	B	muddy	GR	poor	R	poor
UT, Ontonagon River	22	51 40	low	0	B	murky	M	good	S	fair
Mill Creek	1	51 40	-	<5	LB	murky	SC	poor	SR	fair
UT, Mill Creek	21	51 40	low	0	B	murky	C	poor	O	fair
East Branch of Ontonagon River	6	50 39	-	20	B	muddy	GR	good	R	poor
	7	50 38	low	>30	B	murky	CS	poor	SR	fair
	8	50 38	low	>30	B	muddy	CS	poor	S	poor
	18	49 38	low	>30	B	muddy	S	good	R	good
	15	48 37	low	>6	B	murky	S	good	R	fair
	16	47 37	low	>30	LB	murky	SR	good	R	good
	17	47 36	norm.	15	C	clear	R	good	R	fair
UT, East Branch of Ontonagon River	67	49 38	norm.	1	B	clear	SSt	fair	SR	fair
Adventure Creek	9	50 38	low	2	B	muddy	S-C	fair	S	fair
	66	50 38	high	8	R	muddy	C	fair	S	fair
Leveque Creek	56	50 38	high	5	DB	clear	G	good	R	good
	69	50 38	norm.	1	LB	clear	S	good	S	poor
Ellis Creek	55	49 38	norm.	5	LB	muddy	C	good	SR	fair
Onion Creek	63	48 37	high	10	DB	murky	S	good	R	good
Beaver Creek	52	48 37	high	7	DB	murky	C	poor	R	fair
Jumbo River	14	47 37	low	18	C	clear	SG	good	R	good
Slave Creek	62	47 37	high	3	LB	clear	SR	fair	R	fair
West Branch of Jumbo River	60	47 37	high	10	LB	clear	S	good	R	good
Slate Quarry Creek	61	46 37	high	-	C	clear	SR	fair	R	good

Table 1.--continued

Stream <sup>1</sup>	Station		Water level	Vol- ume <sup>2</sup>	Water color <sup>3</sup>	Turbid- ity	Bottom type <sup>4</sup>	Cover	Veloc- ity <sup>5</sup>	CE <sup>6</sup>
	Num- ber	Location T(N) R(W)								
Spargo Creek	58	47 37	high	7	-	-	SG	fair	R	fair
Stony Creek	57	47 36	high	15	DB	murky	B	fair	R	fair
	50	47 36	norm.	10	B	murky	S	good	SR	good
Smith Creek	59	47 36	high	8	LB	murky	C	fair	R	fair
Middle Branch of Ontonagon River	19	48 38	low	>30	B	murky	G	good	R	fair
	65	47 38	norm.	40	LB	murky	R	fair	R	poor
	45	47 38	high	60	LB	murky	G	fair	-	good
	44	47 39	high	60	LB	murky	R	poor	R	good
	46	45 39	norm.	-	B	murky	St	good	S	net set
	37	45 39	high	45	DB	murky	G	fair	R	fair
	36	45 40	high	40	DB	murky	S	fair	SR	fair
	23	45 40	high	-	DB	murky	S	fair	R	fair
	24	45 40	high	10	C	clear	S	fair	R	fair
Baltimore River	12	49 39	low	3	B	murky	CSG	poor	S	fair
	13	48 39	-	<10	B	murky	GR	fair	SR	fair
East Branch of Baltimore River	41	47 39	norm.	3	LB	clear	S	good	S	fair
Clear Creek	64	48 39	norm.	8	C	muddy	C	good	R	poor
	64-A		norm.	8	C	muddy	C	good	R	fair
	54	48 39	norm.	5	LB	muddy	C	fair	R	fair
	49	48 39	norm.	4	LB	muddy	C	fair	SR	good
West Branch of Baltimore River	40	48 39	norm.	6	B	murky	CSG	poor	R	poor
	68	47 39	high	?	B	murky	S	good	SR	fair
Trout Creek	11	48 38	low	12	B	muddy	RG	good	R	poor
	38	47 38	high	10	LB	clear	S	poor	R	poor
Dover Creek	43	47 37	high	10	LB	clear	S	good	R	good
Smith Creek	39	47 38	norm.	6	LB	clear	S	good	R	good
Deadman Creek	35	46 38	-	-	LB	clear	GS	good	R	-
Interior Creek	42	46 38	high	4	DB	murky	StS	poor	SR	fair
McGinnity Creek	34	46 38	-	-	DB	clear	RG	good	R	-
	33	45 38	-	-	B	clear	S-St	good	R	-
Tamarack Creek	51	45 38	high	40	DB	clear	R	fair	R	fair

Table 1.--concluded

Stream <sup>1</sup>	Station		Water level	Vol- ume <sup>2</sup>	Water color <sup>3</sup>	Turbid- ity	Bottom type <sup>4</sup>	Cover	Veloc- ity <sup>5</sup>	CE <sup>6</sup>
	Num- ber	Location T(N) R(W)								
Cedar Creek	29	44 38	high	15	DB	murky	S	poor	S	poor
Morrison Creek	31	45 38	norm.	4	DB	clear	S	fair	S	fair
Marion Creek	32	45 38	norm.	2	B	clear	O	fair	S	fair
Bonifas Creek	30	45 39	norm.	7	LB	-	BS	poor	S	fair
Duck Creek	27 26	45 39 44 39	high -	- -	LB LB	clear clear	G S	good good	R R	fair good
Wolf Creek	28	45 40	-	4	LB	clear	S	poor	R	-
Marathon Creek	25	45 40	-	5	DB	clear	S	fair	R	fair
Bluff Creek	48 53 47	46 39 46 39 46 39	low high norm.	30 10 40	DB LB B	clear clear clear	SG S G	good fair good	R R -	fair fair fair

<sup>1</sup> Streams are listed in order, progressing upstream from the mouth (UT = unnamed tributary).

<sup>2</sup> Estimated volume in cubic feet per second.

<sup>3</sup> B = brown; C = colorless; LB = light brown; R = red.

<sup>4</sup> Predominant bottom types at stations (B = boulders; C = clay; G = gravel; M = muck; O = organic; R = rubble; S = sand; S-C = sandy clay; S-St = sandy silt; St = silt). Where two types are shown together, the principal component precedes.

<sup>5</sup> Estimated velocity. Sluggish (S), less than 1/2 foot per second; rapid (R), greater than 1/2 foot per second; sluggish-rapid (SR), velocity varied in station.

<sup>6</sup> Collecting efficiency--the crew leaders' judgment of overall efficiency of the collecting as influenced by level, volume, color, turbidity, velocity and conductivity of the water, and bottom type, cover, light conditions and experience of crew members.

streams with a hard bottom and ample cover, where the water was shallow, slow, clear and colorless. Conversely, collecting was least efficient in large streams with a soft bottom and little cover where the water was deep, rapid, turbid and highly colored. High turbidity, especially in the lower portion of the stream, made collecting difficult and undoubtedly many "stunned" fish were not collected. Low electrical conductivity of the water throughout the system also lowered the effectiveness of the shocker.

With the exception of a few large game fish, which were scale sampled, measured and released, all fish collected were preserved in 10-percent formalin for later identification. Identifications were made by either T. M. Stauffer or the author and verified by W. R. Crowe or T. M. Stauffer.

#### Fish distribution

Names of fishes in this report conform to the list of common and scientific names of fishes published by the American Fisheries Society (1960). The 41 species (representing 13 families) which were found in the Ontonagon River system during the survey are listed in Table 2.

The number of each species collected at each station, number collected at all stations and the number of stations where each species was collected is shown in Table 3. Brook, brown and rainbow trout were collected only at stations in the East and Middle branches. Six species of warm-water game fish (northern pike, smallmouth bass, largemouth bass, rock bass, walleye and yellow perch) were found in small numbers at widely scattered locations on the Middle Branch and the main stream. The most common species of game fish were: brook trout (318 collected at 32 stations), brown trout (113 collected at 18 stations) and rainbow trout (71 collected at 14 stations). The most common forage and rough fish were creek chubs (438 collected at 50 stations) and white suckers (347 collected at 43 stations).

Table 2.--Species of fish collected in the main stream and East and Middle branches of the Ontonagon River

Common name		Scientific name
Family	Species	
Lamprey	-	<u>Ichthyomyzon</u> spp. <sup>1/</sup>
	Sea lamprey	<u>Petromyzon marinus</u>
Trout	Brown trout	<u>Salmo trutta</u>
	Rainbow trout	<u>Salmo gairdneri</u>
	Brook trout	<u>Salvelinus fontinalis</u>
Mudminnow	Central mudminnow	<u>Umbra limi</u>
Pike	Northern pike	<u>Esox lucius</u>
Sucker	Northern redhorse	<u>Moxostoma macrolepidotum</u>
	White sucker	<u>Catostomus commersoni</u>
	Longnose sucker	<u>Catostomus catostomus</u>
Minnow	Golden shiner	<u>Notemigonus crysoleucas</u>
	Creek chub	<u>Semotilus atromaculatus</u>
	Pearl dace	<u>Semotilus margarita</u>
	Finescale dace	<u>Chrosomus neogaeus</u>
	Northern redbelly dace	<u>Chrosomus eos</u>
	Lake chub	<u>Hybopsis plumbea</u>
	Hornyhead chub	<u>Hybopsis biguttata</u>
	Blacknose dace	<u>Rhinichthys atratulus</u>
	Longnose dace	<u>Rhinichthys cataractae</u>
	Common shiner	<u>Notropis cornutus</u>
	Spottail shiner	<u>Notropis hudsonius</u>
	Sand shiner	<u>Notropis stramineus</u>
	Mimic shiner	<u>Notropis volucellus</u>
	Blacknose shiner	<u>Notropis heterolepis</u>
	Brassy minnow	<u>Hybognathus hankinsoni</u>
	Bluntnose minnow	<u>Pimephales notatus</u>
Fathead minnow	<u>Pimephales promelas</u>	
Catfish	Black bullhead	<u>Ictalurus melas</u>
	Brown bullhead	<u>Ictalurus nebulosus</u>
Codfish	Burbot	<u>Lota lota</u>
Trout-perch	Trout-perch	<u>Percopsis omiscomaycus</u>
Sunfish	Smallmouth bass	<u>Micropterus dolomieu</u>
	Largemouth bass	<u>Micropterus salmoides</u>
	Rock bass	<u>Ambloplites rupestris</u>
Perch	Walleye	<u>Stizostedion vitreum vitreum</u>
	Yellow perch	<u>Perca flavescens</u>
	Johnny darter	<u>Etheostoma nigrum</u>
	Iowa darter	<u>Etheostoma exile</u>
Sculpin	Mottled sculpin	<u>Cottus bairdi</u>
	Slimy sculpin	<u>Cottus cognatus</u>
Stickleback	Brook stickleback	<u>Eucalia inconstans</u>

<sup>1/</sup> Probably the silver lamprey, I. unicuspis and/or Michigan brook lamprey, I. fossor (Hubbs and Lagler, 1947).



Table 3.--Number of fish collected at stations in the main stream and East and Middle branches of the Ontonagon River, July 16-August 16, 1957 and October 5-12, 1959

Species	Stream and station number																								
	Ontonagon River					U.T., Ontonagon R.	Mill Creek	U.T., Mill Creek	East Branch of Ontonagon River							U.T., E. Br. Ontonagon R.	Adven- ture Creek	Leveque Creek	Ellis Creek	Onion Creek					
	3	20	2	10	4	5	22	1	21	6	7	8	18	15	16	17	67	9	66	56	69	55	63		
Ichthyomyzon sp. (larvae)	-	11	49	5	72	166	2	49	1	2	3	9	11	38	4	-	-	1	-	-	-	-	-	-	
Ichthyomyzon sp. (adult)	-	1	-	-	-	-	-	-	-	-	-	-	-	2	6	-	-	-	-	-	-	-	-	-	-
Sea lamprey (larvae)	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brook trout	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	39	2	1	-	-	-
Brown trout	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	1	-	-
Rainbow trout	-	-	-	-	-	-	-	-	-	-	-	-	7	4	-	-	-	-	-	-	-	-	15	-	-
Mudminnow	-	-	-	-	-	-	14	-	1	-	-	-	-	-	-	-	3	1	-	-	-	-	-	-	-
Northern pike	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northern redhorse	1	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
White sucker	-	-	1	7	6	4	3	2	3	2	7	12	5	6	-	-	9	23	3	-	-	-	4	-	-
Longnose sucker	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Golden shiner	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Creek chub	-	3	-	-	6	1	7	-	-	3	4	9	2	3	1	-	14	27	16	-	-	-	4	2	-
Pearl dace	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Finescale dace	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Redbelly dace	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43	-	-	-	-	-	-	-	-
Lake chub	-	-	-	-	1	-	-	-	-	-	5	1	-	-	-	-	-	-	10	-	-	-	-	-	-
Hornyhead chub	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blacknose dace	-	-	-	-	-	-	-	-	-	1	-	2	1	-	1	-	6	1	4	-	-	-	-	6	-
Longnose dace	-	-	-	-	1	2	-	-	-	13	14	1	18	7	44	-	-	-	-	-	-	-	-	-	-
Common shiner	-	1	1	-	-	-	1	-	1	-	-	-	-	-	-	-	-	4	6	-	-	-	-	-	-
Spottail shiner	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sand shiner	1	4	-	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mimic shiner	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blacknose shiner	-	1	8	-	-	-	11	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brassy minnow	-	-	-	-	-	-	11	-	-	-	-	-	-	-	1	-	3	3	2	-	-	-	-	-	-
Bluntnose minnow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fathead minnow	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	23	2	-	-	-	-	-	-	-
Black bullhead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brown bullhead	-	5	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Burbot	-	-	-	1	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trout-perch	-	-	4	7	10	-	-	-	-	1	13	8	7	1	1	-	-	12	6	-	-	-	-	-	-
Smallmouth bass	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Largemouth bass	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rock bass	-	12	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Walleye	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yellow perch	5	11	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Johnny darter	-	1	-	-	-	1	-	3	-	-	1	-	-	1	3	-	-	-	-	-	-	-	-	-	-
Iowa darter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mottled sculpin	-	-	-	-	1	1	-	-	-	-	-	-	-	3	2	-	2	2	-	-	-	-	2	-	-
Slimy sculpin	-	-	-	-	-	-	-	-	-	-	1	-	-	-	5	4	-	-	-	-	-	-	-	-	-
Brook stickleback	-	-	-	-	-	-	1	-	28	-	-	-	-	-	-	-	9	-	-	-	-	2	-	-	-
Collecting time (minutes)	40	75	63	60	55	60	40	45	30	45	65	60	65	60	55	55	30	45	20	20	15	20	20	20	20

(Table continued next page)

Table 3.--continued

Species	Stream and station number																									
	Beaver Creek	Jumbo River	Slave Creek	W.Br. Jumbo River	Slate Quarry Creek	Spargo Creek	Stony Creek	Smith Creek	Middle Branch of Ontonagon River								Balti- more River	E.Br. Balti- more River	Clear Creek							
	52	14	62	60	61	58	57	50	59	19	65	45	44	46	37	36	23	24	12	13	41	64	64-A	54	49	
Ichthyomyzon sp. (larvae)	-	99	-	-	-	-	-	-	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ichthyomyzon sp. (adult)	-	8	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ses lamprey (larvae)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brook trout	2	-	5	9	23	9	2	7	-	1	18	-	-	4	8	1	9	-	-	27	-	-	8	10	-	
Brown trout	-	17	-	-	10	1	21	-	2	6	1	37	3	-	-	-	-	-	3	-	-	-	-	-	-	
Rainbow trout	-	15	-	-	1	4	1	-	5	4	3	-	-	1	-	-	-	-	3	-	-	-	-	-	-	
Madminnow	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	-	19	10	-	-	-	-	7	13	1	
Northern pike	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Northern raddhorse	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
White sucker	-	1	-	3	-	-	3	14	1	10	1	-	-	71	2	2	-	1	25	41	-	-	1	-	-	
Longnose sucker	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Golden shiner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Creek chub	1	-	-	16	-	-	2	25	1	-	-	-	-	3	6	10	28	10	27	16	-	1	3	10	7	
Pearl dace	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Finescale dace	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	
Redbelly dace	-	-	-	30	-	-	-	29	-	-	-	-	-	-	-	1	18	1	-	1	-	-	2	17	16	
Lake chub	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Hornyhead chub	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Blacknose dace	1	-	-	121	-	-	2	36	-	-	2	56	-	143	53	75	23	11	31	-	-	-	1	-	-	
Longnose dace	-	-	-	-	-	-	4	-	-	22	-	-	28	-	-	-	-	-	4	16	-	-	-	-	-	
Common shiner	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	46	1	18	-	-	-	-	-	2	
Spottail shiner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sand shiner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mimic shiner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Blacknose shiner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	
Brassy minnow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bluntnose minnow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Fathead minnow	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	-	
Black bullhead	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	
Brown bullhead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Burbot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Trout-perch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	23	-	-	-	-	-	
Smallmouth bass	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Largemouth bass	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	
Rock bass	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Walleye	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Yellow perch	-	-	-	-	-	-	-	-	-	-	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	
Johnny darter	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Iowa darter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	
Mottled sculpin	9	4	-	-	-	-	-	-	-	1	1	23	5	-	43	35	12	12	-	11	8	-	-	12	76	
Slimy sculpin	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Brook stickleback	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	2	5	-	-	-	-	-	1	-	4	
Collecting time (minutes)	15	60	7	25	25	15	35	30	20	70	45	30	25	30	35	35	45	60	50	12	25	35	35	30		

(Table concluded next page)

Table 3.--concluded

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Species <sup>1</sup>	Stream <sup>2</sup> and station number																			Total number of fish collected	Number of stations where species collected					
	W. Br. Baltimore River		Trout Creek		Dover Creek	Smith Creek	Dead-man Creek	Inte-rior Creek	Mc-Ginnity Creek	Tama-rack Creek	Cedar Creek	Morri-son Creek	Marion Creek	Boni-fas Creek	Duck Creek	Wolf Creek	Marathon Creek	Bluff Creek								
	40	68	11	38	43	39	35	42	34	33	51	29	31	32	30	27	26	28	25			48	53	47		
Ichthyomyzon sp. (larvae)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	560	17		
Ichthyomyzon sp. (adult)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19	5		
Sea lamprey (larvae)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	1		
Brook trout	-	1	-	29	1	15	19	-	8	-	10	-	3	-	-	23	1	-	3	-	15	-	318	32		
Brown trout	-	-	2	-	2	2	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	113	18		
Rainbow trout	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	71	14		
Mudminnow	-	-	-	-	-	-	-	-	4	-	19	3	-	4	-	2	9	8	-	-	-	-	121	18		
Northern pike	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1		
Northern redhorse	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3		
White sucker	2	1	2	-	-	-	-	-	8	1	13	13	3	2	-	16	-	3	8	-	2	-	347	43		
Longnose sucker	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2		
Golden shiner	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	3	2		
Creek chub	7	10	3	-	4	-	1	6	5	8	2	3	38	5	11	2	26	23	6	7	-	3	438	50		
Pearl dace	-	-	-	-	-	1	-	-	-	-	-	3	1	8	-	14	1	1	-	-	-	-	29	7		
Finescale dace	-	-	-	-	-	-	1	-	1	-	-	2	-	4	-	-	1	-	-	-	-	-	12	8		
Redbelly dace	-	-	-	-	-	1	29	-	34	-	16	7	4	3	-	32	26	-	-	-	-	-	310	19		
Lake chub	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27	5		
Hornhead chub	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1		
Blacknose dace	14	6	-	-	-	1	8	-	36	36	5	111	-	1	-	3	-	56	-	-	-	-	854	32		
Longnose dace	-	-	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	37	-	277	16		
Common shiner	-	-	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-	3	5	-	-	-	100	14		
Spottail shiner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1		
Sand shiner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	5		
Mimic shiner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1		
Blacknose shiner	-	-	-	-	-	-	3	-	-	-	3	1	-	1	-	1	-	1	-	-	-	-	33	11		
Brassy minnow	-	-	-	-	-	-	2	-	-	-	2	-	1	-	-	1	2	-	-	-	-	-	28	10		
Bluntnose minnow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	-	-	-	-	-	-	17	1		
Fathead minnow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	43	7		
Black bullhead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	9	2		
Brown bullhead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	2		
Burbot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	2		
Trout-perch	3	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	111	16		
Smallmouth bass	-	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-	1	-	-	-	6	5		
Largemouth bass	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1		
Rock bass	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	14	3		
Walleye	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2		
Yellow perch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42	6		
Johnny darter	-	-	-	-	-	-	-	-	-	1	1	12	-	-	-	3	-	-	-	-	1	-	29	12		
Iowa darter	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	1	3	2		
Mottled sculpin	2	-	-	-	5	-	3	-	2	-	2	1	7	-	-	9	-	-	-	-	-	17	3	20	331	32
Slimy sculpin	-	-	-	1	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	6		
Brook stickleback	-	-	1	-	-	-	5	1	-	7	-	7	-	1	-	-	-	-	-	-	-	-	77	15		
Collecting time (minutes)	15	35	60	25	20	25	20	30	20	20	30	30	20	10	20	20	25	25	20	30	25	25				

<sup>1</sup> Listed in phylogenetic order.

<sup>2</sup> In names of streams, E. Br. = East Branch; W. Br. = West Branch; R = river; U.T. = unnamed tributary. For locations of stations, see Table 1 and Figure 1.

<sup>3</sup> Collections made with a 110 volt, alternating-current, battery powered shocker.

<sup>4</sup> Two 125-foot experimental gill nets fished 21 hours.

There are four natural obstructions (Sparrow Rapids, Agate Falls, Bond Falls and Baltimore River Falls) to upstream migration in the Ontonagon River system. Except for rainbow trout, the obstructions apparently had little effect on the distribution of trout. Brook, brown and rainbow trout were common above Sparrow Rapids. Between Agate and Bond falls, brook and brown trout were common but rainbow trout were not found. Brook trout were common above Bond Falls but no brown trout (even though they are reportedly present) and only one rainbow trout was collected. Above Baltimore Falls, brook trout were common but only three brown trout and three hatchery rainbow trout were taken. Species collected below, but not above, any of the obstructions were: sea lamprey, northern pike, northern redhorse, longnose sucker, lake chub, hornyhead chub, spottail shiner, sand shiner, mimic shiner, brown bullhead, burbot and walleye. Possible causes of the apparent absence of these species above the obstructions are: (1) obstructions are barriers to upstream migration, (2) the cold water habitat above the obstructions may preclude habitation by warm-water species, and (3) sampling may have been inadequate to detect the presence of certain species.

#### Age and growth of trout

Scale samples were taken from all trout more than 3.5 inches in total length. Based on past age and growth studies, it was assumed in the field that trout under 3.5 inches long, collected in the late summer or fall, were in age-group 0. This assumption apparently held true for trout in the Ontonagon River system. Average lengths of trout in age-group I were: brook trout, 6.0 inches (range 3.9-9.8); brown trout, 6.9 inches (range 5.0-9.3); and rainbow trout, 6.1 inches (range 4.5-9.0). Fish over seven inches in length were scale sampled and released; the smaller trout were

preserved and scale sampled in the laboratory. All trout scales were impressed in plastic or placed on glass slides and read with a microprojector by the author.

The average lengths and numbers in the various age groups of brook, brown and rainbow trout collected from the Ontonagon River are summarized in Table 4. For purposes of comparison of growth rate, the October 1959 data were divided in relation to three geographical areas: the main stream of the Middle Branch, tributaries of the Middle Branch, and tributaries of the East Branch (no collections were made in the main streams of the Ontonagon River or East Branch). Trout collected in July and August 1957 were not divided as to areas or combined with October 1959 trout because of the few samples and the difference in time of collection.

Where sample size was sufficiently large in the October, 1959 collections, t-tests and analysis of variance techniques were applied to ascertain if the apparent differences in growth rate among trout (of the same age group) from the different areas was significant. Analysis of variance showed no difference in average size among young-of-the-year brook trout from the main stream of the Middle Branch, tributaries of the Middle Branch and tributaries of the East Branch. On the other hand, analysis of variance demonstrated a difference among age-group-I brook trout from these same areas. Further testing (t-test) indicated that brook trout in age-group I from tributaries of the East Branch were smaller than from the main stream of the Middle Branch ( $t = 4.4$ ) and from tributaries of the Middle Branch ( $t = 4.4$ ). There was no significant difference between the average length of age-group-I brook trout collected from the main stream and tributaries of the Middle Branch ( $t = 0.8$ ). A t-test demonstrated that brown trout in age-group I collected from the main stream of the Middle Branch were larger than from tributaries of the East Branch ( $t = 5.6$ ).

Table 4.--Average total lengths (inches) of trout in various age groups collected from the Ontonagon River System<sup>1</sup>  
and from other Michigan waters  
(Number of fish in parentheses)

Date and locality <sup>2</sup>	Brook trout			Brown trout <sup>3</sup>				Rainbow trout		
	0	I	II	0	I	II	III	0	I	II
October 5-12, 1959										
Middle Branch										
Main stream (8 stations)	3.5 (19)	6.5 (20)	11.1 (1)	4.2 (15)	7.8 (22)	12.4 (3)	15.2 (1)	4.0 (4)	...	...
Tributaries (26 stations)	3.2 (97)	6.3 (73)	7.9 (3)	4.8 (4)	8.8 (2)	...	...	2.9 (1)	6.6 (4)	8.5 (3)
East Branch										
Tributaries (14 stations)	3.2 (31)	5.5 (62)	8.3 (6)	2.8 (4)	6.1 (26)	9.8 (3)	13.4 (2)	2.9 (10)	5.8 (14)	8.6 (2)
Totals	3.2 (147)	6.0 (155)	8.5 (10)	4.1 (23)	6.9 (50)	10.3 (6)	13.9 (3)	3.2 (15)	6.0 (18)	8.5 (5)
July 16-Aug. 16, 1957										
All areas (22 stations)	3.0 (4)	6.5 (1)	...	2.6 (23)	5.6 (3)	8.7 (3)	12.0 (1)	1.8 (22)	6.3 (8)	8.6 (3)
Other waters (State average)	2.6 (2,243)	5.8 (2,396)	8.2 (760)	3.0 (1,060)	6.4 (1,088)	9.1 (897)	11.7 (395)	2.3 (1,001)	6.3 (748)	8.5 (209)

<sup>1</sup> No trout were collected at 9 stations in the main stream and a minor tributary of the main stream of the Ontonagon River.

<sup>2</sup> No collections were made in the main stream of the East Branch in 1959.

<sup>3</sup> One brown trout in age-group IV, 13.9 inches in length, was collected in July, 1957.

A strict comparison cannot be made between the average lengths of trout collected from the Ontonagon River and the state average lengths (Schultz, 1954) because trout used to compile the state average were collected from April to November. If these differences in time of collection are considered, the best general interpretation of the data might be that the growth rate of brook and brown trout is approximately the same as the state average and the growth rate of rainbow trout is somewhat less.

#### Pollution

Little evidence of pollution was encountered in the Ontonagon River system except in Clear Creek, where waste products from the Ontonagon Valley Cooperative Creamery at Bruce Crossing are emptied into the stream. One collection was made above and two collections were made below the outfall from the creamery to determine the effect of waste products on aquatic life. At station 49, 300 feet above the outfall, brook trout and mottled sculpins were abundant. Although a slight odor indicating pollution was noticed, other evidence of pollution was lacking. A collection was also made approximately 200 feet below the outfall from the creamery (Station 54). At this station sewage fungus was present in large amounts, covering much of the stream bottom. Although this area was seriously contaminated by solid wastes from the creamery, the biochemical oxygen demand was apparently not serious since brook trout, mottled sculpins and other fish were present. At Station 64, approximately 1 1/2 miles below the creamery, the stream bottom was completely covered with sewage fungus and devoid of any bottom fauna. Only 13 fish (mudminnows, creek chubs, redbelly dace, and brook stickleback) were collected in 20 minutes of shocking.

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