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THE OCCURRENCE OF YOUNG FISHES IN THE MICHIGAN COASTAL WATERS OF THE GREAT LAKES

by

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ABSTRACT

This report summarizes recent knowledge of the occurrence of larval and juvenile fishes in the Michigan coastal zone of the Great Lakes. It relies on reports from the U.S. Fish and Wildlife Service, the Michigan Department of Natural Resources and private utilities, as well as other published material and personal communication. It may serve as a preliminary inventory of the young fishes reported in Michigan coastal waters.

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INTRODUCTION

This report presents a compilation of recent information on the occurrence of larval and juvenile fish along the Michigan state coastline of the Great Lakes. The data could form a foundational reference for management decisions in coastal zones as long as their extensive limitations are recognized. The primary conclusion to be drawn from this synthesis is that the existing information is inadequate for detailed coastal zone planning. With further research, the information presented here may contribute to much needed documentation of fish distributions in the Michigan coastal zone.

METHODS

The Objectives

The following tasks were addressed:

1. To consult sources for recent information (since 1970) on local distributions of larval and juvenile fish in Michigan coastal waters.

2. To retain a record of all consultations.

3. To summarize the record by county, sampling sites, and sampling methodology.

4. To project the data into distributional displays within the limits of existing information.

Procedures

The relevant information was collected from 15 May 1977 (beginning of research) to 1 July 1977, the deadline provided. Appropriate bibliographies and syntheses (Boreman 1976, Rolan and Skoch 1975, Scott and Crossman 1973) were consulted for previously published material. We interviewed individuals

and representatives believed to be involved with recent research on larval and juvenile fishes. Only data reported since 1970 were requested to avoid misrepresentation of existing conditions in the coastal zone. The results of interviews were recorded on forms like those in Appendix 1. Information was requested for specific taxa, age (larvae, juveniles), dates of study, methods used, and the location. We asked each person interviewed to refer us to others who might contribute. All persons, organizations, unpublished materials and published material consulted are listed in Appendices 2, 3 and 4.

We reviewed reports made by electric utilities to the Michigan Department of Natural Resources in compliance with section 316 (a) and 316 (b) of Public Law 92-500. Most of these data were collected by private consultants, although some were collected by universities acting under contract with electric utilities. Virtually all university studies occurred at Michigan State University and the University of Michigan. Some of the data were collected by University personnel under auspices of grants from the U.S. Environmental Protection Agency. A lesser quantity of data were obtained from the files of the Michigan Department of Natural Resources and the U.S. Fish and Wildlife Service.

All data were compiled by site of capture and sampling methodology for each Michigan county, and the fish were recorded as larvae or juveniles. In some cases, the ages of fish were in doubt; such questionable records were identified in the results.

All fish species discussed in this report are identified in Appendix 5, which also lists all species that have ever been recorded from the lakes bordering Michigan. All data from specific locations are included in Appendix 6.

RESULTS AND DISCUSSION

Many data came from 316 (a) and 316 (b) studies compiled for utilities (The Detroit Edison Co., Consumers Power Co., and American Electric Power Service Corp.) in and near cooling systems of power plants and therefore mostly represent occurrences in a relatively small part of the Great Lakes shoreline. Little recent data on Michigan shores have been published in professional journals. A few data on juvenile fishes were collected by electrofishing in shallow tributaries that enter the Great Lakes coastal zone. Other data gathered by the Michigan Department of Natural Resources and the U.S. Fish and Wildlife Service were collected from the lakes primarily in offshore water several meters deep. Figures 1-6 show the general locations of sites included in this survey. The occurrence of larvae are summarized in Tables 1-8.

Most of the extensive data collections have occurred along the southerly coasts on Lake Michigan and Lake Erie. The western basin of Lake Erie has been the most intensively and comprehensively studied area as a result of extensive studies supported by the Detroit Edison Company and the U.S. Environmental Protection Agency. Only in this part of the Great Lakes has there been any intensive sampling of back-water larval fish distributions (according to Dr. David Jude, the Great Lakes Research Division recently began a study on Pigeon Lake, a back-barrier water bordering southeastern Lake Michigan). The only major effort conducted for Lake Superior was concentrated at a power plant. The following table shows the number of species reported in studies summarized by this report compared to the total number of species that have been recorded for the Great Lakes proper as reported by Rolan and Skoch (1975).

	Michigan	Superior	Huron	Erie	Total
This Report	41	26	43	36	56
Rolan & Skoch	67	31	67	64	89

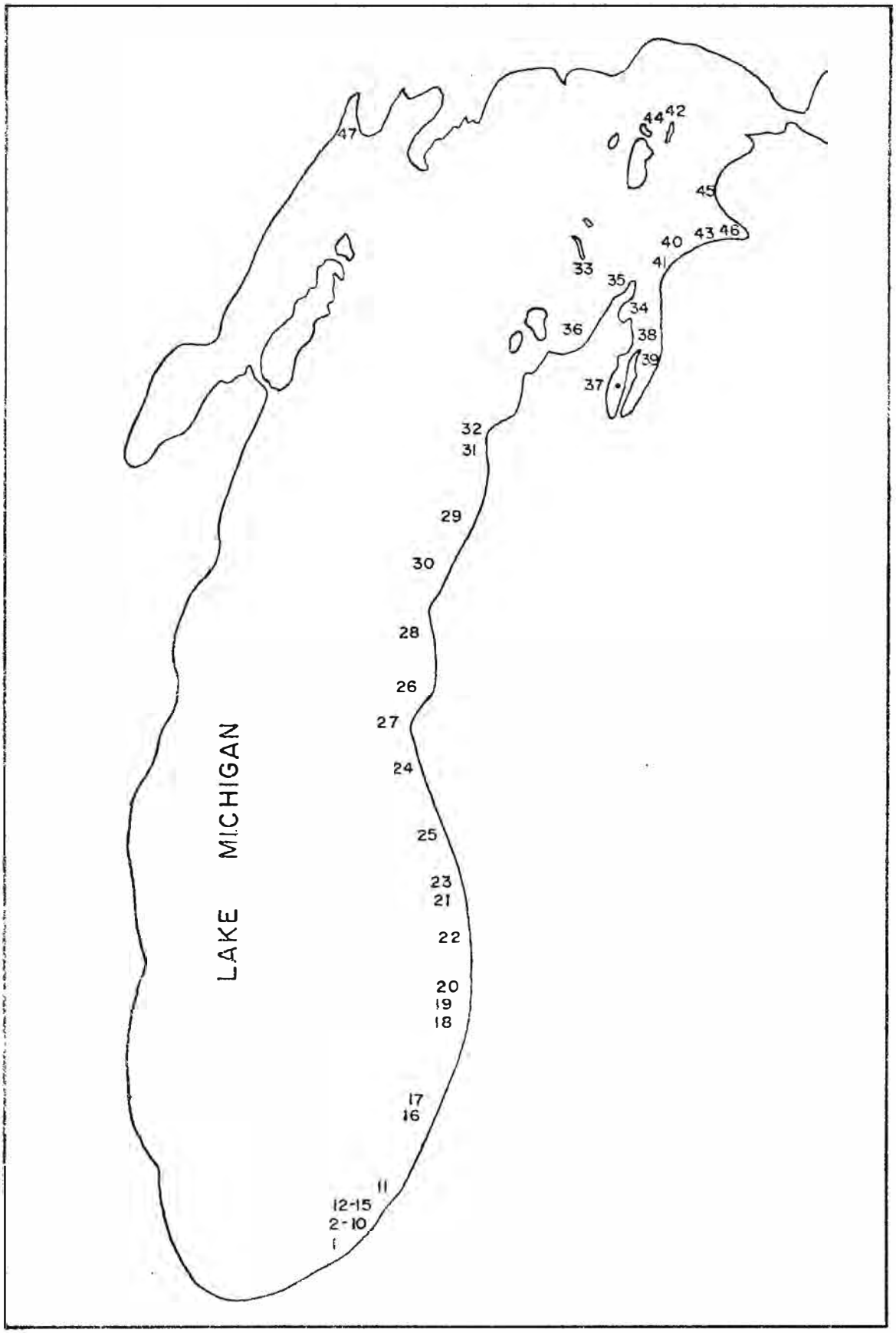

Figure 1. Sites sampled on Lake Michigan.

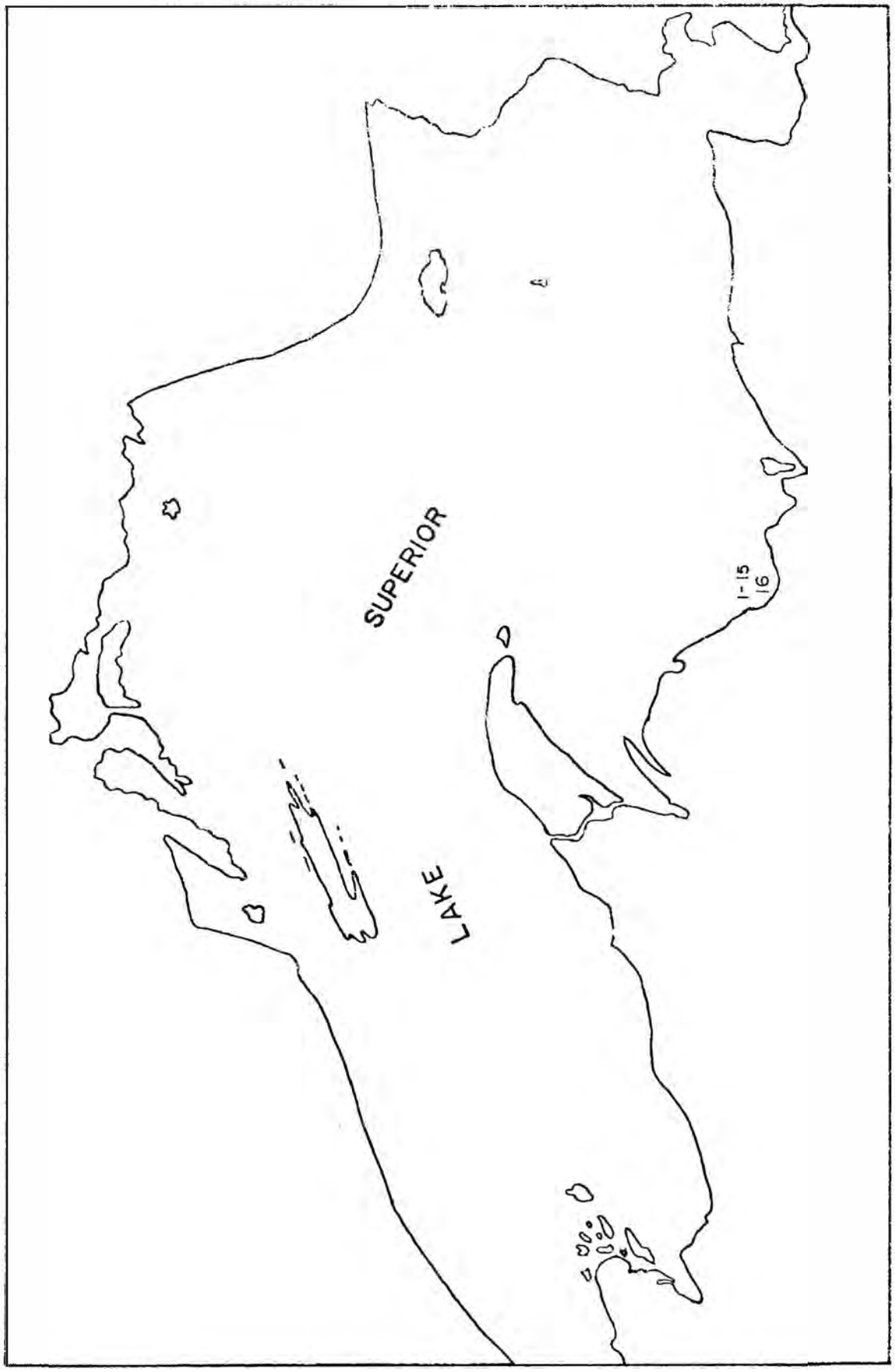

Figure 2. Sites sampled on Lake Superior.

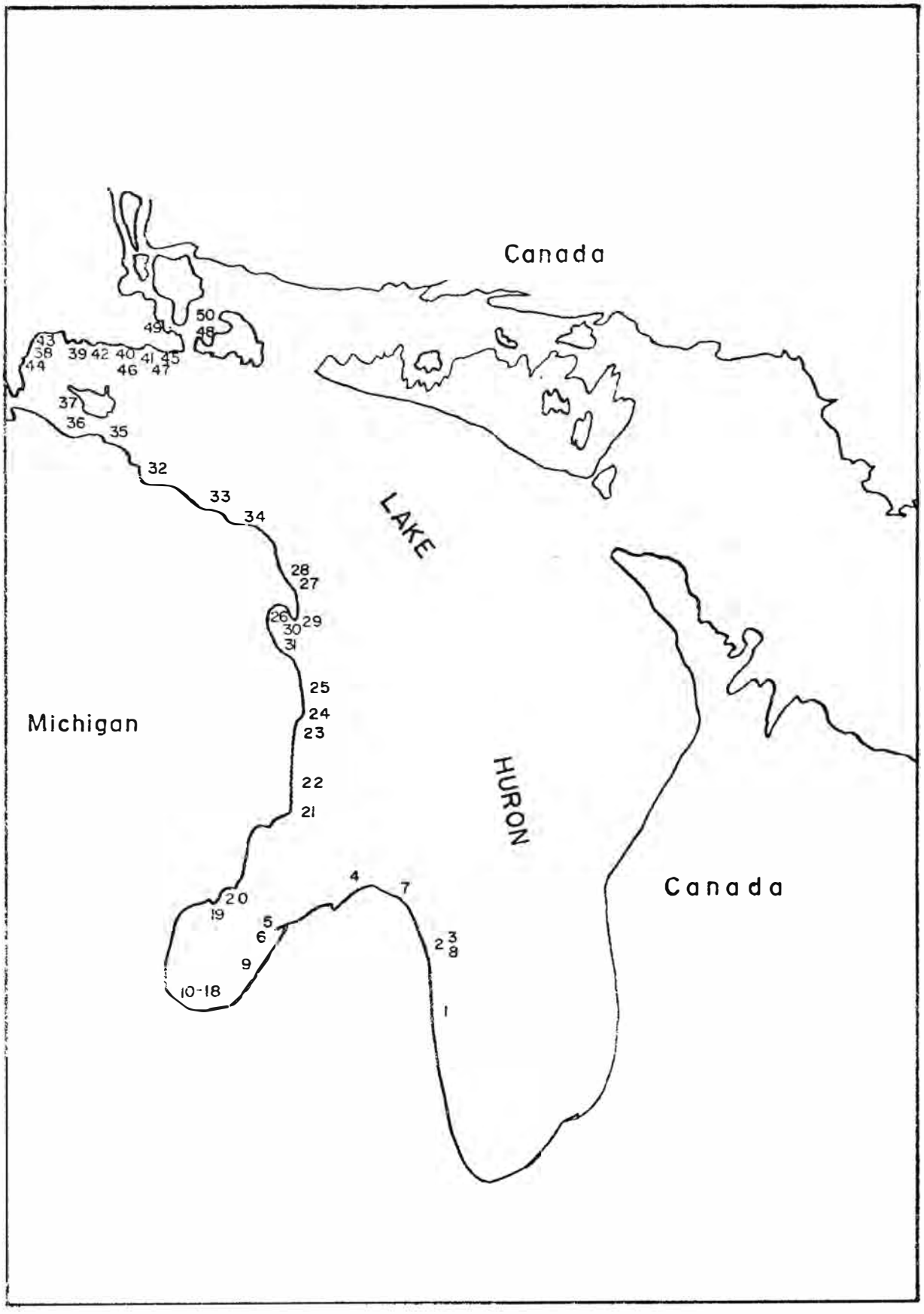

Figure 3. Sites sampled on Lake Huron.

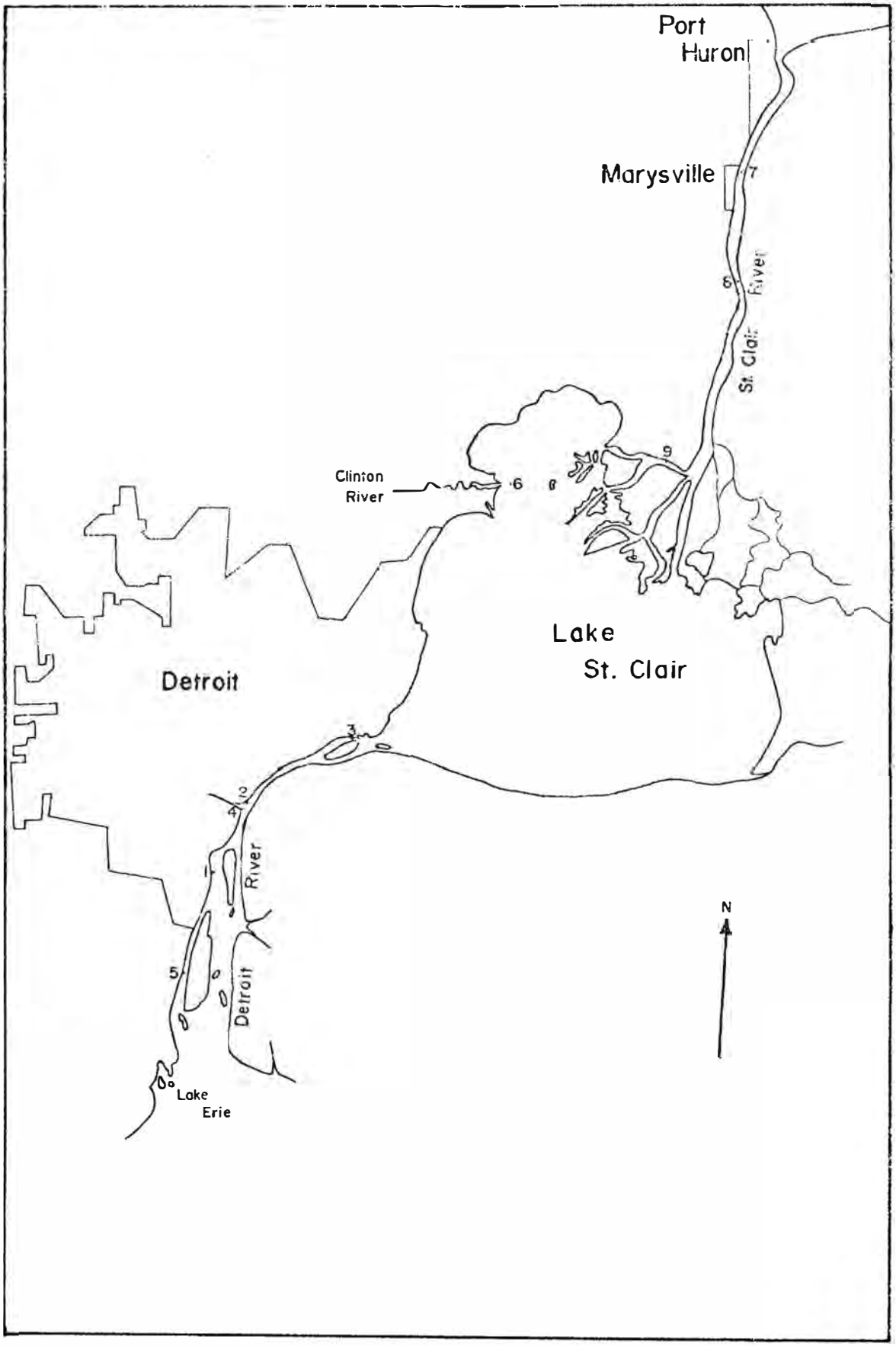

Figure 4. Sites sampled on the St. Clair-Detroit River system.

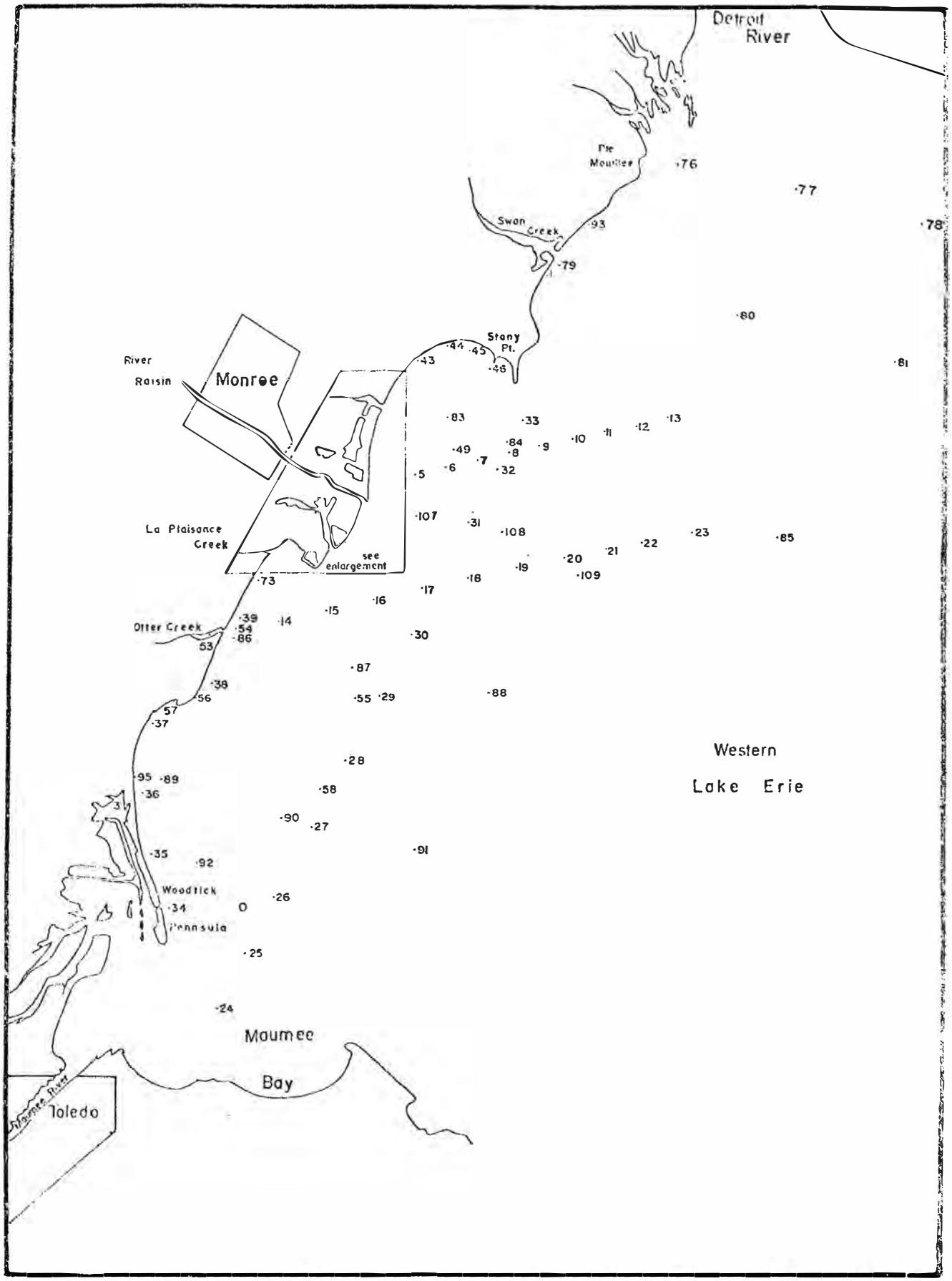

Figure 5. Sites sampled on Lake Erie.

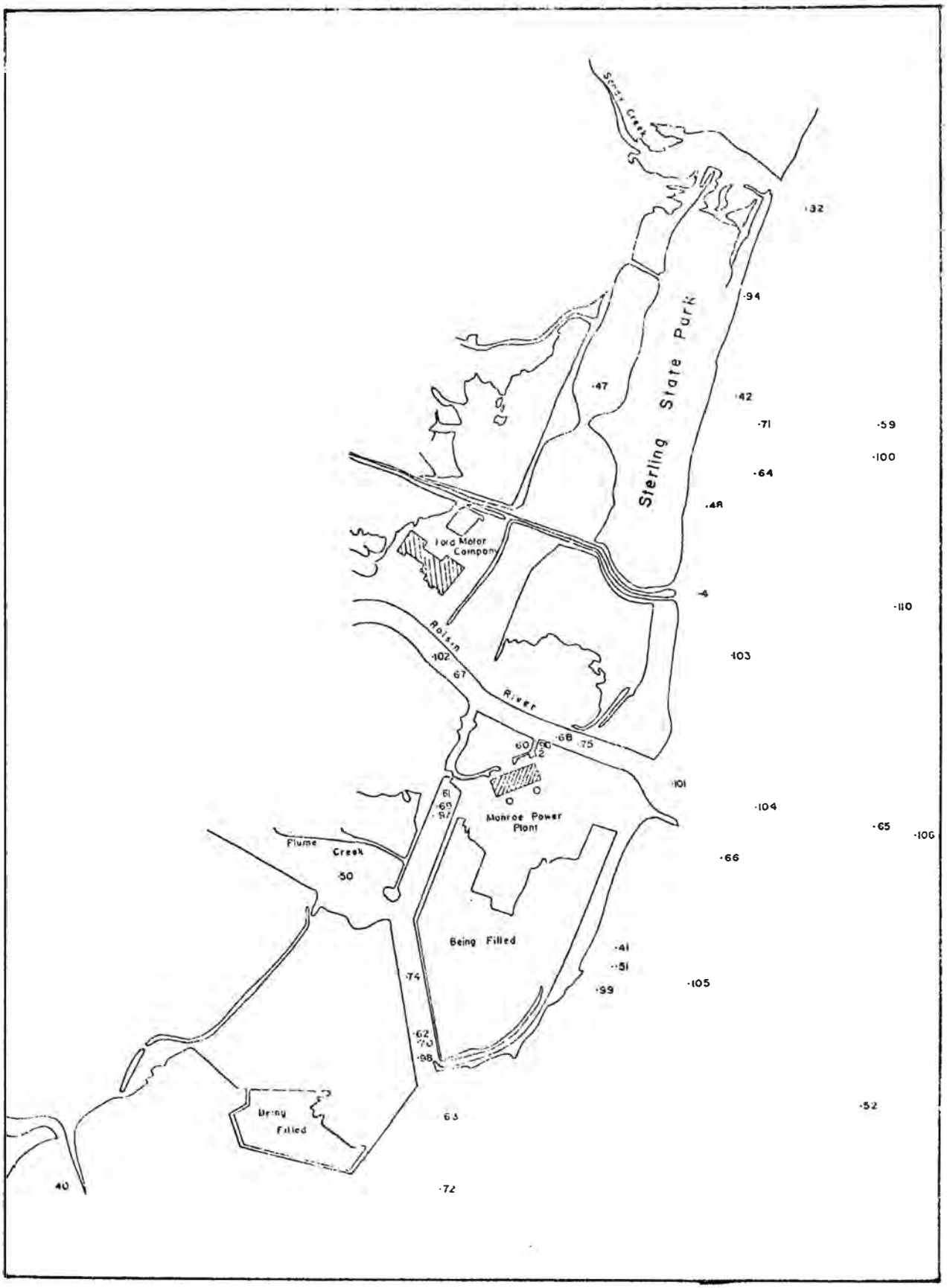

Figure 6. Sites sampled near the Monroe Power Plant on Lake Erie.

Table 1. Incidence of immature fishes in the Great Lakes along the State of Michigan shore.[1]

Great Lake Region	Southern Michigan	Northern Michigan	Southern Huron	Northern Huron	Superior	St. Clair-Detroit	Erie
Number of Stations	23	25	25	25	16	9	109
Petromyzontidae			1				
Acipenseridae							
Acipenser sp.		1		2			
Lepisosteidae							
Lepisosteus sp.							1
Lepisosteus osseus							
Amiidae							
Amia calva	1			3		2	
Clupeidae	20	2	4			6	101
Alosa pseudoharengus	20	18	18	11		7	2
Dorosoma cepedianum	4	4	14	3		7	3
Salmonidae	1						
Coregoninae		1			6		
Coregonus artedii		7		6			
Coregonus clupeaformis	2	13	1	8	3		
Coregonus hoyi	1	1		3			
Prosopium cylindraceum		10	3	9			
Salmoninae		2					
Oncorhynchus kisutch	1	5	1	2		1	1
Oncorhynchus tshawytscha	4	4	2	6	5		1
Salmo gardneri	3	2	2	1			1
Salmo trutta	5	6	3	8			
Salvelinus namaycush	2	14	5	12	2		

[1] Southern Lake Michigan - from Michigan-Indiana boundary to Muskegon River; Northern Lake Michigan - from Muskegon River to Michigan-Wisconsin boundary; Lake Superior - Michigan shores; Southern Lake Huron - from St. Clair River to the Black River; Northern Lake Huron - from the Black River to Saint Mary's River; St. Clair - Detroit River - from Lake Erie to Lake Huron; Lake Erie - from the Ohio-Michigan boundary to the Detroit River.

Table 1. (con't)

Great Lake Region	Southern Michigan	Northern Michigan	Southern Huron	Northern Huron	Superior	St. Clair-Detroit	Erie
Number of Stations	23	25	25	25	16	9	109
Osmeridae							
Osmerus mordax	16	9	20	15	15	7	92
Umbridae							
Umbra limi	1						
Ecocidae							
Esox lucius	3	2	1	9	1	2	3
Cyprinidae							43
Carassius auratus			4			2	13
Cyprinus carpio	2	1	9	3	1	4	28
Hybopsis storeriana			1				
Notropis	1	1			1	1	69
Notropis atherinoides	2		6	1		3	18
Notropis hudsonius	11		11				11
Pimiphales promelas	2						
Rhinichthys cataractae	2						
Catostomidae			1				24
Carpoides cyprinus						1	
Catostomus catostomus	4	9	3	9		0	
Catostomus commersoni	8	10	10	17	7	2	3
Moxostoma sp.			1			2	
Ictaluridae						1	
Ictalurus sp.						1	
Ictalurus melas	1	1	1				1

Table 1. (con't).

Great Lake Region	Southern Michigan	Northern Michigan	Southern Huron	Northern Huron	Superior	St. Clair-Detroit	Erie
Number of Stations	23	25	25	25	16	9	109
Ictalurus natalis							1
Ictalurus nebulosus			1	5		1	1
Ictalurus punctatus	5	2	7	1		7	19
Noturus flavus			2				1
Gadidae							
Lota lota	1	6	3	6	7		1
Atherinidae							
Labidesthes sicculus							4
Gasterosteidae							
Pungitius pungitius	3	2		2	1		0
Percopsidae							
Percopsis omiscomaycus	11	1	7	1	6	1	12
Percicthyidae							
Morone americanus							1
Morone chrysops			7	1		6	83
Centrachidae		1					15
Ambloplites rupestris		1	3	6	1	9	2
Lepomis							25
Lepomis gibbosus	1		9	2		1	
Lepomis macrochirus	4	1	2			1	
Micropterus							9
Micropterus dolomieui			1	2	1	7	5
Micropterus salmoides		2					1

Table 1. (con't)

Great Lake Region	Southern Michigan	Northern Michigan	Southern Huron	Northern Huron	Superior	St. Clair-Detroit	Erie
Number of Stations	23	25	25	25	16	9	109
Pomoxis		2					8
Pomoxis annularis		1		2		1	8
Pomoxis nigromaculatus	1	0	2			1	0
Percidae							
Etheostoma							8
Etheostoma nigrum	10	1					1
Perca flavescens	19	8	22	16	14	9	103
Percina capriodes		1				6	3
Stizostedion vitreum			4	3		8	13
Scienidae						8	49
Aplodinotus grunniens		1	5				
Cottidae	3				6		
Cottus							
Cottus bairdi	4	1			1		
Cottus cognatus	6	2		2	1		
Cottus ricei					1		
Myoxocephalus quadricornis			2	4	1		

Table 2 . Frequency of occurrence of larval (L) and juvenile (J) fish in southern Lake Michigan (stations are identified in Figure 1).

	Stations																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Petromyzontidae																							
Acipenseridae																							
Acipenser sp.																							
Lepisosteidae																							
Lepisosteus																							
Lepisosteus osseus																							
Amiidae																							
Amia calva			J																				
Clupeidae																							
Alosa pseudoharengus	J,L	J,L	J	J,L	J,L	J,L	J,L	J,L	J,L	J,L	L		L	L	L	J,L	J,L	J,L		J,L	J,L	J,L	J
Dorosoma cepidianum			J	J	J												J						
Salmonidae																	L						
Coregoninae																							
Coregonus artedii																							
Coregonus clupeaformis									J	J													
Coregonus hoyi																		L			L		
Prosopium cylindraceum																							
Salmoninae																							
Oncorhynchus kisutch						J																	
Oncorhynchus tshawytscha				J	J				J	J													
Salmo gardneri				J	J	J																	
Salmo trutta				J	J	J	J	J															
Salvelinus namaycush							J	J															

Table 2. (con't)

	Stations																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Osmeridae																							
Osmerus mordax		Fry	J	J,L	J,L	J	J,L	J,L	J	J,L			L	L	L	J,Fry	L			Fry	J,Fry		
Umbridae																							
Umbra limi			J																				
Ecocidae																							
Esox lucius			J	J	J																		
Cyprinidae																							
Carassius auratus																							
Cyprinus carpio				J	J																		
Hybopsis storeriana																							
Notropis																							
Notropis atherinoides				J	J																		
Notropis hudsonius			J	J	J,L	J,L	J,L	J,L	J	J			L	L	L								
Pimiphales promelas				J	J																		
Rhinichthys cataractae				J	J																		
Catostomidae																							
Carpoides cyprinus																							
Catostomus catostomus				J	J				J	J													
Catostomus commersoni			J	J	J	J	J	J	J	J													
Moxostoma																							
Ictaluridae																							
Ictalurus																							
Ictalurus melas			J																				

Table 2. (con't)

	Stations																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Ictalurus natalis																							
Ictalurus nebulosus																							
Ictalurus punctatus			J	J	J		J	J															
Noturus flavus																							
Gadidae																							
Lota lota			J																				
Atherinidae																							
Labidesthes sicculus																							
Gasterosteidae																							
Pungitius pungitius			J				J	J															
Percopsidae																							
Percopsis omiscomaycus			J	J	J		J	J	J	J			L	L	L						J,L		
Percichthyidae																							
Morone americanus																							
Morone chrysops																							
Centrachidae																							
Ambloplites rupestris																							
Lepomis																							
Lepomis gibbosus			J																				
Lepomis macrochirus				J	J				J	J													
Micropterus																							
Micropterus dolomieui																							
Micropterus salmoides																							

Table 2. (con't)

	Stations																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Pomoxis																							
Pomoxis annularis																							
Pomoxis nigromaculatus			J																				
Percidae																							
Etheostoma																							
Etheostoma nigrum			J	J	J		J	J	J	J			L	L	L								
Perca flavescens	J,L	J,L	J	J,L	J,L	J	J,L	J,L	J	J			L	L	L	J,L	J	J,L		J,L	J,L	J,L	J
Percina capriodes																							
Stizostedion vitreum																							
Scienidae																							
Aplodinotus grunniens																							
Cottidae													L	L	L								
Cottus																							
Cottus bairdi			J						J	J													
Cottus cognatus			J				J	J	J	J							L						
Cottus ricei																							
Myoxocephalus quadricornis																							

Table 3. Frequency of occurrence of larval (L) and juvenile (J) fish in northern Lake Michigan (stations are identified in Figure 1). Other letters indicate adult (A), young-of-the-year (Y), or unknown age (O).

	Stations																								
	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Petromyzontidae																									
Acipenseridae																									
Acipenser															J										
Lepisosteidae																									
Lepisosteus																									
Lepisosteus osseus																									
Amiidae																									
Amia calva																									
Clupeidae	L		L																L						
Alosa pseudoharengus	J	J,L	J	J		J,L	J		O	J,L	O	J	J	J	O	J		O	L	J	Y				L
Dorosoma cepidianum	J		J				J													J					
Salmonidae			L																L						
Coregoninae																			L						
Coregonus artedii					J								O		O			O			A		A	O	
Coregonus clupeaformis				J	J		J		J,O		J		C		J	J	O	J			J	O	J	O	
Coregonus hoyi		L					J																		
Prosopium cylindraceum				J	J				J,O		O		J		J		O				J	O		O	
Salmoninae																									
Oncorhynchus kisutch	J			J									O		O									O	
Oncorhynchus tshawytscha							J				O				C			O			J				
Salmo gardneri							J								O									O	
Salmo trutta				J			J		J						O			O			J			O	
Salvelinus namaycush	J			J	J		J		J,O		J,O		J		J,O		O	O		J	J	O	A	O	

Table 3. (con't)

	Stations																								
	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Osmeridae																									
Osmerus mordax	J,L	L	J,L				J	L				J							J,L	J	Y				L
Umbridae																									
Umbra limi																									
Ecocidae																									
Esox lucius	L																							O	L
Cyprinidae																									
Carassius auratus																									
Cyprinus carpio															O										
Hybopsis storeriana																									
Notropis	L																								
Notropis atherinoides																									
Notropis hudsonius							J																		
Pimiphales promelas																									
Rhinichthys cataractae							J																		
Catostomidae																									
Carpoides cyprinus																									
Catostomus catostomus				J	J		J		O		O		O		O						O	O	A	O	
Catostomus commersoni				J			J		O		O		O		O		O	J			O	O	A	O	
Moxostoma																									
Ictaluridae																									
Ictalurus																									
Ictalurus melas	J																								

Table 3. (con't)

	Stations																							
	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Ictalurus natalis																									
Ictalurus nebulosus																									
Ictalurus punctatus	J																	J							
Noturus flavus																									
Gadidae																									
Lota lota					J				O				O				O	J				O	Λ		
Atherinidae																									
Labidesthes sicculus							J																		
Gasterosteidae																									
Pungitius pungitius	J						J														O				
Percopsidae																									
Percopsis omiscomaycus	J						J																		
Percichthyidae																									
Morone americanus																									
Morone chrysops																									
Centrachidae			L																						
Ambloplites rupestris																					J				
Lepomis																									
Lepomis gibbosus																									
Lepomis macrochirus			J				J																		
Micropterus																									
Micropterus dolomieui																									
Micropterus salmoides	J		J																						

Table 3. (con't)

	Stations																							
	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	[illegible]
Pomoxis	J,L		L																					
Pomoxis annularis	J																							
Pomoxis nigromaculatus																								
Percidae																								
Etheostoma																								
Etheostoma nigrum	J						J																	
Perca flavescens	J	J,L	J			J,L	J			J,L									J,L		J			
Percina capriodes	L																							
Stizostedion vitreum																								
Scienidae																								
Aplodinotus grunniens			J																					
Cottidae																								
Cottus							J																	
Cottus bairdi	J																							
Cottus cognatus	J														J									
Cottus ricei																								
Myoxocephalus quadricornis																								

Table 4 . Frequency of occurrence of larval (L) and juvenile (J) fish in Lake Superior (stations are identified in Figure 2). Other letters indicate adult (A), young-of-the-year (Y), or unknown age (O).

	Stations															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Petromyzontidae																
Acipenseridae																
Acipenser																
Lepisosteidae																
Lepisosteus																
Lepisosteus osseus																
Amiidae																
Amia calva																
Clupeidae																
Alosa pseudoharengus																
Dorosoma cepidianum																
Salmonidae																
Coregoninae	O									L	L	L		L	L	
Coregonus artedii																
Coregonus clupeaformis											L			L	L	
Coregonus hoyi																
Prosopium cylindraceum																
Salmoninae																
Oncorhynchus kisutch																L
Oncorhynchus tshawytscha	J				J	J	J	J								
Salmo gardneri																
Salmo trutta																
Salvelinus namaycush	J,O												L			L

Table 4. (con't)

	Stations															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Osmeridae																
Osmerus mordax	J,O	J	J	J	J	J	J	J	L	L	L	L	L	L	L	L
Umbridae																
Umbra limi																
Ecocidae																
Ecox lucius	O															
Cyprinidae																
Carassius auratus																
Cyprinus carpio	O											L				
Hybopsis storeriana																
Notropis	O															
Notropis atherinoides															L	
Notropis hudsonius																
Pimiphales promelas																
Rhinichthys cataractae																
Catostomidae																
Carpoides cyprinus																
Catostomus catostomus																
Catostomus commersoni	O				J	J	J	J	L	L						L
Moxostoma																
Ictaluridae																
Ictalurus																
Ictalurus melas																

Table 4. (con't)

	Stations															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Ictalurus natalis																
Ictalurus nebulosus																
Ictalurus punctatus																
Noturus flavus																
Gadidae																
Lota lota	O								L	L	L	L	L	L		
Atherinidae																
Labidesthes sicculus																
Gasterosteidae																
Pungitius pungitius	J,O															L
Percopsidae																
Percopsis omiscomaycus	O															L
Percichthyidae																
Morone americanus																
Morone chrysops																
Centrachidae																
Ambloplites rupestris	J,O															
Lepomis																L
Lepomis gibbosus																
Lepomis macrochirus																
Micropterus																
Micropterus dolomieui	J															L
Micropterus salmoides																

Table 4. (con't)

	Stations															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Pomoxis																
Pomoxis annularis																
Pomoxis nigromaculatus																
Percidae																
Ethcostoma																
Etheostoma nigrum																
Perca flavescens	J,O	J	J	J	J	J	J	J	L	L	L	L	L	L		L
Percina capriodes																
Stizostedion vitreum																
Sciaenidae																
Aplodinotus grunniens									L	L	L	L	L	L		
Cottidae																
Cottus																L
Cottus bairdi	O															L
Cottus cognatus	O															
Cottus ricei	O															
Myoxocephalus quadricornis	O															

Table 5. Frequency of occurrence of larval (L) and juvenile (J) fish in northern Lake Huron (stations are identified in Figure 3). Other letters indicate adult (A), young-of-the-year (Y), or unknown age (O).

	Stations																							
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Petromyzontidae																									
Acipenseridae																									
Acipenser																		J					J		
Lepisosteidae																									
Lepisosteus																									
Lepisosteus osseus																									
Amiidae																									
Amia calva					O						O					O									
Clupeidae																									
Alosa pseudoharengus	L		O	O			L		O	L		L		L	J					O				Y	
Dorosoma cepidianum				O	O																			O	
Salmonidae																									
Coregoninae																									
Coregonus artedii											O					O	O		O				O	O	
Coregonus clupeaformis				O			L	L									O		O	J	J			J	
Coregonus hoyi							L						L									L			
Prosopium cylindraceum			O	O		O					O						O		O	O			O	O	
Salmoninae																									
Oncorhynchus kisutch					O													O							
Oncorhynchus tshawytscha			O		O						O						O		O					O	
Salmo gardneri																							O		
Salmo trutta			O	O	O	O										O	O	O	O						
Salvelinus namaycush			O	O	O	O					O				J		O	O	O	J	J			O	

Table 5. (con't)

	Stations																							
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Osmeridae																									
Osmerus mordax	L	L	Y				L	L	O	L		L	L	L						Y	Y	L		Y	Y
Umbridae																									
Umbra limi																									
Ecocidae																									
Esox lucius					O	O					O					J		J	J				J	J	Y
Cyprinidae																									
Carassius auratus																									
Cyprinus carpio					O						O					O									
Hybopsis storeriana																									
Notropis																									
Notropis atherinoides			O																						
Notropis hudsonius																									
Pimiphales promelas																									
Rhinichthys cataractae																									
Catostomidae																									
Carpoides cyprinus																									
Catostomus catostomus			O	O		O					O						O		O	O			O		
Catostomus commersoni			O	O	O	O		L			O		L			O	O	O	O	O	O	L	O		
Moxostoma																									
Ictaluridae																									
Ictalurus																									
Ictalurus melas																									

Table 5. (con't)

	Stations																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Ictalurus natalis																									
Ictalurus nebulosus					0						0					0								0	0
Ictalurus punctatus											0														
Noturus flavus																									
Gadidae																									
Lota lota						0										0	0					L	0	0	
Atherinidae																									
Labidesthes sicculus																									
Gasterosteidae																									
Pungitius pungitius			0																		0				
Percopsidae																									
Percopsis omiscomaycus			0																						
Percichthyidae																									
Morone americanus																									
Morone chrysops			0																						
Centrachidae																									
Ambloplites rupestris				0	0						0					0								0	J
Lepomis																									
Lepomis gibbosus																0									J
Lepomis macrochirus																									
Micropterus																									
Micropterus dolomieui											0													0	
Micropterus salmoides																									

Table 5. (con't)

	Stations																							
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Pomoxis																									
Pomoxis annularis				O	O																				
Pomoxis nigromaculatus																									
Percidae																									
Etheostoma																									
Etheostoma nigrum																									
Perca flavescens	L			O	O	O	L	L			O		L	L		O	O	O				L	C		J
Percina capriodes																									
Stizostedion vitreum											O												O	J,O	
Scienidae																									
Aplodinotus grunniens																									
Cottidae																									
Cottus																									
Cottus bairdi																									
Cottus cognatus			O																					O	
Cottus ricei																									
Myoxocephalus quadricornis							L	L					L									L			

Table 6. Frequency of occurrence of larval (L) and juvenile (J) fish in southern Lake Huron (stations are identified in Figure 3). Other letters indicate adult (A), young-of-the-year (Y), or unknown age (O).

	Stations																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Petromyzontidae																	L								
Acipenseridae																									
Acipenser																									
Lepisosteidae																									
Lepisosteus																									
Lepisosteus osseus																									
Amiidae																									
Amia calva																									
Clupeidae				L													L	J,L	L						
Alosa pseudoharengus		L		J	Y	Y			J	L	J	J	J	J		J	J	J		O	L		L	O	O
Dorosoma cepidianum				J	O	Y		O	J		J	J	J	J	J	J	J	J,O		O					
Salmonidae																									
Coregoninae																									
Coregonus artedii																									
Coregonus clupeaformis																								O	
Coregonus hoyi																									
Prosopium cylindraceum							O															O		O	
Salmoninae																									
Oncorhynchus kisutch																						O			
Oncorhynchus tshawytscha							O															O			
Salmo gardneri				J				O																	
Salmo trutta				J				O																	
Salvelinus namaycush				J			J	O														O		O	

Table 6. (con't)

	Stations																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Osmeridae																									
Osmerus mordax	L	L	L	L	Y	Y	J		J	L	J	J	J	J		J	J,L	J,L,O	L	O	L		L		
Umbridae																									
Umbra limi																									
Esocidae																									
Esox lucius								O																	
Cyprinidae																									
Carassius auratus								O	J								L	J,L							
Cyprinus carpio								O		L	J		J		J	J	J		L						
Hybopsis storeriana							J																		
Notropis																									
Notropis atherinoides											J	J	J	J	J	J									
Notropis hudsonius				J	Y				J		J	J	J	J	J	J		J,L		O					
Pimiphales promelas																									
Rhinichthys cataractae																									
Catostomidae																			L						
Carpoides cyprinus																									
Catostomus catostomus							O															O		O	
Catostomus commersoni					O		J	J	J		J				J	J				O		O		O	
Moxostoma							O																		
Ictaluridae																									
Ictalurus																									
Ictalurus melas								O																	

Table 6. (con't)

	Stations																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Ictalurus natalis																									
Ictalurus nebulosus								0																	
Ictalurus punctatus				J				0	J				J	J	J	J									
Noturus flavus							0	0																	
Gadidae																									
Lota lota							J												L					C	
Atherinidae																									
Labidesthes sicculus																									
Gasterosteidae																									
Pungitius pungitius																									
Percopsidae																									
Percopsis omiscomaycus				J	Y						J		J	J				J,L		O					
Percichthyidae																									
Morone americanus																									
Morone chrysops											J		J	J	J	J	J	O							
Centrachidae																									
Ambloplites rupestris				J			0	0																	
Lepomis																									
Lepomis gibbosus					J	Y					J	J	J	J	J	J				O					
Lepomis macrochirus									J								J								
Micropterus																									
Micropterus dolomieui				J																					
Micropterus salmoides																									

Table 6. (con't)

	Stations																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Pomoxis																									
Pomoxis annularis																									
Pomoxis nigromaculatus					Y															O					
Percidae																									
Etheostoma																									
Etheostoma nigrum																									
Perca flavescens	L		L	J,L	J	J	O	O	J	L	J	J	J	J	J	J	J,L	J,L,O	L	O	L	O			
Percina capriodes																									
Stizostedion vitreum				J,L				O										J,L				O			
Scienidae																									
Aplodinotus grunniens				J							J		J	J		J									
Cottidae																									
Cottus																									
Cottus bairdi																									
Cottus cognatus																									
Cottus ricei																									
Myoxocephalus quadricornis							O																		

Table 7 . Frequency of occurrence of larval (L) and juvenile (J) fish in the Detroit River, Lake St. Clair and the St. Clair River (stations are identified in Figure 4). Other letters indicate adult (A), young-of-the-year (Y), or unknown age (O).

	Stations								
	1	2	3	4	5	6	7	8	9
Petromyzontidae									
Acipenseridae									
Acipenser									
Lepisosteidae									
Lepisosteus									
Lepisosteus osseus									O
Amiidae									
Amia calva	J					O			
Clupeidae		L	L	L	L		L	L	
Alosa pseudoharengus	J	J	J	J	J		J	J	
Dorosoma cepidianum	J	J	J	J	J		J	J	
Salmonidae									
Coregoninae									
Coregonus artedii									
Coregonus clupeaformis									
Coregonus hoyi									
Prosopium cylindraceum									
Salmoninae									
Oncorhynchus kisutch					J				
Oncorhynchus tshawytscha									
Salmo gardneri									
Salmo trutta									
Salvelinus namaycush									

Table 7. (con't)

	Stations								
	1	2	3	4	5	6	7	8	9
Osmeridae									
Osmerus mordax	J	J,L	J,L	J,L	J,L		J,L	J,L	
Umbridae									
Umbra limi									
Esocidae									
Esox lucius						O			O
Cyprinidae									
Carassius auratus	J					J			
Cyprinus carpio	J			J		J			O
Hybopsis storeriana									
Notropis	J								
Notropis atherinoides			J	J	J				
Notropis hudsonius									
Pimiphales promelas									
Rhinichthys cataractae									
Catostomidae									
Carpoides cyprinus									O
Catostomus catostomus									
Catostomus commersoni						O			O
Moxostoma						O			O
Ictaluridae									
Ictalurus	J								
Ictalurus melas						O			

Table 7. (con't)

	Stations								
	1	2	3	4	5	6	7	8	9
Ictalurus natalis									
Ictalurus nebulosus						O			
Ictalurus punctatus		J	J	J	J		J	J	O
Noturus flavus									
Gadidae									
Lota lota									
Atherinidae									
Labidesthes sicculus									
Gasterosteidae									
Pungitius pungitius									
Percopsidae									
Percopsis omiscomaycus	J	L	J,L	J,L			L	J,L	
Percichthyidae									
Morone americanus									
Morone chrysops		J,L	J	J,L	J,L	O		J	
Centrachidae									
Ambloplites rupestris	J	J	J	J	J	O	J	J	O
Lepomis	J								
Lepomis gibbosus						J			
Lepomis macrochirus						O			
Micropterus									
Micropterus dolomieui		J	J	J	J	O	J	J	
Micropterus salmoides									

Table 7. (con't)

	Stations								
	1	2	3	4	5	6	7	8	9
Pomoxis									
Pomoxis annularis	J								
Pomoxis nigromaculatus						O			
Percidae									
Etheostoma									
Etheostoma nigrum									
Perca flavescens	J	J,L	J,L	J,L	J,L	O	J,L	J,L	O
Percina capriodes		L	L	L	J		J	L	
Stizostedion vitreum	J	J,L	J,L	J,L	J,L	O	J,L	J,L	
Scienidae									
Aplodinotus grunniens		J	J	J,L	J	O	J	J,L	O
Cottidae									
Cottus									
Cottus bairdi									
Cottus cognatus									
Cottus ricei									
Myoxocephalus quadricornis									

Table 8. Frequency of occurrence of larval (L) and juvenile (J) fish in Lake Erie (stations are identified in Figure 6). Other letters indicate adult (A), young-of-the-year (Y), or unknown age (O).

	Stations																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Petromyzontidae																									
Acipenseridae																									
Acipenser																									
Lepisosteidae																									
Lepisosteus			L																						
Lepisosteus osseus																									
Amiidae																									
Amia calva																									
Clupeidae	L	L	J,L	L	L	L	L	L	L	L	L	L		L	L	L	L	L	L	L	L	L	L	L	L
Alosa pseudoharengus		J	J																						
Dorosoma cepidianum	J	J	J																						
Salmonidae																									
Coregoninae																									
Coregonus artedii																									
Coregonus clupeaformis																									
Coregonus hoyi																									
Prosopium cylindraceum																									
Salmoninae																									
Oncorhynchus kisutch		J																							
Oncorhynchus tshawytscha		J																							
Salmo gardneri		J																							
Salmo trutta																									
Salvelinus namaycush																									

Table 8. (con't)

	Stations																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Osmeridae																									
Osmerus mordax	L	J,L	J,L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Umbridae																									
Umbra limi																									
Esocidae																									
Esox lucius		J	L																						
Cyprinidae																									
Carassius cyprinus		L	L	L		L	L	L		L		L	L		L	L	L				L	L	L		L
Carassius auratus		J																							
Cyprinus carpio		J	J																						
Hybopsis storeriana																									
Notropis					L	L	L	L	L	L	L	L		L	L	L		L	L	L	L	L	L		L
Notropis atherinoides	J	J,L	J																						
Notropis hudsonius			J																						
Pimiphales promelas																									
Rhinichthys cataractae																									
Catostomidae		J			L	L		L													L				L
Carpoides cyprinus																									
Catostomus catostomus																									
Catostomus commersoni																									
Moxostoma																									
Ictaluridae																									
Ictalurus																									
Ictalurus melas		J																							

Table 8. (con't)

	Stations																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Ictalurus natalis		J																							
Ictalurus nebulosus		J																							
Ictalurus punctatus	J,L	J,L	J,L						L							L									
Noturus flavus		J																							
Gadidae																									
Lota lota	L																								
Atherinidae																									
Labidesthes sicculus			J,L																						
Gasterosteidae																									
Pungitius pungitius																									
Percopsidae																									
Percopsis omiscomaycus	J,L	J,L																						L	
Percichthyidae																									
Morone americanus		J																							
Morone chrysops	J,L	J,L	J,L	L	L				L					L	L	L		L			L		L	L	L
Centrachidae																									
Ambloplites rupestris	J	J																							
Lepomis		J																L			L				
Lepomis gibbosus																									
Lepomis macrochirus																									
Micropterus							L	L																	
Micropterus dolomieui	J	J	J																						
Micropterus salmoides		J																							

Table 8. (con't)

	Stations																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Pomoxis																	L								
Pomoxis annularis		J																							
Pomoxis nigromaculatus																									
Percidae																									
Etheostoma																									
Etheostoma nigrum	J,L																								
Perca flavescens		J,L	J,L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Percina capriodes		J,L							L	L	L	L													
Stizostedion vitreum	J,L	J,L	L						L	L					L							L			
Scienidae																									
Aplodinotus grunniens	J,L	J,L	J,L				L				L	L	L	L			L	L	L				L	L	
Cottidae																									
Cottus																									
Cottus bairdi																									
Cottus cognatus																									
Cottus ricei																									
Myoxocephalus quadricornis																									

Table 8 . (con't)

	Stations																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Petromyzontidae																									
Acipenseridae																									
Acipenser																									
Lepisosteidae																									
Lepisosteus																									
Lepisosteus osseus																									
Amiidae																									
Amia calva																									
Clupeidae	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Alosa pseudoharengus																									
Dorosoma cepidianum																									
Salmonidae																									
Coregoninae																									
Coregonus artedii																									
Coregonus clupeaformis																									
Coregonus hoyi																									
Prosopium cylindraceum																									
Salmoninae																									
Oncorhynchus kisutch																									
Oncorhynchus tshawytscha																									
Salmo gardneri																									
Salmo trutta																									
Salvelinus namaycush																									

Table 8. (con't)

	Stations																							
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Osmeridae																									
Osmerus mordax	L	L	L	L	L	L	L	L	L	L	L	L	L	L		L	L	L			L	L	L		L
Umbridae																									
Umbra limi																									
Esocidae																									
Esox lucius																									
Cyprinidae																									
Carassius cyprinus							L	L		L	L	L	L	L	L	L		L	L		L	L		L	L
Carassius auratus																									
Cyprinus carpio																									
Hybopsis storeriana																									
Notropis			L	L	L	L	L	L	L	L	L	L	L	L	L		L	L	L		L				L
Notropis atherinoides																									
Notropis hudsonius																									
Pimiphales promelas																									
Rhinichthys cataractae																									
Catostomidae				L								L	L	L	L	L									
Carpoides cyprinus																									
Catostomus catostomus																									
Catostomus commersoni																									
Moxostoma																									
Ictaluridae																									
Ictalurus																									
Ictalurus melas																									

Table 8. (con't)

	Stations																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Ictalurus natalis																									
Ictalurus nebulosus																									
Ictalurus punctatus																									
Noturus flavus																									
Gadidae																									
Lota lota																									
Atherinidae																									
Labidesthes sicculus																									
Gasterosteidae																									
Pungitius pungitius																									
Percopsidae																									
Percopsis omiscomaycus	L	L								L															
Percichthyidae																									
Morone americanus																									
Morone chrysops	L	L	L		L			L	L	L	L	L	L	L	L	L	L	L	L			L		L	L
Centrachidae																									
Ambloplites rupestris																									
Lepomis											L							L							
Lepomis gibbosus																									
Lepomis macrochirus																									
Micropterus																									
Micropterus dolomieui																									
Micropterus salmoides																									

Table 8. (con't)

	Stations																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Pomoxis																									
Pomoxis annularis																									
Pomoxis nigromaculatus																									
Percidae																									
Etheostoma																									
Etheostoma nigrum																									
Perca flavescens	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Percina capriodes				L	L	L	L																		
Stizostedion vitreum																									
Scienidae																									
Aplodinotus grunniens					L	L		L	L	L			L	L										L	
Cottidae																									
Cottus																									
Cottus bairdi																									
Cottus cognatus																									
Cottus ricei																									
Myoxocephalus quadricornis																									

Table 8. (cont'd)

	Stations																								
	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Petromyzontidae																									
Acipenseridae																									
Acipenser																									
Lepisosteidae																									
Lepisosteus																									
Lepisosteus osseus																									
Amiidae																									
Amia calva																									
Clupeidae	L	L	L	L	L	L	L	L	L	L	L		L	L	L	L	L	L	L						L
Alosa pseudoharengus																				Y	Y	Y	Y	Y	
Dorosoma cepidianum																				Y	Y	Y	Y	Y	
Salmonidae																									
Coregoninae																									
Coregonus artedii																									
Coregonus clupeaformis																									
Coregonus hoyi																									
Prosopium cylindraceum																									
Salmoninae																									
Oncorhynchus kisutch																									
Oncorhynchus tshawytscha																									
Salmo gardneri																									
Salmo trutta																									
Salvelinus namaycush																									

Table 8. (con't)

	Stations																							
	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Osmeridae																									
Osmerus mordax	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L								L
Umbridae																									
Umbra limi																									
Ecocidae																									
Esox lucius																									
Cyprinidae																									
Carassius cyprinus		L			L				L	L	L		L	L	L	L	L	L	L						L
Carassius auratus																				Y	Y	Y	Y	Y	
Cyprinus carpio																				Y	Y	Y	Y		
Hybopsis storeriana																									
Notropis	L	L																							L
Notropis atherinoides								L		L		L	L	L	L	L	L	L	L	Y	Y	Y	Y	Y	
Notropis hudsonius								L	L	L	L	L	L			L	L	L	L						
Pimiphales promelas																									
Rhinichthys cataractae																									
Catostomidae									L	L	L	L	L	L	L	L	L	L	L						
Carpoides cyprinus																									
Catostomus catostomus																									
Catostomus commersoni																									
Moxostoma																									
Ictaluridae																									
Ictalurus																									
Ictalurus melas																									

Table 8. (con't)

	Stations																								
	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ictalurus natalis																									
Ictalurus nebulosus																									
Ictalurus punctatus										L					L		L	L	L	Y	Y	Y	Y		
Noturus flavus																									
Gadidae																									
Lota lota																									
Atherinidae																									
Labidesthes sicculus																									
Gasterosteidae																									
Pungitius pungitius																									
Percopsidae																									
Percopsis omiscomaycus										L	L						L	L							
Percicthyidae																									
Morone americanus																									
Morone chrysops		L	L		L	L		L	L	L	L		L	L	L	L	L	L	L	Y	Y	Y	Y	Y	L
Centrachidae																									L
Ambloplites rupestris																									
Lepomis						L	L			L	L	L	L	L	L	L	L	L	L						
Lepomis gibbosus																									
Lepomis macrochirus																									
Micropterus									L							L		L	L						
Micropterus dolomieui																									
Micropterus salmoides																									

Table 8. (con't)

	Stations																							
	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Pomoxis																									
Pomoxis annularis										L	L	L	L			L		L	L						
Pomoxis nigromaculatus																									
Percidae																									
Etheostoma																									
Etheostoma nigrum																									
Perca flavescens	L	L	L	L	L	L	L	L	L	L	L		L	L	L	L	L	L	L	Y	Y	Y	Y		L
Percina capriodes									L	L		L					L	L							L
Stizostedion vitreum											L						L								
Scienidae																									
Aplodinotus grunniens				L	L		L						L	L	L	L	L	L	L	Y	Y	Y	Y	Y	L
Cottidae																									
Cottus																									
Cottus bairdi																									
Cottus cognatus																									
Cottus ricei																									
Myoxocephalus quadricornis																									

Table 8. (con't)

	Stations																							
	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Petromyzontidae																									
Acipenseridae																									
Acipenser																									
Lepisosteidae																									
Lepisosteus																									
Lepisosteus osseus																									
Amiidae																									
Amia calva																									
Clupeidae	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L			L
Alosa pseudoharengus																									
Dorosoma cepidianum																									
Salmonidae																									
Coregoninae																									
Coregonus artedii																									
Coregonus clupeaformis																									
Coregonus hoyi																									
Prosopium cylindraceum																									
Salmoninae																									
Oncorhynchus kisutch																									
Oncorhynchus tshawytscha																									
Salmo gairdneri																									
Salmo trutta																									
Salvelinus namaycush																									

Table 8. (con't)

	Stations																								
	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Osmeridae																									
Osmerus mordax	L	L	L	L	L	L	L	L	L	L	L		L	L	L	L	L	L	L		L				L
Umbridae																									
Umbra limi																									
Ecocidae																									
Esox lucius		L															L								
Cyprinidae																									
Carassius auratus																					L	L			L
Cyprinus carpio	L		L	L	L	L	L	L		L			L		L		L	L	L	L	L	L			L
Hybopsis storeriana																									
Notropis	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L		L	L			L
Notropis atherinoides																									
Notropis hudsonius																									
Pimiphales promelas																									
Rhinichthys cataractae																									
Catostomidae									L		L							L							
Carpoides cyprinus																									
Catostomus catostomus																									
Catostomus commersoni																					L				L
Moxostoma																									
Ictaluridae																									
Ictalurus																									
Ictalurus melas																									

Table 8. (con't)

	Stations																								
	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Ictalurus natalis																									
Ictalurus nebulosus																									
Ictalurus punctatus																		L			L	L			L
Noturus flavus																									
Gadidae																									
Lota lota																									
Atherinidae																									
Labidesthes sicculus																	L	L	L						
Gasterosteidae																									
Pungitius pungitius																									
Percopsidae																									
Percopsis omiscomaycus																					L				L
Percichthyidae																									
Morone americanus																									
Morone chrysops		L	L			L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L			L
Centrachidae	L	L	L	L	L	L	L		L	L	L		L			L	L	L	L						
Ambloplites rupestris																									
Lepomis																					L	L			L
Lepomis gibbosus																									
Lepomis macrochirus																									
Micropterus																					L				
Micropterus dolomieui																	L		L						
Micropterus salmoides																									

Table 8. (con't)

	Stations																							
	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Pomoxis		L			L				L									L			L				
Pomoxis annularis																									
Pomoxis nigromaculatus																									
Percidae																									
Etheostoma			L			L	L		L	L	L				L	L									
Etheostoma nigrum																									
Perca flavescens	L	L	L	L		L	L	L	L	L	L		L	L	L	L	L	L	L	L	L	L			L
Percina caprodes	L	L	L	L	L	L		L	L	L	L		L	L	L	L	L	L	L		L				L
Stizostedion vitreum					L													L			L				L
Scienidae																									
Aplodinotus grunniens	L		L	L					L	L	L	L	L	L	L	L	L		L		L	L			L
Cottidae																									
Cottus																									
Cottus bairdi																									
Cottus cognatus																									
Cottus ricei																									
Myoxocephalus quadricornis																									

Table 8 . (con't)

	Stations 101	102	103	104	105	106	107	108	109
Petromyzontidae									
Acipenseridae									
Acipenser									
Lepisosteidae									
Lepisosteus									
Lepisosteus osseus									
Amiidae									
Amia calva									
Clupeidae	L	L	L	L	L	L	L	L	L
Alosa pseudoharengus									
Dorosoma cepidianum									
Salmonidae									
Coregoninae									
Coregonus artedii									
Coregonus clupeaformis									
Coregonus hoyi									
Prosopium cylindraceum									
Salmoninae									
Oncorhynchus kisutch									
Oncorhynchus tshawytscha									
Salmo gardneri									
Salmo trutta									
Salvelinus namaycush									

Table 8. (con't)

	Stations								
	101	102	103	104	105	106	107	108	109
Osmeridae									
Osmerus mordax	L	L	L	L	L	L	L	L	L
Umbridae									
Umbra limi									
Ecocidae									
Esox lucius									
Cyprinidae									
Carassius auratus	L	L	L	L					
Cyprinus carpio	L	L	L	L					L
Hybopsis storeriana									
Notropis	L	L	L	L	L	L	L	L	L
Notropis atherinoides									
Notropis hudsonius									
Pimiphales promelas									
Rhinichthys cataractae									
Catostomidae									
Carpoides cyprinus									
Catostomus catostomus									
Catostomus commersoni	L								
Moxostoma									
Ictaluridae									
Ictalurus									
Ictalurus melas									

Table 8. (con't)

	Stations								
	101	102	103	104	105	106	107	108	109
Ictalurus natalis									
Ictalurus nebulosus									
Ictalurus punctatus	L								
Noturus flavus									
Gadidae									
Lota lota									
Atherinidae									
Labidesthes sicculus									
Gasterosteidae									
Pungitius pungitius									
Percopsidae									
Percopsis omiscomaycus									
Percichthyidae									
Morone americanus									
Morone chrysops	L	L	L	L	L	L	L	L	L
Centrachidae									
Ambloplites rupestris									
Lepomis	L	L	L	L					
Lepomis gibbosus									
Lepomis macrochirus									
Micropterus	L			L					
Micropterus dolomieui									
Micropterus salmoides									

Table 8. (con't)

	Stations								
	101	102	103	104	105	106	107	108	109
Pomoxis	L			L					
Pomoxis annularis									
Pomoxis nigromaculatus									
Percidae									
Etheostoma									
Etheostoma nigrum									
Perca flavescens	L	L	L	L	L	L	L	L	L
Percina capriodes									
Stizostedion vitreum									
Scienidae									
Aplodinotus grunniens	L	L	L	L	L	L	L	L	L
Cottidae									
Cottus									
Cottus bairdi									
Cottus cognatus									
Cottus ricei									
Myoxocephalus quadricornis									

More than half of the species previously reported for the Great Lakes were found in the studies summarized here. The lowest proportion was in Erie, which was also the most intensively sampled. But many of the species reported for Erie are most abundant in the deep central and eastern basins, away from the shallow, warm Michigan water. The highest proportion captured was for Lake Superior which was the least intensively sampled of the Michigan shores. This probably occurred because the relatively small number of species inhabiting Lake Superior are widely distributed over the lake basin.

Many of the species reported for the lower lakes are closely associated with protected warm-water embayments and back waters and therefore occur rarely in the open lake waters where most sampling has been conducted. This includes species (see Appendix 5 for scientific names) like the grass pickerel, creek chub, golden shiner, bigeye shiner, and bullhead minnow, which were not captured in the studies reported here even though they are reported to be widely distributed over the Great Lakes (Rolan & Skoch 1975; Scott and Crossman 1973). Many of the rare species reported in these studies are also associated with back waters and tributary streams including the bullhead, ictalurids, the bowfin, several species of redhorse, the lake chubsucker and black crappie. Other fishes missed are probably rare, offshore species including six coregonine chubs, the mooneye, the channel darter and northern sand darter. The sauger and muskellunge and tadpole madtom may not have appeared in the samples because they are rare and may be confused with common species like the walleye, northern pike and brown bullhead. Certain genera of sculpins, darters, bullheads, madtoms, minnows, sunfishes and herrings remain difficult to separate in early stages of development. Some of these species may have been missed entirely and records for specific sites may be uncertain. Many of the species that were missed are simply very rare in the Great Lakes.

The most widely distributed young fish in these studies appeared to be, in order of frequency encountered, the yellow perch, rainbow smelt, white sucker,

trout perch, carp and northern pike. Other species that were very widely distributed were alewife, burbot, chinook salmon, coho salmon, gizzard shad and rock bass. Species which were encountered in all of the upper lakes but not in the St. Clair and Erie system included the bloater, lake trout, lake whitefish, longnose sucker, round whitefish and the sculpins. A few species seemed restricted to the lower Huron-St. Clair-Erie region including freshwater drum, goldfish and white bass.

A large assortment of methods were used in these studies. Table 9 shows the relative use of different techniques. Results from embayment studies and pumping studies at intakes made up particularly large proportions on the St. Clair-Detroit River system. Only lower Lake Michigan and Lake Erie have been extensively examined for larval fishes at sites other than near power plants. Table 9 does not completely reveal the diversity of techniques that have been applied. At least seven different sizes of netting have been used in plankton nets. Both rectangular and circular nets have been used, the openings ranging from 0.24 m^2 to 0.78 m^2. Nets have been towed both night and day, in strata, obliquely and from 1 to 5 minutes. Two different kinds of pumps have been used. Intensities of effort have varied from several years at biweekly or monthly intensity to a single collection for one site.

A legitimate concern of careful coastal zone planning is appropriate management of fish spawning and nursery areas. Obviously the data reported here can serve only in a rudimentary way to provide a reference for such management. The most outstanding result of this inventory is the ignorance that exists about fish use of Great Lakes coastal zones. Because most of the data reported here were collected for specific purposes which were not directly related to coastal zone management, relatively few data apply specifically to that need. Even in western Lake Erie and southern Lake Michigan (Nelson and Cole 1975; Cole 1977; MacMillan 1976; Lavis 1976; Hemmick et al. 1976; Jude 1976) where data are

Table 9. Methodologies used to sample young fishes at sites summarized for this report. Each number represents the number of sites where the technique was applied.

Methods	Michigan	Superior	Huron	St. Clair	Erie
Total no. of sites	48	16	50	9	109
Intake screens					
Juveniles	6	1	4	6	3
Pumps					
Larvae	8	0	3	6	4
Plankton-nets					
Larvae	20	15	16	0	94
Juveniles	1	1	0	0	0
Bottom-sled with plankton-net					
Larvae	0	0	0	0	15
Hardy-high speed net					
Larvae	0	0	0	0	1
Seines					
Juveniles	5	4	0	0	0
Trawls					
Juveniles	13	3	18	3	5
Larvae	0	0	4	0	0
Gill nets					
Juveniles	11	0	18	0	2
Electrofishing					
Juveniles	0	1	0	0	0

numerous, it remains difficult to discern the kinds of coastal zone habitat that are especially valuable for fish spawning and nurseries.

Most of the data reported here simply provide documentation for occurrence of young fishes in the area sampled. Inferences about the locations of spawning and nursery areas are difficult to make without data on density variation and hydrodynamics over a range of habitats. The movements of young fish frequently are too great to assume that presence in a particular location necessarily indicates a required or "preferred" habitat. Over a few days at average velocities, currents in the Great Lakes can carry larvae several kilometers. Studies confined to single sites, such as at intakes, reveal little about the fish use of the area. Cole (1977) reported that larvae in western Lake Erie appeared to be rapidly dispersed from spawning areas once they hatched. Only the presence of the youngest yolk-sac larvae (prolarvae) is likely to indicate a spawning area nearby. Of course, at all the sites sampled the recorded occurrence of fish is a function of abundance, sampling effort (frequency, intensity and method diversification) and the interaction of technique with habitat. Because little attempt was made by the various investigations to standardize the sampling or to assess sampling effectiveness, care should be exercised for any interpretation of the data provided in this report. The data may provide the basis for potential distribution studies, but the absence of fish in the records for various sites may not mean that fish do not occur there or that they are scarce.

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APPENDICES

APPENDIX 1

REVIEWING FORM

Name of Art. _____

Location of Study (County) _____

Duration of Study _____

Fish	Lar.	J	uv.	Year	Length of Study	Methods	Site Descriptions Locations
Lepisosteus							
Amia calva							
Salmo							
Salvelinus namaycush							
Coregonüs							
Prosopium							
Osmerus mordax							
Alosa pseudoharengus							
Dorosoma cepedianum							
Esox							
Moxostoma							
Catostomus							
Cyprinus-Carassius							
Rhinichthys							
Notropis							
Ictalurus							
Lota lota							
Percopsis omiscomaycus							
Morone chrysops							
Micropterus							
Cottus							
Lepomis							
Pomoxis							
Stizostedion							
Aplodinotus grunniens							
Others							

Further References (over):

Date

Person called

List of Fish of Interest	Larva	Juvenile	Year Start	Year Stop	Comments

Further sources

List of Titles

	Available		Not Avail.	
	To be Mailed	To be Copied		To be Mailed

APPENDIX 2

PERSONS AND ORGANIZATIONS CONTACTED

Anderson, Robert
MSU

Boreman, John
Nat. Power Plant Team, Ann Arbor

Bradfield, Paul
Bay de Noc Comm. College

Cole, R. A.
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Cooley, John
CCIW

Dorr, John
U of M, Ann Arbor

Edsall, Tom
USFWS, Ann Arbor

Eisely, Paul
Detroit Edison Co.

Eshenroder, Randy
MDNR, Alpena

Fetterolf, Carlos
Gt. Lks. Fish. Comm.

Fritz, Eugene
USFWS, Ann Arbor

Haas, Bob
MDNR, St. Clair Shores Res. Stn.

Hartman, Will
USFWS, Ann Arbor

Jude, Dave
U of M, Ann Arbor

Lennon, Herb
C.M.U.

Liston, Charles
MSU

Madston, Charlene
WAPORA - Lansing

Mears, Tom
Alpena Comm. College

Morgan, David
Notre Dame

Nelson, Don
MDNR, Jackson

Nepsey, Steve
Ontario Res. Facility
Ontario Min. Nat. Res., Wheatley

Norden, Carroll
Univ. Wisconsin

O'Gorman, Bob
USFWS, Ann Arbor

Patriarche, Merce
MDNR

Pycha, Dick
USFWS, Ann Arbor

Scarfirs, Dick
MDNR, Marquette

Seeley, Jim
USFWS, Ann Arbor

Selgeby, Jim
USFWS, Ann Arbor

Stauffer, Tom
MDNR, Marquette

Waybrant, Ron
MDNR, Water Quality Division

Wells, Tex
USFWS, Ann Arbor

Werner, Earl
Kellogg Biological Station

Zeitoun, Ibraheim
Consumers Power Co., Jackson

APPENDIX 3

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APPENDIX 4

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SPECIES REPORTED FOR THE GREAT LAKES (ROLAN AND SKOCH, 1975) AND CAPTURED IN THE STUDIES COMPILED FOR THIS REPORT.

Common Name	Scientific Name	Habitat	Taxonomic Problems (A,B)[1] for Larvae[2]	Reported Occurrence in This Report
Alewife	*Alosa pseudoharengus*	lake & stream	A (*Dorosoma*)	X
American brook lamprey	*Lampetra lamottei*	stream		
American eel	*Anguilla rostrata*	lake & stream		
American shad	*Alosa sapidissima*	lake & stream		
Artic grayling	*Thymallus arcticus*	?	B?	
Atlantic salmon	*Salmo salar*	lake & stream		
Banded killifish	*Fundulus diaphanus*	lake & stream	B (*Fundulus*)	
Bigeye chub	*Hybopsis amblops*	stream	B (*Hybopsis*)	
Bigeye shiner	*Notropis boops*	stream		
Bigmouth shiner	*Notropis dorsalis*	stream		
Bigmouth buffalo	*Ictiobus cyprinellus*	lake & stream		
Black bullhead	*Ictalurus melas*	lake & stream	B (*Ictalurus*)	X
Black buffalo	*Ictiobus niger*	lake & stream	B	
Black crappie	*Pomoxis nigromaculatus*	lake & stream	B (*Pomoxis*)	X
Black redhorse	*Moxostoma duquesnei*	lake & stream	B (*Moxostoma*)	X?
Blackchin shiner	*Notropis heterodon*	lake & stream	A (*Notropis*)	
Blackfin cisco	*Coregonus nigripinnis*	lake & stream	B (*Coregonus-Prosopium*)	
Blacknose dace	*Rhinichthys atratulus*	lake & stream		
Blacknose shiner	*Notropis heterolepis*	stream		
Blackside darter	*Percina maculata*	stream	B (*Percina*)	
Blackstripe topminnow	*Fundulus notatus*	stream	B (*Fundulus*)	

Appendix 5. (con't)

Common Name	Scientific Name	Habitat	Taxonomic Problems (A,B)[1] for Larvae[2]	Reported Occurrence in This Report
Bloater	*Coregonus hoyi*	lake & stream	B (*Coregonus-Prosopium*)	X
Bowfin	*Amia calva*	lake & stream		X
Bluntnose minnow	*Pimephales notatus*	lake & stream	B (*Pimephales*)	
Bluegill	*Lepomis macrochirus*	lake & stream	B (*Lepomis*)	X
Brindled madtom	*Noturus miurus*	stream		
Brassy minnow	*Hybognathus hankinsoni*	stream		
Brook stickleback	*Culaea inconstans*	lake & stream	A (*Pungitius* and *Gasterosteus*)	
Brook silverside	*Labidesthes sicculus*	lake & stream	B	X
Brook trout	*Salvelinus fontinalis*	stream		
Brown bullhead	*Ictalurus nebulosus*	lake & stream		X
Brown trout	*Salmo trutta*	lake & stream		X
Bullhead minnow	*Pimephales vigilax*	lake & stream	B (*Pimephales*)	
Burbot	*Lota lota*	lake & stream		X
Carp	*Cyprinus carpio*	lake & stream	A (*Carassius*)	X
Central mudminnow	*Umbra limi*	lake & stream	B	X
Channel catfish	*Ictalurus punctatus*	lake & stream		X
Channel darter	*Percina copelandi*	lake & stream	B (*Percina*)	
Chinook salmon	*Oncorhynchus tshawytscha*	lake & stream		X
Chestnut lamprey	*Ichthyomyzon castaneus*	lake & stream		
Coho salmon	*Oncorhynchus kisutch*	lake & stream		X
Common shiner	*Notropis cornutus*	lake & stream	A (*Notropis*)	
Creek chub	*Semotilus atromaculatus*	lake & stream	B (*Semotilus*)	

Appendix 5. (con't)

Common Name	Scientific Name	Habitat	Taxonomic Problems (A,B)[1] for Larvae[2]	Reported Occurrence in This Report
Creek chubsucker	*Erimyzon oblongus*	stream		
Deepwater cisco	*Coregonus johannae*	lake & stream	B (*Coregonus-Prosopium*)	
Eastern madtom	*Noturus insignis*	stream	B (*Noturus*)	
Emerald shiner	*Notropis atherinoides*	lake & stream	A (*Notropis*)	X
Fantail darter	*Etheostoma flabellare*	lake & stream	B (*Etheostoma*)	
Fathead minnow	*Pimephales promelas*	lake & stream	B (*Pimephales*)	X
Finescale dace	*Chrosomus neogaeus*	stream		
Flathead catfish	*Pylodictis olivaris*	lake & stream	B	
Fourhorned sculpin	*Myoxocephalus quadricornis*	lake & stream		X
Freshwater drum (sheepshead)	*Aplodinotus grunniens*	lake & stream		X
Gizzard shad	*Dorosoma cepedianum*	lake & stream	A (*Alosa*)	X
Ghost shiner	*Notropis buchanani*	stream		
Goldfish	*Carassius auratus*	lake & stream	A (*Cyprinus*)	X
Golden redhorse	*Moxostoma erythrurum*	stream		?
Golden shiner	*Notemigonus crysoleucas*	lake & stream		
Grass pickerel	*Esox americanus*	lake & stream	A (*Esox*)	
Gravel chub	*Hybopsis x-punctata*	stream	B (*Hybopsis*)	
Greater redhorse	*Moxostoma valenciennesi*	stream		?
Green sunfish	*Lepomis cyanellus*	stream		
Greenside darter	*Etheostoma blennioides*	stream	B (*Etheostoma*)	
Harelip sucker	*Lagochila lacera*	?		
Hornyhead chub	*Hybopsis biguttata*	stream		

Appendix 5. (con't.)

Common Name	Scientific Name	Habitat	Taxonomic Problems (A,B)[1] for Larvae[2]	Reported Occurrence in This Report
Iowa darter	*Etheostoma exile*	stream	B (*Etheostoma*)	
Ironcolor shiner	*Notropis chalybaeus*	stream		
Johnny darter	*Etheostoma nigrum*	lake & stream	B (*Etheostoma*)	X
Kiyi	*Coregonus kiyi*	lake & stream	B (*Coregonus-Prosopium*)	
Lake chub	*Couesius plumbea*	lake & stream		
Lake chubsucker	*Erimyzon sucetta*	lake & stream	B	
Lake herring	*Coregonus artedii*	lake & stream		X
Lake sturgeon	*Acipenser fulvescens*	lake & stream		X
Lake trout	*Salvelinus namaycush*	lake & stream		X
Lake whitefish	*Coregonus clupeaformis*	lake & stream		X
Largemouth bass	*Micropterus salmoides*	lake & stream		
Least darter	*Etheostoma microptera*	stream		
Logperch	*Percina caprodes*	lake & stream	B (*Percina*)	X
Longear sunfish	*Lepomis megalotis*	stream		
Longjaw cisco	*Coregonus alpenae*	lake & stream	B (*Coregonus-Prosopium*)	
Longnose dace	*Rhinichythys cataractae*	lake & stream		X
Longnose gar	*Lepisosteus osseus*	lake & stream		X
Longnose sucker	*Catostomus catostomus*	lake & stream	B	X
Mimic shiner	*Notropis volucellus*	stream	B (*Notropis*)	
Mooneye	*Hiodon tergisus*	lake & stream		
Mosquitofish	*Gambusia affinis*	stream		
Mottled sculpin	*Cottus bairdi*	lake & stream	A (*Cottus*)	X

Appendix 5. (con't)

Common Name	Scientific Name	Habitat	Taxonomic Problems (A,B)[1] for Larvae[2]	Reported Occurrence in This Report
Muskellunge	*Esox masquinongy*	lake & stream	A (*Esox*)	
Ninespine stickleback	*Pungitius pungitius*	lake & stream	(*Culaea* and *Gasterosteus*)	X
Northern brook lamprey	*Ichthyomyzon fossor*	stream		
Northern hog sucker	*Hypentelium nigricans*	stream	B	
Northern pike	*Esox lucius*	lake & stream		X
Northern redbelly dace	*Chrosomus eos*	stream		
Northern redhorse	*Moxostoma macrolepidotum*	lake & stream		?
Northern sand darter	*Ammocrypta pellucida*	lake & stream	B	
Orangespotted sunfish	*Lepomis humilis*	stream	B (*Lepomis*)	
Orangethroat darter	*Etheostoma spectabile*	stream	B (*Etheostoma*)	
Paddlefish	*Polyodon spathula*	lake & stream		
Pearl dace	*Semotilus margarita*	stream	B (*Semotilus*)	
Pigmy whitefish	*Prosopium coulteri*	lake & stream		
Pirate perch	*Aphredoderus sayanus*	stream		
Popeye shiner	*Notropis ariommus*	stream		
Pugnose minnow	*Opsopoeodus emiliae*	stream		
Pumpkinseed	*Lepomis gibbosus*	lake & stream	B (*Lepomis*)	X
Quillback	*Carpiodes cyprinus*	lake & stream	B (*Carpiodes*)	X
Rainbow darter	*Etheostoma caeruleum*	stream		
Rainbow smelt	*Osmerus mordax*	lake & stream		X
Rainbow trout	*Salmo gairdneri*	lake & stream		X
Redear sunfish	*Lepomis microlophus*	stream	B (*Lepomis*)	
Redfin shiner	*Notropis umbratilis*	stream		

Appendix 5. (con't)

Common Name	Scientific Name	Habitat	Taxonomic Problems (A,B)[1] for Larvae[2]	Reported Occurrence in This Report
Redside dace	*Clinostomus elongatus*	stream	B	
River carpsucker	*Carpiodes carpio*	stream	B (*Carpiodes*)	
River chub	*Hybopsis micropogon*	stream		
River darter	*Percina shumardi*	stream	B (*Percina*)	
River redhorse	*Moxostoma carinatum*	stream		?
Rock bass	*Ambloplites rupestris*	lake & stream	B	X
Rosyface shiner	*Notropis rubellus*	stream		
Round whitefish	*Prosopium cylindraceum*	lake & stream	B (*Coregonus-Prosopium*)	X
Sand shiner	*Notropis deliciosus*	stream		
Sauger	*Stizostedion canadense*	lake & stream		
Sea lamprey	*Petromyzon marinus*	lake & stream		?
Shortjaw cisco	*Coregonus zenithicus*	lake & stream		
Shortnose cisco	*Coregonus reighardi*	lake & stream		
Silver chub	*Hybopsis storeriana*	lake & stream	B (*Hybopsis*)	X
Silver lamprey	*Ichthyomyzon unicuspis*	lake & stream		
Silver redhorse	*Moxostoma anisurum*	lake & stream		?
Silver shiner	*Notropis photogenis*	stream		
Silverjaw minnow	*Ericymba buccata*	stream		
Slimy sculpin	*Cottus cognatus*	lake & stream	A (*Cottus*)	X
Smallmouth bass	*Micropterus dolomieui*	lake & stream		X
Sockeye salmon	*Oncorhynchus nerka*	lake & stream		
S. Redbelly dace	*Chrosomus erythrogaster*	stream		
Spoonhead sculpin	*Cottus ricei*	lake & stream	A (*Cottus*)	X

Appendix 5. (con't)

Common Name	Scientific Name	Habitat	Taxonomic Problems (A,B)[1] for Larvae[2]	Reported Occurrence in This Report
Spotfin shiner	*Notropis spilopterus*	lake & stream	A (*Notropis*)	
Spottail shiner	*Notropis hudsonius*	lake & stream	A (*Notropis*)	X
Spotted gar	*Lepisosteus productus*	lake & stream		
Spotted sucker	*Minytrema melanops*	stream		
Starhead topminnow	*Fundulus nottii*	stream	B (*Fundulus*)	
Stonecat	*Noturus flavus*	lake & stream	B (*Noturus*)	X
Stoneroller	*Campostoma anomalum*	stream	B	
Suckermouth minnow	*Phenacobius mirabilis*	stream		
Tadpole madtom	*Noturus gyrinus*	lake & stream	B (*Noturus*)	
Threespine stickleback	*Gasterosteus aculeatus*	lake & stream	A (*Pungitius* and *Culaea*)	
Trout-perch	*Percopsis omiscomaycus*	lake & stream	A	X
Walleye	*Stizostedion vitreum*	lake & stream		X
Warmouth	*Chaenobryttus gulosus*	stream		
Weed shiner	*Notropis texanus*	stream		
White bass	*Morone chrysops*	lake & stream		X
White crappie	*Pomoxis annularis*	lake & stream	B (*Pomoxis*)	X
White perch	*Morone americana*	lake & stream		X
White sucker	*Catostomus commersoni*	lake & stream		X
Yellow bullhead	*Ictalurus natalis*	stream	B (*Ictalurus*)	X
Yellow perch	*Perca flavescens*	lake & stream		X

[1] A = high priority; B = moderate priority

[2] From Boreman (1976)

APPENDIX 6

COUNTY SUMMARY OF ALL LOCATIONS SAMPLED, GEAR USED AND FISH CAUGHT

LAKE MICHIGAN

County: Berrien

Source of Information: Wells, 1973. Administrative Report.

Site 1:

Location: New Buffalo

Description: Near shore, depth 9.2 m

Method 1: ½ m - nylon plankton net 351μ mesh. Tows made at 1 m depth intervals. Towed at 4 mph for 5 min.

Dates sampled: May 3-9, May 27-28, June 18-20, June 28-July 4, July 9-12, July 20-23, August 25-30, 1973.

Fish captured:		
Alewife	larva	juvenile
Yellow perch	"	"

Site 2:

Location: Cook Power Plant

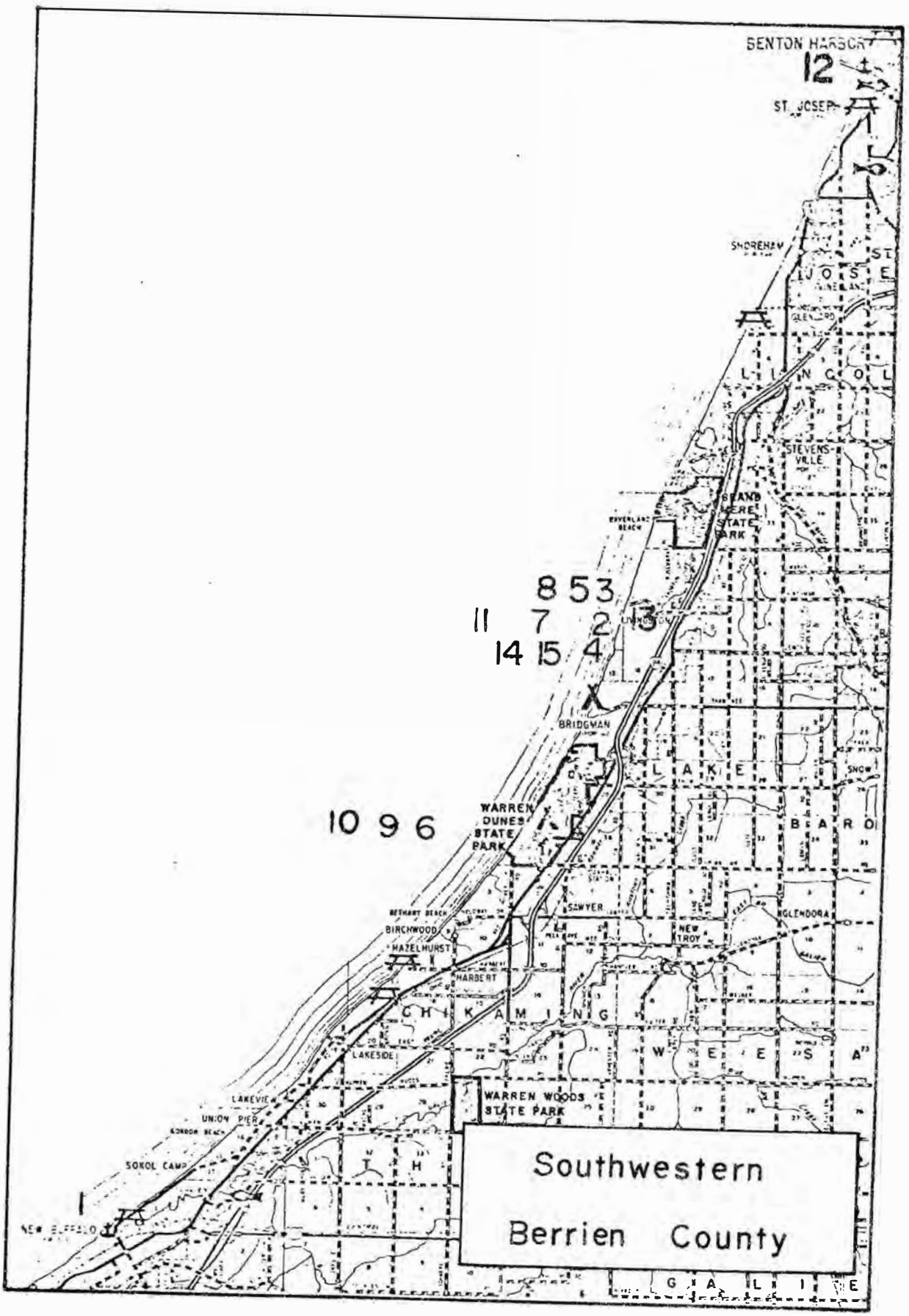
Description: Near shore, depth 9.2 m

Method 1: ½ m - nylon plankton net 351μ mesh tows: 1 m depth intervals, greatest depth 9.2 m. Towed at 4 mph for 5 min.

Dates sampled: May 3-9, May 27-28, June 18-20, June 28-July 4, July 9-12, July 20-23, August 25-30, 1973.

Fish captured:		
Alewife	larva	juvenile
Smelt	larva	
Yellow perch	larva	juvenile

Source of Information: Jude, D. J., F. J. Tesar, J. A. Dorr III, T. J. Miller, P. J. Rago, and D. J. Stewart. 1975. Inshore Lake Michigan fish populations near the Donald C. Cook Nuclear Power Plant, 1973. Spec. Rep. No. 52 Gt. Lakes Res. Div. Univ. of Mich. Ann Arbor, Mich. 267 pp.


BENTON HARBOR
12
ST. JOSEPH
SHOREHAM
ST JOSEPH
LINCOLN
STEVENSVILLE
GRAND MERE STATE PARK
8 5 3
11 7 2 13
14 15 4
BRIDGMAN
LAKE
SNOW
10 9 6
WARREN DUNES STATE PARK
BARO
BETHANY BEACH
BIRCHWOOD
HAZELHURST
SAWYER
NEW TROY
GLENDORA
HARBERT
CHIKAMING
WEESAW
LAKESIDE
WARREN WOODS STATE PARK
LAKEVIEW
UNION PIER
SOKOL CAMP
1
NEW BUFFALO
Southwestern
Berrien County
GALIEE

Site 3:

Location: Donald C. Cook Power Plant intake forebay

Description: Receives water from 671 m intake pipes

Method 1: Traveling screens

Dates sampled: January, February, March, April, October, November, December, 1973

Fish captured:		
	Alewife	juvenile
	Black bullhead	"
	Black crappie	"
	Bowfin	"
	Burbot	"
	Channel catfish	"
	Gizzard shad	"
	Johnny darter	"
	Central mudminnow	"
	Mottled sculpin	"
	Northern pike	"
	Ninespine stickleback	"
	Pumpkinseed	"
	Rainbow smelt	"
	Spottail shiner	"
	Slimy sculpin	"
	Trout-perch	"
	White sucker	"
	Yellow perch	"

Method 2: Diaphragm pump with intake hoses at 1.5, 3.0, 4.6 and 9.1 m

Dates sampled: 1, 15, and 22 February, 1973

Fish captured: No fish captured

Site 4:

Location: Just north of the Cook Power Plant

Description: Beach area, sandy bottom, subject to wave action

Method 1: Day and night sampling with a ½ m 351µ mesh plankton net, duplicated tows

Dates sampled: March to December, 1973 (once a month)

Fish captured:		
	Alewife	larva
	Rainbow smelt	"
	Yellow perch	"

Method 2: 38 m bag seine, ½ cm bar mesh, duplicated, day and night sampling

Dates sampled: March to December, 1973 (once a month)

Fish captured:		
	Alewife	juvenile
	Bluegill	"
	Brown trout	"
	Carp	"
	Channel catfish	"
	Chinook salmon	"
	Emerald shiner	"
	Fathead minnow	"
	Gizzard shad	"
	Johnny darter	"
	Longnose dace	"
	Longnose sucker	"
	Northern pike	"
	Rainbow smelt	"
	Rainbow trout	"
	Spottail shiner	"
	Trout-perch	"
	White sucker	"
	Yellow perch	"

Site 5:

Location: Just south of the Cook Power Plant

Description: Beach area, flat sandy bottom, subject to wave action

Method 1: Day and night sampling with a ½ m 351µ mesh plankton net, duplicated tows

Dates sampled: March to December, 1973, once a month

Fish captured:		
	Alewife	larva
	Rainbow smelt	"
	Spottail shiners	"
	Yellow perch	"

Method 2: 38 m bag seine, ¼ cm bar mesh, duplicated, day and night sampling

Dates sampled: March to December, 1973, once a month

Fish captured:		
	Alewife	juvenile
	Bluegill	"
	Brown trout	"
	Carp	"
	Channel catfish	"
	Chinook salmon	"
	Emerald shiner	"
	Fathead minnow	"
	Gizzard shad	"
	Johnny darter	"
	Longnose dace	"
	Longnose sucker	"
	Northern pike	"
	Rainbow smelt	"
	Rainbow trout	"
	Spottail shiner	"
	Trout-perch	"
	White sucker	"
	Yellow perch	"

Site 6:

Location: Warren Dunes State Park

Description: Beach area, sandy bottom, subject to wave action

Method 1: Day and night sampling with a ½ m 351μ mesh plankton net, duplicated tows

Dates sampled: April to October, 1973

Fish captured:	Alewife	larva
	Spottail shiner	"

Method 2: 38 m bag seine, ½ cm bar mesh, duplicated, day and night sampling

Dates sampled: March to December, 1973, once a month

Fish captured:	Alewife	larva
	Brown trout	"
	Coho salmon	"
	Rainbow smelt	"
	Rainbow trout	"
	Spottail shiner	"
	White sucker	"
	Yellow perch	"

Site 7:

Location: 350 m west of Cook Power Plant

Description: 6.1 m of water, sandy bottom

Method 1: Day and night sampling with a ½ m 351μ mesh plankton net, four five-minute tows

Dates sampled: April to October, 1973, once a month

Fish captured:	Alewife	larva
	Rainbow smelt	"
	Spottail shiner	"
	Yellow perch	"

Method 2: Duplicate 10-min bottom tows with a semi-balloon trawl towed parallel to shore along the 6.1 m depth contour, day and night

Dates sampled: April to December, 1973, once a month

Fish captured:	Alewife	juvenile
	Brown trout	"
	Channel catfish	"
	Johnny darter	"
	Lake trout	"
	Ninespine stickleback	"
	Rainbow smelt	"

	Spottail shiner	juvenile
	Slimy sculpin	"
	Trout-perch	"
	White sucker	"
	Yellow perch	"

Site 8:

Location: 670 m west of the Cook Power Plant

Description: 9.1 m of water, sandy bottom

Method 1: Day and night sampling with a ½ m 351μ mesh plankton net, four five-minute tows

Dates sampled: April to October, 1973, once a month

Fish captured:	Alewife	larva
	Rainbow smelt	"
	Spottail shiner	"
	Yellow perch	"

Method 2: Duplicate 10-min bottom tow with a semi-balloon trawl, towed parallel to shore along the 9.1 m depth contour, day and night sampling

Dates sampled: April to December, 1973, once a month

Fish captured:	Alewife	juvenile
	Brown trout	"
	Channel catfish	"
	Johnny darter	"
	Lake trout	"
	Ninespine stickleback	"
	Rainbow smelt	"
	Spottail shiner	"
	Slimy sculpin	"
	Trout-perch	"
	White sucker	"
	Yellow perch	"

Site 9:

Location: 350 m west of Warren Dunes State Park

Description: 6.1 m of water, coarse sand

Method 1: Day and night sampling with a ½ m 351μ mesh plankton net, four five-minute tows

Dates sampled: April to October, 1973, once a month

Fish captured:		
	Alewife	larva
	Unidentified	"

Method 2: Duplicate 10-min bottom tows with a semi-balloon trawl towed parallel to shore along the 6.1 m depth contour, day and night sampling

Dates sampled: April to December, 1973, once a month

Fish captured:		
	Alewife	juvenile
	Bluegill	"
	Chinook salmon	"
	Johnny darter	"
	Lake whitefish	"
	Longnose sucker	"
	Mottled sculpin	"
	Rainbow smelt	"
	Slimy sculpin	"
	Spottail shiner	"
	Trout-perch	"
	White sucker	"
	Yellow perch	"

Site 10:

Location: 670 m west of Warren Dunes State Park

Description: 9.1 m of water, coarse sand

Method 1: Day and night sampling with a ½ m 351μ mesh plankton net, four five-minute tows

Dates sampled: April to October, 1973, once a month

Fish captured:		
	Alewife	larva
	Rainbow smelt	"
	Unidentified	"

Method 2: Duplicate 10-min bottom tows with a balloon trawl towed parallel to shore along the 9.1 m depth contour, day and night sampling

Dates sampled: April to December, 1973, once a month

Fish captured.		
	Alewife	juvenile
	Bluegill	"
	Chinook salmon	"
	Johnny darter	"
	Lake whitefish	"
	Longnose sucker	"
	Mottled sculpin	"
	Rainbow smelt	"
	Slimy sculpin	"
	Spottail shiner	"
	Trout-perch	"
	White sucker	"
	Yellow perch	"

Site 11:

Location: 5000 m west of the Cook Power Plant

Description: 21.4 m of water

Method 1: Four five-minute tows parallel to shore using a ½ m 351µ mesh plankton net

Dates sampled: June to August, 1973, once a month

Fish captured: Alewife larva

Site 12:

Location: Mouth of the St. Joseph River north of the Cook Power Plant

Description: 6.1 m of water

Method 1: Four five-minute tows parallel to shore using a ½ m 351µ mesh plankton net

Dates sampled: May and October, 1973, once a month

Fish captured: No fish captured

Source of Information: Jude, D. J. 1976. Entrainment of fish larvae and eggs on the Great Lakes with special reference to the D. C. Cook Nuclear Plant, southeastern Lake Michigan. Proc. 3rd Ann. Workshop on Entrainment and Inpingement. N.Y., N.Y. Feb. 1975. (In press)

Site 13:

Location: Power plant intake forebay

Description: Maximum depth of 10.1 m

Method 1: Diaphragm pump with intake hose at 2, 5, and 9 m; pump water filtered through a 361μ mesh plankton net. Samples collected every six hours during a 24-hour sampling period.

Dates sampled: 1974, once a month; 1975, twice a month except for June, July and August when done weekly

Fish captured:		
	Alewife	larva
	Johnny darter	"
	Rainbow smelt	"
	Sculpin	"
	Spottail shiner	"
	Trout-perch	"
	Yellow perch	"

Site 14:

Location: Power plant discharge

Method 1: Diaphragm pump with intake hose at 2, 5, and 9 m; pump water filtered through a 361μ mesh plankton net. Samples collected every six hours during a 24-hour sampling period.

Dates sampled: 1974, once a month; 1975, twice a month except for June, July and August when done weekly

Fish captured:		
	Alewife	larva
	Johnny darter	"
	Rainbow smelt	"
	Spottail shiner	"
	Sculpin	"
	Trout-perch	"
	Yellow perch	"

Site 15:

Location: 10 selected stations around the Cook Power Plant (actual locations unavailable)

Description: Sandy bottom

Method 1: No. 2, ½ m diameter plankton net towed horizontally for 5 minutes; samples taken day and night at 2, 4, 6 and 8 m.

Dates sampled: April through November

Fish captured:		
	Alewife	larva
	Johnny darter	"
	Rainbow smelt	"
	Spottail shiner	"
	Sculpin	"
	Trout-perch	"
	Yellow perch	"

County: Van Buren

Source of Information: Wells, 1973. Administrative Report.

Site 16:

Location: Palisades Power Plant

Description:

Method 1: ½ m nylon plankton net 351µ mesh, 1 m depth intervals, greatest depth 9.2 m. Towed 4 mph for 5 min.

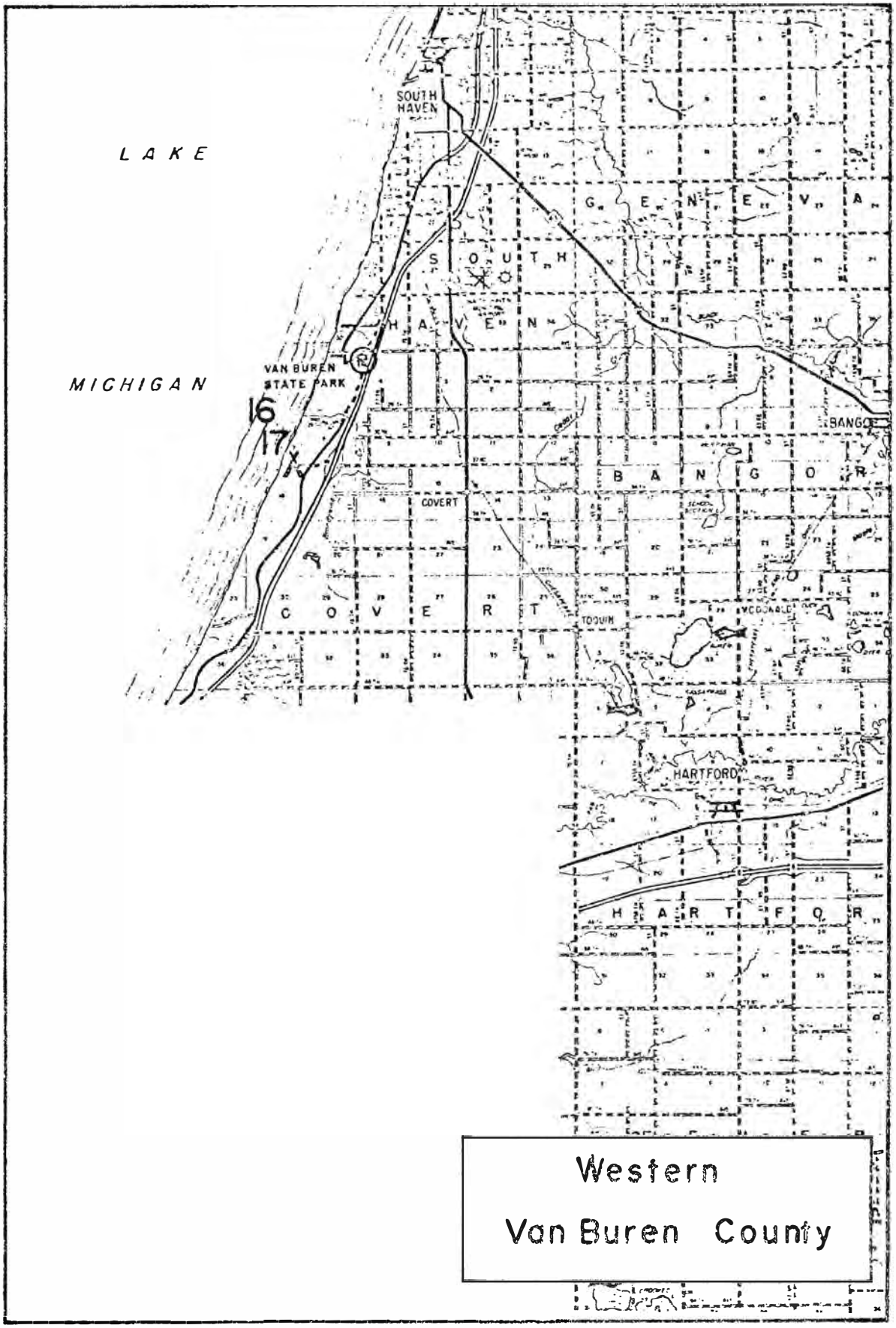
Dates sampled: May 3-9, May 27-28, June 18-20, June 28-July 4, July 9-12, July 20-23, August 25-30, 1973.

Fish captured:			
	Alewife	larva	juvenile
	Smelt	fry	"
	Yellow perch	larva	"

Source of Information: Section 316(b) Intake Study, Palisades Nuclear Plant

Site 17:

Location: Plant intake bay



Western
Van Buren County

Description: Lake bottom sandy, shoreline straight with very little relief

Method 1: Traveling intake screen

Dates sampled: March 1974 to March 1975

Fish captured:		
	Alewife	juvenile
	Gizzard shad	"
	Yellow perch	"

Method 2: Submersible sump pump filtered through a 333μ plankton net; depth: surface and 12 ft

Dates sampled: March 1974 to February 1975

Fish captured:		
	Alewife	larva
	Rainbow smelt	"
	Salmonid	"
	Slimy sculpin	"
	Yellow perch	juvenile

County: Allegan

Source of Information: Wells, 1975. Administrative Report.

Site 18:

Location: Saugatuck

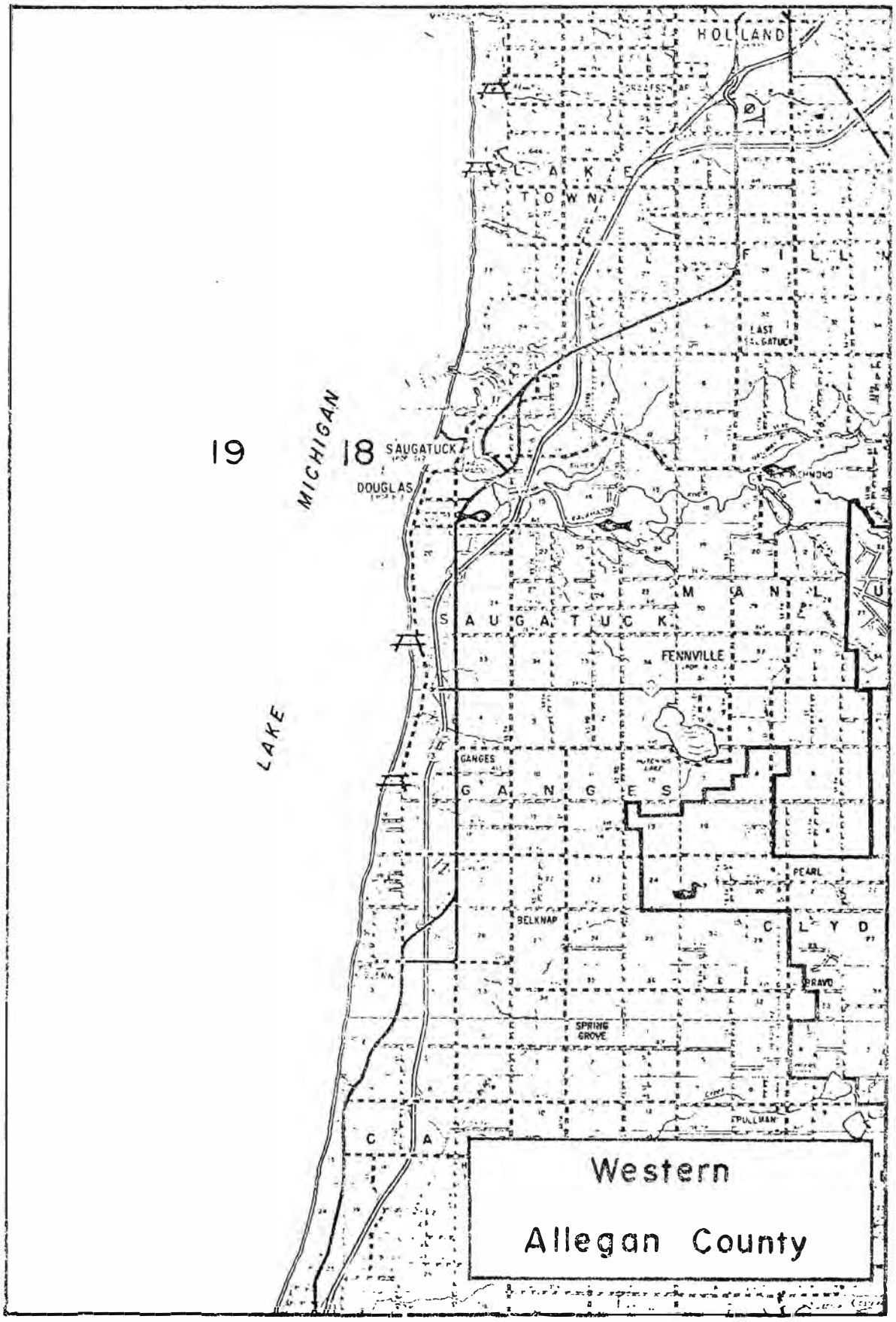
Description: Near water

Method 1: ½ m nylon plankton net 351μ mesh, 1 m depth intervals, greatest depth 9.2 m, towed 4 mph for 5 min

Dates sampled: May 3-9, May 27-28, June 18-20, June 28-July 4, July 9-12, July 20-23, August 25-30, 1973

Fish captured:			
	Alewife	larva	juvenile
	Yellow perch	"	"

Source of Information: Wells, LuRue, 1966. Seasonal and depth distribution of larval bloaters (*Coregonus hoyi*) in southeastern Lake Michigan. Trans. Amer. Fish. Soc. 95:338-396.


HOLLAND
LAKE
TOWN
FILL
LAST
SAUGATUCK
19
18
SAUGATUCK
DOUGLAS
MICHIGAN
LAKE
MANLIUS
SAUGATUCK
FENNVILLE
GANGES
GANGES
PEARL
BELKNAP
CLYDE
BRAYO
SPRING
GROVE
PULLMAN
CA
Western
Allegan County

Site 19:

Location: Southeastern Lake Michigan off Saugatuck, Michigan

Description:

Method 1: Oblique tows for each 10-fathom stratum over bottom depths from 5-50 fathoms. Some additional oblique tows 60, 70, 80 and 88 fathoms. A 1 m plankton net with a 0.66 mm mesh towed for one minute at each level.

Dates sampled: 9 April to 22 August, 1964, every 10 days

Fish captured: Bloater larva

County: Ottawa - Allegan

Source of Information: Wells, 1973. Administrative Report.

Site 20:

Location: Holland

Description: Near water

Method 1: ½ m nylon plankton net 351μ mesh, 1 m depth intervals, greatest depth 9.2 m, towed at 4 mph for 5 min

Dates sampled: May 3-9, May 27-28, June 18-20, June 28-July 4, July 9-12, July 20-23, August 25-30, 1973

Fish captured:		
Alewife	larva	juvenile
Smelt	fry	
Yellow perch	larva	"

County: Ottawa

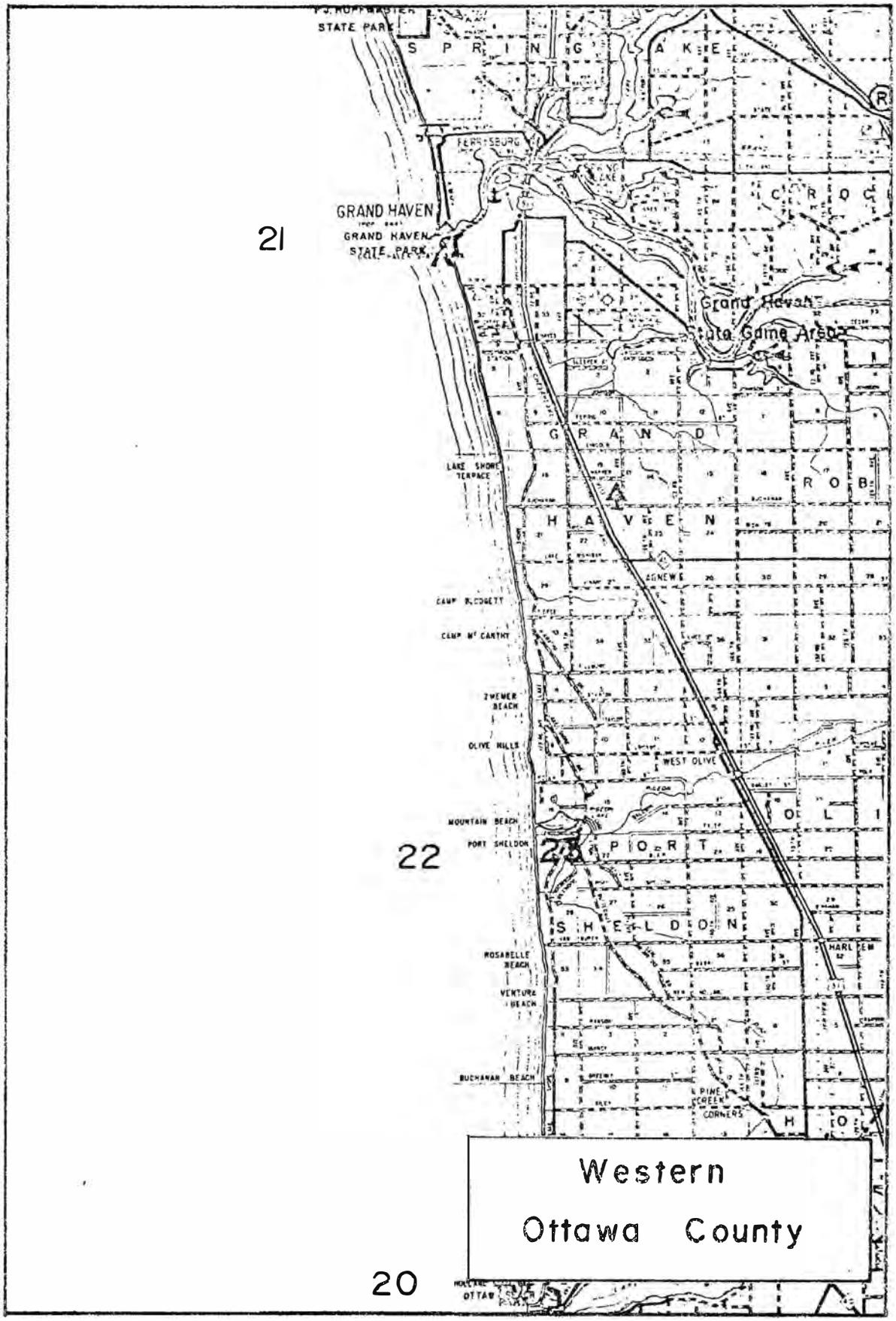
Source of Information: Wells, 1973. Administrative Report.

Site 21:

Location: Grand Haven

Description:

Method 1: ½ m nylon plankton net 351μ mesh, 1 m depth intervals, greatest depth 9.2 m, towed at 4 mph for 5 min


STATE PARK
SPRING LAKE
FERRYSBURG
GRAND HAVEN
GRAND HAVEN STATE PARK
21
Grand Haven State Game Area
GRAND HAVEN
LAKE SHORE TERRACE
AGNEWS
CAMP BLODGETT
CAMP Mc CARTHY
ZWEMER BEACH
OLIVE HILLS
WEST OLIVE
MOUNTAIN BEACH
PORT SHELDON
22
PORT
SHELDON
ROSABELLE BEACH
VENTURA BEACH
BUCHANAN BEACH
PINE CREEK CORNERS
HARLEM
Western
Ottawa County
20

Dates sampled: May 3-9, May 27-28, June 18-20, June 28-July 4, July 9-12, July 20-23, August 25-30, 1973

Fish captured:	Alewife	larva	juvenile
	Bloater	"	
	Smelt	"	"
	Trout-perch	"	"
	Yellow perch	"	"

Source of Information: Wells, 1973. Administrative Report.

Site 22:

Location: Port Sheldon

Description: Near water

Method 1: ½ m nylon plankton net 351μ mesh, 1 m depth intervals, greatest depth 9.2 m, towed at 4 mph for 5 min

Dates sampled: May 3-9, May 27-28, June 18-20, June 28-July 4, July 9-12, July 20-23, August 25-30, 1973

Fish captured:	Alewife	larva	juvenile
	Yellow perch	"	"

Source of Information: Section 316(b) Intake Study, J. H. Campbell Plant Units No. 1 & 2, Consumers Power Company

Site 23:

Location: Plant intake bay

Description: Pigeon Lake on Lake Michigan

Method 1: Traveling intake screen

Dates sampled: January 1974 to March 1975, weekly

Fish captured:	Alewife	juvenile
	Gizzard shad	"
	Rainbow smelt	"
	Yellow perch	"

Method 2: Submersible sump pump filtered through a 333μ plankton net; depth: surface and 12 ft

Dates sampled: January 1975 to March 1975

Fish captured:		
	Alewife	juvenile
	Black bullhead	"
	Channel catfish	"
	Clupeids	larva
	Coho salmon	juvenile
	Gizzard shad	"
	Johnny darter	"
	Lake trout	"
	Largemouth bass	"
	Logperch	larva
	Ninespine stickleback	juvenile
	Northern pike	larva
	Rainbow smelt	larva, juvenile
	Shiner	larva
	Slimy sculpin	juvenile
	Spottail shiner	"
	Sunfish	larva, juvenile
	Trout-perch	juvenile
	White crappie	"
	Yellow perch	"
	Unidentified	larva, juvenile

County: Muskegon

Source of Information: Wells, 1973. Administrative Report.

Site 24:

Location: Whitehall

Description: Near water

Method 1: ½ m nylon plankton net 351μ mesh, 1 m depth intervals, greatest depth 9.2 m, towed at 4 mph for 5 min


WHITE RIVER
MONTAGUE
WHITE HALL
BLUE LAKE
MANISTEE
WHITEHALL
LAKEWOOD
WABANINGO
MICHILLINDA
FRUITLAND
DALTON
LAKETON
MUSKEGON
NORTH MUSKEGON
FIELD OFFICE
MUSKEGON
MUSKEGON HEIGHTS
ROOSEVELT PARK
24
25
LAKE MICHIGAN
Western
Muskegon County

Dates sampled: May 3-9, May 27-28, June 18-20, June 28-July 4, July 9-12, July 20-23, August 25-30, 1973

Fish captured:		
Alewife	larva	juvenile
Bloater	fry	
Smelt	fry	
Yellow perch	larva	"

Source of Information: Section 316(b) Intake Study, B. C. Cobb Plant, Consumers Power Company

Site 25:

Location: Plant intake bay

Description: Muskegon Lake near Lake Michigan

Method 1: Traveling intake screen

Dates sampled: January 1974 to March 1975, weekly

Fish captured:	
Alewife	juvenile
Freshwater drum	"
Gizzard shad	"
Rainbow smelt	"
Yellow perch	"

Method 2: Submersible sump pump filtered through a 333μ plankton net; depth: surface and 12 ft

Dates sampled: January 1974 to January 1975, weekly

Fish captured:	
Alewife	juvenile
Bluegill	"
Centrarchids	larva
Clupeids	"
Crappie	"
Gizzard shad	juvenile
Largemouth bass	"
Rainbow smelt	larva
Salmon	"

County: Oceana

Source of Information: Michigan Department of Natural Resources catch statistics

Site 26:

Location: Pentwater

Description:

Method 1: Fourteen bottom trawls

Dates sampled: 1976

Fish captured:		
	Alewife	juvenile
	Lake trout	"
	Lake whitefish	"
	Round whitefish	"

Method 2: Gill net

Dates sampled: 1976

Fish captured:		
	Brown trout	juvenile
	Coho salmon	"
	Lake trout	"
	Longnose sucker	"
	Round whitefish	"
	White sucker	"

Site 27:

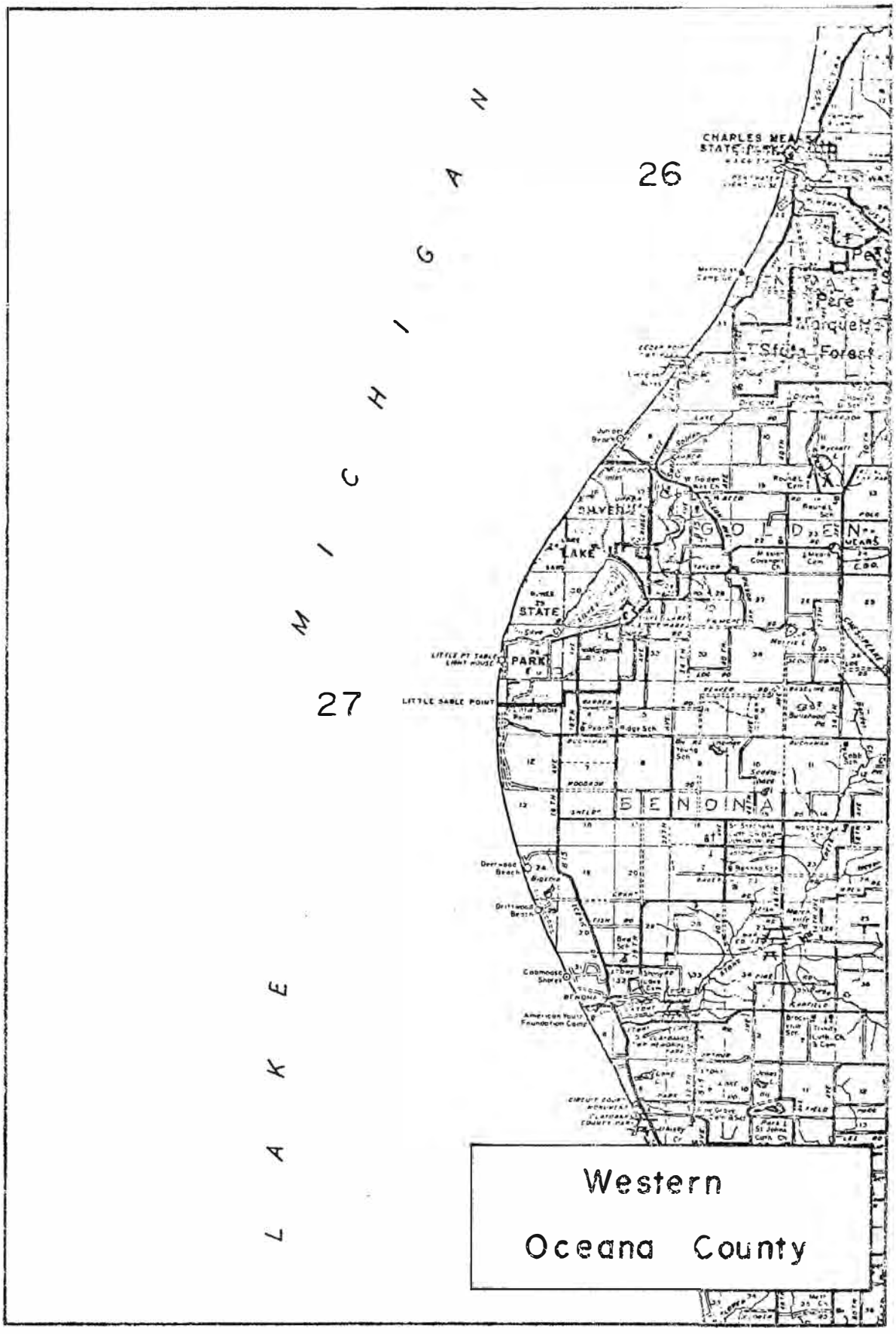
Location: Little Sable Point

Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured:		
	Burbot	juvenile
	Lake herring	"
	Lake trout	"
	Lake whitefish	"
	Longnose sucker	"
	Round whitefish	"


LAKE MICHIGAN
26
27
Pere Marquette State Forest
SILVER LAKE STATE PARK
LITTLE SABLE POINT
GOLDEN BEACH
Western
Oceana County

County: Mason

Source of Information: Wells, 1973. Administrative Report.

Site 28:

Location: Ludington

Description: Near water

Method 1: ½ m nylon plankton net 351μ mesh, 1 m depth intervals, greatest depth 9.2 m, towed at 4 mph for 5 min

Dates sampled: May 3-9, May 27-28, June 28-July 4, July 9-12, July 18-20, July 20-23, August 25-30, 1973

Fish captured:		
Alewife	larva	juvenile
Yellow perch	"	"

Source of Information: Liston, C. and R. Anderson, 1976. Unpublished data on studies of the Ludington Pump Storage Power Plant at Ludington, Michigan.

Site 29:

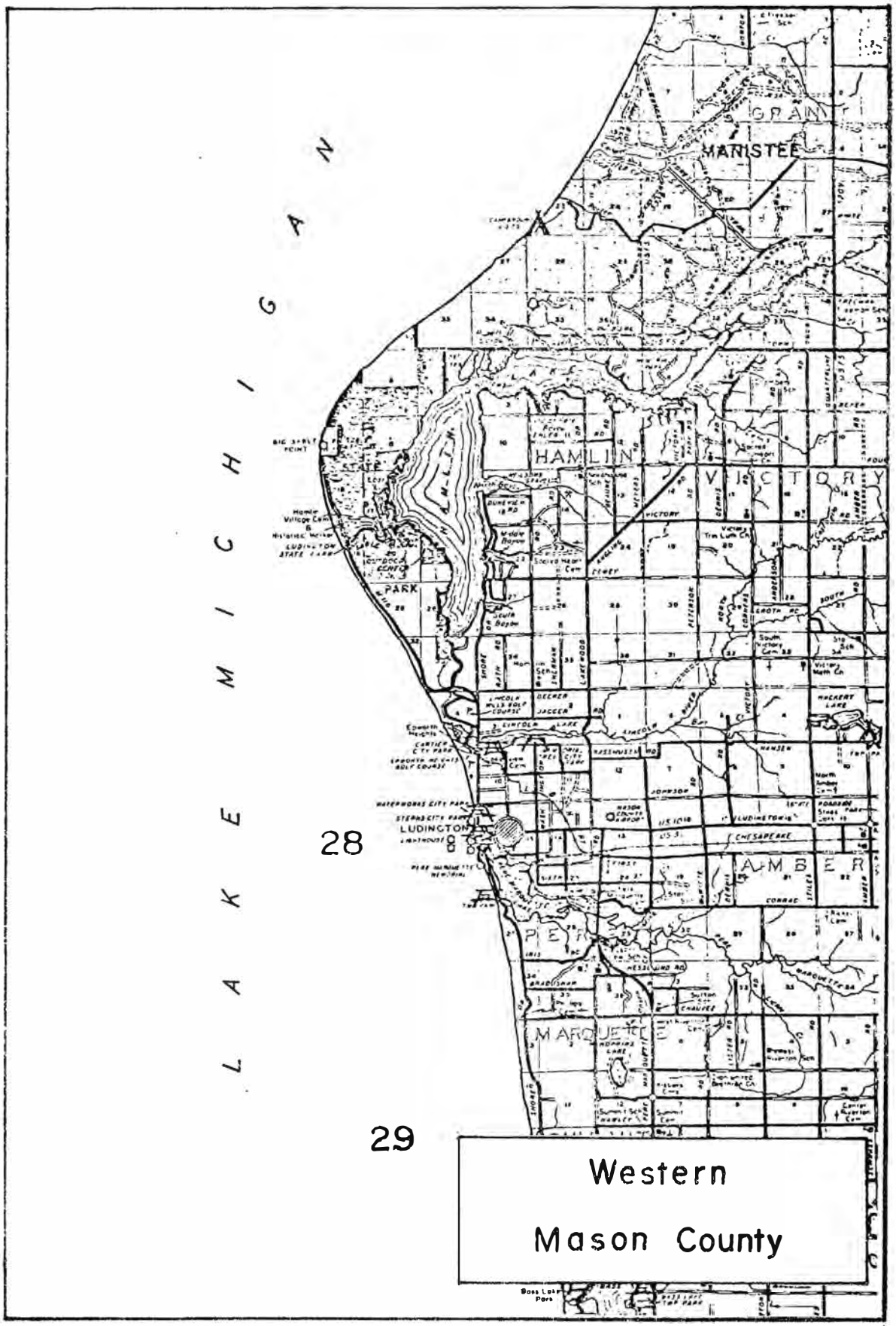
Location: Beach 0-3 km south of Ludington Pump Storage Power Plant

Description: Sandy beach

Method 1: Fifty-foot bag-seine with 1/8 in mesh. 200-ft sample hauls.

Dates sampled: April - November, one to two times per month, from 1973-1977

Fish captured:	
Alewife	juvenile
Bloater bluegill	"
Brook silversides	"
Brown trout	"
Chinook salmon	"
Coho salmon	"
Emerald shiner	"
Johnny darter	"
Lake whitefish	"
Longnose dace	"
Longnose sucker	"


LAKE MICHIGAN
MANISTEE
HAMLIN
VICTORY
PARK
LUDINGTON
28
29
Western
Mason County

	Ninespine stickleback	juvenile
	Rainbow smelt	"
	Rainbow trout	"
	Spottail shiner	"
	Trout-perch	"
	White sucker	"
	Yellow perch	"

Method 2: Surge-zone gill nets; 175 ft nets/set with 7 25-ft panels of 1, 2, 2½, 3, 4, 4½ and 7 stretch mesh.

Dates sampled: 59 sets between April and November in 1976

Fish captured:	Alewife	juvenile
	Brown trout	"
	Chinook salmon	"
	Coho salmon	"
	Gizzard shad	"
	Longnose sucker	"
	Rainbow smelt	"
	Rainbow trout	"
	Spottail shiner	"
	Yellow perch	"

Method 3: Beach seines, sampling around the clock for 24 hrs; 50-ft bag seine; 200-ft hauls.

Dates sampled: April through September 1976, 1977, about once/month

Fish captured:	Alewife	juvenile
	Brown trout	"
	Chinook salmon	"
	Johnny darter	"
	Lake trout	"
	Lake whitefish	"
	Longnose dace	"
	Rainbow smelt	"
	Rainbow trout	"
	Sculpin	"
	White sucker	"
	Yellow perch	"

County: Manistee

Source of Information: Wells, 1974. Administrative Report.

Site 30:

Location: Onekama

Description: Near shore water

Method 1: ½ m nylon plankton net 351μ mesh, 1 m depth, towed at 4 mph for 5 min

Dates sampled: May 17-24, 1974

Fish captured: Smelt fry

Source of Information: Michigan Department of Natural Resources catch statistics

Site 31:

Location: Manistee

Description:

Method 1: Thirteen bottom trawls

Dates sampled: 1976

Fish captured:		
	Alewife	juvenile?
	Lake trout	"
	Lake whitefish	"
	Longnose sucker	"
	Round whitefish	"
	White sucker	"

Method 2: Gill net

Dates sampled: 1976

Fish captured:		
	Brown trout	juvenile?
	Burbot	"
	Lake trout	"
	Lake whitefish	"
	Longnose sucker	"
	Round whitefish	"
	White sucker	"


LAKE MICHIGAN
30
31
ORCHARD BEACH STATE PARK
Manistee River State Game Area
MANISTEE
NAT
Western
Manistee County

County: Benzie

Source of Information: Wells, 1973. Administrative Report.

Site 32:

Location: Frankfort

Description: Near water

Method 1: ½ m nylon plankton net 351μ mesh, 1 m depth intervals, greatest depth 9.2 m, towed at 4 mph for 5 min

Dates sampled: May 3-9, May 27-28, June 28 - July 4, July 9-12, July 20-23, August 25-30, 1973

Fish captured:		
Alewife	larva	juvenile
Yellow perch	"	"

Source of Information: Michigan Department of Natural Resources catch statistics

Site 33:

Location: Frankfort to Pt. Betsie

Description:

Method 1: Fourteen bottom trawls

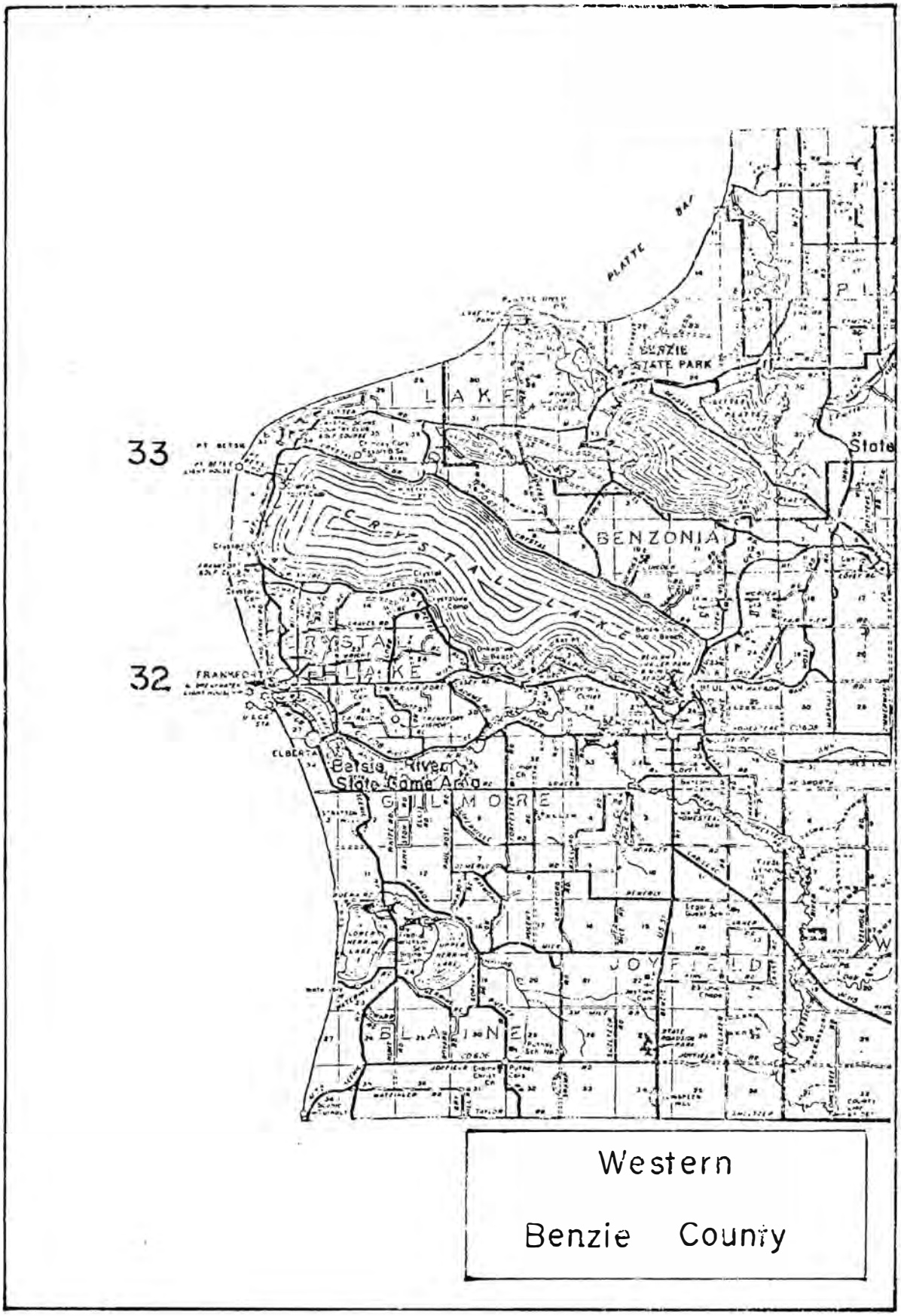
Dates sampled: 1976

Fish captured:	
Alewife	juvenile?
Lake trout	"
Round whitefish	"

Method 2: Gill nets

Dates sampled: 1976

Fish captured:	
Chinook salmon	juvenile?
Lake whitefish	"
Lake trout	"
Longnose sucker	"
Round whitefish	"
White sucker	"


PLATTE BAY
BENZIE STATE PARK
33
32
CRYSTAL LAKE
BENZONIA
FRANKFORT
ELBERTA
Betsie River State Game Area
GILMORE
JOYFIELD
LAKE
Western
Benzie County

County: Leelanau

Source of Information: Michigan Department of Natural Resources catch statistics

Site 34:

Location: South Fox Island Shoal

Description:

Method 1: Four bottom trawls

Dates sampled: 1976

Fish captured:		
	Alewife	juvenile
	Rainbow smelt	"

Site 35:

Location: Northport Bay in Grand Traverse Bay

Description:

Method 1: Eight bottom trawls

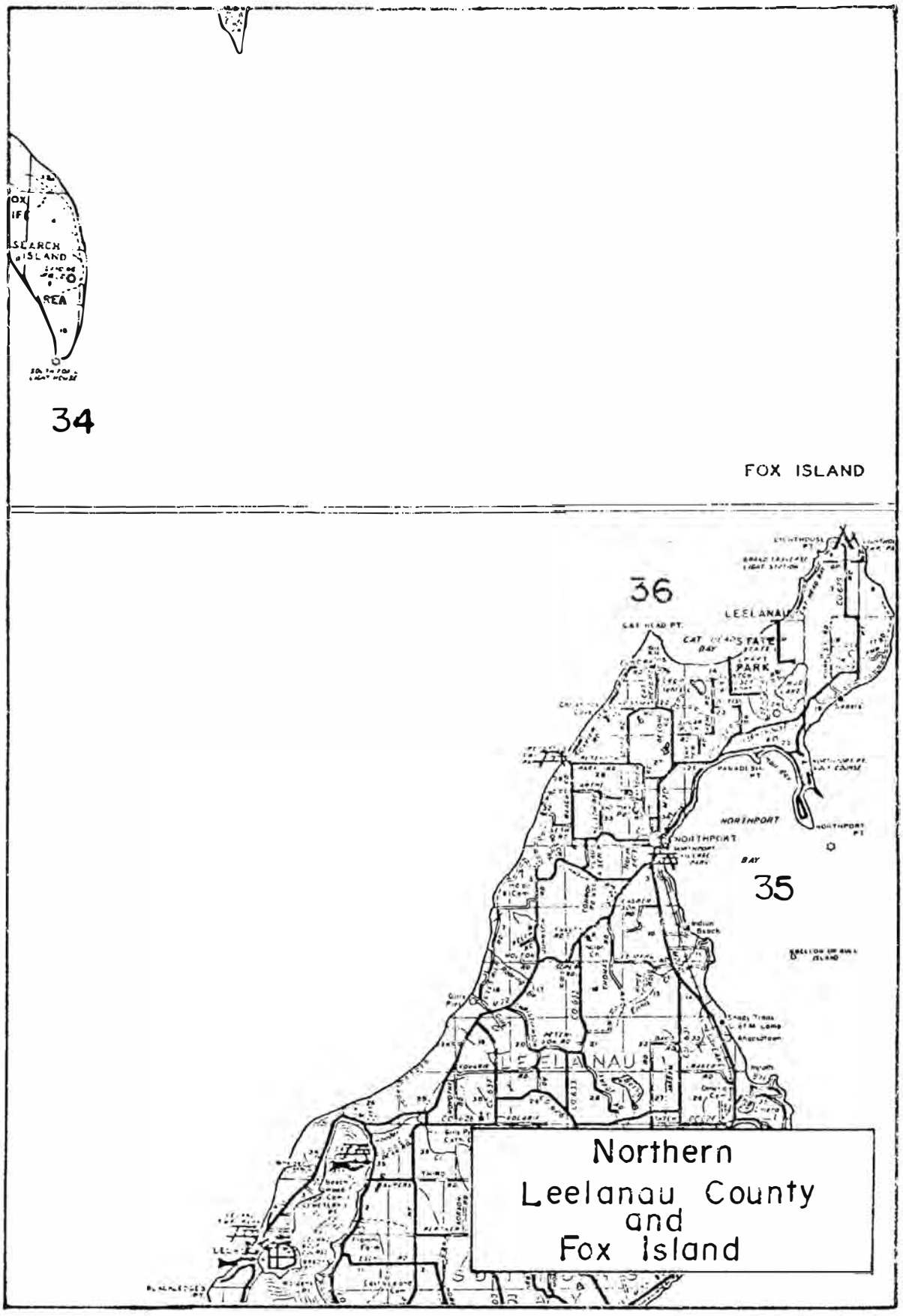
Dates sampled: 1976

Fish captured:		
	Alewife	juvenile
	Coho salmon	"
	Lake trout	"
	Lake whitefish	"
	Round whitefish	"

Method 2: Gill nets

Dates sampled: 1976

Fish captured:		
	Burbot	juvenile?
	Coho salmon	"
	Lake herring	"
	Lake trout	"
	Lake whitefish	"
	Longnose sucker	"
	Round whitefish	"
	White sucker	"


34
FOX ISLAND
36
LEELANAU
PARK
NORTHPORT
35
Northern
Leelanau County
and
Fox Island

Site 36:

Location: Cat Head Pt. and Reef

Description:

Method 1: Four bottom trawls

Dates sampled: 1976

Fish captured: Alewife juvenile

Site 37:

Location: Good Harbor Bay in the Leland Area

Description:

Method 1: Fourteen bottom trawls

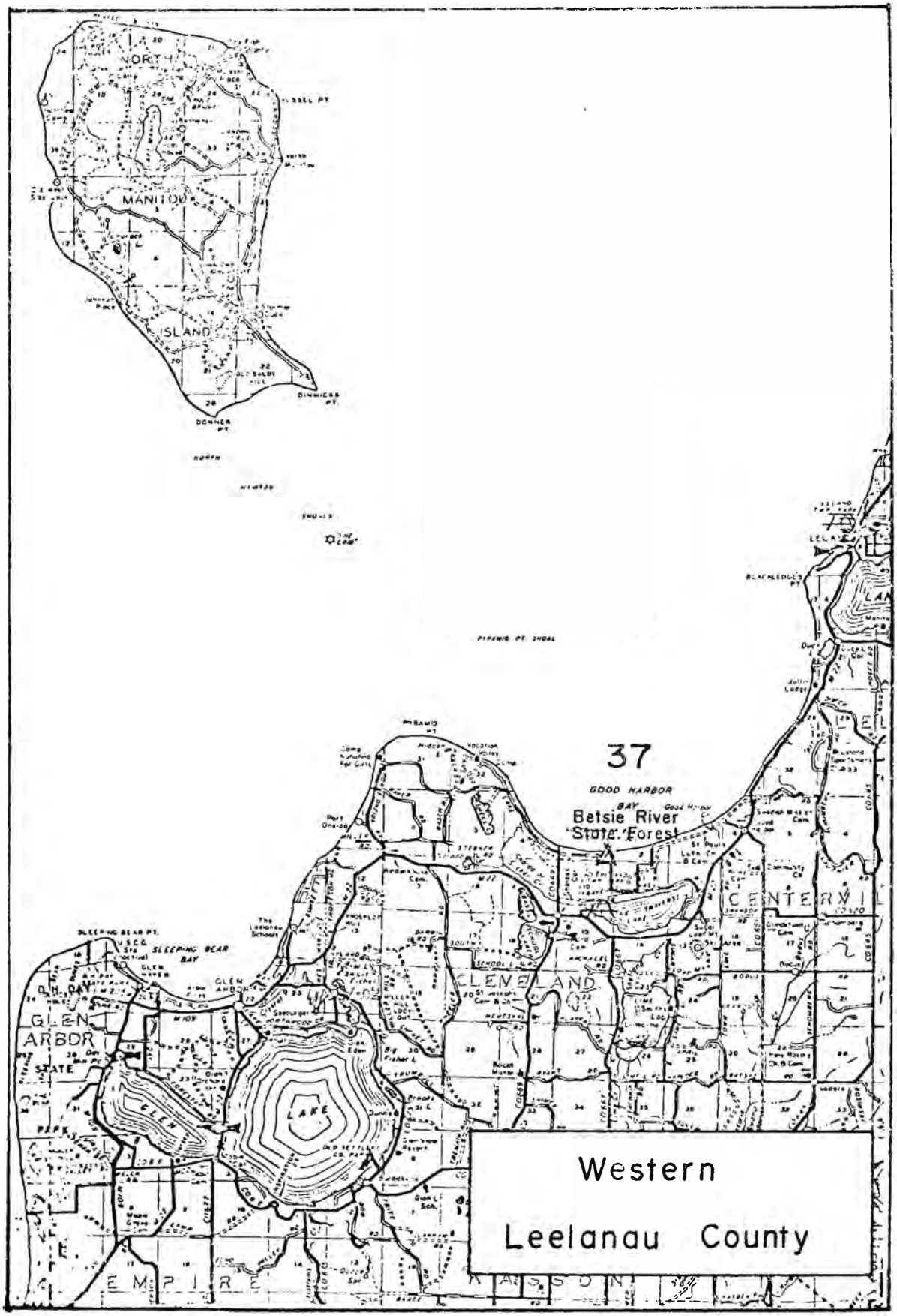
Dates sampled: 1976

Fish captured:	Alewife	juvenile
	Carp	"
	Lake trout	"
	Lake whitefish	"
	Round whitefish	"
	Slimy sculpin	"

Method 2: Gill net

Dates sampled: 1976

Fish captured:	Brown trout	juvenile
	Chinook salmon	"
	Coho salmon	"
	Lake herring	"
	Lake trout	"
	Lake whitefish	"
	Longnose sucker	"
	Rainbow trout	"
	Round whitefish	"
	Sturgeon	"
	White sucker	"


NORTH
MANITOU
ISLAND
37
GOOD HARBOR BAY
Betsie River State Forest
SLEEPING BEAR BAY
GLEN ARBOR STATE
LAKE
CLEVELAND
EMPIRE
Western
Leelanau County

County: Grand Traverse

Source of Information: Michigan Department of Natural Resources catch statistics

Site 38:

Location: Old Mission Pt. in Grand Traverse Bay

Description:

Method 1: Six bottom trawls

Dates sampled: 1976

Fish captured:		
	Alewife	juvenile
	Lake whitefish	"

Site 39:

Location: Bowers Harbor

Description:

Method 1: Gill nets

Dates sampled: 1976

Fish captured:		
	Burbot	juvenile?
	Lake trout	"
	Lake whitefish	"
	Round whitefish	"
	White sucker	"

County: Antrim

Source of Information: Michigan Department of Natural Resources catch statistics

Site 40:

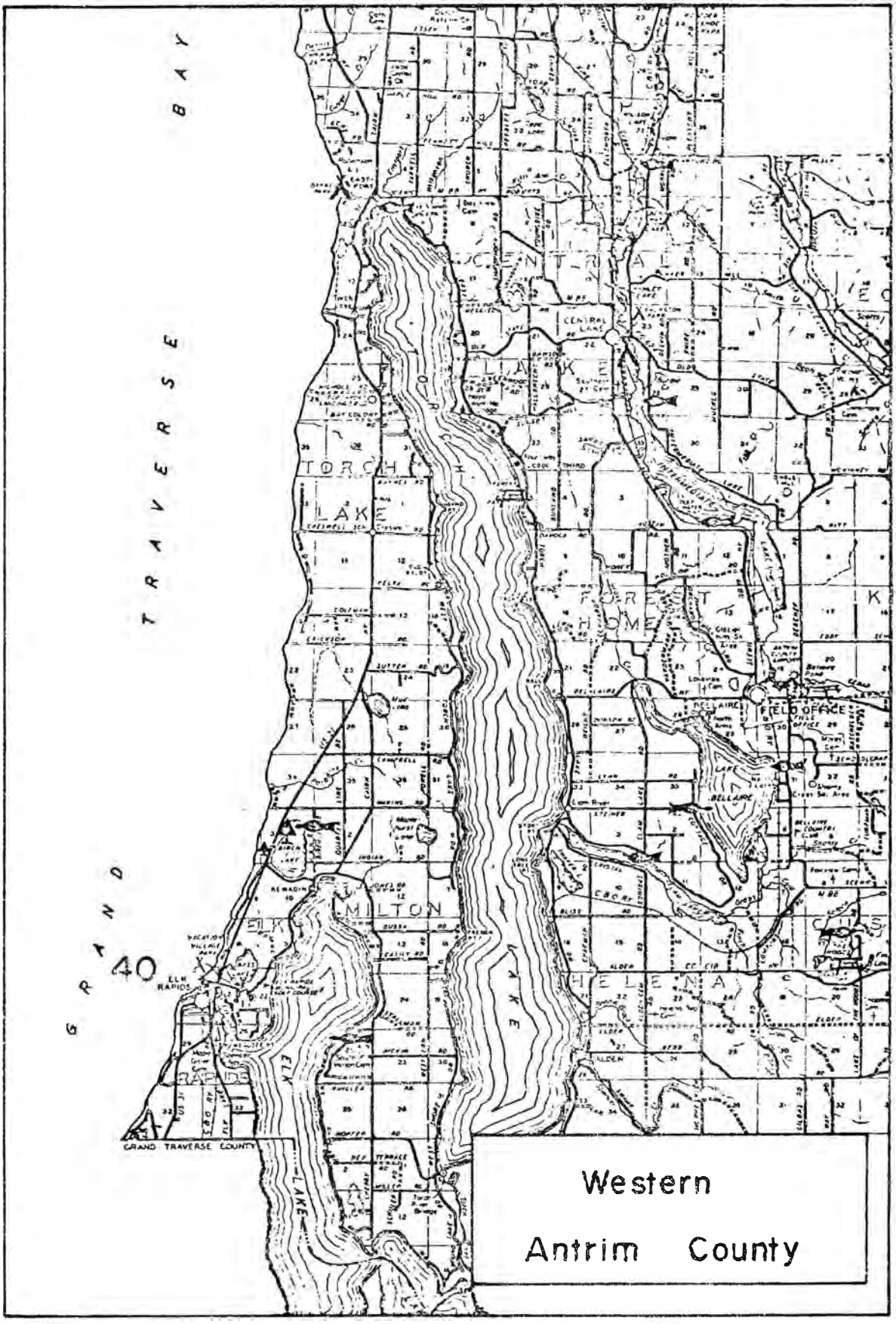
Location: Elk Rapids - east arm Grand Traverse Bay

Description:

Method 1: Two bottom trawls

Dates sampled: 1976


GRAND
TRAVERSE
BAY
38
ARM
PENINSULA
ARM
39
MARION ISLAND
WEST
EAST
Petobega State Game Area
ACME
WILLIAMSBURG
TRAVERSE CITY
TRAVERSE CITY STATE PARK
Northern
Grand Traverse County


GRAND TRAVERSE BAY
TORCH LAKE
CENTRAL LAKE
TORCH LAKE
NORTH HOMESTEAD
FIELD OFFICE
BELLAIRE
BELLAIRE
MILTON
ELK RAPIDS
ELK RAPIDS
ELK LAKE
HELENA
40
GRAND TRAVERSE COUNTY
Western
Antrim County

Fish captured:	Alewife	juvenile
	Lake trout	"
	Lake whitefish	"

Method 2: Gill nets

Dates sampled: 1976

Fish captured:	Brown trout	juvenile?
	Burbot	"
	Channel catfish	"
	Chinook salmon	"
	Lake herring	"
	Lake trout	"
	White sucker	"

County: Charlevoix

Source of Information: Section 316(b) Intake Study, Big Rock Nuclear Plant, Consumers Power Company

Site 41:

Location: Plant intake bay

Description: Big Rock Point

Method 1: Traveling intake screens

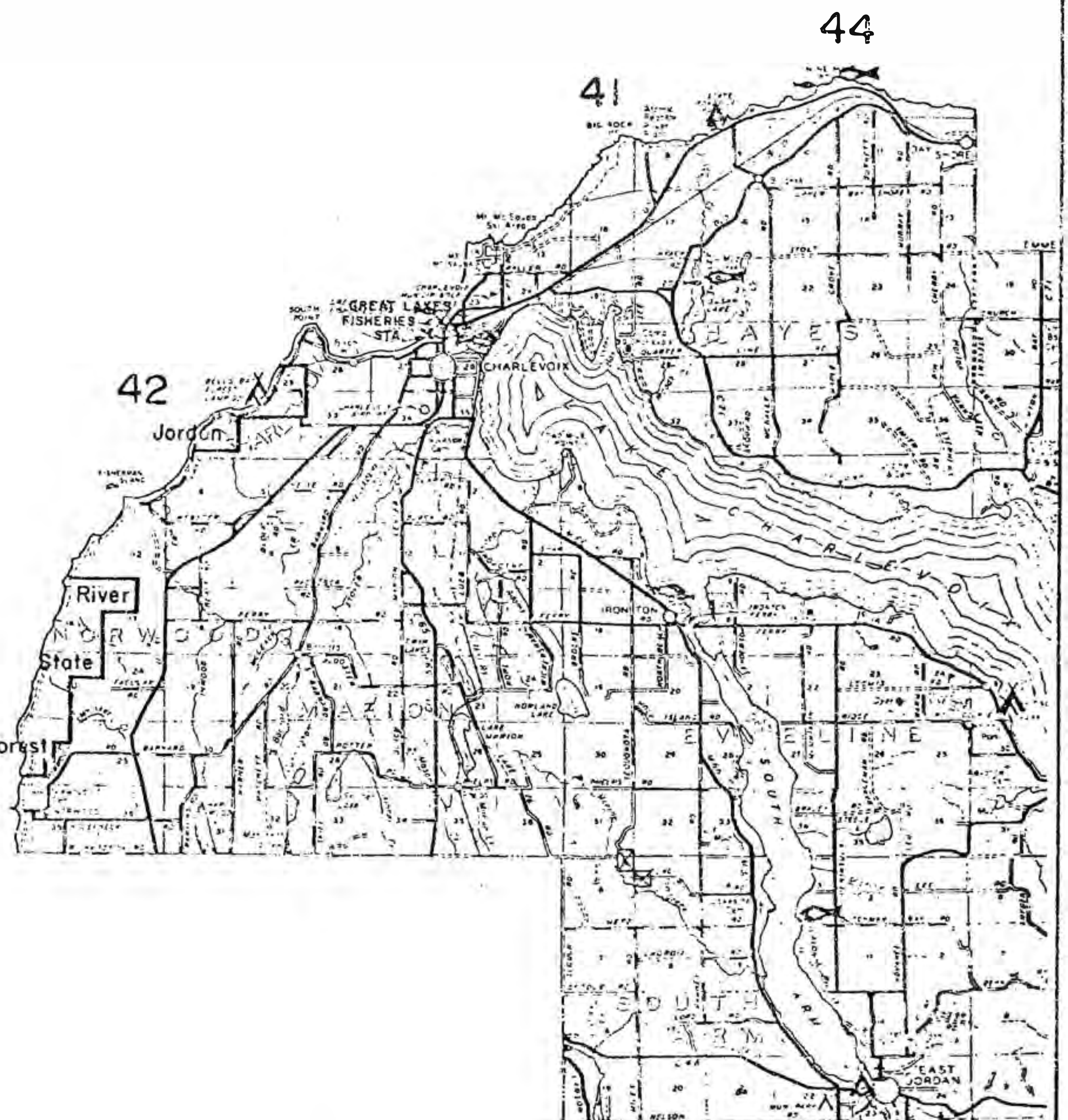
Dates sampled: February 1974 to March 1975

Fish captured:	Alewife	juvenile
	Rainbow smelt	"
	Yellow perch	"

Method 2: Submersible sump pump filtered through a 333μ plankton net; depth: surface and 12 ft.

Dates sampled: February 1974 to March 1975

Fish captured:	Alewife	larva
	Rainbow smelt	larva, juvenile
	Salmon	larva
	Whitefish	"
	Yellow perch	juvenile
	Unidentifiable	larva



Charlevoix County

Source of Information: Michigan Department of Natural Resources catch statistics

Site 42:

Location: South Pt. to Fisherman Island

Description:

Method 1: Four trawls

Dates sampled: 1976

Fish captured:		
	Alewife	juvenile
	Gizzard shad	"
	Lake trout	"
	Rainbow smelt	"

Site 43:

Location: North end Garden, Hog, and Hat Islands

Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured:

	Lake trout	juvenile
	Lake whitefish	"
	Round whitefish	"

Site 44:

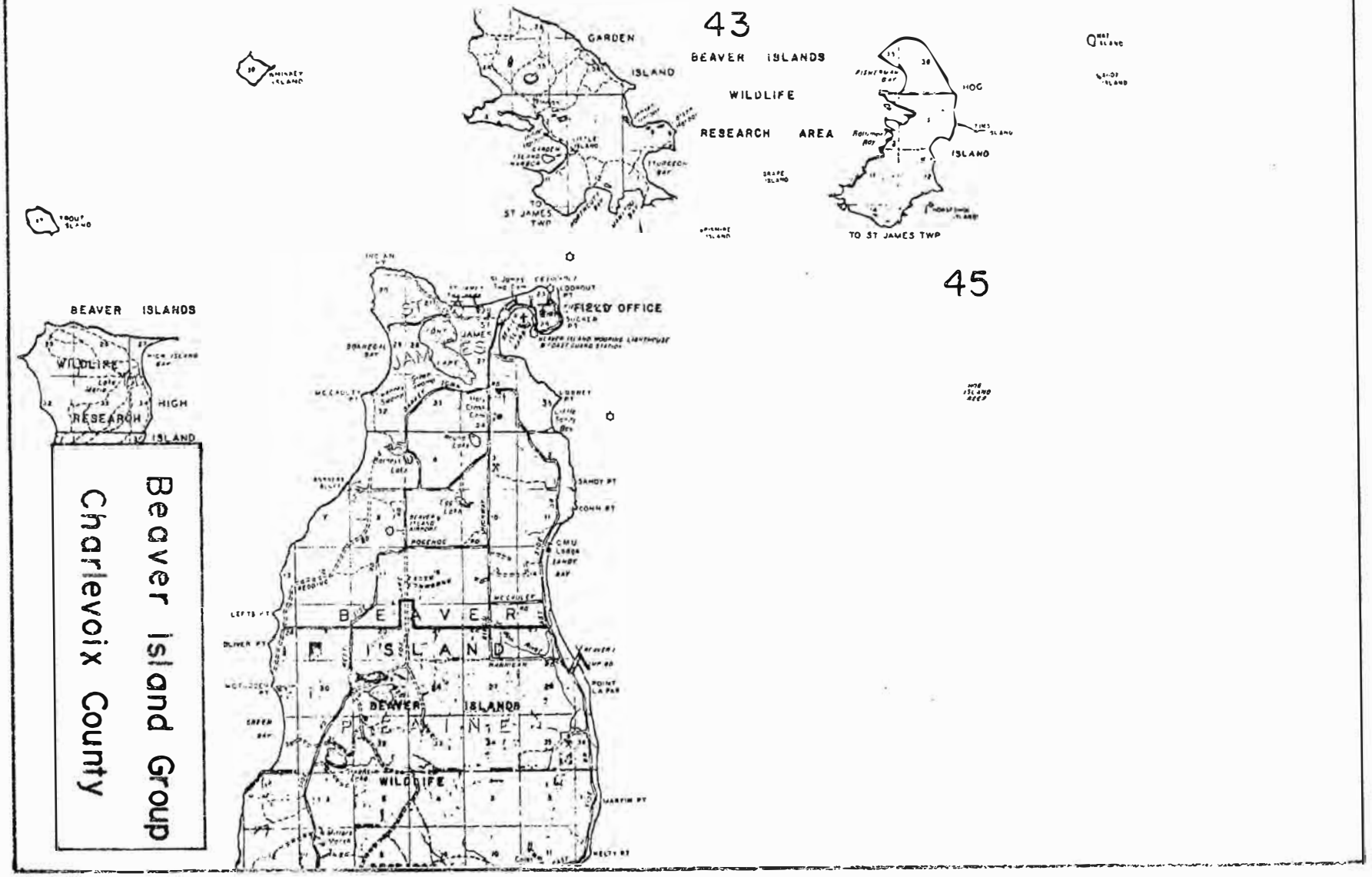
Location: Nine Mile Pt.

Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured:		
	Brown trout	juvenile
	Chinook salmon	"
	Lake whitefish	"
	Lake trout	"
	Longnose sucker	"


43
BEAVER ISLANDS
WILDLIFE
RESEARCH AREA
GARDEN
ISLAND
TO ST JAMES TWP
HOG
ISLAND
TO ST JAMES TWP
45
FIELD OFFICE
BEAVER ISLANDS
WILDLIFE
RESEARCH
HIGH
ISLAND
Beaver Island Group
Charlevoix County
BEAVER
ISLAND
BEAVER ISLANDS
WILDLIFE

	Rock bass	juvenile
	Round whitefish	"
	Splake	"
	White sucker	"
	Yellow perch	"

Method 2: Twenty-three bottom trawls

Dates sampled: 1976

Fish captured:	Alewife	juvenile
	Lake whitefish	"
	Longnose sucker	"
	Ninespine stickleback	"
	Rainbow smelt	"
	Round whitefish	"
	White sucker	"

Site 45:

Location: Hog Island Reef

Description:

Method 1: Gill net

Dates sampled: 1976

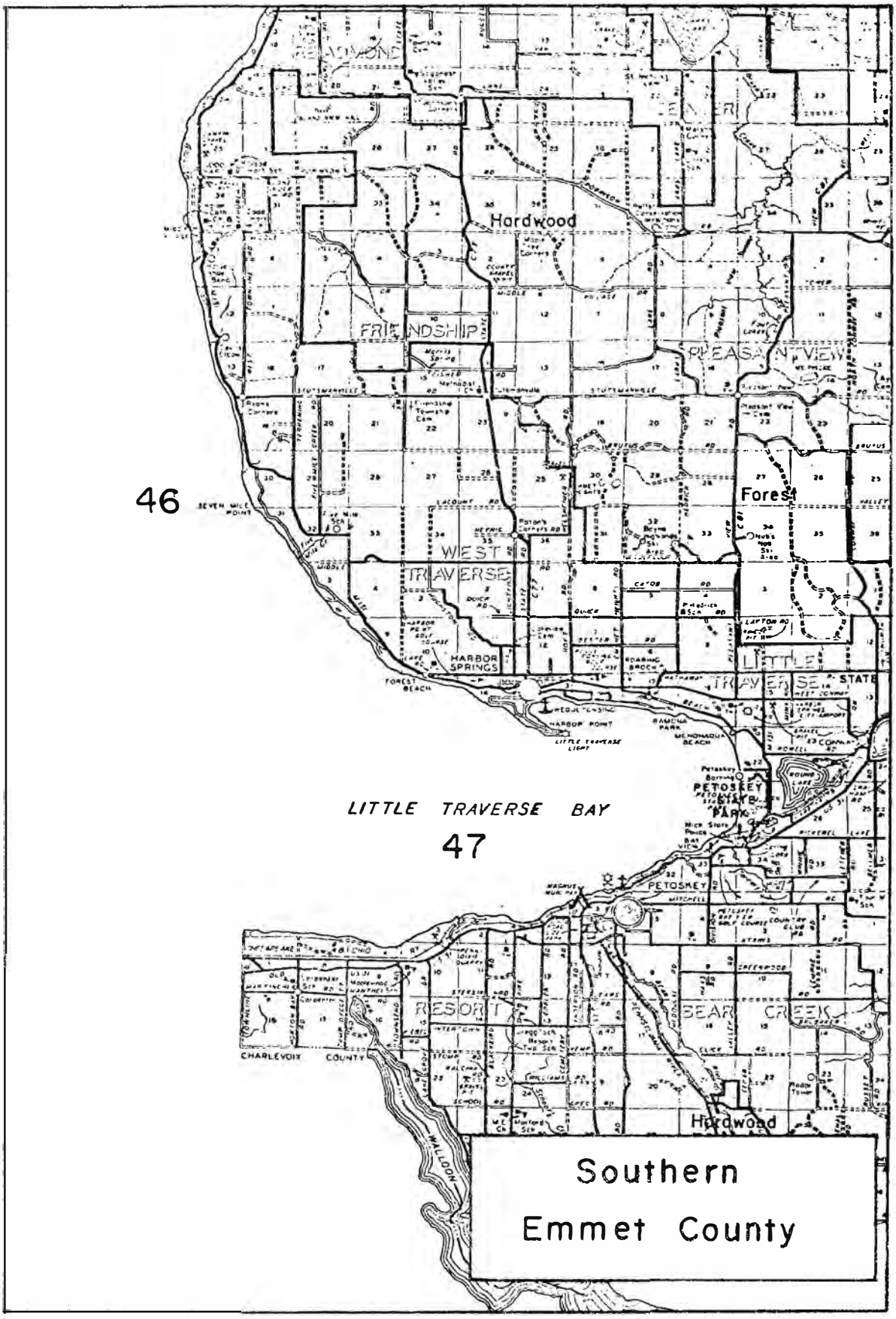
Fish captured:	Burbot	juvenile?
	Lake trout	"
	Lake whitefish	"
	Longnose sucker	"
	Round whitefish	"
	White sucker	"

County: Emmet

Source of Information: Michigan Department of Natural Resources catch statistics

Site 46:

Location: Church Bank - Good Hart to Seven Mile Pte.


Hardwood
FRIENDSHIP
PLEASANT VIEW
Forest
WEST
TRAVERSE
HARBOR
SPRINGS
LITTLE
TRAVERSE
STATE
PARK
PETOSKEY
RESORT
BEAR
CREEK
CHARLEVOIX
COUNTY
Hardwood
WALLOON
46
47
LITTLE TRAVERSE BAY
Southern
Emmet County

Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured:		
	Burbot	adult
	Lake herring	"
	Lake whitefish	juvenile
	Lake trout	adult
	Longnose sucker	"
	White sucker	"

Site 47:

Location: Little Traverse Bay

Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured:		
	Brown trout	juvenile?
	Coho salmon	"
	Lake herring	"
	Lake trout	"
	Lake whitefish	"
	Longnose sucker	"
	Northern pike	"
	Rainbow trout	"
	Round whitefish	"
	White sucker	"

County: Delta

Source of Information: Michigan Department of Natural Resources records

Site 48:

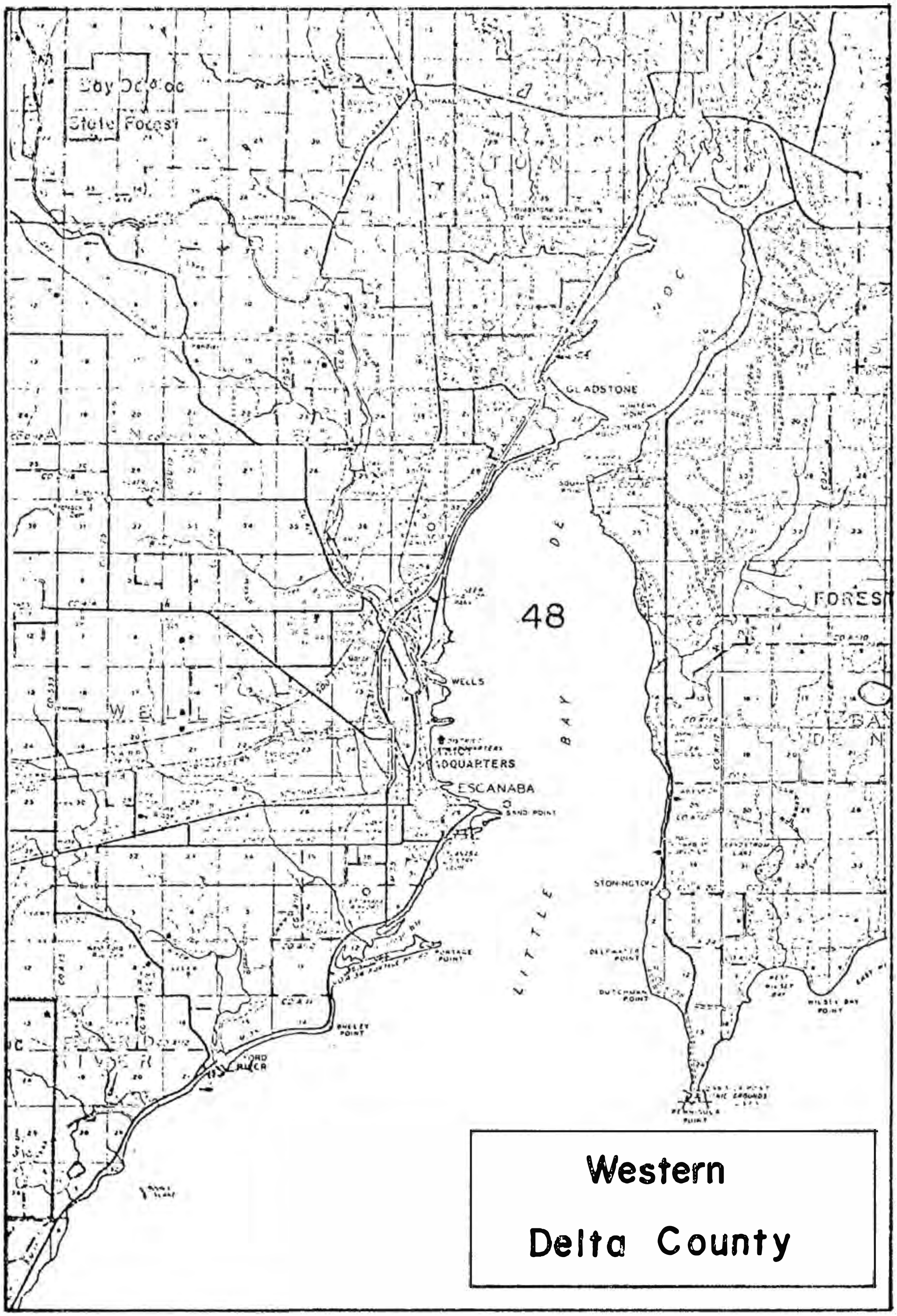
Location: Little Bay de Noc

Description: Not given

Method 1: Not given

Dates sampled: July to September, 1966 to 1968
June 1975

Fish captured:		
	Alewife	larva
	Northern pike	"
	Rainbow smelt	"
	Yellow perch	"


Bay De Noc
State Forest
GLADSTONE
48
WELLS
ESCANABA
STONINGTON
LITTLE BAY DE NOC
FORD RIVER
Western
Delta County

LAKE SUPERIOR

County: Marquette

Source of Information: The Effects of Presque Isle Power Station on the Ecological Balance of Presque Isle Harbor, Final Report, April 1975 to July 1976, Submitted to: Upper Peninsula Generating Company, Wapora Inc.

Site 1:

Location: Plant intake bay

Description: Lake Superior, north of the city of Marquette, Michigan

Method 1: Traveling intake screens

Dates sampled: April 1975 to April 1976, continuous collections counted every fourth day

Fish captured:		
	Lake trout	juvenile
	Ninespine stickleback	"
	Rainbow smelt	"
	Rock bass	"
	Yellow perch	"
	Unidentified	"

Method 2: Electrofishing

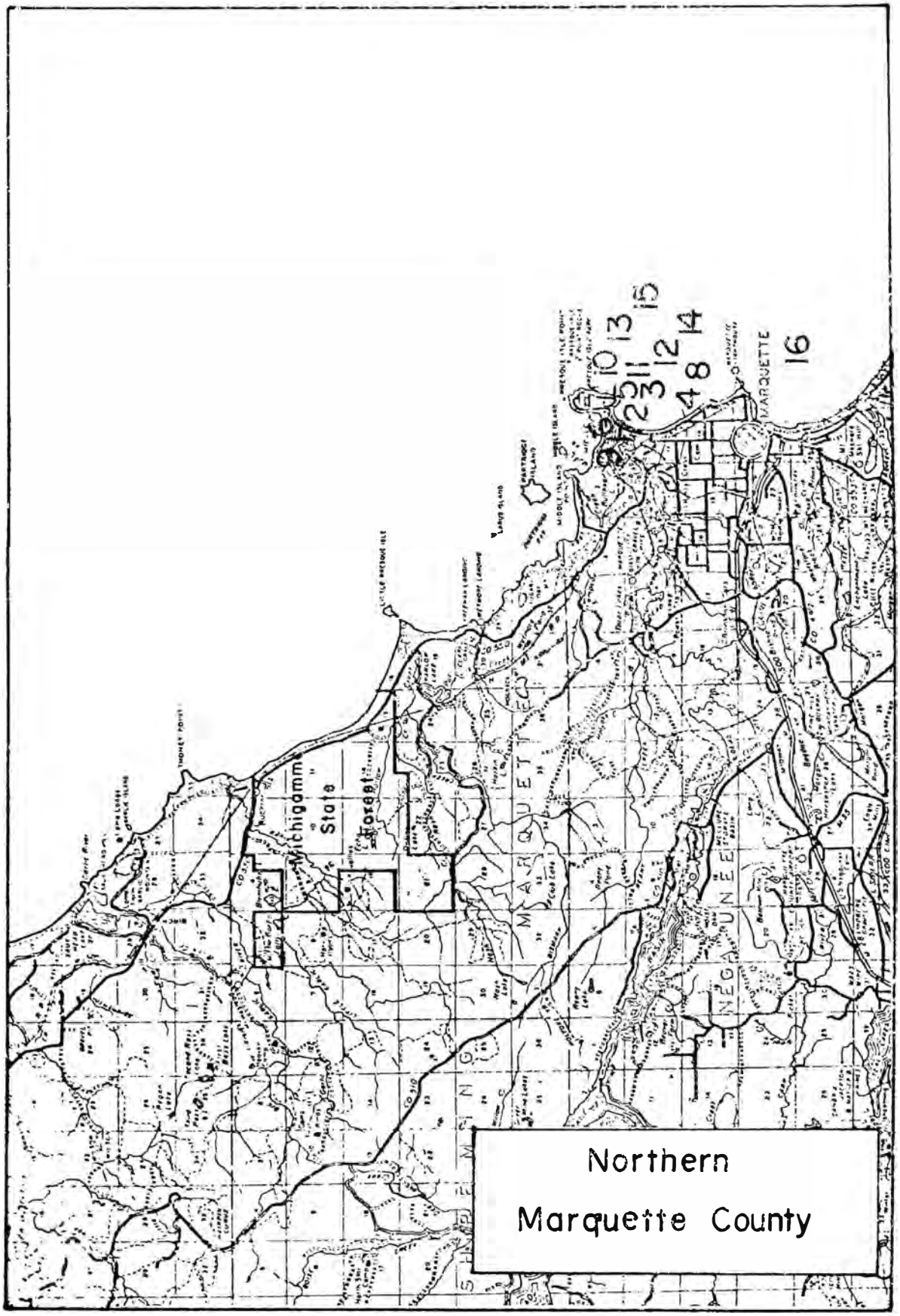
Dates sampled: September 18, 1975 and November 18, 1975

Fish captured:		
	Chinook salmon	juvenile
	Smallmouth bass	"

Method 3: Suspended 355μ tow net with a rectangular opening

Dates sampled: July 1975 - July 1976

Fish captured:		
	Burbot	juvenile
	Carp	"
	Deepwater sculpin	"
	Lake trout	"
	Mottled sculpin	"
	Ninespine stickleback	"
	Northern pike	"


Northern
Marquette County
MARQUETTE
NEGAUNEE
MARQUETTE
Michigamme
State
Forest
10
13
15
2
3
11
12
14
4
8
16

	Rainbow smelt	juvenile
	Rock bass	"
	Shiner	"
	Slimy sculpin	"
	Spoonhead sculpin	"
	Trout-perch	"
	Whitefish Family	"
	White sucker	"
	Yellow perch	"
	Unidentified	"

Site 2:

Location: 200 yds. off the mouth of the Dead River

Description: Near intake structure

Method 1: 16-foot semi-balloon trawl

Dates sampled: November 1975 - May 1976

Fish captured:	Rainbow smelt	juvenile
	Yellow perch	"

Site 3:

Location: ½ mile off the mouth of the Dead River

Description: Presque Isle Harbor, end of ore dock

Method 1: 16-foot semi-balloon trawl

Dates sampled: November 1975 - May 1976

Fish captured:	Rainbow smelt	juvenile
	Yellow perch	"

Site 4:

Location: 3/4 mile south of the mouth of the Dead River

Description: 100 yards from shore

Method 1: 16-foot semi-balloon trawl

Dates sampled: November 1975 - May 1976

Fish captured: Rainbow smelt juvenile
Yellow perch "

Site 5:

Location: Foot of ore dock, south side

Description: Shoreline

Method 1: 100 ft x 8 ft beach seine with ¼ in mesh

Dates sampled: October 1975 - April 1976, monthly

Fish captured: Chinook salmon juvenile
Rainbow smelt "
White suckers "
Yellow perch "
Others "

Site 6:

Location: Mouth of the Dead River, north side

Description: Shoreline

Method 1: 100 ft x 8 ft beach seine with ¼ in mesh

Dates sampled: October 1975 - April 1976, monthly

Fish captured: Chinook salmon juvenile
Rainbow smelt "
White sucker "
Yellow perch "
Others "

Site 7:

Location: Mouth of the Dead River, south side

Description: Shoreline

Method 1: 100 ft x 8 ft beach seine with ¼ in mesh

Dates sampled: October 1975 - April 1976, monthly

Fish captured: Chinook salmon juvenile
Rainbow smelt "
White sucker "

	Yellow perch	juvenile
	Others	"

Site 8:

Location: 2½ miles south of Dead River, west of Picnic Rocks

Description: Shoreline

Method 1: 100 ft x 8 ft beach seine with ¼ in mesh

Dates sampled: October 1975 - April 1976, monthly

Fish captured:	Chinook salmon	juvenile
	Rainbow smelt	"
	White sucker	"
	Yellow perch	"
	Others	"

Site 9:

Location: Dead River, 100 yd. up river from the mouth

Description: River water

Method 1: 563µ plankton net with a 0.24 m opening

Dates sampled: April 1975 - September 1975

Fish captured:	Burbot	larva
	Rainbow smelt	"
	Sculpin	"
	White sucker	"
	Yellow perch	"
	Unknown species A	"
	" " B	"
	" " C	"

Method 2: 351µ plankton net with a 0.4 m opening

Dates sampled: January 1976 - May 1976

Fish captured:	Rainbow smelt	larva
	Yellow perch	"

Site 10:

Location: South side of ore dock

Description: Lake water

Method 1: 563µ plankton net with a 0.24 m opening

Dates sampled: April 1975 - September 1975

Fish captured:	Burbot	larva
	Rainbow smelt	"
	White sucker	"
	Yellow perch	"

Method 2: 351µ plankton net with a 0.4 m opening

Dates sampled: January 1976 - May 1976

Fish captured:	Rainbow smelt	larva
	Sculpin	"
	Whitefish	"

Site 11:

Location: ¼ mile east of the mouth of the Dead River

Description: Near the power plant intake

Method 1: 563µ plankton net with a 0.24 m opening

Dates sampled: April 1975 - September 1975

Fish captured:	Burbot	larva
	Rainbow smelt	"
	Yellow perch	"
	Unknown species B	"
	" " C	"

Method 2: 351µ plankton net with a 0.4 m opening

Dates sampled: January 1976 - May 1976

Fish captured:	Lake whitefish	larva
	Rainbow smelt	"
	Sculpin	"
	Whitefish Family	"

Site 12:

Location: ½ mile southeast of the mouth of the Dead River

Description: Near proposed discharge

Method 1: 563μ plankton net with a 0.24 m opening

Dates sampled: April 1975 - September 1975

Fish captured:	Burbot	larva
	Carp	"
	Rainbow smelt	"
	Sculpins	"
	Yellow perch	"

Method 2: 351μ plankton net with a 0.4 m opening

Dates sampled: January 1976 - May 1976

Fish captured:	Rainbow smelt	larva
	Sculpins	"
	Whitefish	"
	Yellow perch	"
	Unidentified	"

Site 13:

Location: ½ mile east of the mouth of the Dead River

Description: South side of breakwater

Method 1: 563μ plankton net with a 0.24 m opening

Dates sampled: April 1975 - September 1975

Fish captured:	Burbot	larva
	Rainbow smelt	"
	Sculpins	"
	Yellow perch	"

Method 2: 351μ plankton net with a 0.4 m opening

Dates sampled: January 1976 - May 1976

Fish captured:	Lake trout	larva
	Rainbow smelt	"
	Sculpins	"
	Whitefish	"
	Yellow perch	"

Site 14:

Location: One mile southeast of the mouth of the Dead River

Description: Lake water

Method 1: 563µ plankton net with a 0.24 m opening

Dates sampled: April 1975 - September 1975

Fish captured:	Burbot	larva
	Lake whitefish	"
	Rainbow smelt	"
	Yellow perch	"

Method 2: 351µ plankton net with a 0.4 m opening

Dates sampled: January 1976 - May 1976

Fish captured:	Lake whitefish	larva
	Sculpins	"
	Whitefish Family	"

Site 15:

Location: ¼ mile off the end of the breakwater

Description: Lake water

Method 1: 563µ plankton net with a 0.24 m opening

Dates sampled: April 1975 - September 1975

Fish captured:	Emerald shiner	larva
	Lake whitefish	"
	Rainbow smelt	"
	Whitefish Family	"

Method 2: 351µ plankton net with a 0.4 m opening

Dates sampled: January 1976 - May 1976

Fish captured:	Rainbow smelt	larva
	Whitefish	"

Source of Information: Michigan Department of Natural Resources records

Site 16:

Location: Marquette Harbor and vicinity

Description: Not given

Method 1: Not given

Dates sampled: May to August, 1976

Fish captured:	Johnny darter	larva
	Lake trout	"
	Mottled sculpin	"
	Ninespine stickleback	"
	Pink salmon	"
	Rainbow smelt	"
	Rock bass	"
	Round whitefish	"
	Slimy sculpin	"
	Smallmouth bass	"
	Trout-perch	"
	White sucker	"
	Yellow perch	"

LAKE HURON

County: Sanilac

Source of Information: O'Gorman, 1975. Administrative Report.

Site 1:

Location: Richmondville

Description: Near shore, open lake

Method 1: ½ m plankton net, 350μ mesh; tows: 1 m depth intervals, surface to 4 m over 5.5 m bottom contour, surface to 6 m over 9.2 m bottom contour, 9,900 cm/min for 5 min

Dates sampled: May 30 to June 5, 1973

Fish captured:		
	Rainbow smelt	larva
	Yellow perch	"

County: Huron

Source of Information: Harbor Beach Power Plant, Report on Cooling Water Intake, Detroit Edison.

Site 2:

Location: Plant intake bay

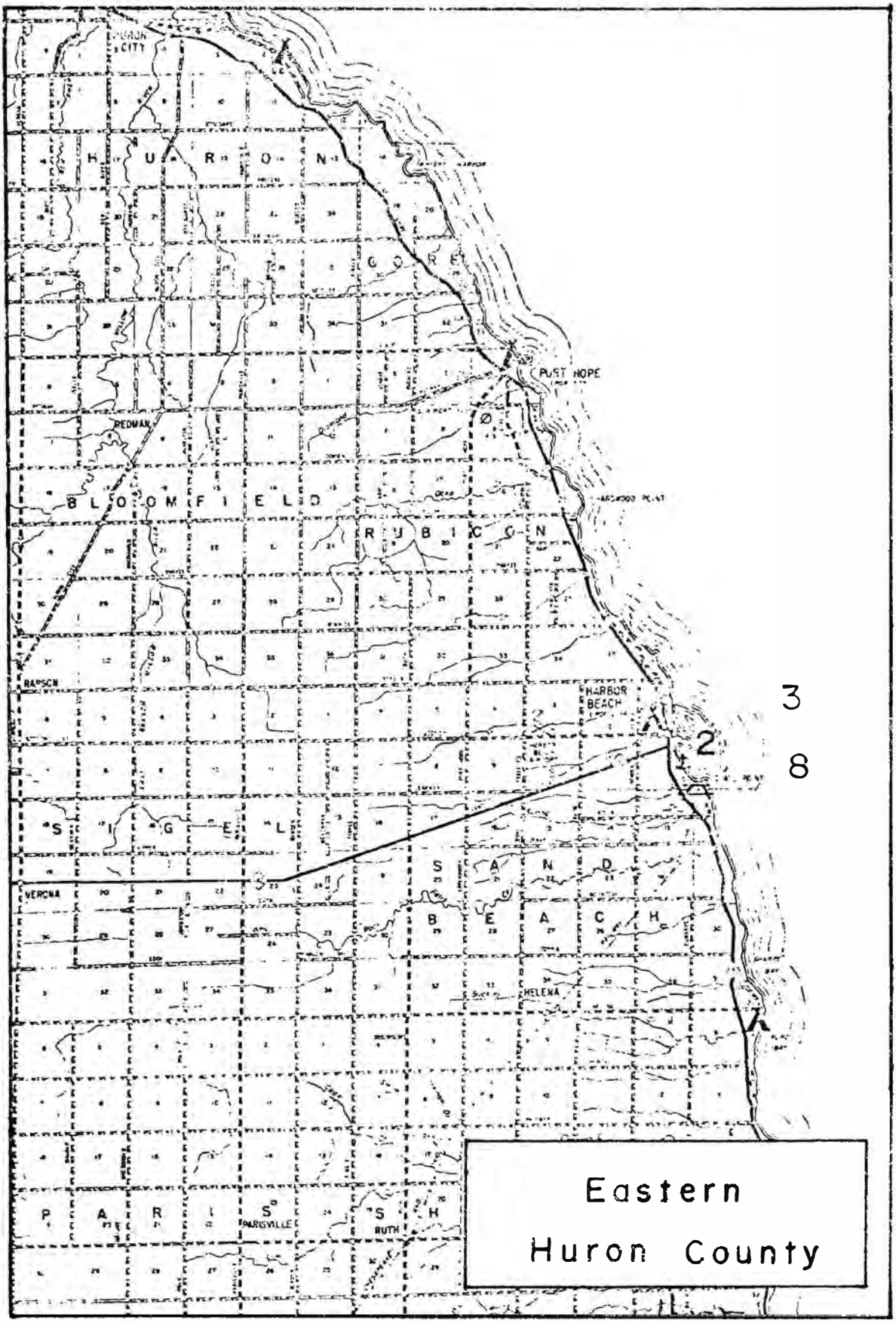
Description: Lake Huron at Harbor Beach, Michigan

Method 1: Traveling intake screens

Dates sampled: July 1974 - August 1975, weekly

Fish captured:		
	Alewife	juvenile
	Brown trout	"
	Channel catfish	"
	Freshwater drum	"
	Gizzard shad	"
	Lake trout	"
	Rainbow trout	"
	Rock bass	"
	Smallmouth bass	"
	Spottail shiner	"


FORESTVILLE
SANILAC STATE PARK
RICHMONDVILLE
LAKE
HURON
FORESTER
PORT SANILAC
CARSONVILLE
APPLEGATE
Eastern
Sanilac County


HURON
BLOOMFIELD
RUBICON
PORT HOPE
REDMAN
HARBOR BEACH
SIGEL
SAND BEACH
VERONA
HELENA
PARIS
PARISVILLE
RUTH
3
8
2
Eastern
Huron County

	Trout-perch	juvenile
	Walleye	"
	Yellow perch	"
	Others	"

Source of Information: O'Gorman, 1975. Administrative Report.

Site 3:

Location: Harbor Beach

Description: Near shore, lake water

Method 1: ½ m plankton net, 350μ mesh; tows: 1 m depth intervals, surface to 4 m over 5.5 m bottom contour, surface to 6 m over 9.2 m bottom contour, 9,900 cm/min for 5 min

Dates sampled: May 30 to June 5, 1973

Fish captured:	Rainbow smelt	larva
	Yellow perch	"

Source of Information: O'Gorman, 1976. Administrative Report.

Site 4:

Location: Port Austin

Description: Near shore, open lake water

Method 1: ½ m plankton net, 350μ mesh, 99 m/min for 5 min, surface to 4 m along 5.5 m contour, surface to 6 m along 9.2 m contour

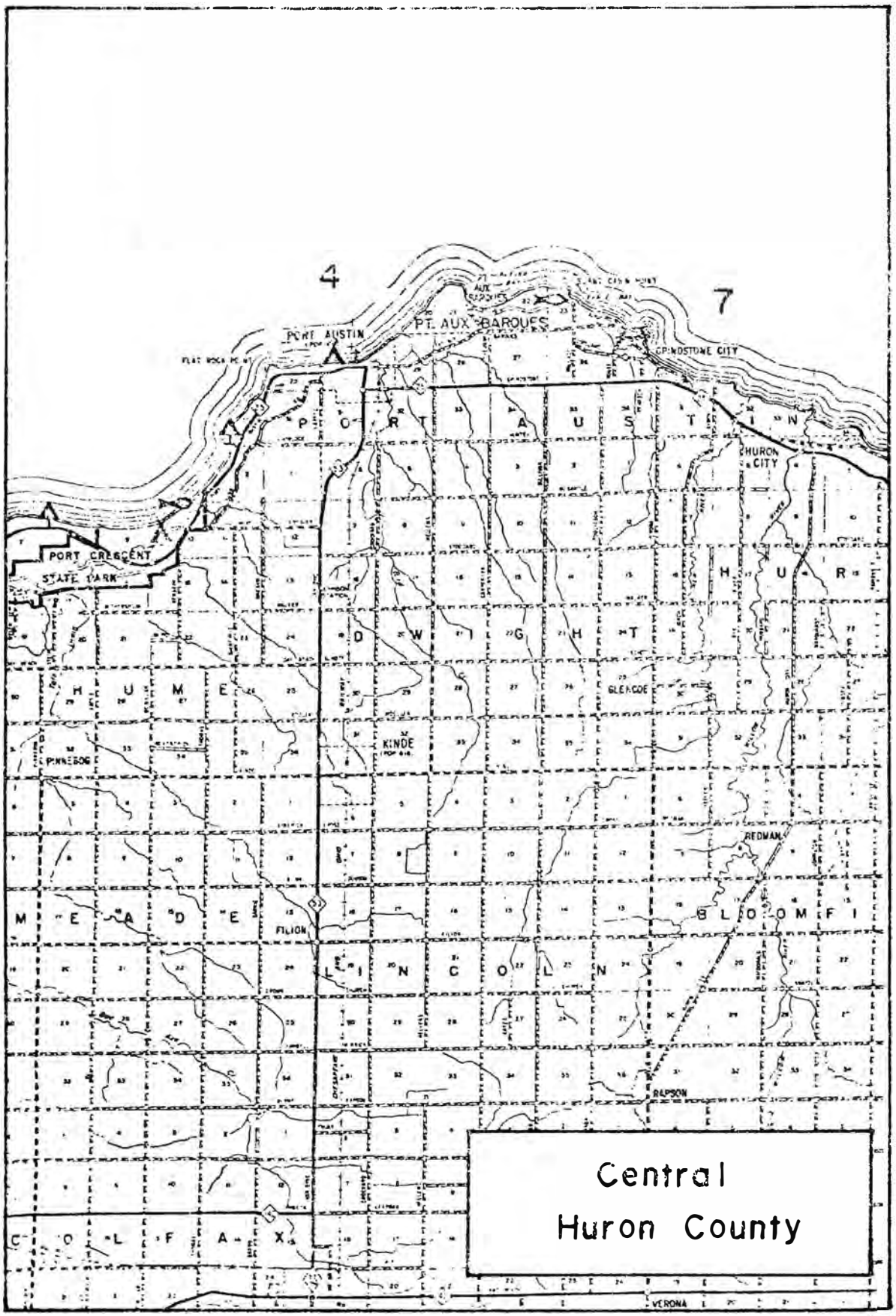
Dates sampled: July 13, 1974

Fish captured:	Alewife	larva
	Rainbow smelt	"

Method 2: Submersible sump pump filtered through 333μ plankton net

Dates sampled: July 1974 - August 1975, weekly

Fish captured:	Clupeids	larva
	Rainbow smelt	"
	Walleye	"
	Yellow perch	"


4
7
PORT AUSTIN
PT. AUX BARQUES
GRINDSTONE CITY
PORT AUSTIN
HURON CITY
PORT CRESCENT
STATE PARK
HUMME
GLENCOE
KINDE
PINNEBOG
REDMAN
MEADE
FILION
BLOOMFI
COLFAX
RAPSON
VERONA
Central
Huron County

	Unidentified	larva
	Others	"

Source of Information: Michigan Department of Natural Resources catch statistics

Site 5:

Location: Sand Point in Saginaw Bay

Description: Open water

Method 1: Trawl

Dates sampled: 1975 and 1976

Fish captured:	Alewife	juvenile
	Black crappie	"
	Gizzard shad	"
	Pumpkinseed	"
	Rainbow smelt	"
	Spottail shiner	"
	Trout-perch	"
	White sucker	"
	Yellow perch	"

Site 6:

Location: North Island

Description:

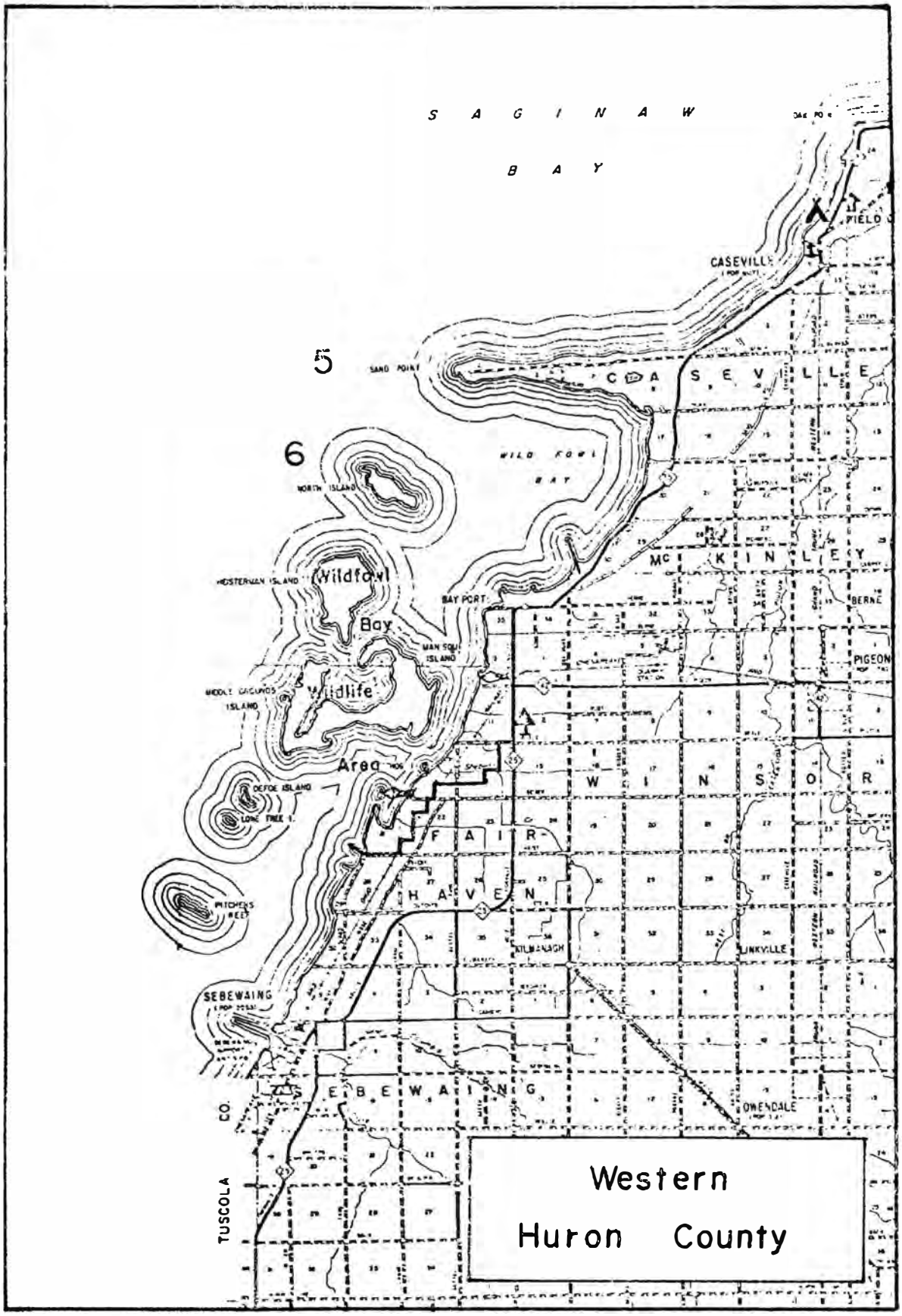
Method 1: Trawl

Dates sampled: 1975 and 1976

Fish captured:	Alewife	juvenile
	Gizzard shad	"
	Pumpkinseed	"
	Rainbow smelt	"
	Yellow perch	"

Site 7:

Location: Grindstone City


SAGINAW
BAY
FIELD
CASEVILLE
5
SAND POINT
CASEVILLE
6
WILD FOWL
BAY
NORTH ISLAND
McKINLEY
(Wildfowl)
Bay
BAY PORT
BERNE
PIGEON
Wildlife
Area
WINSOR
FAIR
HAVEN
KILMANAGH
UNIONVILLE
SEBEWAING
SEBEWAING
OWENDALE
TUSCOLA CO.
Western
Huron County

Description:

Method 1: Gill net

Dates sampled: 1975 and 1976

Fish captured:	Burbot	juvenile
	Chinook salmon	"
	Fournhorn sculpin	"
	Lake trout	"
	Longnose sucker	"
	Rainbow smelt	"
	Redhorse	"
	Rock bass	"
	Round whitefish	"
	Silver chub	"
	Stonecat	"
	White sucker	"
	Yellow perch	"

Site 8:

Location: Harbor Beach

Description:

Method 1: Gill net

Dates sampled: 1975 and 1976

Fish captured:	Black bullhead	juvenile
	Brown bullhead	"
	Brown trout	"
	Carp	"
	Channel catfish	"
	Gizzard shad	"
	Goldfish	"
	Lake trout	"
	Northern pike	"
	Rainbow trout	"
	Rock bass	"
	Stonecat	"
	Walleye	"

	White sucker	juvenile
	Yellow perch	"

County: Tuscola

Source of Information: Michigan Department of Natural Resources catch statistics

Site 9:

Location: FIsh Point

Description:

Method 1: Trawl

Dates sampled: 1975 and 1976

Fish captured:	Alewife	juvenile
	Bluegill	"
	Gizzard shad	"
	Goldfish	"
	Rainbow smelt	"
	Spottail shiner	"
	White sucker	"
	Yellow perch	"

County: Bay

Source of Information: O'Gorman, 1975. Administrative Report.

Site 10:

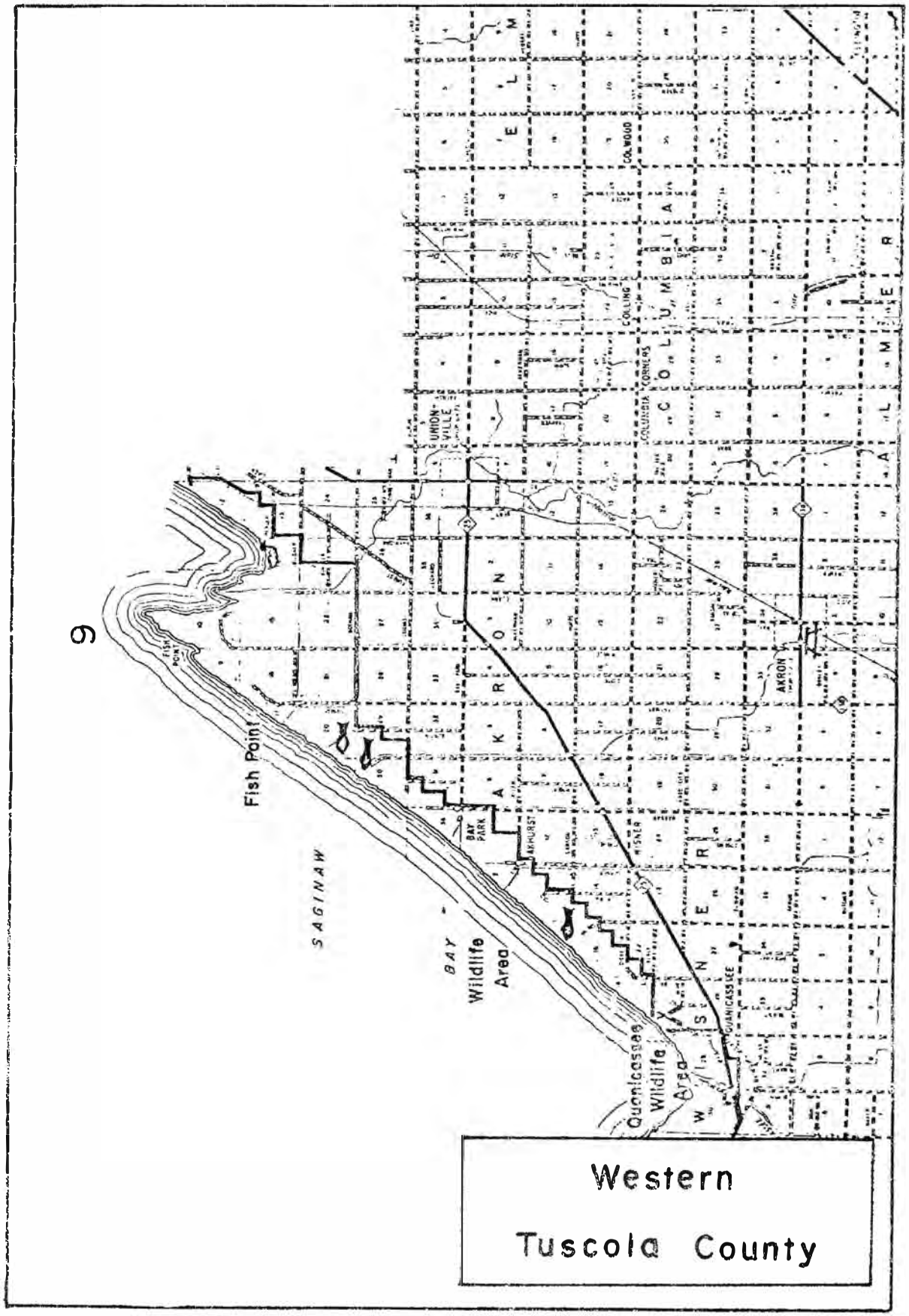
Location: Bay City

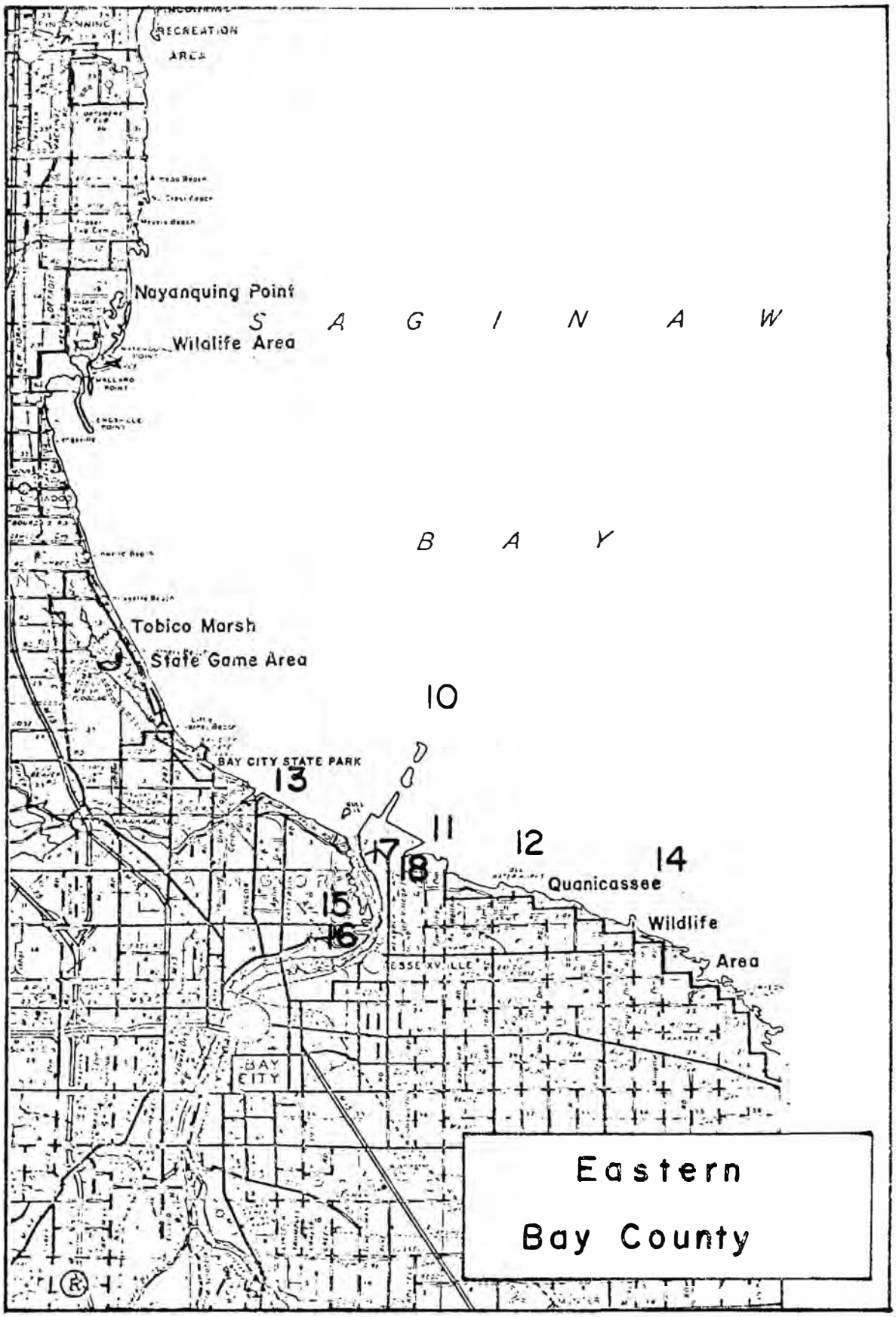
Description:

Method 1: ½ m plankton net, 350μ mesh; tows: 1 m depth intervals, surface to 4 m over 5.5 m bottom contour, surface to 6 m over 9.2 m bottom contour, 9,900 cm/min for 5 min

Dates sampled: May 30 to June 5, June 13-19, 1973

Fish captured:	Alewife	larva
	Carp	"
	Rainbow smelt	"
	Yellow perch	"


Fish Point
SAGINAW
BAY
Wildlife
Area
Quanicassee
Wildlife
Area
Western
Tuscola County
UNION-VILLE
COLLING
COLWOOD
COLUMBIA
CORNERS
AKRON
BAY PARK
AXHURST
HISNER
QUANICASSEE
FISH POINT


RECREATION
AREA
Nayanquing Point
Wilalife Area
S A G I N A W
B A Y
Tobico Marsh
State Game Area
10
BAY CITY STATE PARK
13
11
12
14
17
18
15
16
Quanicassee
Wildlife
Area
ESSEXVILLE
BAY
CITY
Eastern
Bay County

Source of Information: Fisheries Survey of Saginaw Bay. Related to the Thermal Effects of the Karn-Weadock Generating Stations, A Report for Consumers Power Company, Jackson, Michigan.

Site 11:

Location: Just outside the discharge channel

Description: Very shallow inshore station, high temperatures, mixed lake and river waters, relatively constant current, substrate - sand

Method 1: 16-foot semi-balloon otter trawl

Dates sampled: June 1975 to May 1976 (seven sampling periods)

Fish captured:

Alewife	juvenile
Carp	"
Channel catfish	"
Emerald shiner	"
Freshwater drum	"
Gizzard shad	"
Pumpkinseed	"
Rainbow smelt	"
Spottail shiner	"
Trout-perch	"
White bass	"
White sucker	"
Yellow perch	"
Unidentified	" and larva

Method 2: 1050μ conical plankton net with a 0.5 m opening

Dates sampled: June 1975 to May 1976 (seven sampling periods)

Fish captured: Unidentified larva

Site 12:

Location: Approximately 1 mile from discharge channel

Description: Periphery of mixing zone (ambient plus 3° F isotherm of heated discharge), substrate - sand

Method 1: 16-foot semi-balloon otter trawl

Dates sampled: June 1975 to May 1976 (four sampling periods)

Fish captured:		
	Alewife	juvenile
	Emerald shiner	"
	Gizzard shad	"
	Pumpkinseed	"
	Rainbow smelt	"
	Spottail shiner	"
	Yellow perch	"
	Unidentified	larva

Method 2: 1050μ conical plankton net with a 0.5 m opening

Dates sampled: June 1975 to May 1976 (seven sampling periods)

Fish captured: Unidentified larva

Site 13:

Location: One mile west of the mouth of the Saginaw River

Description: Moderate depth and distance from shore, mixture of lake and river water, little river induced current, substrate - sand

Method 1: 16-foot semi-balloon otter trawl

Dates sampled: June 1975 to May 1976 (seven sampling periods)

Fish captured:		
	Alewife	juvenile
	Carp	"
	Channel catfish	"
	Emerald shiner	"
	Freshwater drum	"
	Gizzard shad	"
	Pumpkinseed	"
	Rainbow smelt	"
	Spottail shiner	"
	Trout-perch	"
	White bass	"
	Yellow perch	"
	Unidentified	larva

Method 2: 1050μ conical plankton net with a 0.5 m opening

Dates sampled: June 1975 to May 1976 (seven sampling periods)

Fish captured: Unidentified larva

Site 14:

Location: Four miles east of discharge channel

Description: Considerable distance from shore but in shallow water, substrate - sand

Method 1: 16-foot semi-balloon otter trawl

Dates sampled: June 1975 to May 1976 (seven sampling periods)

Fish captured:

Alewife	juvenile
Channel catfish	"
Emerald shiner	"
Freshwater drum	"
Gizzard shad	"
Pumpkinseed	"
Rainbow smelt	"
Spottail shiner	"
Trout-perch	"
White bass	"
Yellow perch	"

Method 2: 1050μ conical plankton net with a 0.5 m opening

Dates sampled: June 1975 to May 1976 (seven sampling periods)

Fish captured: Unidentified larva

Site 15:

Location: East side of the Saginaw River, upstream from the plant intake

Description: In natural river channel, 4 to 12 feet of water, in main current of river, substrate - mud and soft clay

Method 1: 16-foot semi-balloon otter trawl

Dates sampled: June 1975 to May 1976 (seven sampling periods)

Fish captured:	Carp	juvenile
	Channel catfish	"
	Emerald shiner	"
	Gizzard shad	"
	Pumpkinseed	"
	Spottail shiner	"
	White bass	"
	White sucker	"
	Yellow perch	"
	Unidentified	larva

Method 2: 1050μ conical plankton net with a 0.5 m opening

Dates sampled: June 1975 to May 1976 (seven sampling periods)

Fish captured: Unidentified larva

Site 16:

Location: West side of the Saginaw River, upstream from the plant intake

Description: Shallow water (4 to 6 feet) protected from river current by dike, substrate - mud and clay

Method 1: 16-foot semi-balloon otter trawl

Dates sampled: June 1975 to May 1976

Fish captured:	Alewife	juvenile
	Carp	"
	Channel catfish	"
	Emerald shiner	"
	Freshwater drum	"
	Gizzard shad	"
	Pumpkinseed	"
	Rainbow smelt	"
	Spottail shiner	"
	White bass	"
	White sucker	"
	Yellow perch	"
	Unidentified	larva

Method 2: 1050μ conical plankton net with a 0.5 m opening

Dates sampled: June 1975 to May 1976 (seven sampling periods)

Fish captured: Unidentified larva

Source of Information: Section 316(b) Intake Study, J. C. Weadock Plant, Consumers Power Company

Site 17:

Location: Plant intake bay

Description: Saginaw Bay at the mouth of the Saginaw River

Method 1: Traveling intake screens

Dates sampled: January 1974 to January 1975

Fish captured:		
	Alewife	juvenile
	Gizzard shad	"
	Rainbow smelt	"
	White bass	"
	Yellow perch	"

Method 2: Submersible sump pump filtered through a 333μ plankton net; depth--surface and 12 ft

Dates sampled: January 1974 to January 1975

Fish captured:		
	Alewife	juvenile
	Bluegill	"
	Carp	"
	Clupeids	larva
	Gizzard shad	juvenile
	Goldfish	larva
	Lamprey	"
	Rainbow smelt	juvenile, larva
	Yellow perch	" "
	Unidentified	larva

Source of Information: Section 316(b) Intake Study, D. E. Karn Plant, Units 1 & 2, Consumers Power Company

Site 18:

Location: Plant intake bay

Description: Saginaw Bay at the mouth of the Saginaw River

Method 1: Traveling intake screens

Dates sampled: January 1974 to January 1975

Fish captured:		
	Alewife	juvenile
	Gizzard shad	"
	Rainbow smelt	"
	White bass	"
	Yellow perch	"

Method 2: Submersible sump pump filtered through a 333μ plankton net; depth--surface and 12 ft

Dates sampled: January 1974 to January 1975, weekly

Fish captured:		
	Alewife	juvenile
	Clupeids	juvenile, larva
	Gizzard shad	juvenile
	Goldfish	juvenile, larva
	Rainbow smelt	" "
	Spottail shiner	" "
	Trout-perch	" "
	Walleye	" "
	Yellow perch	" "
	Unidentified	larva

County: Arenac

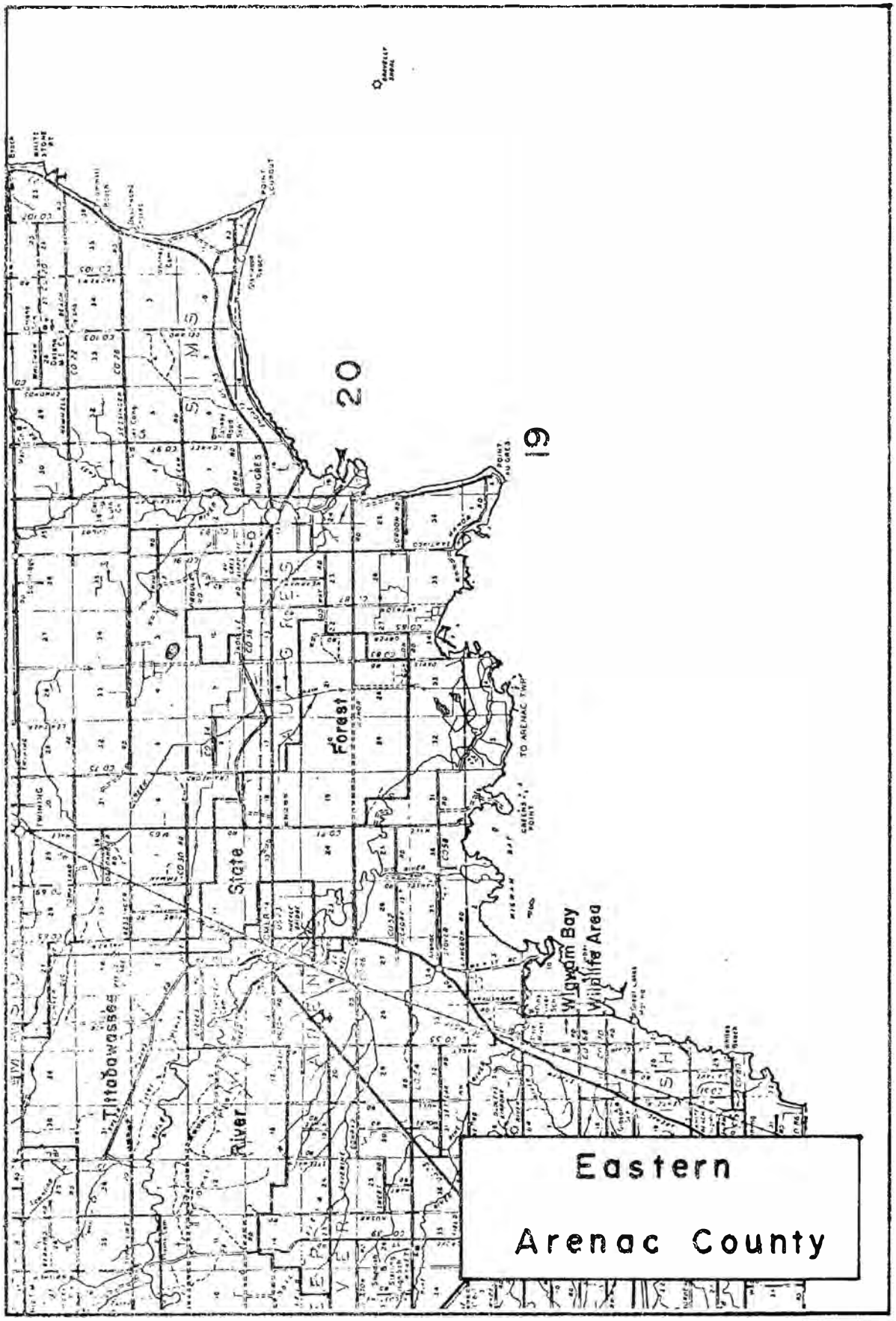
Source of Information: O'Gorman, 1975. Administrative Report.

Site 19:

Location: Pt. Au Gres

Description:

Method 1: ½ m plankton net, 350μ mesh; tows: 1 m depth intervals, surface to 4 m over 5.5 m bottom contour, surface to 6 m over 9.2 m bottom contour, 9,900 cm/min for 5 min


20
19
State Forest
Wigwam Bay Wildlife Area
Tittabawassee River
TO ARENAC TWP.
Eastern
Arenac County

Dates sampled: May 30 to June 5, and June 13-19, 1973

Fish captured: Alewife larva
Burbot "
Carp "
Smelt "
Sucker "
Yellow perch "

Source of Information: Michigan Department of Natural Resources catch statistics

Site 20:

Location: Au Gres

Description:

Method 1: Trawl

Dates sampled: 1975 and 1976

Fish captured: Alewife
Black crappie
Gizzard shad
Pumpkinseed
Rainbow smelt
Spottail shiner
Trout-perch
White sucker
Yellow perch

County: Iosco

Source of Information: O'Gorman, 1975. Administrative Report.

Site 21:

Location: Au Sable Pt.

Description:

Method 1: ½ m plankton net, 350μ mesh; tows: 1 m depth intervals, surface to 4 m over 5.5 m bottom contour, surface to 6 m over 9.2 m bottom contour, 9,900 cm/min for 5 min

Eastern

Iosco County

Dates sampled: May 30 - June 5, and June 13-19, 1973

Fish captured: Alewife larva
Rainbow smelt "
Yellow perch "

Source of Information: Michigan Department of Natural Resources catch statistics

Site 22:

Location: Au Sable River mouth

Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured: Carp
Chinook salmon
Coho salmon
Lake trout
Longnose sucker
Round whitefish
Walleye
White sucker
Yellow perch

County: Alcona

Source of Information: O'Gorman, 1975. Administrative Report.

Site 23:

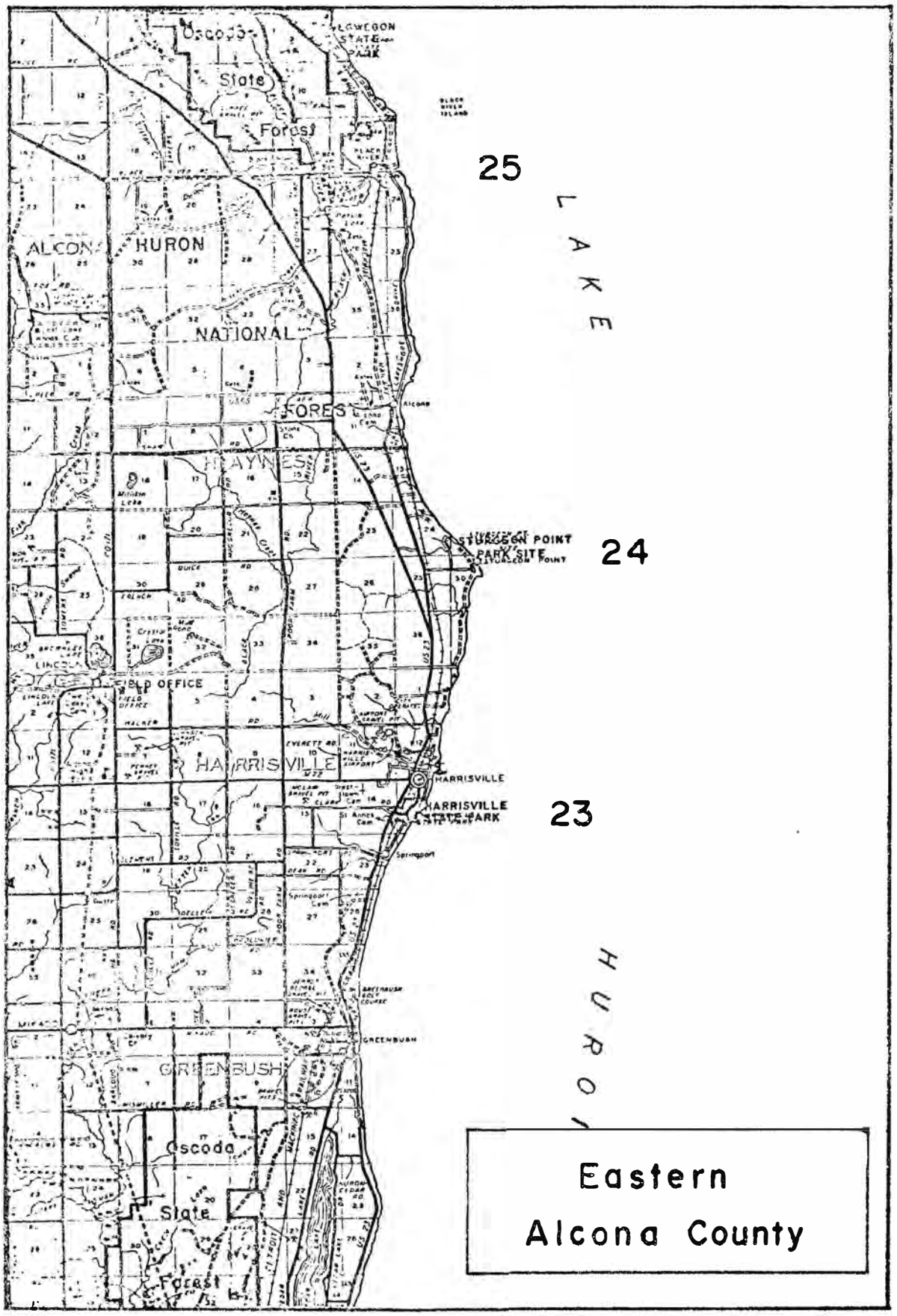
Location: Harrisville

Description:

Method 1: ½ m plankton net, 350μ mesh; tows: 1 m depth intervals, surface to 4 m over 5.5 m bottom contour, surface to 6 m over 9.2 m bottom contour, 9,900 cm/min for 5 min

Dates sampled: May 30 - June 5, and June 13-19, 1973

Fish captured: Alewife larva
Rainbow smelt "


Oscoda
State
Forest
25
LAKE
ALCONA
HURON
NATIONAL
FOREST
HAYNES
STURGEON POINT
PARK SITE
24
FIELD OFFICE
HARRISVILLE
HARRISVILLE
STATE PARK
23
GREENBUSH
Oscoda
State
Forest
Eastern
Alcona County

Source of Information: Michigan Department of Natural Resources catch statistics

Site 24:

Location: Sturgeon Pt.

Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured: Burbot
Brown trout
Lake trout
Lake whitefish
Longnose sucker
Round whitefish
White sucker
Yellow perch

Method 2: Four bottom trawls

Dates sampled: 1976

Fish captured: Alewife
Round whitefish
Trout-perch

Site 25:

Location: Black River

Description: Off-shore

Method 1: Gill net

Dates sampled: 1976

Fish captured: Alewife
Fourhorn sculpin

County: Alpena

Source of Information: O'Gorman, 1975. Administrative Report.

Site 26:

Location: Alpena

Description:

Method 1: ½ m plankton net, 350μ mesh; tow: 1 m depth intervals, surface to 4 m over 5.5 m bottom contour, surface to 6 m over 9.2 m bottom contour, 9,900 cm/min for 5 min

Dates sampled: May 30 - June 5, June 13-19, 1973

Fish captured:		
	Alewife	larva
	Rainbow smelt	"
	Yellow perch	"

Source of Information: O'Gorman, 1976. Administrative Report.

Site 27:

Location: Middle Island

Description:

Method 1: ½ m plankton net, 350μ mesh, 99 m/min for 5 min, surface to 4 m along 5.5 m bottom contour, surface to 6 m along 9.2 m bottom contour

Dates sampled: July 1, 1974

Fish captured:		
	Rainbow smelt	larva

Source of Information: Michigan Department of Natural Resources catch statistics

Site 28:

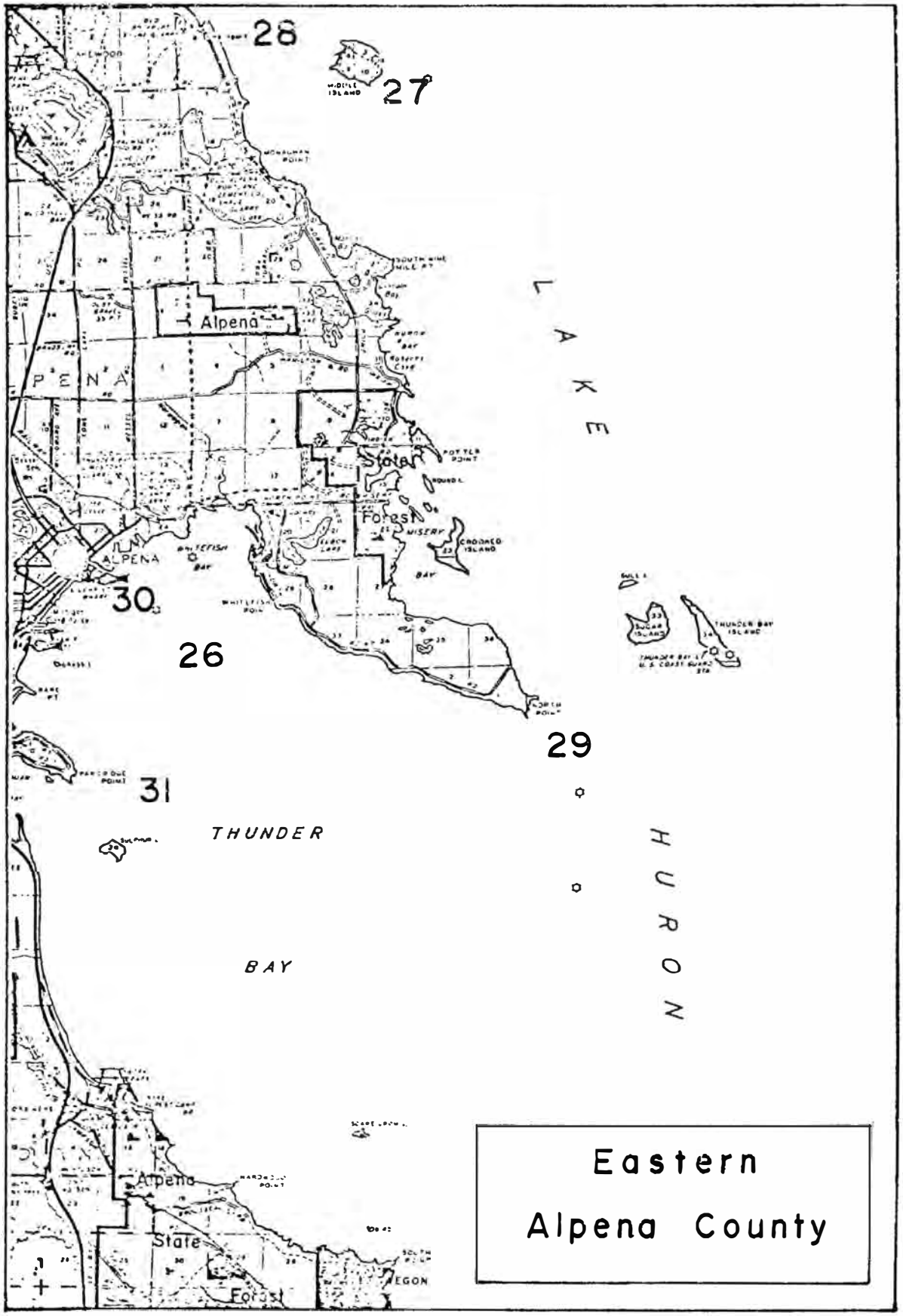
Location: Rockport

Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured: Brown trout
Chinook salmon
Lake trout
Longnose sucker


28
27
Alpena
P E N A
Stata
Forest
ALPENA
30
26
29
31
THUNDER
BAY
L A K E
H U R O N
Alpena
State
Forest
Eastern
Alpena County

Round whitefish
White bass
White sucker

Method 2: Eleven bottom trawls

Dates sampled: 1976

Fish captured: Alewife juvenile
Emerald shiner "
Lake trout "
Ninespine stickleback "
Rainbow smelt "
Slimy sculpin "
Trout-perch "

Site 29:

Location: North Pt. in Thunder Bay

Description:

Method 1: Gill nets

Dates sampled: 1976

Fish captured: Alewife
Brown trout
Gizzard shad
Lake trout
Lake whitefish
Longnose sucker
Rock bass
Round whitefish
White crappie
White sucker
Yellow perch

Site 30:

Location: Thunder Bay

Description: Mouth of the Thunder Bay River

Method 1: Gill net

Dates sampled: 1976

Fish captured: Brown bullhead
Brown trout
Bowfin
Carp
Chinook salmon
Coho salmon
Gizzard shad
Lake trout
Northern pike
Rock bass
White crappie
White sucker
Yellow perch

Site 31:

Location: Partridge Pt. in Thunder Bay

Description:

Method 1: Gill net

Dates sampled: 1976

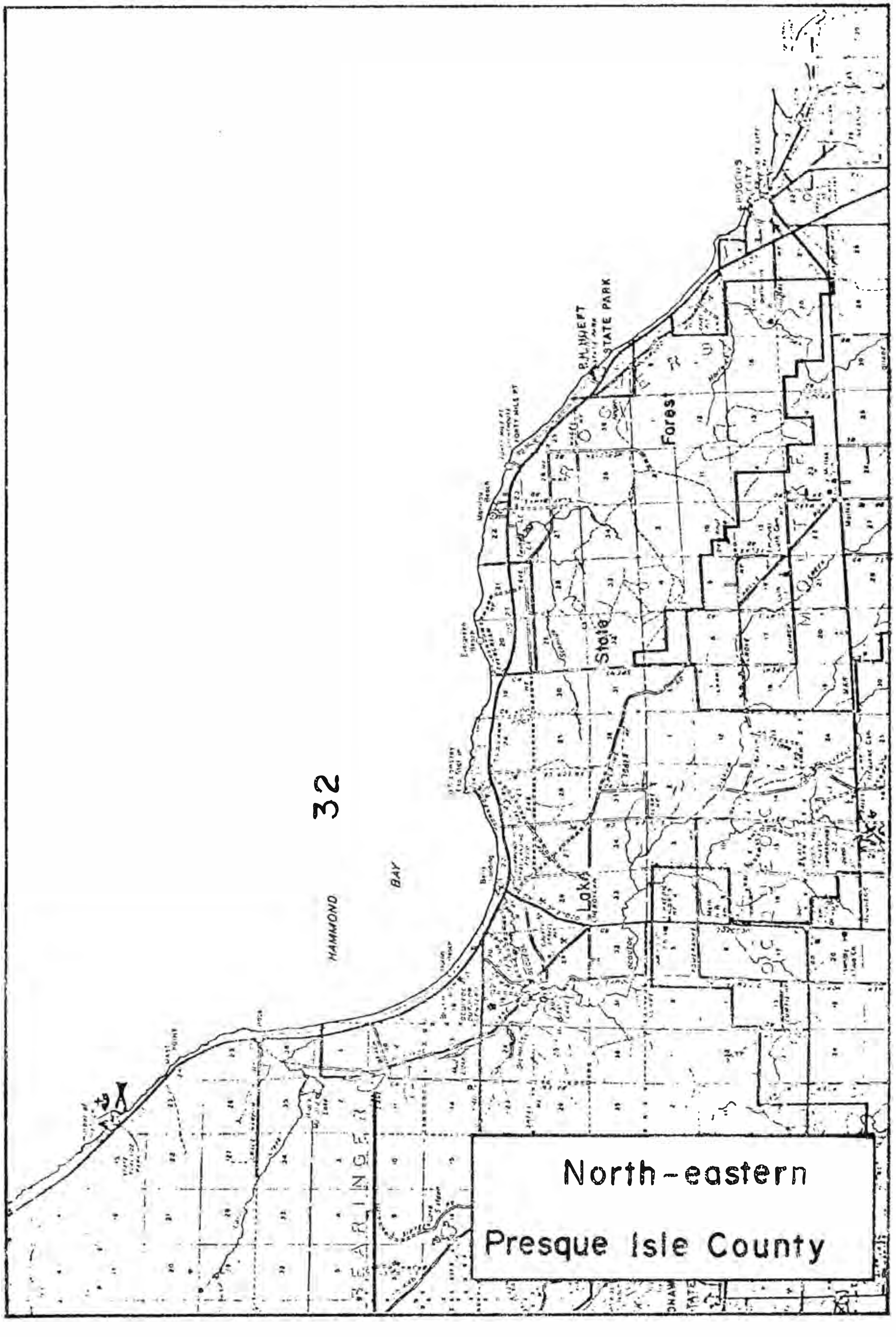
Fish captured: Brown trout
Burbot
Lake trout
Longnose sucker
Northern pike
Round whitefish
White sucker
Yellow perch

County: Presque Isle

Source of Information: O'Gorman, 1975. Administrative Report.

Site 32:

Location: Hammond Bay


North-eastern
Presque Isle County
32
HAMMOND
BAY
P.H. HOEFT
STATE PARK
Lake
State
Forest
BEARINGER

Description:

Method 1: ½ m plankton net, 350μ mesh, tows: 1 m depth intervals, surface to 4 m over 5.5 m bottom contour, surface to 6 m over 9.2 m bottom contour, 9,900 cm/min for 5 min

Dates sampled: May 30 - June 5, June 13-19, 1973

Fish captured:		
	Alewife	larva
	Bloater	"
	Fourhorned sculpin	"
	Lake whitefish	"
	Smelt	"
	Yellow perch	"

Site 33:

Location: Thompson Harbor

Description:

Method 1: ½ m plankton net, 350μ mesh; tows: 1 m depth intervals, surface to 4 m over 5.5 m bottom contour, surface to 6 m over 9.2 m bottom contour, 9,900 cm/min for 5 min

Dates sampled: May 30 to June 5, June 13-19, 1973

Fish captured:		
	Fourhorned sculpin	larva
	Lake whitefish	"
	Smelt	"
	White sucker	"
	Yellow perch	"

Source of Information: Michigan Department of Natural Resources catch statistics

Site 34:

Location: Presque Isle

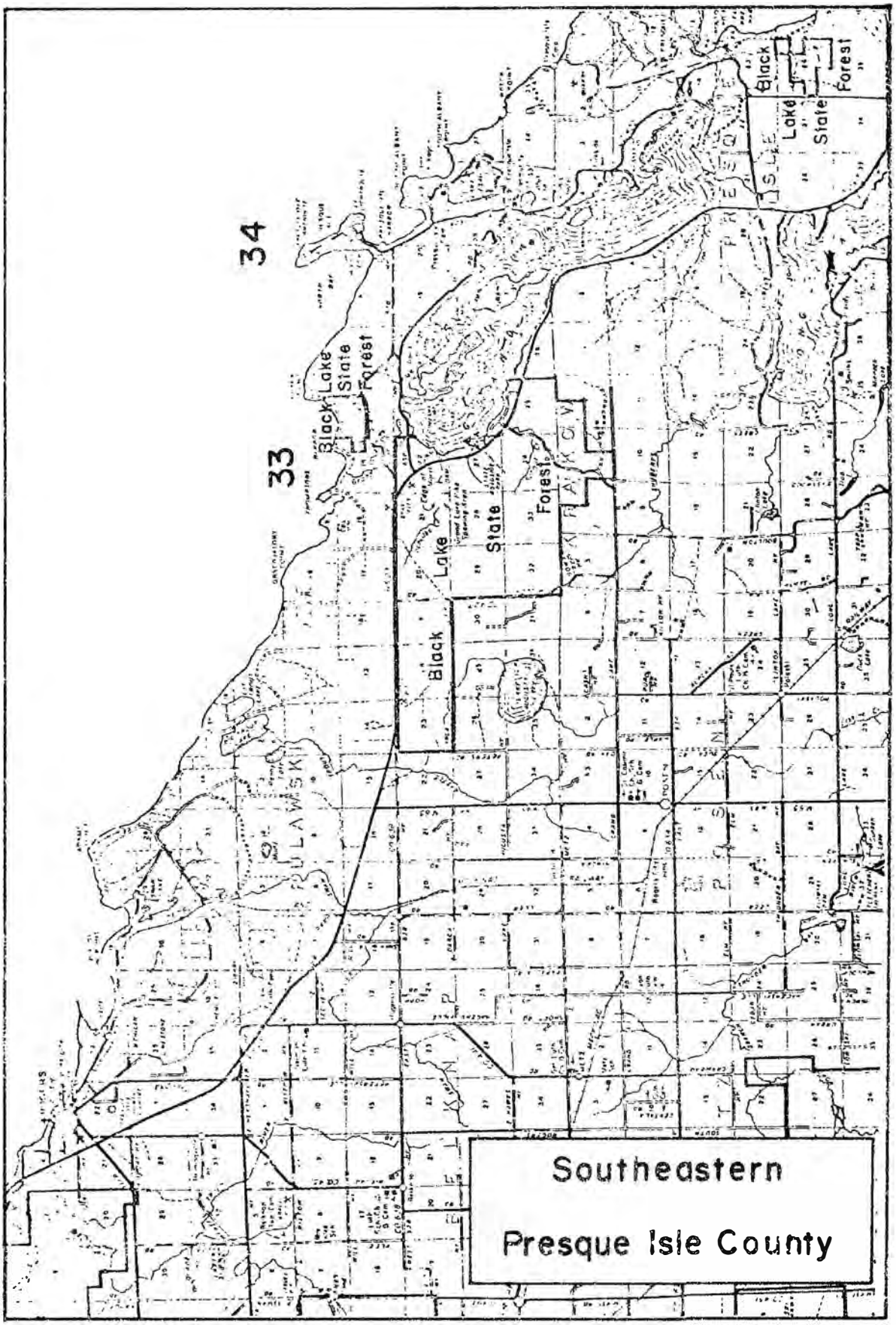
Description: Off-shore

Method 1: Gill nets

Dates sampled: 1976

Fish captured: Alewife

Rainbow smelt


Black Lake State Forest
Black Lake State Forest
Black Lake State Forest
34
33
PULASKI
Southeastern
Presque Isle County

County: Cheboygan - Presque Isle

Source of Information: O'Gorman, 1976. Administrative Report.

Site 35:

Location: Nine Mile Pt.

Description:

Method 1: ½ m plankton net, 350μ mesh, 99 m/min for 5 min, surface to 4 m along 5.5 m contour, surface to 6 m along 9.2 m contour

Dates sampled: June 26, 1974

Fish captured:		
	Alewife	larva
	Rainbow smelt	"

County: Cheboygan

Source of Information: Michigan Department of Natural Resources catch statistics

Site 36:

Location: Cheboygan River mouth

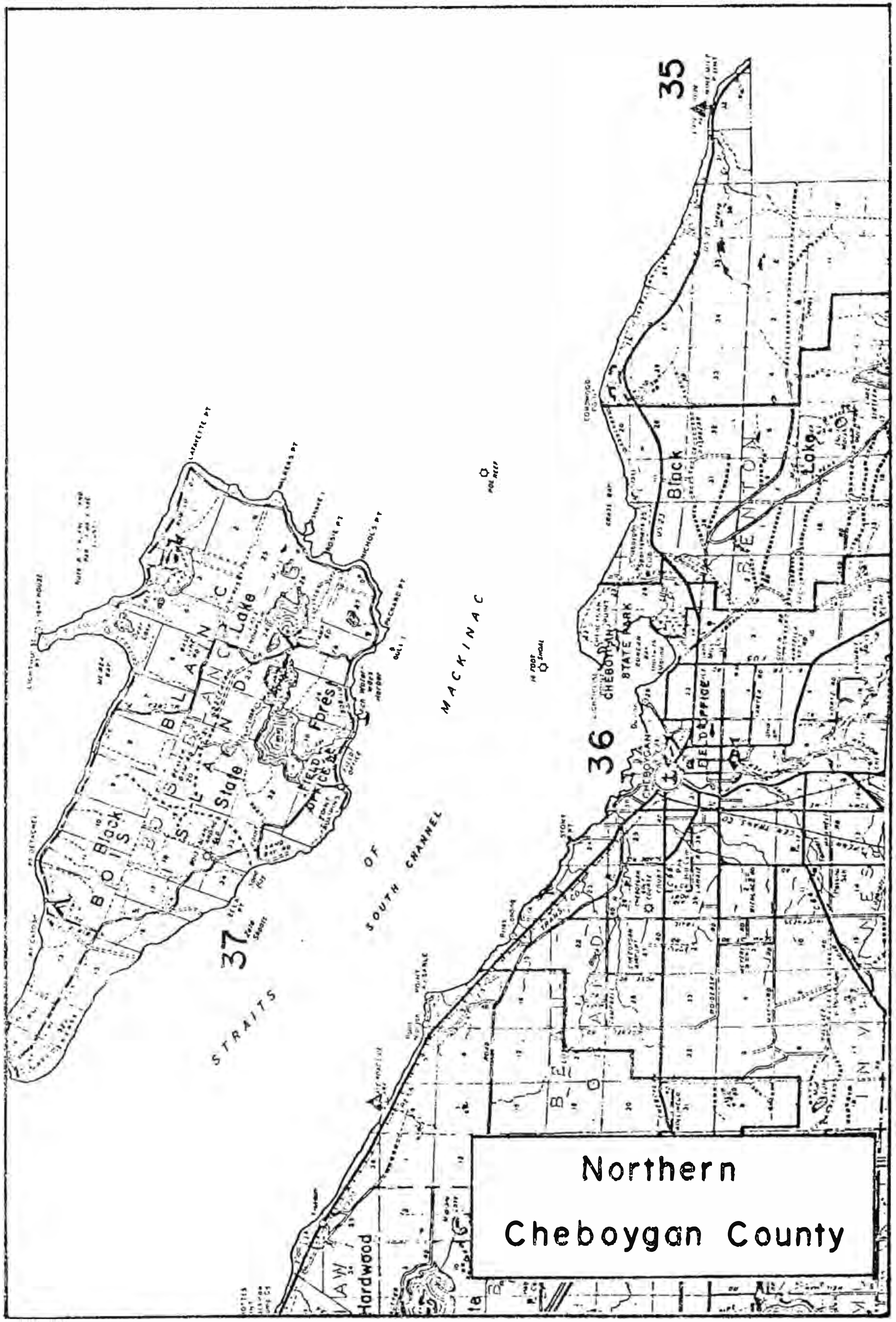
Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured:

- Bowfin
- Brown bullhead
- Carp
- Channel catfish
- Chinook salmon
- Lake herring
- Lake trout
- Longnose sucker
- Northern pike
- Rock bass
- Round whitefish


Northern
Cheboygan County
35
36
37
Black Lake
Straits of Mackinac
South Channel
Bois Blanc Island
State Forest
Hardwood

Smallmouth bass
Walleye
White sucker
Yellow perch

Source of Information: O'Gorman, 1976. Administrative Report.

Site 37:

Location: Off Zella Pt. on Bois Blanc Island

Description:

Method 1: ½ m plankton net, 350μ mesh, 99 m/min for 5 min, surface to 4 m along 5.5 m bottom contour, surface to 6 m along 9.2 m bottom contour

Dates sampled: June 26, 1974

Fish captured:		
	Alewife	larva
	Rainbow smelt	"

County: Mackinac

Source of Information: O'Gorman, 1975. Administrative Report.

Site 38:

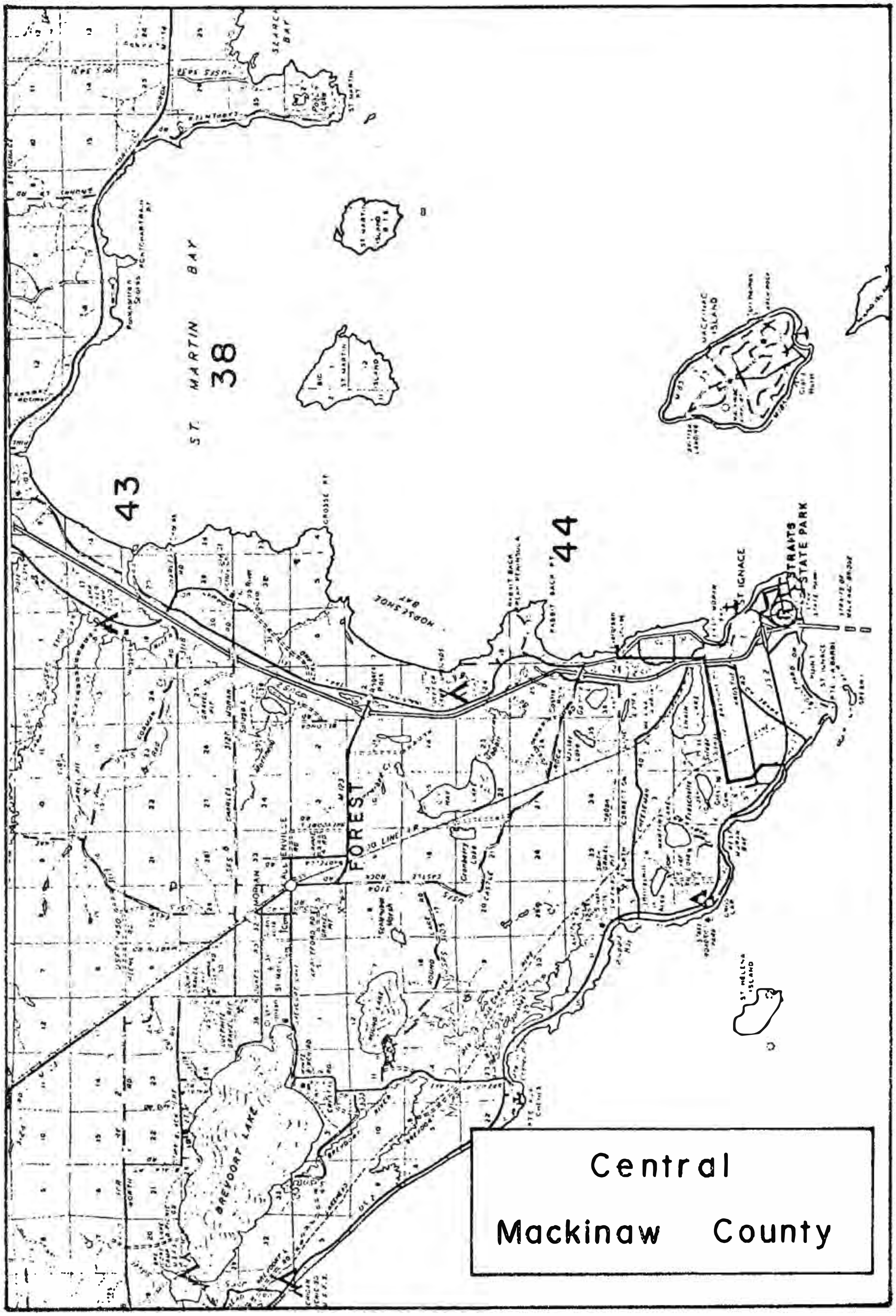
Location: St. Martin Bay

Description:

Method 1: ½ m plankton net, 350μ mesh, tows: 1 m depth intervals, surface 4 m over 5.5 m bottom contour, surface to 6 m over 9.2 m bottom contour, 9,900 cm/min for 5 min

Dates sampled: May 30 to June 5, June 13-19, 1973

Fish captured:		
	Bloater	larva
	Fourhorned sculpin	"
	Rainbow smelt	"
	White sucker	"
	Yellow perch	"


ST. MARTIN BAY
38
43
44
FOREST
ST IGNACE
STRAITS STATE PARK
BREVOORT LAKE
Central
Mackinaw County

Source of Information: O'Gorman, 1976. Administrative Report.

Site 39:

Location: Pt. Fuyards

Description:

Method 1: ½ m plankton net, 350μ mesh; tows: 1 m depth intervals, surface to 4 m over 5.5 m bottom contour, surface to 6 m over 9.2 m bottom contour, 9,900 cm/min for 5 min

Dates sampled: June 28, 1974

Fish captured:		
	Alewife	larva
	Rainbow smelt	"
	Yellow perch	"

Source of Information: Michigan Department of Natural Resources catch statistics

Site 40:

Location: Beavertail Pt.

Description:

Method 1: Four bottom trawls

Dates sampled: 1976

Fish captured:		
	Alewife	juvenile
	Lake trout	"

Source of Information: Michigan Department of Natural Resources catch statistics

Site 41:

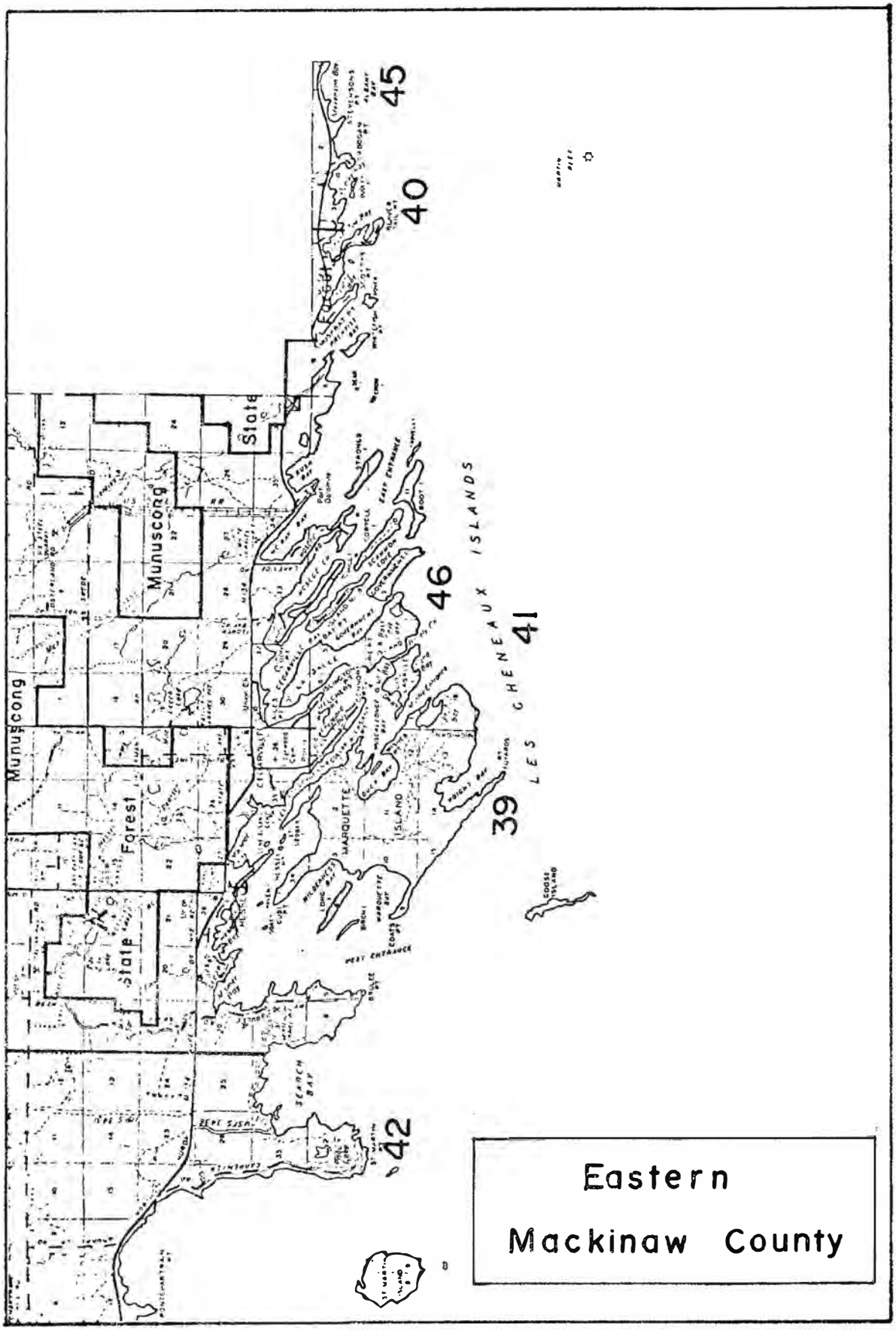
Location: Les Cheneaux Island

Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured:		
	Bowfin	juvenile
	Brown bullhead	"


45
40
46
41
39
42
LES CHENEAUX ISLANDS
Munuscong
Munuscong
State
Forest
State
MARQUETTE
ISLAND
Eastern
Mackinaw County

	Brown trout	juvenile
	Burbot	"
	Carp	"
	Lake herring	"
	Northern pike	"
	Pumpkinseed	"
	Rock bass	"
	White sucker	"
	Yellow perch	"

Site 42:

Location: Point Brulee

Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured: Brown trout
Burbot
Chinook salmon
Lake herring
Lake trout
Lake whitefish
Longnose sucker
Round whitefish
White sucker
Yellow perch

Site 43:

Location: Carp River mouth

Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured:	Brown trout	juvenile
	Coho salmon	"
	Lake trout	"

	Northern pike	juvenile
	Sturgeon	"
	White sucker	"
	Yellow perch	"

Site 44:

Location: Rabbit Back Pt.

Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured:	Brown trout	juvenile
	Chinook salmon	"
	Lake herring	"
	Lake trout	"
	Lake whitefish	"
	Longnose sucker	"
	Northern pike	"
	Round whitefish	"
	White sucker	"

Site 45:

Location: Albany Bay

Description:

Method 1: Nineteen bottom trawls

Dates sampled: 1976

Fish captured:	Alewife	juvenile
	Lake trout	"
	Lake whitefish	"
	Longnose sucker	"
	Rainbow smelt	"
	Round whitefish	"
	White sucker	"

Site 46:

Location: Cedarville Wreck

Description:

Method 1: Nineteen bottom trawls

Dates sampled: 1976

Fish captured:		
	Lake trout	juvenile
	Lake whitefish	"
	Ninespine stickleback	"
	Rainbow smelt	"
	White sucker	"

County: Chippewa

Source of Information: O'Gorman, 1975. Administrative Report.

Site 47:

Location: St. Vital Pt.

Description:

Method 1: ½ m plankton net, 350μ mesh; tows: 1 m depth intervals, surface to 4 m over 5.5 m bottom contour, surface to 6 m over 9.2 m contour, 9,900 cm/min for 5 min

Dates sampled: May 30 - June 5, June 13-19, 1973

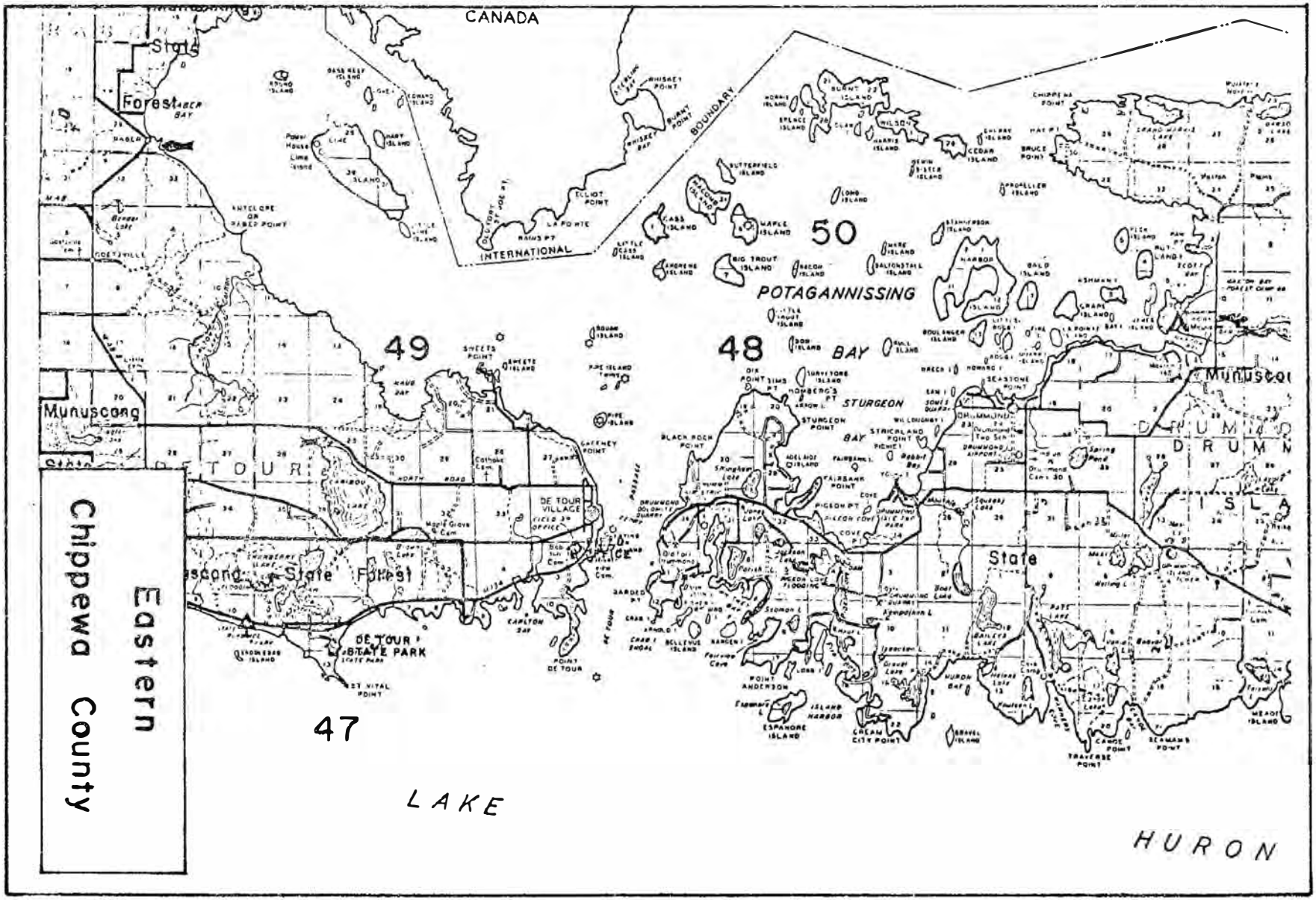
Fish captured:		
	Eloater	larva
	Burbot	"
	Fourhorned sculpin	"
	Rainbow smelt	"
	White sucker	"
	Yellow perch	"

Source of Information: Michigan Department of Natural Resources catch statistics

Site 48:

Location: Sims Point

Description:


CANADA
INTERNATIONAL BOUNDARY
POTAGANNISSING BAY
LAKE HURON
Eastern Chippewa County
49
48
50
47
DE TOUR VILLAGE
DE TOUR STATE PARK
STURGEON BAY
State Forest
Munuscong
DRUMMOND ISLAND

Method 1: Gill net

Dates sampled: 1976

Fish captured:		
	Burbot	juvenile
	Lake herring	"
	Longnose sucker	"
	Northern pike	"
	Rainbow trout	"
	Round whitefish	"
	Sturgeon	"
	Walleye	"
	White sucker	"
	Yellow perch	"

Site 49:

Location: Maud Bay

Description:

Method 1: Gill net

Dates sampled: 1976

Fish captured:		
	Burbot	juvenile
	Chinook salmon	"
	Lake herring	"
	Lake whitefish	"
	Longnose sucker	"
	Northern pike	"
	Rock bass	"
	Round whitefish	"
	Smallmouth bass	"
	Walleye	"
	White sucker	"
	Yellow perch	"

Method 2: Fourteen bottom trawls

Dates sampled: 1976

Fish captured:		
	Alewife	juvenile
	Brown bullhead	"

	Gizzard shad	juvenile
	Lake herring	"
	Lake trout	"
	Lake whitefish	"
	Longnose sucker	"
	Northern pike	"
	Rainbow smelt	"
	Rock bass	"
	Smallmouth bass	"
	Slimy sculpin	"
	Walleye	"
	White sucker	"
	Yellow perch	"

Site 50:

Location: Potagannising Bay

Description:

Method 1: Two bottom trawls

Dates sampled: 1976

Fish captured:	Brown bullhead	juvenile
	Pumpkinseed	"
	Northern pike	"
	Rainbow smelt	"
	Rock bass	"
	White sucker	"
	Yellow perch	"

ST. CLAIR - DETROIT RIVER SYSTEM

County: Wayne

Source of Information: Wyandotte North Power Plant, Study Report on Cooling Water Intake, Detroit Edison

Site 1:

Location: Plant intake bay

Description: Westbank of the Detroit River

Method 1: Traveling intake screens

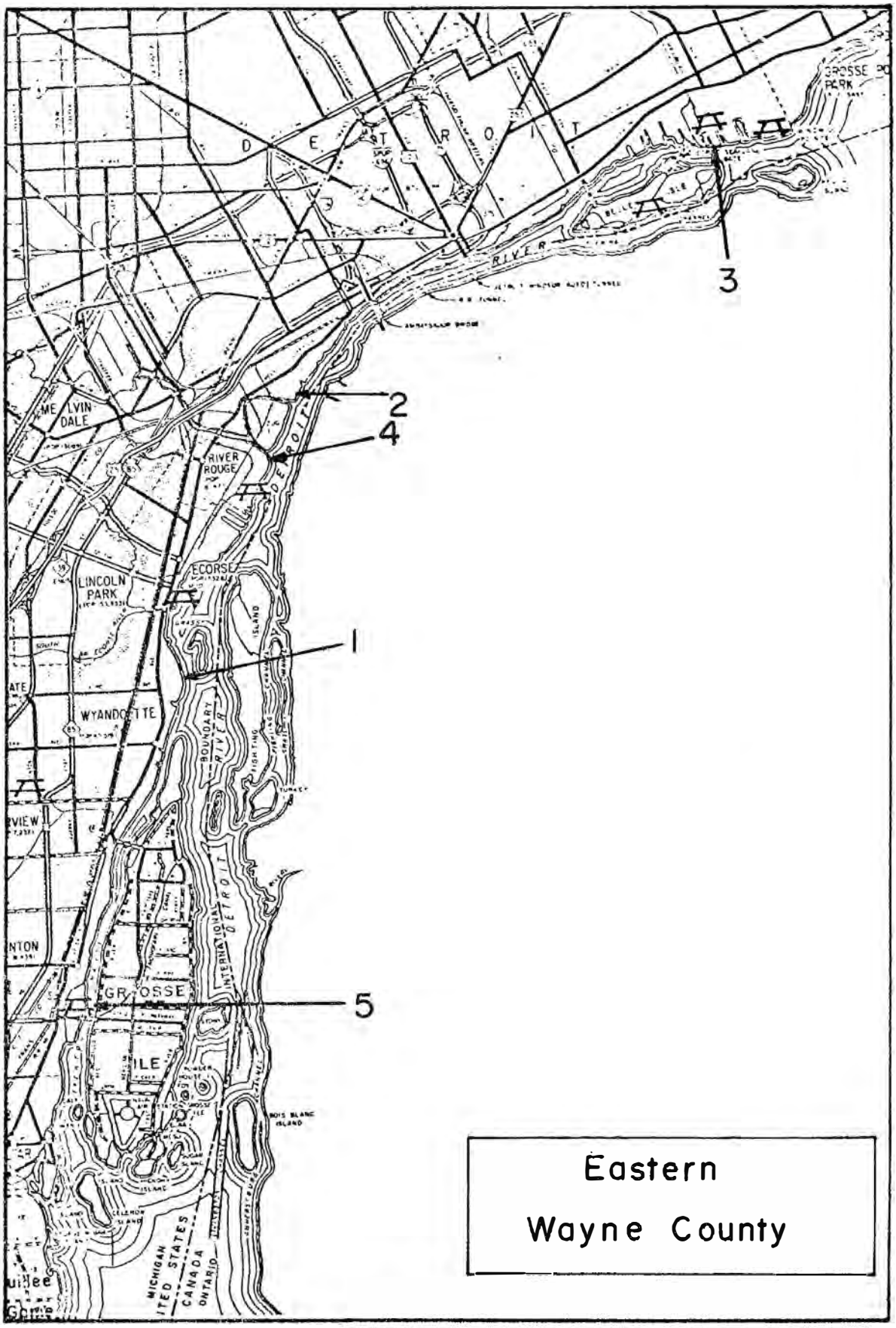
Dates sampled: April 1976, every six days

Fish captured:		
	Alewife	juvenile
	Bowfin	"
	Bullhead	"
	Carp	"
	Gizzard shad	"
	Goldfish	"
	Rainbow smelt	"
	Rock bass	"
	Shiners (*Notropis*)	"
	Sunfish (*Lepomis*)	"
	Trout-perch	"
	Walleye	"
	White crappie	"
	Yellow perch	"
	Others	"

Method 2: Submersible sump pump filtered through a 351µ plankton net, depth 8-12 feet.

Dates sampled: April - October 1976, twice a week

Fish captured: Not available at time of publication


DETROIT
RIVER
3
2
4
MELVINDALE
RIVER ROUGE
ECORSE
LINCOLN PARK
1
WYANDOTTE
BOUNDARY
INTERNATIONAL
DETROIT
GROSSE
5
MICHIGAN
UNITED STATES
CANADA
ONTARIO
Eastern
Wayne County

Source of Information: Delray Power Plant, Study Report on Cooling Water Intake, Detroit Edison

Site 2:

Location: Plant intake bay

Description: West bank of the Detroit River

Method 1: Traveling intake screens

Dates sampled: June 1974 - August 1975, weekly

Fish captured:	Alewife	juvenile
	Channel catfish	"
	Freshwater drum	"
	Gizzard shad	"
	Rock bass	"
	Smallmouth bass	"
	Rainbow smelt	"
	Walleye	"
	White bass	"
	Yellow perch	"
	Others	"

Method 2: Submersible sump pump filtered through a 333μ plankton net

Dates sampled: June 1974 - August 1975, weekly

Fish captured:	Clupeid	larva
	Logperch	"
	Rainbow smelt	"
	Trout-perch	"
	Walleye	"
	White bass	"
	Yellow perch	"
	Unidentified others	"

Source of Information: Conners Creek Power Plant, Study Report on Cooling Water Intake, Detroit Edison

Site 3:

Location: Plant intake bay

Description: West bank of the Detroit River

Method 1: Traveling intake screen

Dates sampled: June 1974 - August 1975, weekly

Fish captured:		
	Alewife	juvenile
	Channel catfish	"
	Emerald shiner	"
	Freshwater drum	"
	Gizzard shad	"
	Rainbow smelt	"
	Rock bass	"
	Smallmouth bass	"
	Trout-perch	"
	Walleye	"
	White bass	"
	Yellow perch	"
	Others	"

Method 2: Submersible sump pumps filtered through a 333μ plankton net

Dates sampled: June 1974 - August 1975, weekly

Fish captured:		
	Clupeids	larva
	Logperch	"
	Rainbow smelt	"
	Trout-perch	"
	Walleye	"
	Yellow perch	"
	Unidentified others	"

Source of Information: River Rouge Power Plant, Study Report on Cooling Water Intake, Detroit Edison

Site 4:

Location: Plant intake bay

Description: West bank of the Detroit River

Method 1: Traveling intake screens

Dates sampled: June 1974 - August 1975, weekly

Fish captured:	Alewife	juvenile
	Carp	"
	Channel catfish	"
	Emerald shiners	"
	Freshwater drum	"
	Gizzard shad	"
	Rainbow smelt	"
	Rock bass	"
	Smallmouth bass	"
	Trout-perch	"
	Walleye	"
	White bass	"
	Yellow perch	"
	Others	"

Method 2: Submersible sump pump filtered through a 333μ plankton net

Dates sampled: June 1974 - August 1975, weekly

Fish captured:	Clupeid	larva
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Trout-perch	"
	Walleye	"
	White bass	"
	Yellow perch	"
	Others	"
	Unidentified	"

Source of Information: Trenton Channel Power Plant, Study Report on Cooling Water Intake, Detroit Edison

Site 5:

Location: Plant intake bay

Description: Trenton Channel of the Detroit River

Method 1: Traveling intake screens

Dates sampled: June 1974 - August 1975, weekly

Fish captured:		
	Alewife	juvenile
	Channel catfish	"
	Coho salmon	"
	Emerald shiner	"
	Freshwater drum	"
	Gizzard shad	"
	Logperch	"
	Rainbow smelt	"
	Rock bass	"
	Smallmouth bass	"
	Walleye	"
	White bass	"
	Yellow perch	"
	Others	"

Method 2: Submersible sump pump filtered through 333μ plankton net

Dates sampled: June 1974 - August 1975, weekly

Fish captured:		
	Clupeids	larva
	Rainbow smelt	"
	Walleye	"
	White bass	"
	Yellow perch	"
	Others	"
	Unidentified	"

County: Macomb

Source of Information: Michigan Department of Natural Resources catch statistics

Site 6:

Location: Mouth of the Clinton River

Description:


LENOX
NEW HAVEN
NEW BALTIMORE
MILTON
CHESTERFIELD
HARRISON
ANCHOR BAY GARDENS
ANCHOR BAY
SELFRIDGE FIELD
SAND POINT
BELVIDERE BAY
SUNSHINE POINT
CAMPAU BAY
METROPOLITAN BEACH
ST CLAIR METROPOLITAN BEACH
PARKWAY
LAKE
ST. CLAIR
ST. CLAIR SHORES
6
Southern
Macomb County

Method 1: Trawl

Dates sampled: 1976

Fish captured:		
	Black bullhead	juvenile
	Black crappie	"
	Bluegill	"
	Bowfin	"
	Brown bullhead	"
	Carp	"
	Freshwater drum	"
	Goldfish	"
	Northern pike	"
	Pumpkinseed	"
	Redhorse	"
	Rock bass	"
	Smallmouth bass	"
	Walleye	"
	White bass	"
	White sucker	"
	Yellow perch	"

County: St. Clair

Source of Information: Marysville Power Plant, Study Report on Cooling Water Intake, Detroit Edison

Site 7:

Location: Plant intake bay

Description: St. Clair River north of Marysville, Michigan

Method 1: Traveling intake screens

Dates sampled: June 1974 - August 1975, weekly

Fish captured:		
	Alewife	juvenile
	Channel catfish	"
	Freshwater drum	"
	Gizzard shad	"


LAKE
HURON
LAKEPORT
STATE PARK
LAKEPORT
UNITED STATES
MICHIGAN
CANADA
ONTARIO
NORTH STREET
FIELD OFFICE
Area
PORT
HURON
SARNIA
ONTARIO
7
BOUNDARY
RIVER
Northern
St. Clair County

	Logperch	juvenile
	Rainbow smelt	"
	Rockbass	"
	Smallmouth bass	"
	Walleye	"
	Yellow perch	"
	Others	"

Method 2: Submersible sump pump filtered through 333μ plankton net

Dates sampled: June 1974 - August 1975, weekly

Fish captured:	Clupeids	larva
	Rainbow smelt	"
	Trout-perch	"
	Walleye	"
	Yellow perch	"
	Unidentified	"
	Others	"

Source of Information: St. Clair Power Plant, Study Report on Cooling Water Intake, Detroit Edison

Site 8:

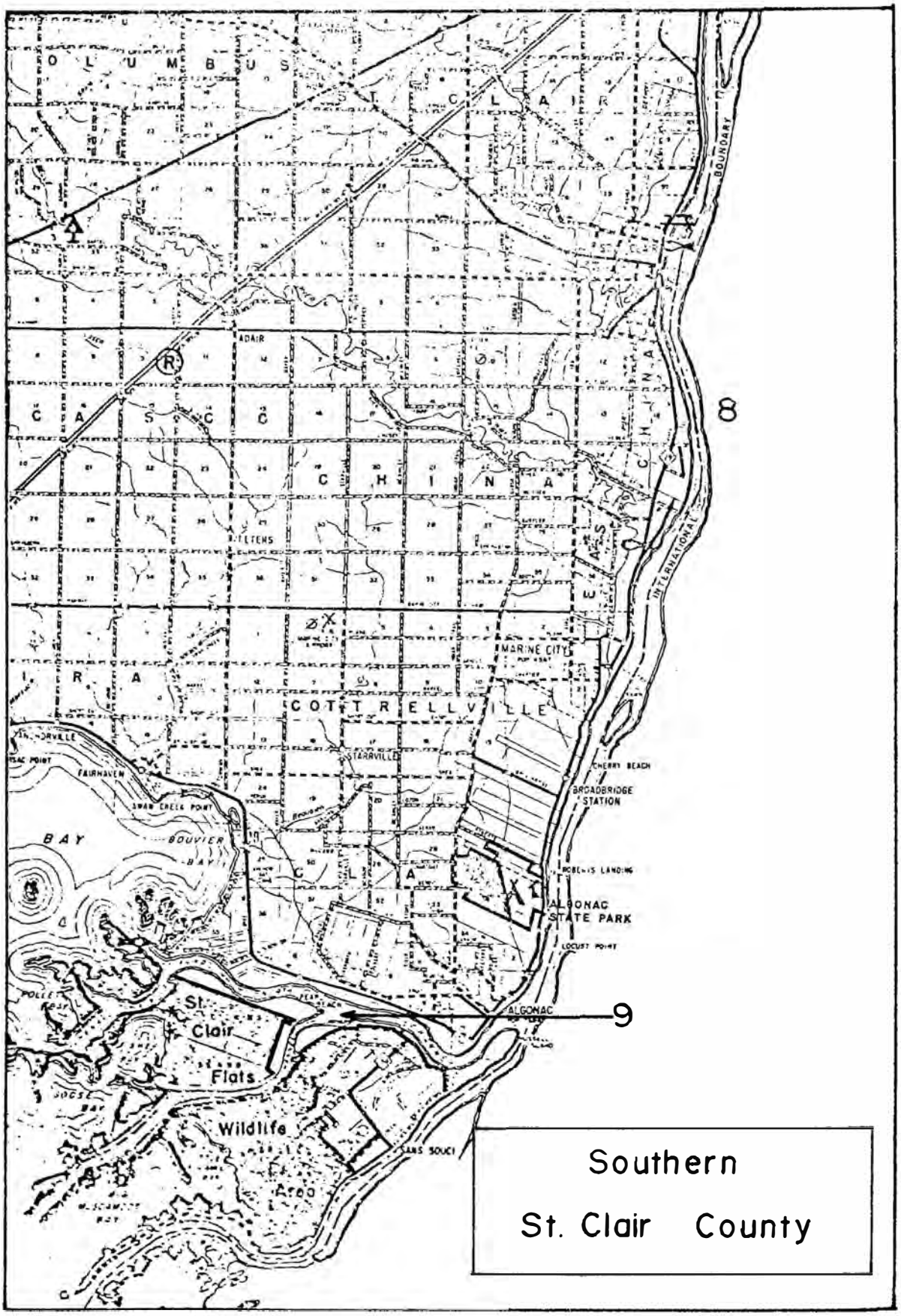
Location: Plant intake bay

Description: St. Clair River south of St. Clair, Michigan

Method 1: Traveling intake screens

Dates sampled: June 1974 - August 1975, weekly

Fish captured:	Alewife	juvenile
	Channel catfish	"
	Freshwater drum	"
	Gizzard shad	"
	Rainbow smelt	"
	Rock bass	"
	Smallmouth bass	"
	Trout-perch	"
	Walleye	"
	White bass	"


O L U M B U S
T. C L A I R
BOUNDARY
ADAIR
C A S C O
C H I N A
8
INTERNATIONAL
MARINE CITY
COTTRELLVILLE
STARVILLE
FAIRHAVEN
CHERRY BEACH
BROADBRIDGE STATION
BAY
BOUVIER BAY
ROBERTS LANDING
ALGONAC STATE PARK
LOCUST POINT
ALGONAC
9
St. Clair Flats Wildlife Area
Southern
St. Clair County

	Yellow perch	juvenile
	Others	"

Method 2: Submersible sump pumps filtered through 333μ plankton net

Dates sampled: June 1974 - July 1975, weekly

Fish captured:	Clupeids	larva
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Trout-perch	"
	Walleye	"
	Yellow perch	"
	Unidentified	"
	Others	"

Source of Information: Michigan Department of Natural Resources catch statistics

Site 9:

Location: North Channel of the St. Clair River

Description:

Method 1: Trawl

Dates sampled: 1976

Fish captured: Carp
Channel catfish
Freshwater drum
Longnose gar
Northern pike
Quillback
Redhorse
Rock bass
White sucker
Yellow perch

LAKE ERIE

County: Monroe

Source of Information: Enrico Fermi Power Plant No. 1, Study Report on Cooling Water Intake, Detroit Edison.

Site 1:

Location: Plant intake bay

Description: Lake Erie, Logoona Beach, Michigan

Method 1: Traveling intake screens

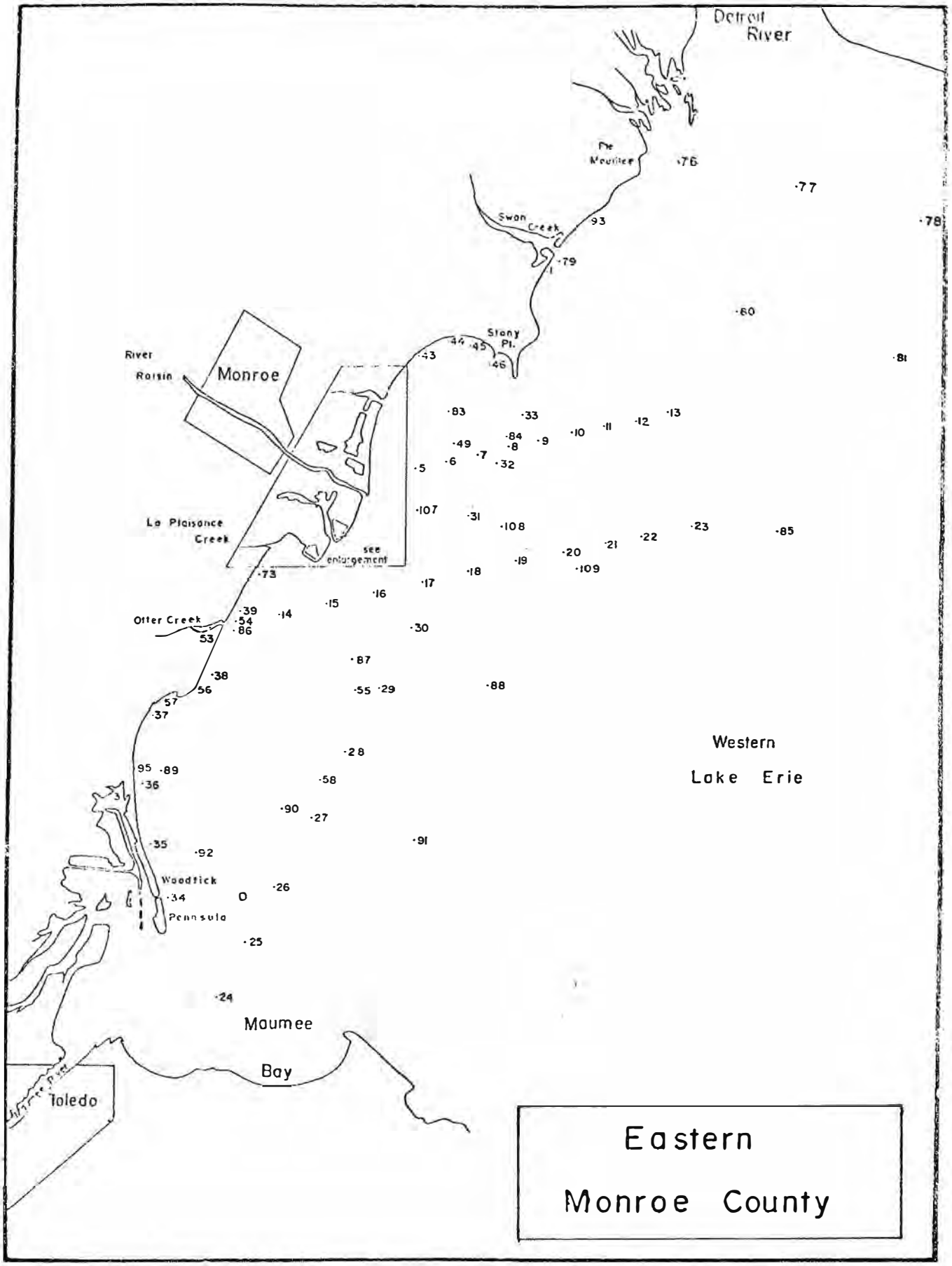
Dates sampled: July to August 1974, intermittently

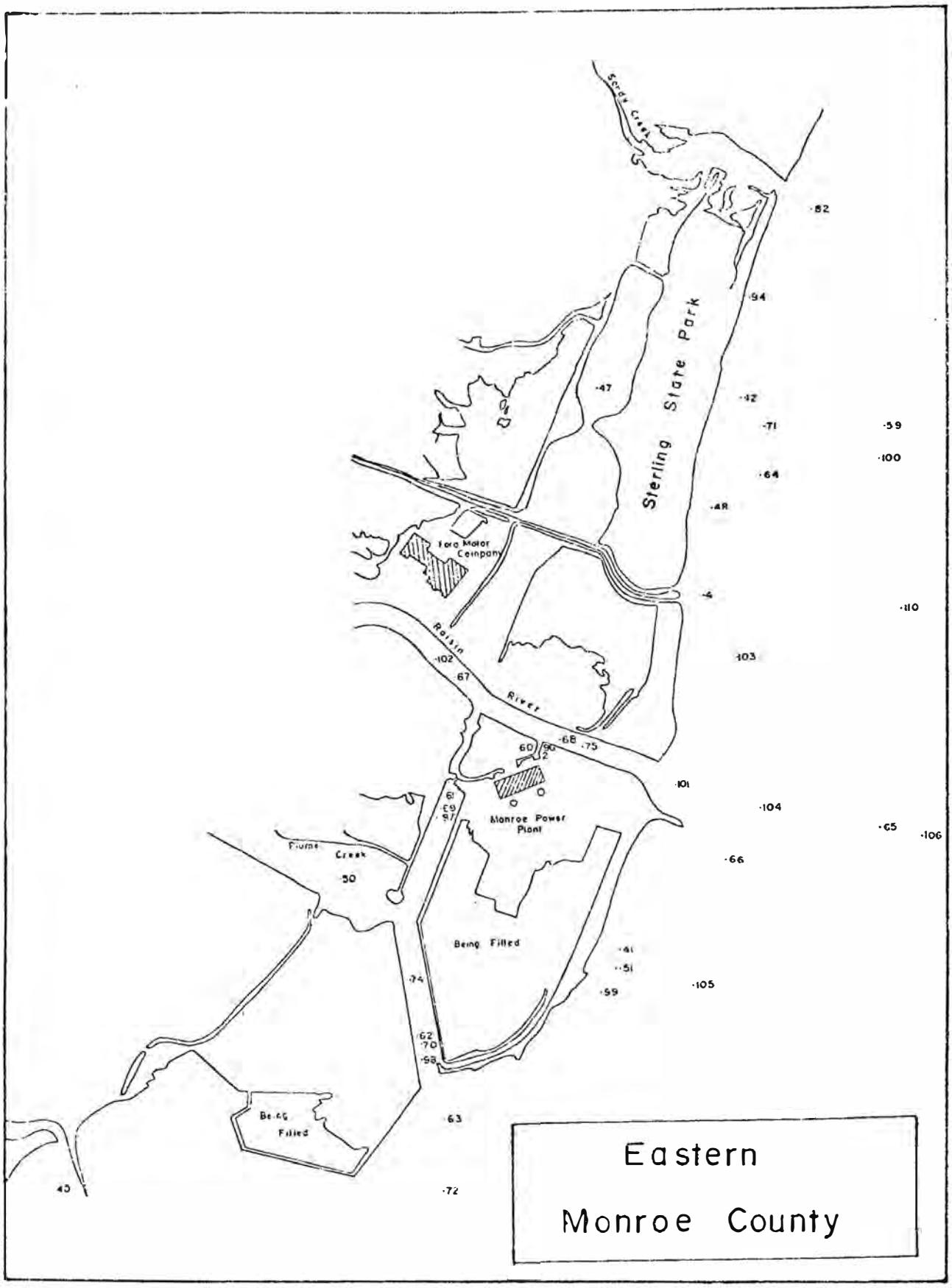
Fish captured:		
	Channel catfish	juvenile
	Emerald shiner	"
	Freshwater drum	"
	Gizzard shad	"
	Rock bass	"
	Smallmouth bass	"
	Trout-perch	"
	Walleye	"
	White bass	"
	Yellow perch	"
	Others	"

Method 2: Submersible sump pumps filtered through a 351µ plankton net

Dates sampled: July 1974, November 1974, February 1975 to August 1975, intermittently

Fish captured:		
	Burbot	larva
	Channel catfish	"
	Clupeids	"
	Freshwater drum	"
	Rainbow smelt	"
	Trout-perch	"
	Walleye	"


Detroit River
De Meuiter
Swan Creek
Stony Pt.
River Raisin
Monroe
La Plaisance Creek
see enlargement
Otter Creek
Woodtick
Peninsula
Maumee Bay
Toledo
Western Lake Erie
Eastern Monroe County


Sterling State Park
Ford Motor Company
Raisin River
Monroe Power Plant
Being Filled
Being Filled
Eastern
Monroe County

White bass	larva
Yellow perch	"
Unidentified	"
Others	"

Source of Information: Monroe Power Plant, Study Report on Cooling Water Intake

Site 2:

Location: Plant intake bay

Description: Lake Erie at the mouth of the River Raisin, Monroe, Michigan

Method 1: Traveling intake screen

Dates sampled: April 1972 to May 1976, Unit 1
June 1972 to May 1976, Unit 2
March 1973 to May 1976, Unit 3
May 1974 to May 1976, Unit 4

Fish captured:		
	Alewife	juvenile
	Brown bullhead	"
	Black bullhead	"
	Carp	"
	Channel catfish	"
	Chinook salmon	"
	Coho salmon	"
	Freshwater drum	"
	Gizzard shad	"
	Goldfish	"
	Largemouth bass	"
	Logperch	"
	Northern pike	"
	Rainbow smelt	"
	Rainbow trout	"
	Rock bass	"
	Shiners	"
	Smallmouth bass	"
	Stone cat	"

	Suckers	juvenile
	Sunfish	"
	Trout-perch	"
	Walleye	"
	White bass	"
	White crappie	"
	White perch	"
	Yellow bullhead	"
	Yellow perch	"
	Others	"

Method 2: Submersible sump pumps filtered through a 571μ plankton net

Dates sampled: April 1975 to May 1976, weekly

Fish captured:	Carp	larva
	Channel catfish	"
	Clupeids	"
	Emerald shiners	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Trout-perch	"
	Walleye	"
	White bass	"
	Yellow perch	"
	Unidentified	"
	Others	"

Source of Information: Section 316(b) Intake Study, J. R. Whiting Plant, Consumers Power Company

Site 3:

Location: Plant intake bay

Description: Lake Erie south of Luna Pier, Michigan

Method 1: Traveling intake screens

Dates sampled: January 1974 to January 1975; 170 samples: day and night

Fish captured:		
	Alewife	juvenile
	Freshwater drum	"
	Gizzard shad	"
	Rainbow smelt	"
	White bass	"
	Yellow perch	"

Method 2: Submersible sump pump filtered through a 333μ plankton net

Dates sampled: January 1974 to January 1975, weekly

Fish captured:		
	Alewife	juvenile
	Brook silversides	juvenile, larva
	Carp	" "
	Channel catfish	" "
	Clupeids	" "
	Emerald shiner	juvenile
	Freshwater drum	juvenile, larva
	Gar	larva
	Gizzard shad	juvenile
	Northern pike	larva
	Smallmouth bass	juvenile
	Spottail shiner	"
	Rainbow smelt	juvenile, larva
	Walleye	larva
	White bass	juvenile, larva
	Yellow perch	" "

Source of Information: Cole, R. A., 1977. Larval Fish Distributions in southwestern Lake Erie near the Monroe Power Plant. Report to the U.S.E.P.A. Manuscript.

Site 4:

Location: Just north of the mouth of the River Raisin

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Smelt	"
	White bass	"
	Yellow perch	"

Site 5:

Location: Two km east-northeast of the mouth of the River Raisin

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Shiners	"
	Smelt	"
	Suckers	"
	Yellow perch	"

Site 6:

Location: Four km east-northeast of the mouth of the River Raisin

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Rainbow Smelt	"
	Shiners	"
	Suckers	"
	White bass	"
	Yellow perch	"

Site 7:

Location: Six km east-northeast of the mouth of the River Raisin

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Black bass	larva
	Carp-Goldfish	"
	Clupeids	"
	Freshwater drum	"
	Shiners	"
	Smelt	"
	Yellow perch	"

Site 8:

Location: Eight km east-northeast of the mouth of the River Raisin

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Black bass	larva
	Carp-Goldfish	"
	Clupeids	"
	Shiners	"
	Smelt	"
	Suckers	"
	Yellow perch	"

Site 9:

Location: Ten km east-northeast of the mouth of the River Raisin

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Channel catfish	larva
	Clupeids	"
	Logperch	"
	Shiners	"
	Smelt	"
	Walleye	"
	White bass	"
	Yellow perch	"

Site 10:

Location: Twelve km east-northeast of the mouth of the River Raisin

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Logperch	"
	Shiners	"
	Smelt	"
	Walleye	"
	Yellow perch	"

Site 11:

Location: Fourteen km east-northeast of the mouth of the River Raisin

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	Yellow perch	"

Site 12:

Location: Sixteen km east-northeast of the mouth of the River Raisin

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	Yellow perch	"

Site 13:

Location: Eighteen km east-northeast of the mouth of the River Raisin

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Freshwater drum	"
	Smelt	"
	Yellow perch	"

Site 14:

Location: The mouth of Otter Creek

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Freshwater drum	"
	Shiners	"

	Smelt	larva
	White bass	"
	Yellow perch	"

Site 15:

Location: Two km east-northeast of the mouth of Otter Creek

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:	Carp-Goldfish	larva
	Clupeids	"
	Shiners	"
	Smelt	"
	White bass	"
	Yellow perch	"

Site 16:

Location: Four km east-northeast of the mouth of Otter Creek

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:	Carp-Goldfish	larva
	Channel catfish	"
	Clupeids	"
	Shiners	"
	Smelt	"
	Walleye	"
	White bass	"
	Yellow perch	"

Site 17:

Location: Six km east-northeast of the mouth of Otter Creek

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Crappie	"
	Freshwater drum	"
	Rainbow smelt	"
	Yellow perch	"

Site 18:

Location: Eight km east-northeast of the mouth of Otter Creek

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Freshwater drum	"
	Rainbow smelt	"
	Shiners	"
	Sunfish	"
	White bass	"
	Yellow perch	"

Site 19:

Location: Ten km east-northeast of the mouth of Otter Creek

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Freshwater drum	"
	Rainbow smelt	"
	Shiners	"
	Yellow perch	"

Site 20:

Location: Twelve km east-northeast of the mouth of Otter Creek

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Rainbow smelt	"
	Shiners	"
	Yellow perch	"

Site 21:

Location: Fourteen km east-northeast of the mouth of Otter Creek

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Rainbow smelt	"
	Shiners	"
	Suckers	"
	Sunfish	"
	White bass	"
	Yellow perch	"

Site 22:

Location: Eighteen km east-northeast of the mouth of Otter Creek

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:	Carp-Goldfish	larva
	Clupeids	"
	Rainbow smelt	"
	Shiners	"
	Walleye	"
	Yellow perch	"

Site 23:

Location: Maumee Bay

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:	Carp-Goldfish	larva
	Clupeids	"
	Freshwater drum	"
	Rainbow smelt	"
	Shiners	"
	Walleye	"
	White bass	"
	Yellow perch	"

Site 24:

Location: 3.5 km north-northeast of Maumee Bay

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:	Clupeids	larva
	Freshwater drum	"
	Rainbow smelt	"
	Trout-perch	"
	White bass	"
	Yellow perch	"

Site 25:

Location: 7 km north-northeast of Maumee Bay

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Rainbow smelt	"
	Shiners	"
	Suckers	"
	White bass	"
	Yellow perch	"

Site 26:

Location: 10.5 km north-northeast of Maumee Bay

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Rainbow smelt	"
	Trout-perch	"
	White bass	"
	Yellow perch	"

Site 27:

Location: 14 km north-northeast of Maumee Bay

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Rainbow smelt	"

	Trout-perch	larva
	White bass	"
	Yellow perch	"

Site 28:

Location: 17.5 km north-northeast of Maumee Bay

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:	Clupeids	larva
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 29:

Location: 21 km north-northeast of Maumee Bay

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:	Clupeids	larva
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	Suckers	"
	Yellow perch	"

Site 30:

Location: 24.5 km north-northeast of Maumee Bay

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:	Clupeids	larva
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 31:

Location: 30 km north-northeast of Maumee Bay

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:	Clupeids	larva
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	Yellow perch	"

Site 32:

Location: 33.5 km north-northeast of Maumee, just off of Stony Pt.

Description: Mud and clay sediments

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:	Carp-Goldfish	larva
	Clupeids	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	Yellow perch	"

Site 33:

Location: One km north of North Cape on Woodtick Peninsula

Description: Near shore (0.3 km) shallow water

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Freshwater drum	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 34:

Location: Four km north of North Cape on Woodtick Peninsula

Description: Near shore (0.3 km) shallow water

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Freshwater drum	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 35:

Location: Due east of the Whiting Power Plant

Description: Near shore (0.3 km) shallow water

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:	Carp-Goldfish	larva
	Clupeids	"
	Freshwater drum	"
	Rainbow smelt	"
	Shiners	"
	Trout-perch	"
	White bass	"
	Yellow perch	"

Site 36:

Location: Due east of Luna Pier

Description: Near shore (0.3 km) shallow water

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:	Carp-Goldfish	larva
	Clupeids	"
	Rainbow smelt	"
	Shiners	"
	Sunfish	"
	White bass	"
	Yellow perch	"

Site 37:

Location: Due east of Toledo Beach

Description: Near shore (0.3 km) shallow water

Method 1: Three-minute oblique tow from bottom to top using a 363 μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:	Carp-Goldfish	larva
	Clupeids	"
	Rainbow smelt	"
	Shiners	"
	Suckers	"
	White bass	"
	Yellow perch	"

Site 38:

Location: Just north of the mouth of Otter Creek

Description: Near shore (0.3 km) shallow water

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Freshwater drum	"
	Rainbow smelt	"
	Shiners	"
	Suckers	"
	White bass	"
	Yellow perch	"

Site 39:

Location: Due east of the mouth of La Plaisance Creek

Description: Near shore (0.3 km) shallow water

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Freshwater drum	"
	Rainbow smelt	"
	Shiners	"
	Suckers	"
	White bass	"
	Yellow perch	"

Site 40:

Location: Just north of the Monroe Power Plant discharge channel

Description: Near shore (0.3 km) shallow water

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Shiners	"
	Suckers	"
	White bass	"
	Yellow perch	"

Site 41:

Location: Due east of Sterling State Park

Description: Near shore (0.3 km) shallow water

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Rainbow smelt	"
	Suckers	"
	White bass	"
	Yellow perch	"

Site 42:

Location: Brest Bay between Sandy Creek and Stony Creek

Description: Near shore (0.3 km) shallow water

Method 1: Three-minute oblique tow from bottom to top using a 363μ mesh plankton net at night

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 43:

Location: In the mouth of Stony Creek

Description: Constant current and river water 1 m to 2 m deep

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Rainbow smelt	"
	Shiners	"
	Sunfish	"
	White bass	"
	Yellow perch	"

Site 44:

Location: North shore of Brest Bay

Description: Beach area (1 m deep)

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 45:

Location: Brest Bay, just off Stony Pt.

Description: Open lake water (1 km from shore, 5 to 6 m deep)

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Yellow perch	"

Site 46:

Location: Backwaters of Sandy Creek

Description: Little to no current, river and lake water mixture, 1 to 2 m deep

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Rainbow smelt	"
	Shiners	"
	Yellow perch	"

Site 47:

Location: Beach area of Sterling State Park

Description: Hard clay bottom (1 m deep)

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Rainbow smelt	"
	White bass	"
	Yellow perch	"

Site 48:

Location: Brest Bay

Description: Open lake water (1 km from shore, 5 to 6 m deep)

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Rainbow smelt	"
	Yellow perch	"

Site 49:

Location: Backwaters of Plum Creek

Description: Creek water, 1 to 2 m deep

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Freshwater drum	"
	White bass	"
	Yellow perch	"

Site 50:

Location: One km south of the mouth of the River Raisin

Description: Beach area (1 m deep)

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 51:

Location: South of the mouth of the River Raisin

Description: One km from shore, 5 to 6 m deep

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Rainbow smelt	"
	Shiners	"
	Yellow perch	"

Site 52:

Location: Mouth of Otter Creek

Description: River water, 1 to 2 m deep

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 53:

Location: Beach area north of Otter Creek

Description: One meter deep water

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Rainbow smelt	"
	White bass	"
	Yellow perch	"

Site 54:

Location: Three km east of the mouth of Otter Creek

Description: Open lake water, 5 to 6 m deep

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Freshwater drum	"
	Rainbow smelt	"
	Yellow perch	"

Site 55:

Location: Backwaters of Sulfur Creek (Toledo Beach)

Description: Little to no current, 1 to 2 m deep

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Freshwater drum	"
	Smelt	"
	White bass	"
	Yellow perch	"

Site 56:

Location: Allens Cove south of Toledo Beach

Description: Beach area (1 m deep)

Method 1: Three-minute bottom tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Rainbow smelt	"
	Sunfish	"
	White bass	"
	Yellow perch	"

Site 57:

Location: Seven km southeast of Allens Cove

Description: Open lake water, 5 to 6 m deep

Method 1: Three-minute tow using a 363μ mesh plankton net attached to a bottom sled, daytime

Dates sampled: April, May, June 1976

Fish captured:		
	Clupeids	larva
	Freshwater drum	"
	Rainbow smelt	"

	Sunfish	larva
	Yellow perch	"

Source of Information: Nelson, D. D. and R. A. Cole, 1975. The distribution and abundance of larval fishes along the western shore of Lake Erie at Monroe, Michigan. Tech. Rep. No. 32.4. Institute of Water Research, Michigan State University, East Lansing, Michigan. 66 pp.

Site 58:

Location: Open lake northeast of the mouth of the River Raisin

Description: Lake water, 5 m deep

Method 1: Five-minute tow at surface, mid-depth, and near bottom using a 571μ mesh plankton net, replicated

Dates sampled: Summer 1973

Fish captured:	Clupeids	larva
	Emerald shiner	"
	Rainbow smelt	"
	Spottail shiner	"
	White bass	"
	Yellow perch	"

Site 59:

Location: Intake channel of the Monroe Power Plant

Description: In the River Raisin, mixture of lake and river water

Method 1: Five-minute tow at surface, mid-depth, and near bottom using a 571μ mesh plankton net, replicated

Dates sampled: Summer 1973

Fish captured:	Black bass	larva
	Carp	"
	Logperch	"
	Rainbow smelt	"
	Spottail shiner	"
	Suckers	"
	White bass	"
	Yellow perch	"

Site 60:

Location: Upper discharge channel of the Monroe Power Plant

Description: Heated discharge water from the power plant

Method 1: Five-minute tow at surface, mid-depth, and near bottom using a 571μ mesh plankton net, replicated

Dates sampled: Summer 1973

Fish captured:		
	Carp	larva
	Channel catfish	"
	Clupeids	"
	Emerald shiners	"
	Logperch	"
	Rainbow smelt	"
	Spottail shiner	"
	Suckers	"
	Sunfish	"
	Trout-perch	"
	White bass	"
	White crappie	"
	Yellow perch	"

Site 61:

Location: Lower discharge channel of the Monroe Power Plant

Description: Heated discharge from the power plant

Method 1: Five-minute tow at surface, mid-depth, and near bottom using a 571μ mesh plankton net, replicated

Dates sampled: Summer 1973

Fish captured:		
	Carp	larva
	Clupeids	"
	Rainbow smelt	"
	Spottail shiner	"
	Suckers	"
	Sunfish	"
	Trout-perch	"
	Walleye	"
	White bass	"

	White crappie	larva
	Yellow perch	"

Site 62:

Location: Plume

Description: Thermal plume in the lake (heated water)

Method 1: Five-minute tow at surface, mid-depth and near bottom using a 571μ mesh plankton net, replicated

Dates sampled: Summer 1973

Fish captured:	Emerald shiner	larva
	Logperch	"
	Rainbow smelt	"
	Spottail shiner	"
	Suckers	"
	Sunfish	"
	White crappie	"

Site 63:

Location: Two km northeast of the mouth of the River Raisin

Description: Lake water, 3 m deep

Method 1: 2.5-minute integrated tow using a 571μ mesh plankton net, replicated

Dates sampled: Summer 1974

Fish captured:	Carp	larva
	Clupeids	"
	Emerald shiner	"
	Freshwater drum	"
	Rainbow smelt	"
	Spottail shiner	"
	Suckers	"
	Sunfish	"
	White bass	"
	White crappie	"
	Yellow perch	"

Site 64:

Location: Due east of the mouth of the River Raisin (2 km)

Description: Mixture of river and lake water

Method 1: 2.5-minute integrated tow using a 571μ mesh plankton net, replicated

Dates sampled: Summer 1974

Fish captured:		
	Carp	larva
	Clupeids	"
	Emerald shiners	"
	Freshwater drum	"
	Rainbow smelt	"
	Suckers	"
	Sunfish	"
	White bass	"
	Yellow perch	"

Site 65:

Location: Southeast of the mouth of the River Raisin (1 km), 3 m deep

Description: Mixture of river and lake water

Method 1: 2.5-minute integrated tow using a 571μ mesh plankton net, replicated

Dates sampled: Summer 1974

Fish captured:		
	Carp	larva
	Clupeids	"
	Channel catfish	"
	Emerald shiners	"
	Freshwater drum	"
	Rainbow smelt	"
	Suckers	"
	Sunfish	"
	White bass	"
	Yellow perch	"

Site 66:

Location: River Raisin above the Monroe Power Plant intake

Description: River water

Method 1: 2.5-minute integrated tow using a 571μ mesh plankton net, replicated

Dates sampled: Summer 1974

Fish captured:		
	Bass	larva
	Carp	"
	Clupeids	"
	Emerald shiners	"
	Freshwater drum	"
	Rainbow smelt	"
	Spottail shiners	"
	Suckers	"
	Sunfish	"
	White bass	"
	White crappie	"
	Yellow perch	"

Site 67:

Location: River Raisin below the Monroe Power Plant intake

Description: Mixture of lake and river water

Method 1: 2.5-minute integrated tow using a 571μ mesh plankton net, replicated

Dates sampled: Summer 1974

Fish captured:		
	Carp	larva
	Channel catfish	"
	Clupeids	"
	Emerald shiners	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Spottail shiners	"
	Suckers	"
	Sunfish	"
	Trout-perch	"
	Walleye	"

	White bass	larva
	Yellow perch	"

Site 68:

Location: Upper discharge channel of the Monroe Power Plant

Description: Heated waters

Method 1: 2.5-minute integrated tow using a 571µ mesh plankton net, replicated

Dates sampled: Summer 1974

Fish captured:	Bass	larva
	Carp	"
	Channel catfish	"
	Clupeids	"
	Emerald shiners	"
	Freshwater drum	"
	Logperch	"
	Spottail shiners	"
	Suckers	"
	Sunfish	"
	Trout-perch	"
	White bass	"
	White crappie	"
	Yellow perch	"

Site 69:

Location: Lower discharge channel of the Monroe Power Plant

Description: Heated waters

Method 1: 2.5-minute integrated tow using a 571µ mesh plankton net, replicated

Dates sampled: Summer 1974

Fish captured:	Black bass	larva
	Carp	"
	Channel catfish	"
	Clupeids	"
	Emerald shiners	"
	Freshwater drum	"

Spottail shiners	larva
Suckers	"
Sunfish	"
White bass	"
White crappie	"
Yellow perch	"

Source of Information: Lavis, D. S., 1976. Distribution of fish populations near a thermal discharge into western Lake Erie. Michigan State University. Thesis.

Site 70:

Location: 3.5 km north of the Monroe Power Plant discharge canal

Description: Sand and mud sediments in 2 to 3 m of water

Method 1: Five-meter otter trawl 2.5 cm mesh in netting, 6 mm mesh in cod-end, 5-minute trawl, replicated

Dates sampled: 1971, 1972, 1973, 1974, 1975, bi-weekly

Fish captured:	Alewife	young-of-the-year, juvenile
	Carp	" " " " "
	Channel catfish	" " " " "
	Emerald shiners	" " " " "
	Freshwater drum	" " " " "
	Gizzard shad	" " " " "
	Goldfish	" " " " "
	White bass	" " " " "
	Yellow perch	" " " " "

Site 71:

Location: In Monroe Power Plant discharge canal thermal plume (1.5 km)

Description: Over sandy shoal in 1.5 to 2 m of water

Method 1: Five-meter otter trawl 2.5 cm mesh in netting, 6 mm mesh in cod-end, five-minute trawl, replicated

Dates sampled: 1971, 1972, 1973, 1974, 1975, bi-weekly

Fish captured:	Alewife	juvenile
	Carp	young-of-the-year, juvenile

Channel catfish	young-of-the-year, juvenile
Emerald shiners	" " " " "
Freshwater drum	" " " " "
Gizzard shad	juvenile
Goldfish	young-of-the-year, juvenile
White bass	" " " " "
Yellow perch	" " " " "

Site 72:

Location: Six km south of the discharge canal of the Monroe Power Plant

Description: Two to four meters of water over sand and mud sediments

Method 1: Five-meter otter trawl 2.5 cm mesh in netting, 6 mm mesh in cod end, five-minute trawls, replicated

Dates sampled: 1971, 1972, 1973, 1974, 1975, bi-weekly

Fish captured:

Alewife	juvenile
Carp	young-of-the-year, juvenile
Channel catfish	" " " " "
Emerald shiners	" " " " "
Freshwater drum	" " " " "
Gizzard shad	" " " " "
Goldfish	" " " " "
White bass	" " " " "
Yellow perch	" " " " "

Method 2: Gill net, night sets

Dates sampled: 1972, 1973, 1974, bi-weekly

Fish captured:

Alewife	juvenile
Carp	young-of-the-year, juvenile
Channel catfish	" " " " "
Emerald shiners	" " " " "
Freshwater drum	" " " " "
Gizzard shad	" " " " "
Goldfish	" " " " "
White bass	" " " " "
Yellow perch	" " " " "

Site 73:

Location: Discharge canal of the Monroe Power Plant

Description: Three meters of water over silt sediments

Method 1: Five-meter otter trawl 2.5 cm mesh in netting, 6 mm mesh in cod-end, five-minute trawl, replicated

Dates sampled: 1971, 1972, 1973, 1974, 1975, bi-weekly

Fish captured:		
	Alewife	juvenile
	Channel catfish	young-of-the-year, juvenile
	Emerald shiners	" " " " "
	Freshwater drum	" " " " "
	Gizzard shad	" " " " "
	Goldfish	" " " " "
	White bass	" " " " "
	Yellow perch	" " " " "

Method 2: Gill net, night set

Dates sampled: 1972, 1973, 1974, bi-weekly

Fish captured:		
	Alewife	juvenile
	Carp	young-of-the-year, juvenile
	Channel catfish	" " " " "
	Emerald shiners	" " " " "
	Freshwater drum	" " " " "
	Gizzard shad	" " " " "
	Goldfish	" " " " "
	White bass	" " " " "
	Yellow perch	" " " " "

Site 74:

Location: River Raisin between lake and intake

Description: Soft silt, clay, and paper fiber sediments in 6-8 m of water

Method 1: Five-meter otter trawl 2.5 cm mesh in netting, 6 mm mesh in cod-end, five-minute trawl, replicated

Dates sampled: 1971, 1972, 1973, 1974, 1975, bi-weekly

Fish captured:	Alewife	juvenile
	Emerald shiners	"
	Freshwater drum	young-of-the-year
	Gizzard shad	" " " "
	Goldfish	" " " "
	White bass	" " " "

Source of Information: Hemmick, W., J. Schaeffer, and R. Waybrant. 1976. Larval fish survey in Michigan waters of Lake Erie, 1975. Mich. Water Res. Comm., Bur. Env. Protect. Mich. D.N.R.

Site 75:

Location: Near the mouth of the Huron River

Description: Shallow water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571μ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:	Carp	larva
	Centrarchids	"
	Clupeids	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 76:

Location: East of the Detroit River Light (1.5 km)

Description: Seven meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571μ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:	Carp	larva
	Centrarchids	"

	Clupeids	larva
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	Yellow perch	"

Site 77:

Location: Eleven km east of the Detroit River Light

Description: Nine meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571μ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:	Centrarchids	larva
	Clupeids	"
	Crappie	"
	Logperch	"
	Northern pike	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 78:

Location: Mouth of Swan Creek, just off the north cooling tower of the Enrico Fermi Power Plant

Description: Shallow water, sediment - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571μ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:	Carp	larva
	Centrarchids	"
	Clupeids	"
	Darters	"
	Freshwater drum	"
	Logperch	"

	Rainbow smelt	larva
	Shiners	"
	White bass	"
	Yellow perch	"

Site 79:

Location: 6.4 km east of the mouth of Swan Creek

Description: Seven meters of water, sediment - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571µ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:	Carp	larva
	Centrarchids	"
	Clupeids	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	Yellow perch	"

Site 80:

Location: Sixteen km east of the mouth of Swan Creek

Description: Nine meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571µ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:	Carp	larva
	Centrarchids	"
	Clupeids	"
	Crappie	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	Walleye	"

Site 81:

Location: Mouth of Sandy Creek

Description: Three meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571μ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:	Carp	larva
	Centrarchids	"
	Clupeids	"
	Darters	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 82:

Location: Center of Brest Bay

Description: Seven meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571μ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:	Carp	larva
	Centrarchids	"
	Clupeids	"
	Darters	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 83:

Location: Three km south-southeast of Stony Pt.

Description: Nine meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571µ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:		
	Carp	larva
	Clupeids	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 84:

Location: Sixteen km east of the mouth of Sandy Creek

Description: Ten meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571µ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:		
	Centrarchids	larva
	Clupeids	"
	Crappie	"
	Darter	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	Suckers	"
	White bass	"
	Yellow perch	"

Site 85:

Location: Just east of the mouth of Otter Creek

Description: Three meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571µ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:		
	Carp	larva
	Centrarchids	"
	Clupeids	"
	Darters	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 86:

Location: Six km east of the mouth of Otter Creek

Description: Seven meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571μ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:		
	Centrarchids	larva
	Clupeids	"
	Darters	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	Suckers	"
	White bass	"
	Yellow perch	"

Site 87:

Location: Twelve km east of the mouth of Otter Creek

Description: Nine meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571μ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:	Clupeids	larva
	Freshwater drum	"
	Shiners	"
	White bass	"

Site 88:

Location: Just east of J. R. Whiting Power Plant

Description: Three meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571μ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:	Carp	larva
	Centrarchids	"
	Clupeids	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 89:

Location: Six km east of the J. R. Whiting Power Plant

Description: Seven meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571μ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:	Clupeids	larva
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 90:

Location: Eleven km east of the J. R. Whiting Power Plant

Description: Nine meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571μ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:		
	Carp	larva
	Clupeids	"
	Darters	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 91:

Location: Near (east) Turtle Island

Description: Four meters of water, sediments - silt and clay

Method 1: Two, four-minute tows (surface and bottom) using a 571μ mesh plankton net

Dates sampled: June to August 1975, bi-weekly

Fish captured:		
	Centrarchids	larva
	Clupeids	"
	Darters	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 92:

Location: One km north of the mouth of Swan Creek

Description: One meter of water (beach area), sediments - hard clay, subject to wave action

Method 1: Bag seine 9.1 meters long with a 363μ mesh, pulled 52 meters

Dates sampled: June to August 1975, bi-weekly

Fish captured:		
	Black bass	larva
	Brook silversides	"
	Carp	"
	Centrarchids	"
	Clupeids	"
	Freshwater drum	"
	Logperch	"
	Northern pike	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Site 93:

Location: Sterling State Park

Description: One meter of water (beach area), sediments - hard clay, subject to wave action

Method 1: Bag seine 9.1 meters long with a 363μ mesh, pulled 73 meters

Dates sampled: June to August 1975, bi-weekly

Fish captured:		
	Brook silversides	larva
	Carp	"
	Centrarchids	"
	Channel catfish	"
	Clupeids	"
	Crappie	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	Suckers	"
	Walleye	"
	White bass	"
	Yellow perch	"

Site 94:

Location: Far east end of Erie Road near the J. R. Whiting Power Plant

Description: One meter of water (beach area), sediments - silt and clay, subject to wave action

Method 1: Bag seine 9.1 meters long with a 363μ mesh pulled 68 meters

Dates sampled: June to August 1975, bi-weekly

Fish captured:		
	Black bass	larva
	Brook silversides	"
	Carp	"
	Centrarchids	"
	Clupeids	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	White bass	"
	Yellow perch	"

Source of Information: MacMillian, J. R., 1976. Larval fish sampling and population distributions relevant to estimating power plant entrainment in western Lake Erie. Thesis. Michigan State University, East Lansing, Michigan.

Site 95:

Location: Monroe Power Plant intake canal

Description: Mixture of river and lake water

Method 1: Stationary 1 m 571μ mesh plankton net in slow current

Dates sampled: May to July 1975

Fish captured:		
	Carp	larva
	Clupeids	"
	White bass	"
	Yellow perch	"
	Others	"

Site 96:

Location: Discharge canal of the Monroe Power Plant

Description: Upper end, heated waters

Method 1: Stationary 1 m 571μ mesh plankton net in slow currents

Dates sampled: May to July 1975

Fish captured:	Carp	larva
	Clupeids	"
	White bass	"
	Yellow perch	"
	Others	"

Method 2: Oblique tow using a 1 m plankton net with 571μ mesh for 2.5 minutes, replicated

Dates sampled: May to July, 1974 and 1976

Fish captured:	Black bass	larva
	Carp-Goldfish	"
	Clupeids	"
	Channel catfish	"
	Crappie	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	Sunfish	"
	Trout-perch	"
	Walleye	"
	White bass	"
	White sucker	"
	Yellow perch	"

Site 97:

Location: Discharge canal of the Monroe Power Plant

Description: Lower end, heated waters

Method 1: Stationary 1 m 571μ mesh plankton net in slow currents

Dates sampled: May to July 1975

Fish captured:		
	Carp	larva
	Clupeids	"
	White bass	"
	Yellow perch	"
	Others	"

Method 2: Oblique tow using a 1 m plankton net with a 571µ mesh for 2.5 minutes, replicated

Dates sampled: May to July, 1974 and 1975

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Channel catfish	"
	Freshwater drum	"
	Shiners	"
	Sunfish	"
	White bass	"
	Yellow perch	"

Site 98:

Location: Five km south of the mouth of the River Raisin, one km from shore

Description: Two meters of water

Method 1: Oblique tow using a 1 m plankton net with 571µ mesh for 2.5 minutes, replicated

Dates sampled: May to July, 1974 and 1975

Fish captured: Not published

Site 99:

Location: One km east of Sterling State Park

Description: Three meters of water

Method 1: Oblique tow using a 1 m plankton net with 571µ mesh for 2.5 minutes, replicated

Dates sampled: May to July, 1974 and 1975

Fish captured: Not published

Site 100:

Location: Mouth of the River Raisin

Description: Mixture of river and lake waters

Method 1: Oblique tow using a 1 m plankton net with 571µ mesh for 2.5 minutes, replicated

Dates sampled: May to July, 1974 and 1975

Fish captured:		
	Carp-Goldfish	larva
	Clupeids	"
	Channel catfish	"
	Freshwater drum	"
	Logperch	"
	Rainbow smelt	"
	Shiners	"
	Sunfish	"
	Trout-perch	"
	Walleye	"
	White bass	"
	White sucker	"
	Yellow perch	"

Site 101:

Location: One km upstream of the Monroe Power Plant intake

Description: River water

Method 1: Oblique tow using a 1 m plankton net with 571µ mesh for 2.5 minutes, replicated

Dates sampled: May to July, 1974 and 1975

Fish captured:		
	Black bass	larva
	Carp-Goldfish	"
	Clupeids	"
	Channel catfish	"
	Crappie	"
	Freshwater drum	"
	Rainbow smelt	"
	Shiners	"
	Sunfish	"

	White bass	larva
	White sucker	"
	Yellow perch	"

Site 102:

Location: Two km north of the mouth of the River Raisin, one km from shore

Description: Four meters of water

Method 1: Oblique tow using a 1 m plankton net with 571µ mesh for 2.5 minutes, replicated

Dates sampled: May to July, 1974 and 1975

Fish captured:	Carp-Goldfish	larva
	Clupeids	"
	Freshwater drum	"
	Rainbow smelt	"
	Shiners	"
	Sunfish	"
	White bass	"
	Yellow perch	"

Site 103:

Location: One km east of the mouth of the River Raisin

Description: Three meters of water

Method 1: Oblique tow using a 1 m plankton net with 571µ mesh for 2.5 minutes, replicated

Dates sampled: May to July, 1974 and 1975

Fish captured:	Carp-Goldfish	larva
	Clupeids	"
	Freshwater drum	"
	Rainbow smelt	"
	Shiners	"
	Sunfish	"
	White bass	"
	Yellow perch	"