



DATES OF FIRST AND LAST
OCCURRENCE AND MAXIMUM DENSITY
OF FISH EGGS AND LARVAE IN
CENTRAL LAKE ERIE

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Prepared for
Ohio Environmental Protection Agency
and
U.S. Environmental Protection Agency
Project Officers: Chris Yoder and Gary Milburn

THE OHIO STATE UNIVERSITY
CENTER FOR LAKE ERIE AREA RESEARCH
COLUMBUS, OHIO

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THE OHIO STATE UNIVERSITY

13 February 1978

Mr. Chris Yoder
316 Coordinator
Division of Industrial Wastewater
Ohio Environmental Protection Agency
Box 1049 361 East Broad Street
Columbus, Ohio 43216

Dear Chris:

I have reviewed the 316(b) Interim Reports for the CEI plants at Avon Lake, Lake Shore, Eastlake, and Ashtabula for the date of first occurrence of fish larvae species and differences in day/night densities. This information for entrainment and source water samples is summarized on the enclosed tables. These tables also contain data on the maximum density (date and no.100m3) for each species.

In addition to these reports, I have reviewed similar data in the Environmental Reports for the Erie and Perry Nuclear Plant sites, the Ecology Reports for the U.S. Steel Conneaut site, and the U.S. Fish and Wildlife Service report for the nearshore area off Berlin Heights (Erie NP site). Summary tables are also enclosed for these locations.

The date of first occurrence of eggs and larvae for several key species at various locations along the Ohio shore of central Lake Erie is presented below:

TABLE 1
DATE OF FIRST OCCURRENCE OF FISH EGGS AND LARVAE
IN THE NEARSHORE WATERS OF CENTRAL LAKE ERIE

Table with 8 columns: SPECIES, LOCATION, and DATE OF FIRST OCCURRENCE (ERIE, AVON LAKE, LAKESHORE, EASTLAKE, PERRY, ASHTABULA, CONNEAUT). Rows list species like Walleye/sauger, Yellow perch, Rainbow smelt, Shiners, Gizzard shad, Freshwater drum, White bass, and Eggs with their respective occurrence dates.

Mr. Chris Yoder

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From this table, it can be seen that with the exception of shiners and eggs, the first date of occurrence of all key species is after the first of May. Based on these data, I am recommending that the 1978 ichthyoplankton surveys span the period May 1 to July 15 at approximately 10-day intervals.

In almost all cases, both eggs and larvae were higher in night entrainment samples. No night sampling was conducted in the source water. However, based on experience in the western basin, I am also recommending night sampling for the 1978 survey.

The locations of the source water samples for the CEI plants (1977 survey) were not in the form of a transect as proposed for the 1978 survey. It would be very useful in assessing the impacts of the plants on the larvae population if entrainment sampling could be continued in the plants during the period of our surveys.

Sincerely,



Charles E. Herdendorf
Director

CEH/pjw

Enclosures

cc: Gary Milburn
Nelson Thomas
Andrew White

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TABLE 1

DATE OF FIRST OCCURRENCE OF FISH EGGS AND LARVAE
IN THE NEARSHORE WATERS OF CENTRAL LAKE ERIE

SPECIES	DATE OF FIRST OCCURRENCE						
	Location	ERIE (Huron)	AVON LAKE	LAKESHORE (Euclid)	EASTLAKE	PERRY (Painesville)	ASHTABULA
Year	1974	1977	1977	1977	1974	1977	1977
Walleye/sauger	-	5/18	-	-	5/09	5/02	-
Yellow perch	5/01	5/11	-	5/04	5/09	5/16	5/09
Rainbow smelt	5/17	6/01	-	5/23	5/09	5/30	5/09
Shiners	4/30	5/11	5/23	4/15	6/12	5/16	5/23
Gizzard shad	6/20	5/25	6/20	6/20	6/12	6/27	5/23
Freshwater drum	5/17	7/06	-	6/24	7/12	6/27	-
White bass	5/17	-	-	7/08	7/12	7/11	-
Eggs	5/01	5/04	4/25	4/15	4/26	5/02	5/23

TABLE 2

ICHTHYOPLANKTON SUMMARY
 ERIE NUCLEAR PLANT SITE (OE)

SOURCE WATER:

Location: Erie County, Ohio Period: 4/1-8/23 Year: 1974

SPECIES	FIRST OCCURRENCE		MAXIMUM DENSITY			LAST OCCURRENCE	
	Day	Night	Date	D/N	No/100m ³	Day	Night
Eggs	5/01	-				8/01	-
Emerald shiner	4/30	-					-
Spottail shiner	4/30	-					-
Whitefish	4/30	-					-
Yellow perch	5/01	-	6/04	D	7.81		-
Trout perch	5/17	-					-
Rainbow smelt	5/17	-				8/23	-
Freshwater drum	5/17	-					-
Alewife	5/17	-					-
White bass	5/17	-					-
Logperch	5/17	-					-
Perches	5/17	-					-
Minnows	6/04	-					-
Suckers	6/04	-					-
Crappies	6/04	-					-
Gizzard shad		-					-
Carp		-					-

SOURCE WATER: USF & WS

Period: 5/16-8/16 Year: 1974

Location: Berlin Heights, Ohio

Yellow perch	5/30	-	6/12	D	3.6	6/12	-
Rainbow smelt	6/12	-	6/12	D	15.7	7/01	-
Gizzard shad	6/20	-	7/01	D	19.2	8/09	-
Alewife	7/01	-	7/01	D	11.2	7/16	-
Emerald shiner	7/01	-	7/16	D	7445.2	8/09	-
Trout perch		-					-

TABLE 3

ICHTHYOPLANKTON SUMMARY AVON LAKE PLANT (CEI)

ENTRAINMENT:

Location: Avon Lake, Ohio

Period: 4/13-7/27 Year: 1977

SPECIES	FIRST OCCURRENCE		MAXIMUM DENSITY			LAST OCCURRENCE	
	Day	Night	Date	D/N	No/100m ³	Day	Night
Eggs	5/04	4/20	5/25	N	124.9	7/20	7/20
Trout perch	5/18	5/11	5/25	N	29.5	6/29	6/22
Yellow perch	5/18	5/11	5/18	D	20.7	6/08	6/22
Minnows	5/11	5/25	5/25	N	275.7	5/11	5/25
Shiners	5/18	5/18	6/22	D	716.6	7/27	6/29
Carp	5/25	5/18	5/25	N	594.0	7/27	7/27
Walleye	5/18	-	5/18	D	3.4	5/18	-
Logperch	5/25	6/15	6/15	N	4.7	6/15	6/15
Gizzard shad	6/01	6/08	6/29	D	121.0	7/13	7/13
Rainbow smelt	6/01	6/01	6/08	D	139.2	7/13	7/13
Mottled sculpin	6/01	-	6/01	D	3.3	6/01	-
Herrings	6/29	6/01	7/06	N	185.4	7/13	7/06
Alewife	6/08	6/15	6/29	N	97.1	7/06	6/29
Freshwater drum	-	7/06	7/06	N	4.0	-	7/06
Perches	6/01	5/25	6/01	D	10.9	6/01	6/08

MEAN DENSITY		
Taxon	Day No/100m ³	Night No/100m ³
Eggs	7.4	11.4
Larvae	61.4	100.6

TABLE 4

ICHTHYOPLANKTON SUMMARY AVON LAKE PLANT (CEI)

SOURCE WATER:

Location: Avon Lake, Ohio Period: 4/13 - 7/20 Year: 1977

SPECIES	FIRST OCCURRENCE		MAXIMUM DENSITY			LAST OCCURRENCE	
	Day	Night*	Date	D/N	No/100m ³	Day	Night*
Shiners	5/11	-	6/22	D	6,623.5	7/20	-
Yellow perch	5/11	-	5/11	D	7.4	6/08	-
Eggs	5/25	-	7/20	D	41.7	7/20	-
Gizzard shad	5/25	-	7/06	D	21.0	7/06	-
Carp	5/25	-	5/25	D	42.2	7/06	-
Logperch	5/25	-	5/25	D	2.2	6/08	-
Rainbow smelt	6/08	-	6/08	D	7.1	6/08	-
Trout perch	6/08	-	6/08	D	2.7	6/08	-
Minnows	6/08	-	6/08	D	2.2	6/08	-
Freshwater drum	7/06	-	7/06	D	6.7	7/06	-

* No night sampling of source water

TABLE 5

ICHTHYOPLANKTON SUMMARY* LAKE SHORE PLANT (CEI)

ENTRAINMENT:

Location: Euclid, Ohio

Period: 4/25-7/18

Year: 1977

SPECIES	FIRST OCCURRENCE		MAXIMUM DENSITY			LAST OCCURRENCE	
	Day	Night	Date	D/N	No/100m ³	Day	Night
Eggs	5/09	4/25	6/20	N	122.4	6/20	7/18
Trout Perch	5/09	5/09	5/09	D	13.3	6/06	7/18
Shiners	6/20	5/23	7/18	N	14.9	7/04	7/18
Carp	6/06	7/04	7/18	N	31.1	7/18	7/18
Gizzard shad	6/20	7/04	7/04	N	21.1	7/04	7/04
Log perch	6/20	-	6/20	D	6.1	6/20	-
Herrings	-	7/04	7/04	N	3.7	-	7/04

* Entrainment only, no source water data presented

MEAN DENSITY		
Taxon	Day No/100m ³	Night no/100m ³
Eggs	17.3	32.0
Larvae	4.8	5.5

TABLE 6

ICHTHYOPLANKTON SUMMARY EAST LAKE PLANT (CEI)

ENTRAINMENT:

Location: Eastlake, Ohio Period: 4/15-7/27 Year: 1977

SPECIES	FIRST OCCURRENCE		MAXIMUM DENSITY			LAST OCCURRENCE	
	Day	Night	Date	D/N	No/100m ³	Day	Night
Eggs	4/15	4/15	5/18	N	570.4	7/22	7/22
Shiners	4/15	4/15*	6/29	N	295.7	7/27	7/27
Carp	4/15	4/15	7/22	D	113.9	7/27	7/27
Gizzard shad	6/20	4/15*	6/29	N	22.7	7/04	6/29
Yellow perch	5/4	5/4	5/13	N	20.5	5/27	5/18
Rainbow smelt	6/24	5/23	6/20	N	12.9	6/24	7/27
Alewife	-	5/27	5/27	N	3.1	-	6/06
Mottled sculpin	6/01	-	6/01	D	3.4	6/01	-
Trout perch	6/15	6/06	6/06	N	8.2	6/20	6/24
Sauger	-	6/06	6/06	N	3.6	-	6/24
Logperch	6/29	6/20	6/24	N	3.5	6/29	6/24
Herrings	6/29	-	6/29	D	3.4	6/29	-
Minnows	-	7/27	7/27	N	6.2	-	7/27
White bass	-	7/27	7/27	N	3.1	-	7/27

*Y-0-Y

Taxon	MEAN DENSITY	
	Day No/100m ³	Night No/100m ³
Eggs	23.6	30.4
Larvae	23.4	21.1

TABLE 7

ICHTHYOPLANKTON SUMMARY EAST LAKE PLANT (CEI)

SOURCE WATER:

Location: Eastlake, Ohio Period: 4/15 - 7/23 Year: 1977

SPECIES	FIRST OCCURRENCE		MAXIMUM DENSITY			LAST OCCURRENCE	
	Day	Night*	Date	D/N	No/100m ³	Day	Night*
Yellow perch	5/13	-	5/13	D	18.7	6/10	-
Eggs	5/27	-	6/24	D	95.2	7/23	-
Rainbow smelt	5/27	-	5/27	D	3.0	7/08	-
Trout perch	5/27	-	6/10	D	3.1	6/24	-
Mottled sculpin	5/27	-	5/27	D	3.0	5/27	-
Shiners	6/10	-	6/24	D	7.7	7/08	-
Gizzard shad	6/24	-	6/24	D	2.3	6/24	-
Freshwater Drum	6/24	-	6/24	D	30.1	6/24	-
Carp	6/24	-	7/23	D	10.0	7/23	-
White bass	7/08	-	7/23	D	2.6	7/08	-
Sunfish	7/23	-	7/23	D	2.0	7/23	-

* No night sampling of source water

TABLE 8
 ICHTHYOPLANKTON SUMMARY
 ASHTABULA A&B PLANT (CEI)

ENTRAINMENT:

Location: Ashtabula, Ohio Period: 4/18 - 7/25 Year 1977

SPECIES	FIRST OCCURRENCE		MAXIMUM DENSITY			LAST OCCURRENCE	
	Day	Night	Date	D/N	No/100m ³	Day	Night
Eggs	5/02	5/02	6/13	D	195.0	7/25	7/25
Logperch	5/02	7/11	7/11	N	26.2	5/02	7/11
Sauger	-	5/02	5/02	N	6.6	-	5/02
Trout perch	5/30	5/16	5/30	N	14.7	6/27	6/27
Yellow perch	5/30	5/16	5/30	D	25.7	6/27	7/25
Shiners	5/30	5/16	6/27	N	495.2	7/25	7/25
Crappies	-	5/16	5/16	N	3.7	-	5/16
Carp	5/30	5/30	6/27	N	307.1	7/11	7/25
Mottled sculpin	5/30	5/30	5/30	N	47.6	5/30	5/30
Rainbow smelt-	-	5/30	6/13	N	13.7	-	6/13
Gizzard shad	6/27	6/27	6/27	N	3.6	6/27	6/27
Freshwater drum	6/27	-	6/27	D	3.4	6/27	-
Herrings	7/11	-	7/11	D	18.6	7/11	-
White Bass	7/11	7/11	7/11	D/N	3.1	7/11	7/11

ASHTABULA PLANT C (CEI)

ENTRAINMENT:

Eggs	5/16	5/02	6/13	N	6.7	5/16	6/13
Rainbow smelt	7/11	5/30	7/11	N	25.0	7/11	7/11
Carp	7/11	7/11	7/11	N	6.3	7/11	7/11
Freshwater drum	7/11	-	7/11	D	11.5	7/11	-
Shiners	-	7/25	7/25	N	3.4	-	7/25

MEAN DENSITY				
Taxon	Plant A & B		Plant C	
	Day	Night	Day	Night
	No/100m ³	No/100m ³	No/100m ³	No/100 ³
Eggs	17.1	13.5	0.5	1.7
Larvae	15.4	75.7	3.2	5.5

TABLE 9

ICHTHYOPLANKTON SUMMARY ASHTABULA PLANTS A, B & C (CEI)

SOURCE WATER:

Location: Ashtabula, Ohio Period: 4/17-7/11 Year: 1977

SPECIES	FIRST OCCURRENCE		MAXIMUM DENSITY			LAST OCCURRENCE	
	Day	Night*	Date	D/N	No/100m ³	Day	Night*
Eggs	5/02	-	5/30	D	119.3	7/11	-
Yellow perch	5/16	-	5/30	D	54.7	6/13	-
Trout perch	5/16	-	5/30	D	4.9	6/27	-
Rainbow smelt	5/30	-	5/30	D	17.3	5/30	-
Carp	5/30	-	7/11	D	14.3	7/11	-
Shiner	5/30	-	7/11	D	480.3	7/11	-
Logperch	5/30	-	5/30	D	9.1	5/30	-
Mottled sculpin	5/30	-	5/30	D	18.2	5/30	-
Sucker	5/30	-	5/30	D	2.4	5/30	-
Alewife	5/30	-	5/30	D	22.6	5/30	-
Freshwater drum	6/27	-	7/11	D	71.4	7/11	-
Gizzard shad	7/11	-	7/11	D	61.7	7/11	-
Herrings	7/11	-	7/11	D	28.6	7/11	-
White bass	7/11	-	7/11	D	3.6	7/11	-

* No night sampling of source water