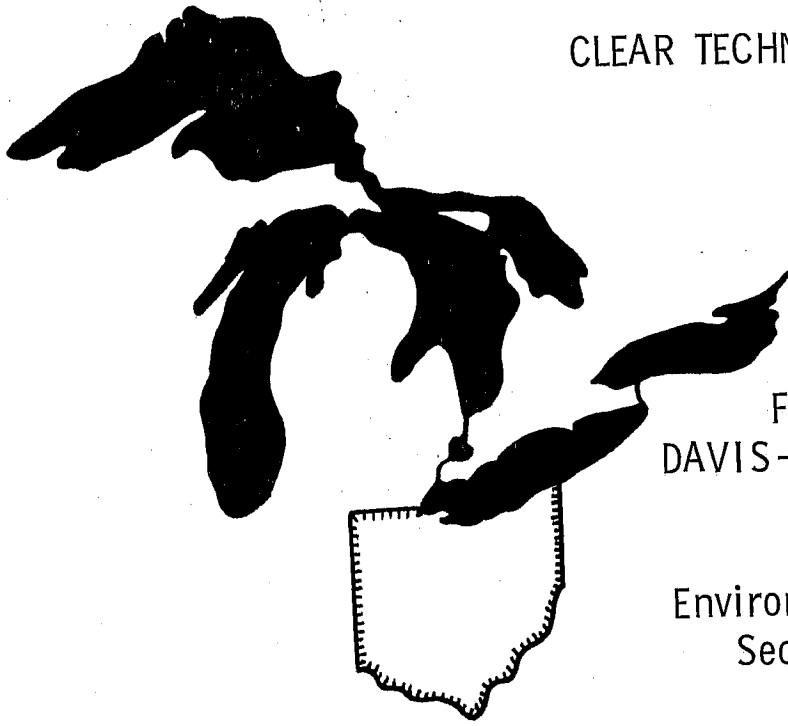


CLEAR TECHNICAL REPORT NO. 165



FISH IMPINGEMENT AT THE
DAVIS-BESSE NUCLEAR POWER STATION
DURING 1979

Environmental Technical Specifications
Sec. 3.1.2.a.6 Fish Impingement

Prepared by

Jeffrey M. Reutter

Prepared for

Toledo Edison Company
Toledo, Ohio

THE OHIO STATE UNIVERSITY

CENTER FOR LAKE ERIE AREA RESEARCH

Columbus, Ohio

February 1980

3.1.2.a.6 Fish Impingement

Procedures

Between 1 January and 31 December 1979 the traveling screens at the Davis-Besse Nuclear Power Station were operated 272 times. The date, time, and duration of each screen operation were recorded and keypunched, even when the impinged fish were not collected (Table 1). Collections of impinged fish were made by Toledo Edison personnel during 134 of the 272 screen operations by placing a screen having the same mesh size as the traveling screens ($\frac{1}{4}$ -inch bar mesh) in the sluiceway through which the backwashed material passed. Fish collected in this manner were placed in plastic bags, labeled with the date and time of screen operation, and frozen. The samples were picked up by personnel of The Ohio State University Center for Lake Erie Area Research (CLEAR) weekly. All specimens in all samples were identified (Trautman, 1957) and enumerated. All specimens, or a representative number thereof, were also weighed and measured.

In addition to the information pertinent to traveling screen operation, the total number and total weight of each species and the length and weight of each individual fish were also keypunched. All these data were stored on magnetic tape at The Ohio State University for use with the Statistical Analysis System: SAS (Barr et al., 1976) on an AMDAHL 370 computer.

Since the time and duration of every screen operation was known, it was possible to determine the number of hours represented by each collection. From this a rate, fish impinged/hour, was developed and used to estimate impingement on days when samples were not collected.

Results

A total of 4,385 fish representing 19 species was impinged on the traveling screens at the Davis-Besse Nuclear Power Station from 1 January through 31 December 1979 (Table 2). Goldfish was the dominant species impinged representing 78.6 percent of the total. Only 4 other species represented more than 1 percent of the total: yellow perch, 6.5 percent; emerald shiner, 4.9 percent; gizzard shad, 3.7 percent; and freshwater drum, 2.6 percent.

Impingement was also computed on a monthly basis (Table 3). Most of the impingement occurred during January (55.4 percent) and April (17.2 percent). Of the 2,429 fish estimated to have been impinged during January, 2,218 (91.3 percent) were goldfish, 103 (4.2 percent) were freshwater drum, and 80 (1.8 percent) were gizzard shad. Of the 753 fish estimated to have been impinged in April, 333 (44.2 percent) were goldfish, 200 (26.6 percent) were yellow perch, and 184 (24.4 percent) were emerald shiners.

Analysis

With the exception of goldfish, black and brown bullheads, and black and white crappies, the impinged fish occurred in relative numbers which were not

TABLE 1

TRAVELING SCREEN OPERATION AT THE DAVIS-BESSE NUCLEAR POWER STATION
FROM 1 JANUARY TO 31 DECEMBER 1979

DATE	TIME OF SCREEN OPERATION		FISH COLLECTION YES/NO	HOURS SINCE LAST SCREEN OPERATION
	ON	OFF		
1 January	0.01	0.31	N	0.31
2 January	19.20	21.45	N	45.14
4 January	17.55	18.26	Y	44.81
6 January	20.25	20.55	Y	50.29
8 January	16.00	17.54	N	44.99
10 January	17.20	17.52	Y	47.98
12 January	17.40	18.15	Y	48.63
13 January	16.05	16.35	N	22.20
14 January	19.20	19.50	Y	27.15
16 January	18.26	18.56	Y	47.06
17 January	16.12	16.42	N	21.86
20 January	17.20	18.45	N	74.03
24 January	11.50	17.30	N	94.85
26 January	18.55	19.25	N	49.95
27 January	16.27	16.57	N	21.32
28 January	16.30	17.00	N	24.43
1 February	19.39	20.09	N	99.09
2 February	20.15	21.00	N	24.91
3 February	21.07	21.40	Y	24.40
5 February	17.30	18.00	Y	44.60
7 February	18.19	18.57	N	48.57
9 February	17.00	17.35	Y	46.78
11 February	19.32	20.05	Y	50.70
13 February	18.20	18.50	N	46.45
15 February	19.10	19.41	N	48.91
16 February	18.55	19.25	N	23.84
17 February	17.02	17.35	Y	22.10
19 February	17.50	18.25	Y	48.90
20 February	17.00	17.35	N	23.10
21 February	18.45	19.15	Y	25.80
23 February	19.10	19.40	Y	48.25
24 February	21.45	22.25	N	26.85
25 February	21.05	21.31	Y	23.06
26 February	21.00	21.30	N	23.99
27 February	17.50	18.25	Y	20.95
28 February	22.00	22.30	N	28.05
1 March	21.22	21.52	Y	23.22
3 March	19.33	20.03	Y	46.51
5 March	16.10	16.40	Y	44.37

TABLE 1 (con't)

TRAVELING SCREEN OPERATION AT THE DAVIS-BESSE NUCLEAR POWER STATION
FROM 1 JANUARY TO 31 DECEMBER 1979

DATE	TIME OF SCREEN OPERATION		FISH COLLECTION YES/NO	HOURS SINCE LAST SCREEN OPERATION
	ON	OFF		
7 March	16.52	17.22	Y	48.82
9 March	16.10	16.40	Y	47.18
10 March	21.15	21.45	N	29.05
11 March	19.30	20.00	Y	22.55
13 March	17.17	17.50	Y	45.50
17 March	19.50	20.25	N	98.75
18 March	16.45	17.15	N	20.90
19 March	20.15	20.45	Y	27.30
21 March	16.13	16.43	Y	43.98
22 March	17.03	17.33	N	24.90
23 March	19.50	20.20	Y	26.87
24 March	16.58	17.30	N	21.10
25 March	16.40	17.10	Y	23.80
26 March	16.03	16.36	N	23.26
27 March	18.40	17.12	Y	24.76
28 March	17.30	18.00	N	24.88
31 March	16.20	16.50	Y	70.50
2 April	18.10	18.42	Y	49.92
3 April	21.00	21.30	Y	26.88
4 April	20.50	21.26	N	23.96
6 April	21.40	22.10	Y	48.84
8 April	17.27	18.00	Y	43.90
9 April	19.45	20.20	N	26.20
10 April	18.10	18.40	Y	22.20
12 April	18.15	18.45	Y	48.05
13 April	19.44	20.20	N	25.75
14 April	16.30	17.00	N	20.80
16 April	18.55	19.27	N	50.27
18 April	20.45	21.15	N	49.88
19 April	22.30	23.00	N	25.85
20 April	22.00	22.38	Y	23.38
21 April	16.50	17.25	Y	18.87
22 April	18.40	19.10	N	25.85
23 April	17.20	18.00	Y	22.90
24 April	18.00	18.30	N	24.30
25 April	18.43	19.09	Y	24.79
26 April	16.35	17.06	N	21.97
27 April	16.50	17.25	N	24.19
28 April	16.55	17.30	N	24.05
29 April	19.30	20.00	Y	26.70
30 April	19.50	20.20	Y	24.20

TABLE 1 (con't)

TRAVELING SCREEN OPERATION AT THE DAVIS-BESSE NUCLEAR POWER STATION
FROM 1 JANUARY TO 31 DECEMBER 1979

DATE	TIME OF SCREEN OPERATION		FISH COLLECTION YES/NO	HOURS SINCE LAST SCREEN OPERATION
	ON	OFF		
1 May	19.45	20.21	N	24.01
3 May	19.30	20.02	Y	47.81
4 May	16.50	17.20	N	21.18
5 May	16.05	16.35	N	23.15
7 May	18.25	18.55	Y	50.20
8 May	16.45	17.15	N	22.60
9 May	18.20	18.50	Y	25.35
11 May	17.35	18.05	Y	47.55
12 May	20.10	20.40	N	26.35
13 May	18.36	19.06	Y	22.66
13 May	17.17	17.49	Y	46.43
16 May	19.55	20.30	N	26.81
17 May	19.16	19.46	Y	23.16
17 May	19.16	20.35	Y	48.89
19 May	20.05	17.48	N	21.13
20 May	17.18	17.48	Y	24.00
21 May	17.17	17.48	N	24.00
22 May	17.17	17.08	Y	23.60
23 May	16.37	16.00	Y	22.92
24 May	15.30	17.00	N	361.00
8 June	16.25	19.45	N	26.45
9 June	19.15	23.00	N	27.55
10 June	22.30	20.25	N	21.25
11 June	19.30	18.15	N	21.90
12 June	17.43	23.45	N	29.30
13 June	23.15	23.00	N	23.55
14 June	22.30	23.50	N	24.50
15 June	23.20	22.08	Y	46.58
17 June	21.38	19.15	Y	45.07
19 June	18.45	19.19	N	48.04
21 June	18.18	19.15	N	47.96
23 June	18.40	21.25	Y	50.10
25 June	20.25	17.15	N	19.90
26 June	16.15	18.35	Y	25.20
27 June	17.45	22.35	N	28.00
28 June	22.05	1.30	Y	2.95
29 June	1.00			

TABLE 1 (con't)

TRAVELING SCREEN OPERATION AT THE DAVIS-BESSE NUCLEAR POWER STATION
FROM 1 JANUARY TO 31 DECEMBER 1979

DATE	TIME OF SCREEN. OPERATION		FISH COLLECTION YES/NO	HOURS SINCE LAST SCREEN OPERATION
	ON	OFF		
1 July	20.55	21.25	Y	67.95
3 July	21.20	22.00	N	48.75
4 July	23.00	24.00	N	26.00
5 July	16.45	17.25	N	17.25
7 July	20.00	21.00	Y	51.75
8 July	22.00	23.00	N	26.00
9 July	18.35	19.35	Y	20.35
10 July	20.30	21.30	N	25.95
11 July	19.40	20.40	N	23.10
12 July	21.00	22.00	N	25.60
13 July	20.05	21.05	Y	23.05
14 July	18.15	18.45	N	21.40
15 July	18.30	19.00	Y	24.55
16 July	17.30	18.00	N	23.00
17 July	20.10	20.40	Y	26.40
18 July	17.20	17.50	N	21.10
19 July	19.10	21.00	Y	27.50
20 July	17.20	18.10	N	21.10
21 July	19.55	20.45	Y	26.35
22 July	20.00	20.30	N	23.85
25 July	20.12	20.42	Y	72.12
27 July	19.30	20.30	Y	47.88
28 July	16.45	17.15	N	20.85
29 July	16.15	19.16	Y	26.01
30 July	17.06	18.06	N	22.90
31 July	18.35	19.35	Y	25.29
1 August	16.30	17.30	N	21.95
2 August	16.45	17.45	Y	24.15
3 August	16.15	17.15	N	23.70
4 August	17.25	18.25	N	25.10
6 August	17.10	17.40	Y	47.15
7 August	16.00	17.00	N	23.60
8 August	17.35	18.05	Y	25.05
9 August	17.15	18.15	N	24.10
10 August	16.35	17.31	Y	23.16
11 August	18.45	19.15	N	25.84
13 August	21.45	22.15	Y	51.00
15 August	17.00	17.30	N	43.15
17 August	18.00	18.40	Y	49.10
18 August	20.05	20.40	N	26.00
19 August	16.45	17.45	Y	21.05

TABLE 1 (con't)

TRAVELING SCREEN OPERATION AT THE DAVIS-BESSE NUCLEAR POWER STATION
FROM 1 JANUARY TO 31 DECEMBER 1979

DATE	TIME OF SCREEN OPERATION		FISH COLLECTION YES/NO	HOURS SINCE LAST SCREEN OPERATION
	ON	OFF		
20 August	20.30	21.30	N	27.85
21 August	17.00	18.00	Y	20.70
22 August	17.50	18.50	N	24.50
23 August	17.45	18.45	Y	23.95
24 August	20.55	22.00	N	27.55
25 August	17.00	18.00	Y	20.00
27 August	16.20	17.20	Y	47.20
28 August	18.50	19.50	N	26.30
29 August	16.45	17.45	Y	21.95
30 August	22.05	23.05	N	29.60
1 September	16.45	17.15	N	42.10
2 September	16.50	17.20	Y	24.05
3 September	16.45	17.15	N	23.95
4 September	16.50	17.20	Y	24.05
5 September	16.50	17.20	N	24.00
6 September	16.45	17.15	Y	23.95
7 September	17.00	17.40	N	24.25
8 September	18.12	19.18	Y	25.78
9 September	18.30	19.45	N	24.27
10 September	17.30	18.45	N	23.00
11 September	17.40	18.40	N	23.95
12 September	19.25	20.33	Y	25.93
13 September	16.40	18.15	N	21.82
14 September	16.38	17.40	Y	23.25
15 September	20.00	21.00	N	27.60
16 September	16.31	17.02	N	20.02
17 September	16.35	17.05	N	24.03
18 September	19.02	19.35	Y	26.30
20 September	18.40	19.10	Y	47.75
21 September	16.25	16.55	N	21.45
22 September	16.35	17.05	Y	24.50
23 September	16.15	16.50	N	23.45
24 September	16.54	17.27	Y	24.77
25 September	16.20	16.57	N	23.30
26 September	17.00	17.35	Y	24.78
28 September	16.40	17.10	N	23.75
29 September	16.11	16.44	Y	23.34
31 September	17.06	18.09	N	49.65
1 October	20.06	21.07	N	26.98
2 October	20.00	21.02	Y	23.95
4 October	17.14	18.25	Y	45.23
6 October	20.50	21.20	Y	50.95

TABLE 1 (con't)

TRAVELING SCREEN OPERATION AT THE DAVIS-BESSE NUCLEAR POWER STATION
FROM 1 JANUARY TO 31 DECEMBER 1979

DATE	TIME OF SCREEN OPERATION		FISH COLLECTION YES/NO	HOURS SINCE LAST SCREEN OPERATION
	ON	OFF		
7 October	18.35	19.05	N	21.85
8 October	20.11	20.41	Y	25.36
9 October	20.30	21.00	N	24.59
10 October	21.00	21.30	Y	24.30
11 October	23.00	23.30	N	26.00
13 October	16.50	18.05	N	42.75
14 October	17.08	18.10	Y	24.05
15 October	21.10	22.20	N	28.10
16 October	21.20	22.25	Y	24.05
17 October	21.05	22.10	N	23.85
18 October	22.05	23.10	Y	25.00
19 October	21.05	22.10	N	23.00
20 October	16.50	18.10	Y	20.00
21 October	16.35	17.35	N	23.25
22 October	16.38	17.38	Y	24.03
23 October	16.40	17.00	N	23.62
24 October	16.45	18.00	N	25.00
25 October	16.45	17.45	N	23.45
26 October	16.05	17.15	Y	23.70
30 October	16.06	17.15	Y	96.00
31 October	18.30	19.30	N	26.15
1 November	23.15	23.45	Y	28.15
2 November	20.40	21.10	N	21.65
3 November	17.10	17.43	Y	20.33
4 November	23.00	23.30	N	29.87
5 November	23.20	23.40	Y	24.10
7 November	21.10	22.40	Y	47.00
8 November	17.45	18.45	N	20.05
9 November	21.18	22.20	Y	27.75
10 November	22.00	23.00	N	24.80
11 November	18.00	19.00	N	20.00
12 November	17.07	18.07	N	23.07
13 November	17.22	18.25	Y	24.18
14 November	16.37	17.37	N	23.12
15 November	16.57	18.00	Y	24.63
16 November	19.13	20.25	N	26.25
17 November	21.15	22.20	Y	25.95
18 November	20.40	21.45	N	23.25
19 November	22.00	23.10	Y	25.65
20 November	19.20	19.50	N	20.40

TABLE 1 (con't)

TRAVELING SCREEN OPERATION AT THE DAVIS-BESSE NUCLEAR POWER STATION
FROM 1 JANUARY TO 31 DECEMBER 1979

DATE	TIME OF SCREEN OPERATION		FISH COLLECTION YES/NO	HOURS SINCE LAST SCREEN OPERATION
	ON	OFF		
21 November	19.12	20.15	Y	24.65
22 November	19.07	20.25	N	24.10
23 November	17.15	18.30	Y	22.05
24 November	21.10	22.10	N	27.80
25 November	19.30	20.30	Y	22.20
26 November	20.55	22.05	N	25.75
27 November	18.40	19.40	Y	21.35
28 November	20.35	22.00	N	26.60
29 November	19.10	20.10	Y	22.10
30 November	21.00	22.30	N	26.20
3 December	19.45	20.00	Y	69.70
5 December	16.30	17.05	Y	45.05
7 December	21.12	21.45	Y	52.40
8 December	20.30	21.30	N	23.85
9 December	17.20	18.10	Y	20.80
10 December	20.40	21.30	N	27.20
11 December	21.00	21.30	Y	24.00
12 December	19.00	19.30	N	22.00
13 December	17.05	17.35	Y	22.05
15 December	21.12	21.42	Y	52.07
16 December	16.30	17.05	N	19.63
17 December	17.00	17.30	Y	24.25
19 December	19.07	19.37	Y	50.07
20 December	16.40	17.10	N	21.73
21 December	19.00	19.30	Y	26.20
22 December	20.43	23.10	N	27.80
23 December	21.20	23.00	Y	23.90
24 December	21.20	22.00	N	23.00
25 December	19.10	20.15	Y	22.15
26 December	19.30	20.10	N	23.95
27 December	27.20	22.30	Y	26.20
29 December	17.20	21.10	Y	46.80
31 December	22.00	23.30	Y	50.20

TABLE 2

FISH SPECIES IMPINGED AT THE DAVIS-BESSE NUCLEAR POWER STATION: 1 January through 31 December 1979

SPECIES	NUMBER IMPINGED			WEIGHT (grams)			LENGTH (mm)		
	Estimate	95% Confidence Interval		Mean	95% Confidence Interval		Mean	95% Confidence Interval	
		Lower Bound	Upper Bound		Lower Bound	Upper Bound		Lower Bound	Upper Bound
Alewife	1	0	5	0	*	*	100	*	*
Black Bullhead	17	17	17	2	-1	5	59	57	60
Black Crappie	28	14	54	8	-27	44	81	70	91
Brown Bullhead	11	7	17	12	12*	12*	83	83	83
Carp	3	1	9	12	12*	12*	99	*	*
Emerald Shiner	214	90	511	1	1	1	55	54	55
Freshwater Drum	115	61	218	4	-1	8	82	79	84
Gizzard Shad	162	95	275	8	0	15	91	88	93
Goldfish	3449	2266	5248	5	1	9	70	70	71
Logperch Darter	21	13	34	2	-2	7	66	63	70
Pumpkinseed Sunfish	3	1	9	1	*	*	36	*	*
Rainbow Smelt	32	18	55	2	-8	12	64	58	70
Spottail Shiner	9	5	16	3	-17	24	69	58	81
Troutperch	5	2	15	4	-1	8	83	78	88
Unidentified Sunfish	1	0	5	1	*	*	32	*	*
White Bass	3	1	12	4	*	*	81	*	*
White Crappie	23	13	40	6	-16	28	69	62	75
White Perch	3	1	9	2	2	2	62	60	64
Yellow Perch	285	129	631	5	-3	13	76	73	78
TOTAL	4385	3128	6149	5	2	8	71	70	71

* Confidence intervals could not be computed when no more than one representative of a given species occurred.

TABLE 3

A SUMMARY OF MONTHLY FISH IMPINGEMENT
AT THE DAVIS-BESSE NUCLEAR POWER STATIONS: 1 January through 31 December 1979

MONTHS	NUMBER IMPINGED				WEIGHT (grams)			LENGTH (mm)		
	Estimate	95% Confidence Interval		Mean	95% Confidence Interval		Mean	95% Confidence Interval		
		Lower Bound	Upper Bound		Lower Bound	Upper Bound		Lower Bound	Upper Bound	
January	2429	1363	4335	4	1	6	71	70	71	
February	30	17	52	3	-4	10	62	58	66	
March	501	345	726	3	-0	7	64	63	65	
April	753	498	1137	3	-1	7	66	65	67	
May	16	9	29	3	0	5	63	61	64	
June	20	6	66	7	-42	56	77	65	89	
July	29	18	45	18	-18	53	108	100	116	
August	54	39	76	17	-177	210	63	51	76	
September	35	20	60	5	13	22	62	52	71	
October	2	0	8	18			97			
November	147	83	269	11	1	21	83	81	86	
December	367	172	786	9	5	13	84	83	85	
TOTAL	4385	3128	6149	5	2	8	71	70	71	



unusual for populations in Lake Erie at Locust Point. These 5 species occurred in relative proportions well above that of the open lake. This indicates probable use of the intake canal as a permanent residence for these species. Furthermore, due to the small sizes of these fish (they were young-of-the-year) and results from previous trawling efforts (Reutter and Herdendorf, 1975), it appears that these species are also spawning within the intake canal and, consequently, these losses should not be considered as a negative impact on lake populations of these species.

Impingement losses at the Davis-Besse Nuclear Power Station during 1979 were extremely low even when compared to other plants on the Western Basin with lower generating capacities (Reutter *et al.*, 1978). Tables 4-6 present sport and commercial fish landings from the Ohio waters of Lake Erie and commercial landings from all of Lake Erie. Table 4 presents 1978 results because 1979 sport fishing harvest estimates are not available for all species. However, they would probably have been higher than 1978 because commercial fishing harvests increased by 13 percent from 1978 to 1979, and because the sport harvest of walleye increased from 1,652,000 in 1978 to 3,351,000 in 1979 (Ohio Department of Natural Resources, 1980). Although the fish impinged at Davis-Besse were primarily YOY (mean length, 71 mm) and, consequently, much more abundant than the adults taken by commercial and sport fishermen, the total number impinged (including gizzard shad and goldfish which are not taken by sport fishermen) was only 0.03 percent of the number harvested by Ohio sport fishermen in 1978. This figure becomes even less significant when one realizes that the Ohio sport catch was only 83.4 percent of the Ohio 1978 commercial catch and only 15.9 percent of the 1978 commercial catch from all of Lake Erie (Tables 4-6). Furthermore, as stated above, more fish were harvested commercially and by sportsmen in 1979 than in 1978.

The above comparisons make it obvious that impingement losses at the Davis-Besse Nuclear Power Station have an insignificant effect of Lake Erie fish stocks and further justification of this is probably unnecessary. However, it should be noted that although by number impingement losses were 0.03 percent of the Ohio sport fishing harvest, by weight impingement was less than 0.001 percent of the Ohio sport harvest from 1978. Furthermore, based on the estimates of Patterson (1976) (See Section 3.1.2.a.5) the impingement of 285 young-of-the-year yellow perch, a species which is very important to sport and commercial fishermen, will result in the loss of only 5-16 adults which is from 0.00004 to 0.0001 percent of the number captured by Ohio sport fishermen in 1978. It should also be noted that no walleye were impinged and that impingement results were also extremely low in 1978, 6,607 fish (Reutter, 1979).

Jan

TABLE 4
ESTIMATED 1978 SPORT AND COMMERCIAL FISH HARVEST FROM THE OHIO WATERS OF LAKE ERIE^a

SPECIES	SPORT HARVEST		COMMERCIAL HARVEST		TOTAL HARVEST	
	No. of Individuals	Weight (Kilograms)	No. of Individuals	Weight (Kilograms)	No. of Individuals	Weight (Kilograms)
Yellow Perch	11,483,000	1,116,386	9,178,000 ^b	890,294	20,661,000	2,006,680
Walleye	1,652,000	1,515,906	0 ^f	0	1,652,000	1,515,906
White Bass	1,533,000	334,825	3,380,000 ^b	736,842	4,913,000	1,071,667
Freshwater Drum	668,000	363,200	981,000 ^b	533,904	1,649,000	897,104
Channel Catfish	218,000	86,033	235,000 ^b	92,843	453,000	178,876
Smallmouth Bass	32,000	20,203	0 ^f	0	32,000	20,203
Others	c	c	—	1,867,983 ^d	—	1,867,983 ^e
TOTAL	15,586,000 ^e	3,436,553 ^e	—	4,121,866	—	7,648,419

a Scholl (1979).
b Estimated based on mean weight of sport fish.
c Data not available.
d Thirty-eight percent carp.
e Excludes weight of "Others" caught by sport fishermen.
f Closed to commercial fishing.

TABLE 5

COMMERCIAL FISH LANDINGS FROM THE OHIO
WATERS OF LAKE ERIE: 1974-1979*

SPECIES	1974	1975	1976	1977	1978	1979
Buffalo	14,528	14,982	13,620	15,890	16,344	14,982
Bullhead	12,258	14,074	19,522	29,056	32,688	24,062
Carp	1,284,366	1,265,298	1,196,290	1,249,408	701,430	883,938
Channel Catfish	136,200	117,586	101,242	115,316	92,843	107,144
Freshwater Drum	307,812	340,500	432,208	361,838	533,904	574,764
Gizzard Shad	**	**	274,216	228,816	706,878	863,962
Goldfish	29,510	23,608	60,836	250,154	343,678	98,064
Quillback	**	**	57,658	46,762	46,762	36,320
Rainbow Smelt	2,270	4,086	15,890	454	4,994	**
Sucker	39,952	24,516	28,602	14,982	14,982	17,706
White Bass	1,314,330	760,450	680,546	501,216	736,842	866,232
Yellow Perch	797,678	675,552	652,852	1,051,918	890,294	1,189,934
TOTAL	3,934,364	3,241,106	3,533,482	3,865,810	4,122,774	4,677,108

* Ohio Dept. of Natural Resources (1980). Data presented in kilograms.

** Data not available.

TABLE 6

COMMERCIAL FISH LANDINGS FROM
LAKE ERIE: 1975 - 1979^a

SPECIES	WEIGHT (Kilograms)				
	1975	1976	1977	1978	1979
Bowfin	c		15,000	12,000	10,000
Buffalo	30,000	43,000	34,000	25,000	24,000
Bullhead	69,000	64,000	77,000	54,000	47,000
Carp	1,491,000	1,444,000	1,439,000	871,000	1,091,000
Channel Catfish	197,000	155,000	160,000	148,000	151,000
Freshwater Drum	538,000	619,000	538,000	692,000	720,000
Gizzard Shad	1,000	301,000	229,000	707,000	888,000
Goldfish	26,000	61,000	250,000	344,000	89,000
Lake Whitefish	c		3,000	2,000	1,000
Quillback	60,000	58,000	47,000	47,000	38,000
Rainbow Smelt	7,688,000	7,845,000	9,700,000	11,002,000	10,148,000
Rock Bass	c		19,000	10,000	20,000
Sucker	52,000	48,000	31,000	33,000	43,000
Sunfish	c		33,000	23,000	21,000
Walleye ^b	114,000	138,000	261,000	295,000	489,000

TABLE 6 (Cont'd)
 COMMERCIAL FISH LANDINGS FROM
 LAKE ERIE: 1975 - 1979^a

SPECIES	WEIGHT (Kilograms)				
	1975	1976	1977	1978	1979
White Bass	1,932,000	1,162,000	948,000	1,590,000	1,626,000
Yellow Perch	4,597,000	2,903,000	4,801,000	4,918,000	5,931,000
Others	927,000	833,000	928,000	796,000	639,000
TOTAL	17,722,000	15,674,000	19,513,000	21,569,000	21,976,000

a. Muth (1980).

b Not taken commercially in Ohio and Michigan waters.

c Included with "Others" during this year.

LITERATURE CITED

- Barr, J., J.H. Goodnight, J.P. Sall, and T. Helwig. 1976. A user's guide to SAS 76. SAS Institute, Inc., Raleigh, N.C. 329 p.
- Muth, K.M. 1980. Commercial fish production from Lake Erie, 1979. USFWS Special Report for Annual Meeting Lake Erie Committee Great Lakes Fishing Commission Ann Arbor Michigan. March 18-19, 1980. 22 pp.
- Ohio Department of Natural Resources 1980. Status of Ohio's Lake Erie Fisheries. Ohio Division of Wildlife Publication. 18 pp.
- Patterson, R.L. 1976. Analysis of losses in standing crop and fishery yields of yellow perch in the western basin of Lake Erie due to entrainment and impingement mortality at the Detroit Edison Monroe Power Plant, Large Lakes Research Station. U.S. Environmental Protection Agency, Grosse Ile, Mich.
- Reutter, J.M. 1979. Fish impingement at the Davis-Besse Nuclear Power Station During 1978. The Ohio State University. CLEAR Tech. Rept. No. 103. 13 pp.
- Reutter, J.M. and C.E. Herdendorf. 1975. Pre-operational aquatic ecology monitoring program for the Davis-Besse Nuclear Power Station, Unit 1. Toledo Edison Co. Contract No. 1780. 123 p.
- Reutter, J.M., C.E. Herdendorf and G.W. Sturm. 1978. Impingement and entrainment studies at the Bay Shore Power Station, Toledo Edison Company. The Ohio State University CLEAR Tech. Rept. No. 78b.
- Scholl, R.L. 1979. Status of Ohio's Lake Erie fisheries. Ohio Dept. Nat. Res. Div. of Wildlife. Sandusky, Ohio. 19 p.
- Trautman, M.B. 1957. The Fishes of Ohio. The Ohio State University Press, Columbus, Ohio. 683 p.