SUMMARY OF THE OPERATION OF THE CONOWINGO DAM FISH COLLECTION FACILITY DURING THE SPRING OF 1976

by

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FISH FACILITY OPERATION REPORT 5

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INTRODUCTION

An agreement was signed between the Philadelphia Electric Company, Susquehanna Electric Company, Pennsylvania Power and Light Company, Metropolitan Edison Company, Safe Harbor Water Power Corporation, State of Maryland, Commonwealth of Pennsylvania, State of New York, and the Department of the Interior on 29 September 1970, for the implementation of a five-year program "for restoration of the American shad to the Susquehanna River". Part of the program called for construction of "fish attraction, collection and trapping devices" to determine the number of American shad (Alosa sapidissima) available that could be collected from immediately below Conowingo Dam and transported upriver and released. The Conowingo Dam Fish Collection Facility was constructed for Philadelphia Electric Company by the Arundel Corporation using conceptual plans supplied by the U.S. Department of Interior through the Susquehanna River Shad Advisory Committee.

The facility was operated in 1972 through 1975 (Robbins, 1972, Foote and Robbins, 1973, Buchanan and Robbins, 1974 and Buchanan, 1975). Operation in 1976 was according to procedures outlined by Robbins, Buchanan and Rosage (1976) and approved by the Operations Subcommittee of the Susquehanna River Shad Advisory Committee. Details of operation procedures in 1972 through 1975 are given in Robbins (1972 and 1973) and Robbins, Kotkas and Buchanan (1974 and 1975).

The present report summarizes the 1976 operation and makes comparisons with results from previous years. Items discussed include (1) schedule of operation (2) attraction velocity (3) disposition of catch including transplantation of blueback herring and alewife to Conowingo Pond and release

of tagged shad at Shures Landing (4) a creel census conducted below Conowingo Dam (5) statistics on the catch of the American shad, and (6) a comparison of data obtained in 1976 with that of 1972 through 1975.

METHODS

Schedule of Operation

The fifth year of operation of the fish collection facility began on 5 April 1976. The first phase of operation was to determine when alewife or blueback herring were present in sufficient number in the tailrace of Conowingo Dam to transport 50,000 individuals above the dam. The facility was operated for two to six hrs on the mornings of 5, 7, 9, 12 and 15 April until the presence of herring was established. Daily operation (one half hour before sunrise to 1200 hr EST) began on 19 April and continued through 30 June 1976. Mechanical problems which prevented operation were few. Malfunction of the crowder mechanism prevented sampling from 0835-1200 hrs on 7 May, 1015-1200 hrs on 8 May and 11-1200 hrs on 22 May. Hopper mechanism repairs prevented sampling from 0430-0630 hrs on 31 May and from 0430-0530 hrs on 2 June.

The length of fishing time per lift depended upon the relative abundance of fishes. It ranged from 1 to 60 minutes. One minute sets were used when large numbers of herring or white perch were present. Sets of thirty minutes were most commonly used. Several lifts of longer duration were used when few fish were being taken.

The fish collection facility was also operated from 0700-1400 hrs on 8 July and from 0800-1430 hrs on 26 July. The purpose of operation on these days was to determine the abundance of juvenile and adult striped bass in the Conowingo Dam tailrace. If present in sufficient numbers in the catch, they were to be transported above the dam. Plant personnel were asked to census the angler catch of striped bass daily on the stoplog gallery and the west shore of the tailrace at 0700, 1000 and 1400 hrs during July. The results of the creel census were used to select 8 and 26 July as days when striped bass would be most likely to be taken in the fish lift.

Attraction Velocity

A standard attraction velocity of approximately 6.5-7.0 fps was used from 5-24 April. This was achieved by setting both weir gates 6.0 ft below tailrace and operating Station Service Units 1 and 2 (approximately 400 cfs each) at 35% and 75% gate opening. However, the gate setting on one station service unit is always dependent on plant demand, thus gate opening of this unit may vary from 30-50% which results in slight variation in attraction velocity at the weirs.

An experimental schedule of attraction velocities and flow (volume of water through the facility) was initiated on 24 April and continued through 30 June. Four test conditions of attraction velocity and flow were used in a schedule of eight test periods (Table 1). Each day was divided into two test periods and a set of test conditions was run in each period. Test periods were used consecutively throughout the test season.

Tests using each of two positions of the crowder gates were also conducted to determine if there were differences in catch. The intermediate gate position (12 in. opening) was used on one lift and the full-open position was used on the next.

Operation of Conowingo Hydro-electric Station in the spring is, in part, modified by the occurrence of anadromous fish runs. As part of an agreement with the State of Maryland, to prevent fish mortality in the tailrace due to oxygen deficiences, a generator was operated continuously between 22 April and 10 June (Dietz, 1976). Either one or more of Units 1 through 7 (approximately 5,000 cfs each) were used. The selection of which one to operate was made by a biologist conducting a surveillance and depended upon the relative abundance and distribution of fishes (primarily blueback herring, alewife, and white perch) in the tailrace. In 1976, Unit No. 2 was operated to provide oxygenated

water from Conowingo Pond and enhance the attraction of shad along the west bank of the tailrace near the facility. Units 8 through 11 (approximately 10,000 cfs each) were not used for the above purposes.

Station engineers were requested to operate Unit No. 1 at a reduced load (20 megawatts) when station load requirements permitted. This reduced turbulence near the entrance of the collection facility. When Unit No. 1 was scheduled for full load, it was requested that it be the last unit on line.

Disposition of Catch

Specimens in all lifts were released into a 6' x 12' x 4' sorting tank. The catch was first examined for American shad which were immediately tagged with a floy anchor tag (FD-67) and transferred to a 460 gallon fiberglass transport tank which was equipped with an oxygen cylinder for aeration. Sex was noted for most shad collected. Shad were then released at Shures Landing (3/4 mi downstream from Conowingo Dam).

Transplantation of alewife and blueback herring to Conowingo Pond began on 19 April and was terminated on 25 April. Juvenile American eel were transplanted into Conowingo Pond between 25 and 30 June. All releases in Conowingo Pond were made at the Conowingo Creek boat launch. The 600 gallon plywood tank constructed by the Pennsylvania Fish Commission, in 1972, was used to transport the fish. The tank was equipped with air pumps to provide aeration.

Other fishes were counted after the above operations were completed. Large catches were subsampled. The most common method of obtaining a subsample was to crowd the fishes to within 2 ft of the discharge end of the sorting tank with a moveable 4' x 6' aluminum screen. Another screen was then used to partition off 1/8, 1/5, 1/4 or 1/2 of the catch. Fishes not included in the subsample were then released into the tailrace through a 12 in. discharge pipe. An estimate of the numbers of

fishes in the lift was made from a count of fish in the subsample. All catches were counted or subsampled except when large numbers of herring were available for transport. Where mortalities due to an oxygen deficiency were likely, large catches were estimated visually and released to the river immediately.

Length, weight, sex and scale samples were taken from blueback herring, alewife, white perch, and gizzard shad. Scale samples were also taken from American shad caught by anglers along the west shore of the tailrace.

Fishes, other than American shad, were tagged on 10 June to determine numbers of fishes that may be captured more than one time. A total of 373 fish of 12 species were tagged with floy anchor tags and released into the tailrace from the sorting tank. Numbers of tagged fish in the catch were then recorded from 11 through 30 June. The tags of recaptured fish were partially clipped so that multiple recaptures could be identified.

Common names of fishes are used throughout the text and tables. A list of common and scientific names of fishes collected in the Conowingo Dam Fish Collection Facility from 1972 to 1976 is given in Table 2.

Creel Census

A creel census was conducted below Conowingo Dam to determine: (1) if the distribution of shad changes in the tailrace with the phases of operation of Conowingo Hydro-electric Station and (2) if a relationship existed between the anglers catch and the collection of shad in the fish facility.

The number and distribution of boats and anglers fishing from the west shore were counted. The catch of the shore anglers was counted once an hour daily from approximately 0400 to 1200 hrs between 21 April and 30 June. Changes in the distribution of boats was determined by a count

of the number in east and west sections of the tailrace. The sections were established by an imaginary line from Unit No. 6 to the northern tip of Rowland Island.

RESULTS

A total of 839 lifts yielded a catch of 1,416,109 fish representing 12 families and 38 species (Table 3). The white perch (581,768), gizzard shad (405,510), American eel (187,035) and channel catfish (91,715) were most common. The anadromous clupeids (alewife, blueback herring, hickory shad and American shad) made up 2.8% of the catch. These same species have made up 25.9%, 35.1%, 20.7% and 8.1% of the catch, respectively, from 1972 through 1975.

Alewife abundance was the lowest observed since operation of the facility began in 1972. Most of the alewife run may have taken place before 5 April when operation of the lift began. Alewife were reported in Deer Creek in early March. A total of 235 alewife was collected in the facility between the week of 12 April and 24 May.

The catch of blueback herring in 1976 was the lowest observed in five years. A total of 39,503 was collected. Three peaks in blueback herring abundance were noted. These occurred during the weeks of 19 April, 17 May and 14 June. Water temperatures during these weeks ranged from 53-68 F, 64-66 F and 73-78 F.

Hickory shad were absent from the 1976 catch although a few were observed taken by anglers along the west shore of the tailrace. The hickory shad catch in the facility has declined steadily since 1973 when 738 individuals were collected.

Juvenile American eel were collected in greater numbers in 1976 than in previous years. It comprised 17.2% of the 1976 catch. The greatest numbers were taken between 7 and 27 June when water temperatures ranged from 68 to 80 F.

American Shad Catch

A total of 91 American shad was collected between 21 April and 19 June. Twenty-two shad died prior to release. One was tagged and released at Conowingo Creek. The remaining 68 fish were tagged and released at Shures Landing. No recaptures of tagged shad were made in the collection facility in 1976. Two tags were returned by anglers. Both fish were tagged on 18 May. One was caught along the west shore of the tailrace on 20 May and the other was caught in the Susquehanna Flats area of the Chesapeake Bay on 29 May. The sex ratio of 71 shad examined in 1976 was 0.78 males to 1.00 females (Table 4). Most females were green while all males examined were ripe. Ripe females were not observed in the catch.

Conditions of operation associated with the collection of shad are given in Table 5. Data from the lift preceeding and the lift following one(s) which contained shad is included to show which variables may have changed. The largest number of shad (31) were collected when Unit 1 through 11 were shut-down (Table 6). Seven shad were taken with all units operating. The effect of operating Unit No. 1 at a reduced gate is not obvious. Results of the velocity, volume and crowder gate position tests are presented in Tables 7, 8 and 9. Data from a clean out lift and the first lift with the crowder gates open are not included in the analysis. The function of the clean out lift was to remove fishes that gained access to the holding channel, primarily through the closed crowder gates, between hours of operation. The first lift with a

scheduled velocity and open gate position usually contained large numbers of fishes which had gathered behind the crowder gates between hours of operation. These fishes were collected independent of attraction velocity, volume of water, and crowder gate position. The catch of the blueback herring, alewife, American shad, gizzard shad, channel catfish and white perch is greatest at the intermediate gate while that of the carp and quillback is greatest at the full open position (Table 7). The mean hourly catch of shad in the intermediate position (0.3 fish per hour) is not significantly greater ($P < .05$) than in the wide open position (0.2 fish per hour). The results of the velocity tests (Table 7 and 8) indicates that high velocity combined with either low or high flows may be preferred by American shad. The difference in the catch per hour between high and low velocity, however, is not significant ($P < .05$). One possible advantage of high velocity is that it appears to reduce the catch of carp, channel catfish and white perch.

The peak hourly catch of shad occurred between 0700 and 0800 hrs when 33 fish (36.3%) were collected (Table 10). One shad was collected before 0500 hrs and five were taken between 1100 and 1200 hrs. The peak catch in previous years occurred between 0600 and 0700 hrs except in 1973 when it occurred between 0500 and 0600 hrs. Most shad were taken at water temperatures of 66 to 68 F (Table 11).

Age determinations were made on 21 American shad collected in the facility and 27 shad taken by anglers. Four year old fish (1972 year class) dominated (62-63%) both groups (Table 12). The major difference in the age distribution of shad from the two sources in 1976 was that anglers caught fewer five year old fish and more three year old fish than were taken in the collection facility.

Fish Transplantation

A total of 90 alewife, 6,622 blueback herring and 2,384 American eel was transported from the Conowingo Dam Fish Collection Facility to Conowingo Pond (Table 13). The goal of transporting 50,000 herring was not met due to an unusually small herring run and the time consuming process of sorting herring from catches with large numbers of white perch.

Monitoring studies in Conowingo Pond by Ichthyological Associates, Inc., have provided evidence of successful alewife reproduction above Conowingo Dam. Seven young (27-76 mm FL) were taken. The first was taken by 16 ft trawl off Peach Bottom Beach (Lancaster County) on 15 June. Two were collected by trawl on 8 July, 50 yds above the mouth of Peters Creek. Two were found on the traveling screens of the Peach Bottom Atomic Power Station on 20 July and an additional two on 27 July.

No striped bass were transported above Conowingo Dam. A total of four juvenile striped bass (71-245 mm FL) were observed in the fish collection facility in two days of operation in July. Creel census data provided by plant personnel showed that a few striped bass (8-21 inches) were taken almost daily by anglers off the stoplog gallery between 2 and 30 July. No catches were reported on 6, 15, 18 and 25 July. The largest daily catches reported were 25 striped bass on 7 July and 25-30 fish on 23 July.

Tagging Program

Twenty-one fish were recaptured between 11 and 30 June (Table 15). Most (19) were gizzard shad. One redbreast sunfish and one tagged channel catfish were also taken. One gizzard shad was recaptured twice. Multiple recapture of gizzard shad were 8.0% (20 of 251 tagged fish) which indicates that a portion of the catch is recycled through the facility in daily operation.

Creel and Boat Census

Anglers caught 164 American shad along the west shore of the tailrace from 21 April through 25 May (Table 16). American shad were not observed in the creel census after 25 May. The peak catch occurred from 0800 to 1000 hrs. Anglers were most successful on 25 April when 40 shad were taken. Above average catches of shad were also made on 16 (15 shad) and 18 May (30 shad). Anglers caught 48% of the shad when no large units (10,000 cfs) were operating and four or fewer small units (5,000 cfs) were operating (Table 17). Shore angler effort dropped sharply after 31 May and no anglers were observed after 27 June.

Angling effort from boats was greatest on the east side of the tailrace below the large units. Approximately 60% of all boat hours were censused on the east side (Table 18). The total boat hours of effort in the tailrace was slightly higher in 1976 than in 1975 but lower than in 1973 and 1974.

SUMMARY OF THE SHAD CATCH, 1972-1976

Since 1972, 670 adult and three juvenile American shad have been taken in the Conowingo Dam Fish Collection Facility (Table 19). The conditions under which they were taken each year were similar. Most shad (88.3%) collected in the period from 0400 to 1100 hrs were taken before 0900 hrs (Table 20). The percentage caught in each hour was relatively consistent for each of the five years. The catch of shad by anglers was more evenly distributed through the morning hours (Table 21).

Most shad (80.9%) collected in the facility were taken at water temperatures of 68-71 F and 74-75 F (Table 11). Anglers caught most shad (72.9%) at water temperatures of 59-66 F (Table 22).

In 1973-1976, 72.0% of the shad were taken in the facility when no large units were operating (Table 6). Anglers fishing from shore took 35.2% of their catch under similar conditions (Table 16). Shore angler effort below Conowingo Dam has decreased steadily since 1973. The catch of American shad per fisherman hour ranged from 0.007 to 0.010 in 1973, 1974 and 1975 (Table 23). The 1976 catch per fisherman hour increased to 0.041. The greatest angling pressure normally occurs on weekend days. Weekend angling effort comprised 43 to 52% of the total angling effort from 1973 through 1976.

Of the shad taken in the facility from 1973-1976, 47.9% were males and 52.0% were females (Table 4). Almost all males were ripe. Approximately 75% of all females were green, 8% ripe and 17% were spent.

Age composition of adult shad caught in the collection facility and by anglers is similar, i.e., most shad taken were four year old fish (Table 12). The presence of three year old fish in 1975 and four year old fish in 1976 indicates that some survival occurred in 1972 when Tropical Storm Agnes caused severe flooding of the Susquehanna River in late June.

Daily river flows and water temperatures, for April-June, 1972-1976 (Table 24), has been included to aid those who might attempt further analysis of the facilities' past operation.

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Table 1. Schedule of test velocities and volumes for the Conowingo Dam Fish Collection Facility, 24 April-30 June 1976.

Period No.	Test Conditions	Service Unit Setting No. 1	Service Unit Setting No. 2	Entrance Weir Setting: Depth Below Tailrace	Entrance Weir Setting: Velocity ft/sec (± 0.5)
1	HV-HF	35%	75%	4.2 ft	7.5
2	LV-LF	35%	35%	5.7 ft	4.0
3	LV-HF	35%	75%	9.8 ft	3.5
4	HV-LF	35%	35%	2.4 ft	6.5
5	HV-LF	35%	35%	2.4 ft	6.5
6	LV-HF	35%	75%	9.8 ft	3.5
7	LV-LF	35%	35%	5.7 ft	4.0
8	HV-HF	35%	75%	4.2 ft	7.5
A*	HV-XLF	35%	0%	1.2 ft	7.5
B*	LV-XLF	35%	0%	2.9 ft	4.0

* Alternate between A and B operation when too many generating units are off and tailrace is too low for standard setting.

HV - High Velocity
LV - Low Velocity
HF - High Flow
LF - Low Flow
XLF - Extra Low Flow

Table 2. List of scientific and common names of fishes collected in the Conowingo Dam Fish Collection Facility, 1972-1976 (according to Baily, et al., 1970).

Scientific Name	Common Name	Scientific Name	Common Name
Family - Petromyzontidae	Lampreys	Family - Ictaluridae	Freshwater catfishes
Petromyzon marinus	Sea lamprey	*Ictalurus catus*	White catfish
		Ictalurus natalis	Yellow bullhead
Family - Anguillidae	Freshwater eels	*Ictalurus nebulosus*	Brown bullhead
Anguilla rostrata	American eel	*Ictalurus punctatus*	Channel catfish
Family - Clupeidae	Herrings	Family - Cyprinodontidae	Killifishes
Alosa aestivalis	Blueback herring	*Fundulus heteroclitus*	Mummichog
Alosa mediocris	Hickory shad		
Alosa pseudoharengus	Alewife	Family - Belonidae	Needlefishes
Alosa sapidissima	American shad	*Strongylura marina*	Atlantic needlefish
Brevoortia tyrannus	Atlantic menhaden		
Dorosoma cepedianum	Gizzard shad	Family - Percichthyidae	Temperate basses
		Morone americana	White perch
Family - Salmonidae	Trouts	*Morone saxatilis*	Striped bass
Coregonus artedii	Lake herring		
Salmo gairdneri	Rainbow trout	Family - Centrarchidae	Sunfishes
Salmo trutta	Brown trout	*Ambloplites rupestris*	Rock bass
Salvelinus fontinalis	Brook trout	*Lepomis auritus*	Redbreast sunfish
		Lepomis cyanellus	Green sunfish
Family - Esocidae	Pikes	*Lepomis gibbosus*	Pumpkinseed
Esox niger	Chain pickerel	*Lepomis macrochirus*	Bluegill
Esox lucius	Northern pike	*Micropterus dolomieui*	Smallmouth bass
Esox masquinongy	Muskellunge	*Micropterus salmoides*	Largemouth bass
		Pomoxis annularis	White crappie
Family - Cyprinidae	Minnows and carps	*Pomoxis nigromaculatus*	Black crappie
Carassius auratus	Goldfish		
Cyprinus carpio	Carp	Family - Percidae	Perches
Notemigonus crysoleucas	Golden shiner	*Etheostoma olmstedi*	Tessellated darter
Notropis amoenus	Comely shiner	*Perca flavescens*	Yellow perch
Notropis hudsonius	Spottail shiner	*Stizostedion vitreum*	Walleye
Notropis rubellus	Rosyface shiner		
Notropis spilopterus	Spotfin shiner		
Rhinichthys cataractae	Longnose dace		
Family - Catostomidae	Suckers		
Carpiodes cyprinus	Quillback		
Catostomus commersoni	White sucker		
Erimyzon oblongus	Creek chubsucker		
Hypentelium nigricans	Northern hog sucker		
Moxostoma macrolepidotum	Shorthead redhorse		

Table 3. Numbers of fishes taken in the Conowingo Dam Fish Collection Facility, 5 April - 30 June 1976.

Dates	5-9 Apr	12-15 Apr	19-25 Apr	26 Apr-2 May	3-9 May	10-16 May	17-23 May	24-30 May	31 May-6 Jun	7-13 Jun	14-20 Jun	21-27 Jun	28-30 Jun	Totals
No. Lifts	13	11	80	90	73	85	78	81	75	76	77	74	26	839
Fishing Time (hr)	9.0	5.7	12.8	24.3	26.3	29.4	32.6	33.6	32.7	32.9	32.4	30.7	11.5	313.9
Water Temperature (F)	50-51	50-51	53-68	59-69	57-62.5	60-64	64-66.5	63.5-65.5	65-67.5	67.5-72	73-78	74-80	75-76	
Lampreys														
Sea lamprey	-	-	-	25	4	-	-	-	-	-	-	-	-	29
Freshwater eels														
American eel	1	-	131	536	46	139	1578	754	1842	38096	126373	16483	1056	187035
Herrings														
Blueback herring	-	-	26878	5	133	600	780	315	551	3529	6679	28	5	39503
Alewife	-	3	195	2	12	18	1	4	-	-	-	-	-	235
American shad	-	-	8	1	-	9	12	8	9	30	14	-	-	91
Atlantic menhaden	-	-	-	-	-	-	-	1	12	8	556	-	-	577
Gizzard shad	406	221	94576	31249	31293	111642	43540	13709	20329	21123	23651	13138	633	405510
Trouts														
Rainbow trout	-	1	-	-	-	4	-	1	12	36	6	-	-	60
Brown trout	5	4	8	15	3	38	19	46	52	181	122	1	-	494
Pikes														
Muskellunge	-	1	4	-	-	-	2	1	2	1	3	-	-	14
Minnows and Carps														
Goldfish	-	-	-	-	-	4	-	-	-	-	4	-	-	8
Carp	-	-	324	794	180	448	1179	782	530	1500	1469	2222	24	9452
Golden shiner	-	-	132	74	91	218	171	175	175	491	233	108	-	1868
Comely shiner	-	-	-	-	-	40	-	-	-	700	101	-	-	841
Spottail shiner	-	-	664	1023	56	-	-	-	-	-	-	-	-	1743
Spotfin shiner	1	-	8	-	64	30	159	360	1001	27693	29992	489	59	59856
Suckers														
Quillback	-	-	1406	52	-	205	2579	1392	2074	1878	358	271	2	10217
White sucker	2	2	136	57	9	97	56	23	23	44	8	-	-	457
Northern hog sucker	-	1	-	4	-	-	-	-	-	-	-	-	-	5
Shorthead redhorse	-	-	226	39	63	673	227	23	20	4	-	-	-	1275
Freshwater Catfishes														
White catfish	1	-	-	26	4	15	270	130	156	374	524	559	3	2062
Yellow bullhead	-	-	-	-	-	-	-	-	-	-	10	-	-	10
Brown bullhead	-	-	47	7	4	54	131	76	31	68	74	84	4	580
Channel catfish	29	8	7523	3077	1147	1811	5589	2422	11830	5911	6492	44274	1602	91715

continued

Table 3. Continued.

Dates	5-9 Apr	12-15 Apr	19-25 Apr	26 Apr-2 May	3-9 May	10-16 May	17-23 May	24-30 May	31 May-6 Jun	7-13 Jun	14-20 Jun	21-27 Jun	28-30 Jun	Totals
No. Lifts	13	11	80	90	73	85	78	81	75	76	77	74	26	839
Fishing Time (hr)	9.0	5.7	12.8	24.3	26.3	29.4	32.6	33.6	32.7	32.9	32.4	30.7	11.5	313.9
Water Temperature (F)	50-51	50-51	53-68	59-69	57-62.5	60-64	64-66.5	63.5-65.5	65-67.5	67.5-72	73-78	74-80	75-76	
Killifishes														
Mummichog	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Temperate Basses														
White perch	-	-	66487	50733	78179	81056	29727	89340	56744	94953	32981	1500	68	581768
Striped bass	-	-	-	-	1	-	-	1	9	2	13	14	11	51
Sunfishes														
Rock bass	-	-	-	42	4	5	4	3	20	20	11	19	2	130
Redbreast sunfish	-	-	60	150	115	274	394	442	698	1048	1662	574	15	5432
Green sunfish	-	-	-	-	-	5	-	3	5	37	73	9	1	133
Pumpkinseed	-	-	5	38	43	76	39	124	179	254	457	96	8	1319
Bluegill	-	-	100	245	97	144	397	236	367	813	706	203	29	3337
Smallmouth bass	-	-	191	6	1	62	18	11	-	39	4	-	-	332
Largemouth bass	-	-	10	-	3	-	19	1	-	-	-	-	-	33
White crappie	-	-	30	80	63	142	320	565	309	1150	698	206	273	3836
Black crappie	-	-	-	2	-	-	-	69	1	14	4	-	-	90
Perches														
Yellow perch	-	-	242	1030	4	330	184	172	117	492	684	26	35	3316
Walleye	5	3	292	80	83	422	250	199	251	504	515	86	4	2694
Total	**451**	**244**	**199683**	**89392**	**111702**	**198561**	**87645**	**111388**	**97349**	**200993**	**234477**	**80390**	**3834**	**1416109**

Table 4. Sex ratio and spawning conditions of American shad, Alosa sapidissima, collected in the Conowingo Dam Fish Collection Facility, 1972-1976.

Year	Male		Female				Undetermined	Total
	Ripe	Spent	Green	Ripe	Spent	Undetermined		
1972	-	-	-	-	-	-	293	293
%	-	-	-	-	-	-	100.0	
1973	34	1	22	1	12	0	7	77
%	44.2	1.3	28.6	1.3	15.6	0	9.1	
1974	48	0	41	9	6	12	12	128
%	37.5	0	32.0	7.0	4.7	9.4	9.4	
1975	49	0	30	0	4	0	1	84
%	58.3	0	35.7	0	4.8	0	1.2	
1976	31	0	0	0	0	40	20	91
%	34.1	0	0	0	0	44.0	22.0	
Total	162	1	93	10	22	52	333	673
	24.1	0.1	13.8	1.5	3.3	7.7	49.5	

Males = 163 (47.9%)
Females = 177 (52.0%)

Table 5. Data describing conditions for each lift before, at the time of, and after American shad, Alosa sapidissima, were taken in the Conowingo Dam Fish Collection Facility, 21 April - 19 June 1976.

Date	21 Apr			22 Apr			25 Apr						27 Apr		11 May		
Lift Number	5	6	7	1	2	3	2	3	4	5	6	7	1	2	8	9	10
Parameters *																	
Shad Taken	0	4	0	0	1	0	0	1	0	1	1	0	1	0	0	2	0
Total Fish	2517	4606	1000	2250	17301	5000	5088	1193	1966	2620	5601	3720	4513	5696	505	422	316
Rel. Loc.	-	1	-	-	2	-	-	-	-	2	2	-	-	-	-	2	-
Lift Time	0650	0715	1005	0530	0545	0634	0530	0550	0633	0710	0745	0840	0601	0625	0930	1015	1100
Min. Fished	5	5	5	0	5	5	5	5	5	5	5	5	5	5	30	30	30
Air Temp.	63.0	63.0	75.0	65.0	67.0	67.0	55.0	55.0	55.0	55.0	55.0	55.0	41.0	42.0	68.0	68.0	68.0
Water Temp.	59.0	59.0	62.0	62.0	62.0	62.0	68.0	68.0	68.0	68.0	68.0	68.0	67.0	67.0	61.0	61.0	61.0
Weather	2	2	1	1	1	1	3	4	4	4	4	4	1	1	1	2	2
At. Pressure	30.55	30.55	30.55	30.50	30.50	30.50	30.36	30.36	30.36	30.36	30.36	30.30	-	-	30.00	29.96	29.96
Small Gen. On	0	0	4	0	0	1	1	1	1	1	1	1	1	4	4	4	5
Large Gen. On	0	0	2	0	0	0	0	0	0	0	0	0	0	2	2	4	4
Unit 1	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1
Unit 2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	34.9	34.9	34.9	30.3	30.3	30.3	23.8	23.8	23.8	23.8	23.8	23.8	23.6	23.6	22.9	22.9	22.9
% Gate S.U.1	45	45	45	45	45	45	45	45	45	45	45	45	40	45	35	35	35
% Gate S.U.2	75	75	75	0	35	35	35	35	35	35	35	0	0	45	35	75	75
Vel. Hld. Chan.	1.5	1.5	1.5	-	0.6	0.6	0.6	0.6	0.6	0.6	0.6	1.5	1.5	999	1.3	1.5	1.5
Vel. Weir 1	6.0	6.0	6.8	-	4.2	4.2	4.0	4.0	4.0	4.0	4.0	3.8	3.8	999	4.3	7.7	7.7
Vel. Weir 2	6.0	6.0	6.5	-	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	999	3.7	7.4	7.4
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR																	
Weir 1	6.6	6.6	6.0	-	5.0	5.0	6.7	6.7	6.7	6.7	6.7	3.9	3.9	2.9	6.7	4.7	4.7
Weir 2	6.6	6.6	6.0	-	5.0	5.0	6.7	6.7	6.7	6.7	6.7	3.9	3.9	2.9	6.7	4.7	4.7
Tailrace Elev.	13.6	13.6	18.0	-	13.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	999	18.1	19.9	20.0
Hld. Chan. Elev.	-	-	19.5	-	-	-	14.4	14.4	14.4	14.4	14.4	14.4	14.5	999	18.4	21.2	21.2
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	1	2	2	-	2	1	1	2	1	2	1	2	1	2	1	2	1

continued

Table 5. Continued.

Date	14 May			15 May			15 May					16 May						
Lift Number	8	9	10	4	5	6	10	11	12	14	15	1	2	3	4	5	6	7
Parameters *																		
Shad Taken	0	1	0	0	1	0	0	1	0	0	1	1	0	0	1	0	1	0
Total Fish	1200	565	556	660	537	2160	4192	4425	1696	3616	4561	1346	4544	98	525	312	1569	2496
Rel. Loc.	-	2	-	-	2	-	-	2	-	-	2	2	-	-	2	-	2	-
Lift Time	0920	1005	1050	0625	0707	0749	0940	0957	1015	1057	1130	0450	0504	0525	0601	0619	0700	0742
Min. Fished	30	30	30	30	30	30	5	5	5	5	2	0	5	5	10	15	30	30
Air Temp.	66.5	68.0	67.0	65.0	66.0	68.0	77.0	76.0	76.0	78.0	79.0	67.5	67.5	66.0	66.0	68.0	69.0	69.0
Water Temp.	62.0	62.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0
Weather	3	3	3	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3
At. Pressure	30.16	30.16	30.16	30.07	30.07	30.07	30.06	30.06	30.06	30.06	30.06	30.02	30.02	30.02	30.02	30.02	30.02	30.02
Small Gen. On	6	6	6	2	2	4	4	4	4	4	4	2	2	2	2	2	2	3
Large Gen. On	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unit 1	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	2	2	2
Unit 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	20.4	20.4	20.4	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	26.6	26.6	26.6	26.6	26.6	26.6	26.6
% Gate S.U.1	45	45	45	35	35	35	35	35	35	35	35	45	45	45	45	45	45	45
% Gate S.U.2	75	75	35	35	35	35	75	75	75	75	75	0	75	75	75	75	75	75
Vel. Hld. Chan.	1.6	1.6	1.6	1.3	1.3	1.3	1.5	1.5	1.5	1.5	1.5	-	2.0	2.0	2.0	2.0	2.0	999
Vel. Weir 1	3.7	3.7	3.7	4.2	4.2	4.2	7.7	7.7	7.7	7.7	7.7	-	7.7	7.7	7.7	7.7	7.7	999
Vel. Weir 2	3.6	3.6	3.6	3.8	3.8	3.8	7.5	7.5	7.5	7.5	7.5	-	7.5	7.5	7.5	7.5	7.5	999
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR																		
Weir 1	10.8	10.8	10.8	5.7	5.7	5.7	4.2	4.2	4.2	4.2	4.2	-	4.7	4.7	4.7	4.7	4.7	999
Weir 2	10.8	10.8	10.8	5.7	5.7	5.7	4.2	4.2	4.2	4.2	4.2	-	4.7	4.7	4.7	4.7	4.7	999
Tailrace Elev.	20.1	20.2	20.2	14.8	14.8	16.0	16.1	16.1	16.1	16.1	16.1	-	14.8	14.8	14.8	14.8	14.8	999
Hld. Chan. Elev.	20.1	20.6	20.6	15.0	15.1	16.2	17.7	17.7	17.7	17.7	17.7	-	15.5	16.1	16.1	16.1	16.1	999
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	1	2	2	1	2	2	1	2	2	1	-	2	1	2	1	2	1

continued

Table 5. Continued.

Date	17 May			18 May						21 May			23 May				
Lift Number	10	11	12	3	4	5	6	7	8	9	10	11	7	8	9	10	11
Parameters *																	
Shad Taken	0	1	0	0	1	3	3	1	0	0	1	0	0	1	0	0	1
Total Fish	292	329	159	268	397	711	1155	666	1216	605	1537	2544	288	3297	700	556	571
Rel. Loc.	-	2	-	-	2	2	2	2	-	-	2	-	-	2	-	-	2
Lift Time	1025	1105	1140	0520	0605	0645	0730	0815	0855	0950	1030	1125	0828	0913	0955	1036	1133
Min. Fished	30	30	30	10	30	30	30	30	30	30	30	20	30	30	30	30	45
Air Temp.	67.0	71.0	71.0	60.0	60.0	62.0	63.0	65.0	67.0	73.0	76.0	78.0	58.5	61.0	64.0	64.0	66.5
Water Temp.	64.0	64.0	64.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	65.5	65.5	65.5	65.5	65.5
Weather	4	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1
At. Pressure	29.84	29.84	29.84	29.57	29.57	29.57	29.57	29.57	29.57	29.76	29.76	29.76	29.92	29.92	29.92	29.92	29.91
Small Gen. On	4	4	4	1	1	4	4	4	4	7	7	7	4	4	4	4	4
Large Gen. On	4	4	4	0	0	1	3	4	4	4	4	4	0	1	3	3	3
Unit 1	1	1	1	2	2	2	2	1	1	3	3	3	3	3	3	3	3
Unit 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	25.2	25.2	25.2	26.6	26.6	26.6	26.6	26.6	26.6	37.2	37.2	37.2	49.9	49.9	49.9	49.9	49.9
% Gate S.U.1	0	0	0	35	35	35	35	35	35	0	0	0	0	0	0	0	0
% Gate S.U.2	35	35	35	0	0	75	75	75	75	75	75	75	35	75	75	75	75
Vel. Hld. Chan.	1.2	1.2	1.2	1.2	999	1.6	1.6	1.6	1.6	0.6	0.6	0.6	1.2	0.6	0.6	0.6	0.6
Vel. Weir 1	7.7	7.7	7.7	7.7	999	3.7	3.7	3.7	3.7	4.2	4.2	4.2	7.7	4.2	4.2	4.2	4.2
Vel. Weir 2	7.5	7.5	7.5	7.5	999	3.6	3.6	3.6	3.6	3.8	3.8	3.8	7.5	3.8	3.8	3.8	3.8
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR																	
Weir 1	1.2	1.2	1.2	1.2	999	9.8	9.8	9.8	9.8	5.7	5.7	5.7	1.7	6.7	6.7	6.7	6.7
Weir 2	1.2	1.2	1.2	1.2	999	9.8	9.8	9.8	9.8	5.7	5.7	5.7	1.7	6.7	6.7	6.7	6.7
Tailrace Elev.	19.4	19.4	19.4	14.0	999	15.0	15.0	999	19.6	20.5	20.5	20.5	16.0	17.0	18.8	18.8	18.8
Hld. Chan. Elev.	19.8	19.8	19.8	15.3	999	15.6	15.6	999	19.9	21.0	21.0	21.0	16.7	17.5	19.3	19.3	19.3
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	1	2	1	1	2	1	2	1	2	2	1	2	1	2	1	2	1

continued

Table 5. Continued.

Date	25 May			27 May			28 May						29 May			30 May		
Lift Number	5	6	7	9	10	11	3	4	5	6	11	12	5	6	7	6	7	8
Parameters *																		
Shad Taken	0	1	0	0	1	0	0	1	1	0	0	1	0	2	0	0	1	0
Total Fish	72	106	67	396	1337	186	462	653	209	116	260	145	292	170	808	269	1025	3744
Rel. Loc.	-	2	-	-	-	-	-	2	2	-	-	2	-	2	-	-	2	-
Lift Time	0705	0750	0830	0955	1035	1110	0535	0615	0655	0740	1105	1145	0655	0736	0818	0750	0832	0913
Min. Fished	30	30	30	30	30	20	20	30	30	30	30	30	30	30	30	30	30	30
Air Temp.	58.0	59.0	61.0	65.0	67.0	69.0	52.0	55.0	57.0	61.0	73.0	73.5	62.0	64.0	65.5	63.5	64.5	65.0
Water Temp.	65.0	65.0	65.0	63.5	63.5	63.5	65.0	65.0	65.0	65.0	65.0	65.0	65.5	65.5	65.5	65.5	65.5	65.5
Weather	2	1	2	1	1	1	1	1	1	1	1	1	3	3	3	3	3	3
At. Pressure	29.83	29.83	29.83	30.22	30.22	30.22	30.26	30.26	30.26	30.26	30.26	30.26	30.15	30.15	30.15	29.86	29.88	29.88
Small Gen. On	4	7	7	7	7	7	1	3	3	4	7	7	4	4	4	1	1	2
Large Gen. On	3	4	4	4	4	4	0	0	0	4	4	4	1	1	1	0	0	0
Unit 1	3	3	3	3	3	3	2	2	2	2	1	1	3	3	3	2	2	3
Unit 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	40.0	40.0	40.0	36.5	36.5	36.5	34.1	34.1	34.1	34.1	34.1	34.1	31.6	31.6	31.6	34.8	34.8	34.8
% Gate S.U.1	0	0	0	0	0	40	35	35	35	35	35	35	35	35	35	35	35	35
% Gate S.U.2	35	35	35	75	75	75	35	35	35	35	75	75	75	75	75	0	0	35
Vel. Hld. Chan.	1.2	1.2	1.2	0.6	0.6	2.0	1.3	1.3	1.3	1.3	1.5	1.5	2.0	2.0	2.0	1.5	1.5	1.5
Vel. Weir 1	7.7	7.7	7.7	4.2	4.2	7.7	4.2	4.2	4.2	4.2	7.7	7.7	7.7	7.7	7.7	3.8	3.8	6.7
Vel. Weir 2	7.5	7.5	7.5	3.8	3.8	7.7	3.8	3.8	3.8	3.8	7.5	7.5	7.5	7.5	7.5	3.8	3.8	6.7
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR																		
Weir 1	1.2	1.2	1.2	5.7	5.7	4.7	5.7	5.7	5.7	5.7	4.2	4.2	4.2	4.2	4.2	2.9	2.9	2.4
Weir 2	1.2	1.2	1.2	5.7	5.7	4.7	5.7	5.7	5.7	5.7	4.2	4.2	4.2	4.2	4.2	2.9	2.9	2.4
Tailrace Elev.	18.6	20.3	20.6	20.5	20.6	20.6	14.0	15.1	15.5	999	20.7	20.7	16.8	17.1	17.1	13.9	13.9	14.5
Hld. Chan. Elev.	19.3	20.9	21.1	21.0	21.0	21.0	14.0	15.4	15.7	999	21.9	21.9	18.3	18.5	18.5	13.9	13.9	15.8
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	1	2	1	2	1	2	1	2	1	2	1	2	2	1	2	2	1	2

continued

Table 5. Continued.

Date	1 Jun								4 Jun						5 Jun				
Lift Number	2	3	4	5	6	9	10	11	3	4	5	6	7	8	7	8	9	10	11
Parameters *																			
Shad Taken	0	1	1	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0
Total Fish	10440	1031	672	225	435	212	265	1216	720	841	384	128	151	332	748	88	50	51	58
Rel. Loc.	-	2	2	2	-	-	2	-	-	2	-	-	2	-	-	2	-	2	-
Lift Time	0455	0540	0620	0705	0750	1000	1045	1140	0540	0620	0700	0740	0825	0905	0830	0912	0954	1036	1140
Min. Fished	10	30	30	30	30	30	30	40	30	30	30	30	30	30	30	30	30	30	50
Air Temp.	66.0	67.0	67.5	69.0	69.0	74.5	74.5	74.5	52.0	54.0	58.0	58.0	60.0	64.0	69.0	69.0	70.0	71.0	72.0
Water Temp.	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	66.0	66.0	66.0	66.0	66.0	66.0	67.0	67.0	67.0	67.0	67.0
Weather	2	2	2	2	2	2	2	2	1	1	1	2	2	2	1	1	1	1	1
At. Pressure	29.81	29.81	29.81	29.81	29.81	29.81	29.81	29.81	30.30	30.30	30.36	30.36	30.36	30.36	30.48	30.46	30.46	30.46	30.46
Small Gen. On	1	3	4	7	7	7	7	7	1	4	5	7	7	7	4	4	4	4	4
Large Gen. On	0	0	2	4	4	4	4	4	0	1	4	4	4	4	2	4	4	4	4
Unit 1	2	2	2	1	1	1	1	1	2	3	3	3	3	3	2	2	2	2	2
Unit 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	38.0	38.0	38.0	38.0	38.0	38.0	36.0	36.0	36.0	36.0	36.0
% Gate S.U.1	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
% Gate S.U.2	35	35	35	35	35	75	75	75	35	35	35	35	35	75	35	75	75	75	75
Vel. Hld. Chan.	1.3	1.3	1.3	1.3	1.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6	1.3	1.5	1.5	1.5	1.5
Vel. Weir 1	4.2	4.2	4.2	4.2	4.2	7.7	7.7	7.7	6.7	6.7	6.7	6.7	6.7	3.7	4.2	7.7	7.7	7.7	7.7
Vel. Weir 2	3.8	3.8	3.8	3.8	3.8	7.5	7.5	7.5	6.7	6.7	6.7	6.7	6.7	3.6	3.8	7.5	7.5	7.5	7.5
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR																			
Weir 1	5.7	5.7	5.7	5.7	5.7	4.2	4.2	4.2	2.4	2.4	2.4	2.4	2.4	9.8	5.7	4.2	4.2	4.2	4.2
Weir 2	5.7	5.7	5.7	5.7	5.7	4.2	4.2	4.2	2.4	2.4	2.4	2.4	2.4	9.8	5.7	4.2	4.2	4.2	4.2
Tailrace Elev.	15.6	15.6	18.0	999	20.5	20.7	20.7	20.7	14.0	999	18.5	20.4	20.5	20.5	16.0	999	19.5	19.5	19.5
Hld. Chan. Elev.	15.7	15.7	18.3	999	20.9	21.0	21.0	21.0	14.0	999	19.1	21.2	21.3	20.8	16.2	999	20.8	20.8	20.8
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	1	2	1	2	2	2	2	2	1	2	1	2	1	2	1	2	1	2

continued

Table 5. Continued.

Date	6 Jun			8 Jun			8 Jun					9 Jun						
Lift Number	8	9	10	3	4	5	6	7	9	10	11	4	5	6	7	8	9	10
Parameters *																		
Shad Taken	0	1	0	0	1	2	1	0	0	1	0	0	2	0	0	1	1	0
Total Fish	1920	4065	910	790	180	1452	791	930	1190	1057	725	925	6077	1561	1175	1501	171	204
Rel. Loc.	-	2	-	-	2	2	2	-	-	2	-	-	2	-	-	2	2	-
Lift Time	0913	0955	1038	0540	0620	0700	0745	0830	1000	1045	1140	0545	0730	0815	0900	1020	1105	1140
Min. Fished	30	30	30	30	30	30	30	30	30	30	40	30	30	30	30	30	30	25
Air Temp.	66.0	71.0	69.5	60.0	61.0	63.5	68.0	70.0	70.0	77.0	79.0	67.0	71.0	77.0	78.0	82.0	83.0	84.5
Water Temp.	67.5	67.5	67.5	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0
Weather	2	2	2	6	6	6	2	2	3	3	3	1	1	1	1	1	1	1
At. Pressure	30.24	30.24	30.21	29.97	30.00	30.00	30.02	30.02	30.02	30.02	30.02	29.96	29.96	29.97	29.97	29.97	29.97	29.99
Small Gen. On	4	4	4	1	1	4	4	4	4	4	4	1	1	4	4	4	4	4
Large Gen. On	0	0	1	0	0	0	1	1	2	2	2	0	0	0	0	2	2	2
Unit 1	3	3	3	2	2	3	3	3	3	3	3	2	2	2	2	2	2	2
Unit 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	34.9	34.9	34.9	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	25.1	25.1	25.1	25.1	25.1	25.1	25.1
% Gate S.U.1	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
% Gate S.U.2	35	35	35	35	35	35	35	35	75	75	75	35	35	35	75	75	75	75
Vel. Hld. Chan.	0.6	0.6	0.6	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.3	1.3	1.3	1.5	1.5	1.5	1.5
Vel. Weir 1	4.2	4.2	4.2	6.7	6.7	6.7	6.7	6.7	3.7	3.7	3.7	4.2	4.2	4.2	7.7	7.7	7.7	7.7
Vel. Weir 2	3.8	3.8	3.8	6.7	6.7	6.7	6.7	6.7	3.6	3.6	3.6	3.8	3.8	3.8	7.5	7.5	7.5	7.5
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR																		
Weir 1	5.7	5.7	5.7	2.4	2.4	2.4	2.4	2.4	9.8	9.8	9.8	5.7	5.7	5.7	4.2	4.2	4.2	4.2
Weir 2	5.7	5.7	5.7	2.4	2.4	2.4	2.4	2.4	9.8	9.8	9.8	5.7	5.7	5.7	4.2	4.2	4.2	4.2
Tailrace Elev.	999	16.0	17.0	14.0	14.0	15.7	16.9	16.9	17.6	17.6	17.6	14.0	14.0	16.1	999	18.1	18.1	18.1
Hld. Chan. Elev.	999	16.2	17.2	14.7	14.7	16.4	17.9	17.9	18.0	18.0	18.0	14.1	14.1	16.3	999	19.6	19.6	19.6
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	1	2	1	2	1	2	1	2	2	1	2	1	2	1	2	1	2	1

continued

Table 5. Continued.

Date	10 Jun						12 Jun					13 Jun				
Lift Number	2	3	4	5	6	7	4	5	6	7	8	4	5	6	7	8
Parameters *																
Shad Taken	0	1	0	1	2	0	0	2	6	4	0	0	2	0	3	0
Total Fish	5760	385	340	335	1272	928	980	626	955	3524	2025	5608	5954	20225	10419	6172
Rel. Loc.	-	2	-	2	2	-	-	2	2	2	-	-	-	-	2	-
Lift Time	0500	0545	0630	0715	0800	0845	0628	0705	0746	0828	0920	0631	0713	0755	0836	0920
Min. Fished	10	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Air Temp.	63.0	63.5	65.0	67.0	72.0	75.0	70.5	72.0	75.0	80.0	80.0	62.0	63.0	65.5	66.0	66.0
Water Temp.	68.5	68.5	68.5	68.5	68.5	68.5	71.0	71.0	71.0	71.0	71.0	72.0	72.0	72.0	72.0	72.0
Weather	6	6	6	6	1	1	6	1	1	1	1	3	3	3	3	3
At. Pressure	30.02	30.02	30.03	30.02	30.06	30.06	29.83	29.83	29.85	29.86	29.86	30.38	30.40	30.40	30.40	30.40
Small Gen. On	1	1	1	4	4	4	0	0	0	3	3	1	0	0	0	0
Large Gen. On	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unit 1	2	2	2	3	3	3	2	2	2	2	2	2	2	2	2	2
Unit 2	1	1	1	1	1	1	2	2	2	1	1	2	2	2	2	2
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	25.2	25.2	25.2	25.2	25.2	25.2	25.5	25.5	25.5	25.5	25.5	24.5	24.5	24.5	24.5	24.5
% Gate S.U.1	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
% Gate S.U.2	75	75	75	75	75	75	35	35	35	35	0	35	35	35	0	0
Vel. Hld. Chan.	999	2.0	2.0	2.0	2.0	2.0	1.5	1.5	1.5	1.5	1.5	1.3	999	999	999	1.2
Vel. Weir 1	999	7.7	7.7	7.7	7.7	7.7	6.7	6.7	6.7	6.7	3.8	4.2	999	999	999	7.7
Vel. Weir 2	999	7.5	7.5	7.5	7.5	7.5	6.7	6.7	6.7	6.7	3.8	3.8	999	999	999	7.5
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR																
Weir 1	4.2	4.2	4.2	4.2	4.2	4.2	2.4	2.4	2.4	2.4	2.9	5.7	999	999	999	1.2
Weir 2	4.2	4.2	4.2	4.2	4.2	4.2	2.4	2.4	2.4	2.4	2.9	5.7	999	999	999	1.2
Tailrace Elev.	14.0	14.0	14.0	999	15.9	15.9	13.0	13.0	13.0	13.0	999	13.9	999	999	999	12.5
Hld. Chan. Elev.	999	15.1	15.1	999	17.1	17.1	14.5	14.5	14.5	14.5	999	14.2	999	999	999	13.3
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	1	2	1	2	1	1	2	1	2	1	1	2	1	2	1

continued

Table 5. Continued.

Date	14 Jun						15 Jun					16 Jun			17 Jun			
Lift Number	2	3	4	5	6	7	6	7	8	9	10	4	5	6	5	6	7	8
Parameters *																		
Shad Taken	0	2	0	0	1	0	0	1	0	1	0	0	1	0	0	3	1	0
Total Fish	5664	8802	4960	3232	4401	1540	1210	517	6951	1411	2720	9164	4897	3870	1384	1127	497	3360
Rel. Loc.	-	2	-	-	2	-	-	2	-	-	-	-	2	-	-	2	2	-
Lift Time	0500	0545	0630	0715	0800	0845	0800	0845	0930	1015	1100	0625	0705	0755	0715	0800	0845	0930
Min. Fished	10	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Air Temp.	63.0	65.0	65.0	67.0	67.0	69.5	73.0	76.0	79.0	82.0	83.5	74.5	76.0	77.0	71.5	72.0	73.0	75.5
Water Temp.	73.0	73.0	73.0	73.0	73.0	73.0	74.5	74.5	74.5	74.5	74.5	75.0	75.0	75.0	76.0	76.0	76.0	76.0
Weather	3	3	3	3	3	3	3	3	3	3	3	2	2	2	3	3	3	3
At. Pressure	30.26	30.26	30.26	30.26	30.26	30.26	30.13	30.13	30.13	30.13	30.13	29.95	29.95	29.95	30.00	30.00	30.00	30.00
Small Gen. On	0	0	0	0	0	4	0	0	0	4	4	0	0	0	0	0	0	0
Large Gen. On	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
Unit 1	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2
Unit 2	2	2	2	2	2	1	2	2	2	1	1	2	2	2	2	2	2	2
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	19.6	19.6	19.6	19.6	19.6	19.6	19.1	19.1	19.1	19.1	19.1	17.8	17.8	17.8	18.2	18.2	18.2	18.2
% Gate S.U.1	35	35	35	35	35	35	0	0	0	0	0	0	0	0	0	0	0	0
% Gate S.U.2	0	0	0	0	0	0	35	35	75	75	75	35	35	35	35	35	35	75
Vel. Hld. Chan.	1.5	1.5	1.5	1.5	1.5	1.5	1.2	1.2	0.6	0.6	0.6	1.5	1.5	1.5	1.2	1.2	1.2	0.6
Vel. Weir 1	3.8	3.8	3.8	3.8	3.8	3.8	7.7	7.7	4.2	4.2	4.2	3.8	3.8	3.8	7.7	7.7	7.7	4.2
Vel. Weir 2	3.8	3.8	3.8	3.8	3.8	3.8	7.5	7.5	3.8	3.8	3.8	3.8	3.8	3.8	7.5	7.5	7.5	3.8
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR																		
Weir 1	2.9	2.9	2.9	2.9	2.9	2.9	1.2	1.2	5.7	5.7	5.7	2.9	2.9	2.9	1.2	1.2	1.2	5.7
Weir 2	2.9	2.9	2.9	2.9	2.9	2.9	1.2	1.2	5.7	5.7	5.7	2.9	2.9	2.9	1.2	1.2	1.2	5.7
Tailrace Elev.	12.2	12.2	12.2	12.2	12.2	15.7	13.3	13.3	13.3	999	17.0	11.9	11.9	11.9	12.0	12.0	12.0	12.0
Hld. Chan. Elev.	12.5	12.5	12.5	12.5	12.5	15.9	15.0	15.0	999	999	17.5	12.3	12.3	12.3	12.8	12.8	12.8	12.7
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	1	2	1	2	1	2	1	2	1	2	1	1	2	1	1	2	1	2

continued

Table 5. Continued.

Date	18 Jun					19 Jun				
Lift Number	4	5	6	7	8	1	2	3	4	5
Parameters *										
Shad Taken	0	1	0	1	0	0	1	0	1	0
Total Fish	860	831	395	951	364	892	531	1360	553	440
Rel. Loc.	-	2	-	-	-	-	-	-	2	-
Lift Time	0630	0715	0800	0845	0930	0455	0520	0603	0646	0729
Min. Fished	35	30	30	30	30	0	10	30	30	30
Air Temp.	71.0	73.0	75.0	77.0	78.0	70.0	71.0	72.0	74.0	73.0
Water Temp.	75.5	75.5	75.5	75.5	75.5	76.5	76.5	76.5	76.5	76.5
Weather	6	2	2	2	2	3	3	3	3	3
At. Pressure	30.20	30.20	30.20	30.20	30.20	30.11	30.11	30.12	30.12	30.12
Small Gen. On	0	0	0	0	0	0	0	0	0	0
Large Gen. On	0	0	0	0	0	0	0	0	0	0
Unit 1	2	2	2	2	2	2	2	2	2	2
Unit 2	2	2	2	2	2	2	2	2	2	2
Spill Gates Open	0	0	0	0	0	0	0	0	0	0
River Flow	18.5	18.5	18.5	18.5	18.5	19.0	19.0	19.0	19.0	19.0
% Gate S.U.1	0	0	0	35	35	35	35	35	35	35
% Gate S.U.2	35	35	35	35	35	0	75	75	75	75
Vel. Hld. Chan.	1.5	1.5	1.5	999	1.5	-	2.0	2.0	2.0	2.0
Vel. Weir 1	3.8	3.8	3.8	999	6.7	-	7.7	7.7	7.7	7.7
Vel. Weir 2	3.8	3.8	3.8	999	6.7	-	7.5	7.5	7.5	7.5
Weir Gates Open	3	3	3	3	3	3	3	3	3	3
Ft. Below TR										
Weir 1	2.9	2.9	2.9	2.4	2.4	-	4.2	4.2	4.2	4.2
Weir 2	2.9	2.9	2.9	2.4	2.4	-	4.2	4.2	4.2	4.2
Tailrace Elev.	12.0	11.9	11.9	11.9	11.9	12.0	12.0	12.0	12.0	12.0
Hld. Chan. Elev.	12.7	12.6	12.6	999	13.1	13.9	13.9	13.9	13.9	13.9
Crowder Position	1	1	1	1	1	-	1	1	1	1
Cr. Gate Position	1	2	1	2	1	-	1	2	1	2

* Explanation of abreviations and code numbers given on following page

TABLE 5. Continued.

*PARAMETER	ABBREVIATION	CODE
Date	Date	-
Lift Number	Lift Number	-
Number of shad in lift	Shad Taken	-
Total number of fish in lift	Total Fish	-
Location shad were released	Rel. Loc.	1. Above dam 2. Returned to tailrace
Time of Lift	Lift Time	EST
Fishing Time (minutes)	Min. Fished	-
Air Temperature	Air Temp.	^{o}F
Water Temperature	Water Temp.	^{o}F
Weather	Weather	1. Clear 2. Partly cloudy 31. Overcast 4. Light rain 5. Heavy rain 6. Fog
Barometric pressure	At. Pressure	inches
Number of small generators operating**	Small Gen. on	9. Varying
Number of large generators operating***	Large Gen. on	9. Varying
Generating status of Unit 1	Unit 1	1. On 2. Off 3. Reduced
Generating status of Unit 2	Unit 2	1. On 2. Off
Number of spill gates open	Spill gates open	-
Natural river flow	River Flow	cfs x 1000
Gate opening (%) of station service Unit 1	% Gate S.U.1	-
Gate opening (%) of station service Unit 2	% Gate S.U.2	-
Water Velocity in holding Channel (ft/sec)	Vel. Hld. Chan.	999. Varying
Attraction velocity at Entrance #1 (ft/sec)	Vel. Weir 1	999. Varying
Attraction velocity at Entrance #2 (ft/sec)	Vel. Weir 2	999. Varying
Number of weir gates open	Weir gates open	1. #1, 2. #2, 3. Both
Setting of each weir gate	Ft. Below TR	-
Setting of Weir #1	Weir 1	999. Varying
Setting of Weir #2	Weir 2	999. Varying
Tailrace Elevation	Tailrace Elev.	999. Varying
Holding Channel Elevation	Hld. Chan. Elev.	999. Varying
Crowder Fishing Position	Crowder Position	1. Full, 2. Reduced
Crowder Gate Position	Cr. Gate Position	1. Full Open, 2. Intermediate Open

** 5,000 cfs unit
*** 10,000 cfs unit

Table 6. Number of American shad, Alosa sapidissima, taken in the Conowingo Dam Fish Collection Facility under various conditions of generation of the Conowingo Hydro-electric Station, 1973-1976.

No. Units Operating		Status of	Status of	No. of Shad Caught					% of Catch				
Small**	Large***	Unit No. 1	Unit No. 2	1973	1974	1975	1976	Total	1973	1974	1975	1976	Total
0	0	OFF	OFF	12	43	4	31	90	15.6	33.6	4.8	34.1	23.7
1	0	OFF	ON	3	15	50	10	78	3.9	11.7	60.2	11.0	20.7
1	0	OFF	OFF	37	0	0	0	37	48.0	-	-	-	9.8
1	0	ON	OFF	1	0	0	0	1	1.3	-	-	-	0.3
2	0	OFF	ON	0	1	4	4	9	-	0.8	4.8	4.4	2.4
3	0	OFF	ON	5	10	5	7	27	6.5	7.8	6.0	7.7	7.2
3	0	OFF	OFF	1	0	0	0	1	1.3	-	-	-	0.3
3	1	OFF	ON	0	0	6	0	6	-	-	7.2	-	1.6
4	0	OFF	ON	0	8	0	0	8	-	6.3	-	-	2.1
4	0	Reduced	ON	0	0	0	8	8	-	-	-	8.8	2.1
4	1	OFF	ON	0	12	4	4	20	-	9.4	4.8	4.4	5.3
4	1	Reduced	ON	0	0	0	5	5	-	-	-	5.5	1.3
4	1	ON	ON	0	1	0	0	1	-	0.8	-	-	0.3
4	2	OFF	OFF	1	0	0	0	1	1.3	-	-	-	0.3
4	2	OFF	ON	0	12	6	3	21	-	9.4	7.2	3.3	5.6
4	2	ON	ON	0	1	0	0	1	-	0.8	-	-	0.3
4	2	Reduced	ON	0	0	0	1	1	-	-	-	1.1	0.3
4	3	OFF	ON	2	0	0	3	5	2.6	-	-	3.3	1.3
4	3	Reduced	ON	0	0	0	1	1	-	-	-	1.1	0.3
4	4	OFF	ON	0	6	0	2	8	-	4.7	-	2.2	2.1
4	4	ON	ON	2	0	0	4	6	2.6	-	-	4.4	1.6
5	2	OFF	ON	0	3	0	0	3	-	2.3	-	-	0.8
5	3	OFF	ON	1	2	0	0	3	1.3	1.6	-	-	0.8
5	4	OFF	ON	1	4	0	0	5	1.3	3.1	-	-	1.3
6	1	OFF	ON	0	3	0	0	3	-	2.3	-	-	0.8
6	2	ON	ON	0	1	0	0	1	-	0.8	-	-	0.3
6	4	OFF	ON	0	5	1	1	7	-	3.9	1.2	1.1	1.8
7	4	ON	ON	8	1	3	3	15	10.4	0.8	3.6	3.3	4.0
7	4	Reduced	ON	0	0	0	4	4	-	-	-	4.4	1.1
Changing		Changing		3	0	0	0	3	3.9	-	-	-	0.8
Total				77	128	83*	91	379					

* Does not include 1 dead shad taken on 7 June 1975
** 5,000 cfs unit
*** 10,000 cfs unit

Table 7. Comparison of numbers of eight selected species taken in the Conowingo Dam Fish Collection Facility at intermediate and full positions of the crowder gates, 5 April-30 June 1976.

Date	5 Apr		9 Apr		12 Apr		15 Apr		19 Apr		20 Apr		21 Apr		22 Apr.	
No. Lifts*	1	2	4	3	4	3	1	1	4	4	2	2	4	4	5	6
Fishing Time (hr)	1.0	1.0	2.0	1.5	2.2	1.5	0.5	0.5	2.3	2.0	0.3	0.3	0.5	0.5	0.7	1.2
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	-	-	-	-	-	-	-	-	-	-	550	125	4710	1545	4896	3258
Alewife	-	-	-	-	-	1	2	-	73	50	20	30	12	-	-	-
American shad	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-
Gizzard shad	1	1	288	144	152	51	5	11	1157	857	2200	880	3088	4596	9744	5958
Carp	-	-	-	-	-	-	-	-	-	-	-	-	8	12	-	-
Quillback	-	-	-	-	-	-	-	-	55	325	-	-	12	44	-	8
Channel catfish	2	17	-	-	-		-	-	-	-	-	-	-	10	-	52
White perch	-	-	-	-	-	-	-	-	4	30	3200	215	134	24	1674	2060
Total	3	18	288	144	152	52	7	11	1289	1262	5970	1250	7968	6231	16314	11336

Date	23 Apr		24 Apr		25 Apr		26 Apr		27 Apr		28 Apr		29 Apr		30 Apr	
No. Lifts*	6	7	7	6	6	5	6	7	6	5	6	5	5	5	6	6
Fishing Time (hr)	1.4	1.6	1.0	0.7	0.6	0.4	0.8	0.8	1.5	1.4	2.1	1.8	1.8	1.8	1.5	1.5
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	-	5	45	-	2407	4629	-	-	-	-	-	-	5	-	-	-
Alewife	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
American shad	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-
Gizzard shad	4896	15565	9000	4672	3495	3467	5170	3252	1600	782	3206	791	879	411	2347	1462
Carp	32	5	65	51	16	130	115	312	36	106	4	58	1	19	10	26
Quillback	32	-	560	430	-	-	-	-	4	48	-	-	-	-	-	-
Channel catfish	3364	814	259	437	24	29	220	257	44	46	81	83	78	42	24	26
White perch	5196	8560	1272	526	4630	2270	9152	6653	5055	766	999	919	226	88	591	1106
Total	13520	24949	11141	6116	10574	10526	14657	10474	6739	1748	4290	1851	1189	560	2972	2620

continued

INT - Intermediate gate setting (12 in. opening)
FULL - Full open gate setting

* The clean out lift and the first lift with the crowder gates open are not included

Table 7. Continued.

Date	1 May		2 May		3 May		4 May		5 May		6 May		7 May		8 May	
No. Lifts *	4	4	6	5	5	5	5	5	5	4	4	5	2	2	4	4
Fishing Time (hr)	2.0	2.3	1.9	1.9	2.2	2.3	2.1	2.3	2.2	2.3	2.0	2.5	1.0	0.8	1.7	1.3
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	-	-	-	-	-	1	1	-	-	1	-	1	5	4	4	-
Alewife	-	-	2	-	-	-	1	-	-	2	8	-	1	-	-	-
American shad	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gizzard shad	756	558	3195	1856	3710	1631	945	705	533	651	2264	1599	235	342	3828	601
Carp	5	23	8	10	-	24	6	4	6	2	4	9	-	12	1	13
Quillback	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Channel catfish	39	23	2	4	33	41	9	1	9	2	5	16	2	6	2	13
White perch	396	263	1398	404	1572	871	39	48	198	46	70	164	635	330	211	138
Total	1196	867	4605	2274	5315	2568	1001	758	746	704	2351	1789	878	694	4046	765

Date	9 May		10 May		11 May		12 May		13 May		14 May		15 May		16 May	
No. Lifts *	5	4	5	4	5	4	5	4	5	5	4	5	6	7	6	6
Fishing Time (hr)	2.3	2.0	2.3	2.0	2.3	2.1	2.3	2.0	2.0	2.3	2.0	2.3	1.6	1.5	2.2	1.8
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	44	24	37	4	4	4	-	-	-	-	26	5	-	4	-	-
Alewife	-	-	-	-	-	-	-	5	-	-	13	-	-	-	-	-
American shad	-	-	-	-	2	-	-	-	-	-	-	1	-	3	2	-
Gizzard shad	7464	3882	5268	6128	1694	2393	9272	3444	11704	9760	3647	3285	13705	17628	7344	7210
Carp	8	4	10	4	-	-	32	5	20	32	5	-	-	4	208	48
Quillback	-	-	-	-	4	-	-	-	-	44	-	-	-	-	-	160
Channel catfish	-	-	4	37	10	22	68	13	5	40	5	38	-	-	-	14
White perch	368	176	650	691	672	1239	10708	17148	884	180	1543	694	457	704	664	1138
Total	7884	4086	5969	6864	2386	3658	20080	20615	12613	10056	5239	4023	14162	18343	8218	8570

continued

INT - Intermediate gate setting (12 in. opening)
FULL - Full open gate setting

* The clean out lift and the first lift with the crowder gates open are not included

Table 7. Continued.

Date	17 May		18 May		19 May		20 May		21 May		22 May		23 May		24 May	
No. Lifts*	5	5	5	5	5	4	5	4	5	4	4	4	4	5	4	5
Fishing Time (hr)	2.3	2.5	2.3	2.2	2.7	1.7	2.8	2.0	2.3	2.0	2.0	2.0	2.0	2.7	2.0	2.8
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	16	36	8	4	-	-	356	64	5	24	8	2	-	7	-	-
Alewife	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	1
American shad	1	-	4	4	-	-	-	-	-	1	-	-	1	1	-	-
Gizzard shad	6094	1975	2880	2836	8907	2252	3454	716	1976	1594	754	996	3370	1050	204	435
Carp	44	20	109	327	33	36	8	7	458	48	1	32	-	28	3	13
Quillback	-	5	22	489	14	97	57	78	601	744	22	225	32	170	9	375
Channel catfish	318	91	109	88	1107	508	25	29	46	112	21	18	26	33	29	60
White perch	730	341	124	242	132	105	2544	25	216	403	255	60	1201	276	142	1056
Total	7203	2468	3256	3990	10193	2998	6444	919	3303	2926	1061	1333	4630	1565	388	1940

Date	25 May		26 May		27 May		28 May		29 May		30 May		31 May		1 Jun	
No. Lifts*	5	5	5	4	5	5	5	5	5	5	4	5	3	4	4	5
Fishing Time (hr)	2.3	2.5	2.7	1.8	2.3	2.3	2.5	2.3	2.3	2.3	2.0	2.7	1.5	2.0	2.0	2.7
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	-	-	12	6	5	-	96	89	1	6	3	9	-	5	20	10
Alewife	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-
American shad	1	-	-	-	-	1	2	1	-	2	-	1	-	-	2	2
Gizzard shad	533	514	844	586	1003	1413	813	680	1425	984	1638	606	499	749	1093	971
Carp	25	349	304	16	9	36	5	10	-	9	-	1	5	-	32	316
Quillback	-	337	147	192	-	196	6	57	-	17	-	56	-	-	20	1172
Channel catfish	68	137	45	83	81	99	59	33	47	79	10	94	57	113	86	93
White perch	280	425	549	102	896	590	220	377	1807	1275	2716	1154	1678	1582	669	1026
Total	907	1762	1901	986	1994	2335	1201	1247	3280	2372	4367	1922	2239	2449	1922	3590

INT - Intermediate gate setting (12 in. opening)
FULL - Full open gate setting
* The clean out lift and the first lift with the crowder gates open are not included

Table 7. Continued.

Date	2 Jun		3 Jun		4 Jun		5 Jun		6 Jun		7 Jun		8 Jun		9 Jun	
No. Lifts *	4	5	4	5	5	4	5	4	5	4	5	4	5	4	4	4
Fishing Time (hr)	2.0	2.2	2.0	2.7	2.8	2.0	2.8	2.0	2.8	2.0	2.7	2.0	2.7	2.0	2.0	1.9
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	-	-	50	12	8	7	21	41	-	37	11	30	30	2	565	312
Alewife	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
American shad	-	-	-	-	1	1	-	2	1	-	-	-	2	3	3	1
Gizzard shad	701	702	323	383	553	768	1124	275	2962	1252	923	1002	2280	1255	1636	1640
Carp	48	78	4	19	5	4	4	-	5	-	38	360	90	178	-	-
Quillback	27	747	-	29	25	4	-	-	-	-	5	168	55	460	15	90
Channel catfish	3692	1242	170	336	1119	326	58	85	395	448	111	278	65	56	67	14
White perch	1505	1487	244	392	1304	525	1249	525	3784	1578	467	574	2005	1328	4774	1540
Total	5973	4256	791	1171	3015	1635	2456	928	7147	3315	1555	2412	4527	3282	7060	3597

Date	10 Jun		11 Jun		12 Jun		13 Jun		14 Jun		15 Jun		16 Jun		17 Jun	
No. Lifts *	4	5	4	5	5	4	5	4	5	4	5	5	5	4	4	5
Fishing Time (hr)	2.0	2.4	2.0	2.6	2.8	2.0	2.7	2.0	2.4	2.0	2.4	2.2	2.5	2.0	2.0	2.4
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	4	22	-	-	208	311	1462	18	2096	100	188	320	330	276	744	624
Alewife	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
American shad	2	2	-	-	6	6	5	-	2	1	2	-	1	-	3	1
Gizzard shad	1057	1192	502	435	4368	1914	1400	278	2776	3184	982	7090	1848	380	1584	892
Carp	64	128	411	165	16	5	36	-	140	784	45	10	88	130	96	16
Quillback	27	928	-	130	-	-	-	-	-	288	-	-	-	-	40	12
Channel catfish	99	62	219	463	64	85	42	25	352	32	175	462	82	48	44	132
White perch	1040	1404	504	796	1272	2249	11232	18803	5630	4688	4148	1497	1526	1236	1948	1696
Total	2293	3738	1636	1989	5934	4570	14172	19124	10996	9077	5540	9379	3875	2070	4459	3373

INT - Intermediate gate setting (12 in. opening)
FULL - Full open gate setting

* The clean out lift and the first lift with the crowder gates open are not included

Table 7. Continued.

Date	18 Jun		19 Jun		20 Jun		21 Jun		22 Jun		23 Jun		24 Jun		25 Jun	
No. Lifts*	5	4	5	4	5	4	5	4	5	4	5	4	4	4	4	4
Fishing Time (hr)	2.4	2.1	2.4	2.0	2.5	2.0	2.4	2.0	2.4	2.0	2.2	1.8	2.0	2.0	2.0	2.0
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	422	183	20	28	288	884	4	11	-	-	-	-	-	8	-	-
Alewife	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
American shad	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Gizzard shad	1267	488	408	184	360	226	112	325	261	376	1674	669	1719	1848	1972	600
Carp	46	20	16	4	10	-	23	12	25	29	825	274	256	381	208	140
Quillback	-	10	8	-	-	-	16	67	5	38	-	16	32	37	-	60
Channel catfish	191	73	200	160	46	32	107	122	1692	1674	5151	1812	2869	2908	2630	2695
White perch	174	169	64	129	364	568	42	55	213	93	-	-	-	8	-	-
Total	2102	943	716	506	1068	1710	304	592	2196	2210	7650	2771	4876	5190	4810	3495

Date	26 Jun		27 Jun		28 Jun		29 Jun		30 Jun		SEASON TOTALS			
No. Lifts *	4	4	5	4	4	3	3	3	4	3				
Fishing Time (hr)	2.0	2.2	2.5	2.0	2.0	1.5	1.5	1.5	2.0	1.5	155.2	Fish/ Hour		145.7
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	INT	FULL	FULL
Species														
Blueback herring	-	-	-	-	1	-	2	-	1	-	19719	127.0	89.9	13098
Alewife	-	-	-	-	-	-	-	-	-	-	134	0.9	0.6	91
American shad	-	-	-	-	-	-	-	-	-	-	51	0.3	0.2	36
Gizzard shad	577	400	460	250	99	220	83	54	48	51	192338	1239.3	1038.2	151263
Carp	-	-	1	3	3	10	1	1	4	4	4144	26.7	33.7	4916
Quillback	-	-	-	-	-	-	-	-	2	-	1794	11.6	57.3	8353
Channel catfish	548	350	402	314	631	232	114	77	198	94	27956	180.1	126.2	18390
White perch	-	-	-	-	11	2	4	5	22	5	110283	710.6	671.5	97842
Total	1125	750	863	567	745	464	204	137	275	154	356419	2296.5	2017.6	293991

INT - Intermediate gate setting (12 in. opening)
FULL - Full open gate setting

* The clean out lift and the first lift with the crowder gates open are not included

Table 8. Numbers of eight selected species taken in the Conowingo Dam Fish Collection Facility under various conditions of velocity and flow, 24 April-30 June 1976.

Date	24 Apr		25 Apr		26 Apr		27 Apr	28 Apr		29 Apr		30 Apr		1 May			2 May	
No. Lifts*	6	7	7	4	10	3	11	6	5	6	4	6	6	2	4	2	7	4
Fishing Time (hr)	0.7	1.1	0.7	0.3	1.4	0.2	2.9	1.4	2.5	1.7	2.0	1.5	1.5	1.0	2.0	1.2	1.9	1.9
Velocity + Volume	HV-XLF	HV-HF	LV-XLF	LV-LF	LV-HF	HV-XLF	HV-LF	HV-LF	LV-HF	LV-LF	HV-HF	HV-HF	LV-LF	HV-XLF	LV-HF	HV-LF	HV-LF	LV-XLF
Species																		
Blueback herring	45	-	1571	5465	-	-	-	-	-	5	-	-	-	-	-	-	-	-
Alewife	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
American shad	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gizzard shad	4584	9088	3666	3296	7462	960	2382	3017	980	808	482	3103	706	103	1154	57	2351	2700
Carp	-	116	146	-	355	72	142	30	32	2	18	24	12	8	11	9	2	16
Quillback	-	580	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-
Channel catfish	166	530	13	40	457	-	90	52	112	86	34	24	28	7	46	9	6	4
White perch	1150	648	4548	2352	12181	484	5822	1026	892	292	22	325	1372	5	466	188	236	1566
Total	5945	10962	9944	11156	20455	1516	8488	4125	2016	1193	556	3476	2118	123	1677	263	2597	4282

Date	3 May		4 May		5 May			6 May		7 May	8 May		9 May		10 May		11 May	
No. Lifts	6	4	5	5	1	4	4	5	4	4	5	3	5	4	5	4	6	3
Fishing Time (hr)	2.3	2.2	2.0	2.3	0.2	2.0	2.2	2.2	2.2	1.8	2.0	1.0	2.2	2.0	2.2	2.1	2.8	1.5
Velocity + Volume	LV-LF	HV-HF	HV-HF	LV-LF	HV-XLF	LV-HF	HV-LF	HV-LF	LV-HF	LV-LF	HV-HF	LV-LF	LV-XLF	HV-LF	HV-LF	LV-HF	LV-LF	HV-HF
Species																		
Blueback herring	1	-	-	1	-	1	-	1	-	9	4	-	16	52	32	9	4	4
Alewife	-	-	-	1	-	2	-	-	8	1	-	-	-	-	-	-	-	-
American shad	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Gizzard shad	1300	4041	1329	321	20	759	405	1503	2360	577	4412	17	2844	8502	9172	2224	3335	752
Carp	10	14	7	3	1	-	7	1	12	12	5	9	12	-	-	14	-	-
Quillback	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-
Channel catfish	3	71	6	4	1	12	-	5	16	8	11	4	-	-	36	5	22	10
White perch	1912	531	8	79	117	39	88	42	192	965	119	230	396	148	972	369	1895	16
Total	3226	4657	1350	409	139	813	500	1552	2588	1572	4551	260	3268	8702	10212	2621	5260	784

continued

HV - High Velocity
LV - Low Velocity
HF - High Flow
LF - Low Flow
XLF - Extra Low Flow

* The clean out lift and the first lift with the crowder gates open are not included

Table 8. Continued.

Date	12 May		13 May			14 May		15 May		16 May		17 May		18 May			19 May	
No. Lifts *	5	4	3	4	3	5	4	6	7	6	6	4	6	2	4	4	5	4
Fishing Time (hr)	2.2	2.0	1.2	1.5	1.5	2.2	2.1	2.2	0.7	1.8	2.2	1.8	3.0	0.7	2.0	1.8	2.1	2.3
Velocity + Volume	HV-HF	LV-LF	HV-XLF	LV-HF	HV-LF	HV-LF	LV-HF	LV-LF	HV-HF	HV-HF	LV-LF	LV-XLF	HV-XLF	HV-XLF	LV-HF	HV-LF	HV-LF	LV-HF
Species																		
Blueback herring	-	-	-	-	-	5	26	4	-	-	-	52	-	-	12	-	-	-
Alewife	-	5	-	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-
American shad	-	-	-	-	-	-	1	1	2	2	-	-	1	1	7	-	-	-
Gizzard shad	10152	2564	2408	14272	4784	3757	3175	5381	25952	7066	9184	2140	5929	498	3147	2071	8575	2584
Carp	-	37	-	-	52	-	5	4	-	-	256	24	40	-	36	400	17	52
Quillback	-	-	-	-	44	-	-	-	-	-	160	4	1	-	20	491	30	81
Channel catfish	12	69	5	32	8	2	41	-	-	6	8	92	317	25	115	57	87	1528
White perch	1076	26780	836	128	100	1650	587	1161	-	50	1752	488	383	93	128	143	144	93
Total	11240	29455	3249	14432	4988	5414	3848	6551	25954	7124	11360	2800	6871	617	3465	3164	8853	4338

Date	20 May		21 May		22 May		23 May		24 May		25 May		26 May		27 May		
No. Lifts	5	4	5	4	5	3	5	4	5	4	5	5	5	4	5	3	2
Fishing Time (hr)	2.5	2.3	2.5	1.8	2.5	1.5	2.5	2.2	2.5	2.3	2.5	2.2	2.5	2.1	2.5	1.5	0.7
Velocity + Volume	LV-LF	HV-LF	HV-XLF	LV-LF	LV-XLF	HV-LF	HV-XLF	LV-LF	LV-XLF	HV-LF	HV-XLF	LV-LF	LV-XLF	HV-LF	HV-XLF	LV-LF	HV-HF
Species																	
Blueback herring	420	-	13	16	10	-	2	5	-	-	-	-	14	4	5	-	-
Alewife	-	-	1	-	-	-	-	-	1	1	-	-	1	-	-	-	-
American shad	-	-	-	1	-	-	-	2	-	-	1	-	-	-	-	1	-
Gizzard shad	3818	352	429	3141	850	900	936	3484	391	248	157	890	169	1261	1022	1126	268
Carp	2	13	1	505	3	30	3	25	3	13	-	374	-	320	1	32	12
Quillback	-	135	-	1345	12	235	-	202	-	384	-	337	-	339	-	132	64
Channel catfish	28	26	52	106	29	10	22	37	74	15	69	136	59	69	94	68	18
White perch	2564	5	275	344	301	14	339	1138	1189	9	375	330	567	84	828	598	60
Total	6832	531	771	5458	1205	1189	1302	4893	1658	670	602	2067	810	2077	1950	1957	422

continued

HV - High Velocity
LV - Low Velocity
HF - High Flow
LF - Low Flow
XLF - Extra Low Flow

* The clean out lift and the first lift with the crowder gates open are not included

Table 8. Continued.

Date	28 May		29 May		30 May		31 May		1 Jun		2 Jun		3 Jun			4 Jun	
No. Lifts*	5	5	5	5	5	4	3	4	5	4	5	4	1	5	3	5	4
Fishing Time (hr)	2.3	2.5	2.3	2.3	2.5	2.2	1.5	2.0	2.5	2.2	2.2	2.2	0.5	2.5	1.7	2.5	2.2
Velocity + Volume	LV-LF	HV-HF	HV-HF	LV-LF	LV-XLF	HV-LF	HV-LF	LV-HF	LV-LF	HV-HF	HV-HF	LV-LF	HV-XLF	LV-HF	HV-LF	HV-LF	LV-HF
Species																	
Blueback herring	183	2	4	3	11	-	-	5	30	-	-	-	4	58	-	13	2
Alewife	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
American shad	2	1	2	-	1	-	-	-	3	1	-	-	-	-	-	2	1
Gizzard shad	875	618	1621	788	266	1978	558	690	1488	576	785	618	48	423	235	1008	313
Carp	3	12	-	9	1	-	-	5	-	348	80	46	-	12	11	2	7
Quillback	-	63	-	17	-	56	-	-	288	904	699	75	-	4	25	1	28
Channel catfish	9	83	61	65	44	60	18	152	51	128	676	4258	24	314	168	30	1415
White perch	528	69	143	2939	1243	2627	338	2922	1343	352	121	2871	168	373	95	947	882
Total	1600	848	1831	3821	1567	4721	914	3774	3203	2309	2361	7868	244	1184	534	2003	2647

Date	5 Jun		6 Jun		7 Jun			8 Jun		9 Jun		10 Jun		11 Jun		12 Jun	
No. Lifts	5	4	5	4	3	3	3	5	4	4	4	5	4	4	5	5	4
Fishing Time (hr)	2.5	2.3	2.5	2.3	1.5	1.5	1.7	2.5	2.2	2.0	1.9	2.5	1.9	2.0	2.6	2.5	2.2
Velocity + Volume	LV-LF	HV-HF	HV-HF	LV-LF	LV-XLF	LV-HF	HV-LF	HV-LF	LV-HF	LV-LF	HV-HF	HV-HF	LV-LF	HV-XLF	LV-HF	HV-LF	LV-XLF
Species																	
Blueback herring	61	1	5	32	41	-	-	27	5	843	34	26	-	-	-	370	149
Alewife	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
American shad	-	2	-	1	-	-	-	4	1	2	2	4	-	-	-	12	-
Gizzard shad	1307	92	1644	2570	214	972	739	1870	1665	1263	2013	1364	885	72	865	4434	1848
Carp	4	-	5	-	-	228	170	-	266	-	-	-	192	1	575	-	21
Quillback	-	-	-	-	-	32	141	220	295	-	105	484	471	-	130	-	-
Channel catfish	72	71	428	415	15	216	158	34	87	50	31	52	109	112	570	98	51
White perch	1753	21	20	5342	577	448	16	1567	1766	5920	394	604	1840	180	1120	1536	1985
Total	3197	187	2102	8360	847	1896	1224	3722	4085	8078	2579	2534	3497	365	3260	6450	4054

continued

HV - High Velocity
LV - Low Velocity
HF - High Flow
LF - Low Flow
XLF - Extra Low Flow

* The clean out lift and the first lift with the crowder gates open are not included

Table 8. Continued.

Date	13 Jun			14 Jun		15 Jun		16 Jun		17 Jun		18 Jun		19 Jun		20 Jun	
No. Lifts	1	3	5	6	3	5	4	4	5	5	4	4	5	5	4	5	4
Fishing Time (hr)	0.5	1.5	2.7	3.0	1.4	2.5	1.9	2.0	2.5	2.5	1.9	2.1	2.4	2.5	1.9	2.2	2.2
Velocity + Volume	LV-XLF	LV-LF	HV-XLF	LV-XLF	HV-LF	HV-XLF	LV-LF	LV-XLF	HV-LF	HV-XLF	LV-LF	LV-XLF	HV-LF	HV-HF	LV-XLF	LV-XLF	HV-LF
Species																	
Blueback herring	20	548	912	2196	-	8	490	594	12	116	1252	588	17	40	8	1143	29
Alewife	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
American shad	-	2	3	3	-	1	1	1	-	4	-	1	1	1	-	-	-
Gizzard shad	80	668	930	3732	2228	602	7360	320	1908	504	1972	510	1245	580	12	19	567
Carp	-	32	4	218	706	-	55	10	208	4	108	25	41	16	4	10	-
Quillback	-	-	-	192	96	-	-	-	-	20	32	10	-	8	-	-	-
Channel catfish	-	8	59	352	32	202	35	54	76	140	36	75	189	240	120	40	38
White perch	3080	22600	4355	10286	32	4475	1040	1800	962	1284	2360	320	23	8	185	758	174
Total	3180	23858	6263	16979	3094	5288	8981	2779	3166	2072	5760	1529	1516	893	329	1970	808

Date	21 Jun		22 Jun			23 Jun		24 Jun		25 Jun		26 Jun			27 Jun	
No. Lifts	4	5	4	1	4	5	4	4	4	4	4	1	4	3	5	4
Fishing Time (hr)	2.0	2.4	2.0	0.5	1.9	2.1	2.0	2.0	2.0	2.0	2.0	0.5	2.0	1.7	2.5	2.0
Velocity + Volume	HV-LF	LV-XLF	HV-XLF	LV-LF	LV-XLF	HV-HF	LV-HF	LV-HF	HV-HF	HV-HF	LV-LF	HV-XLF	LV-HF	HV-LF	HV-LF	LV-HF
Species																
Blueback herring	12	3	-	-	-	-	-	8	-	-	-	-	-	-	-	-
Alewife	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
American shad	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gizzard shad	423	14	277	50	310	2098	245	895	2672	1650	922	10	594	373	431	279
Carp	10	25	4	5	45	28	1071	5	632	200	148	-	-	-	-	4
Quillback	79	4	8	-	35	-	16	5	64	10	50	-	-	-	-	-
Channel catfish	59	170	196	620	2550	4426	2537	2977	2800	2780	2545	54	434	410	117	599
White perch	43	54	226	10	70	-	-	8	-	-	-	-	-	-	-	-
Total	626	270	711	685	3010	6552	3869	3898	6168	4640	3665	64	1028	783	548	882

continued

HV - High Velocity
LV - Low Velocity
HF - High Flow
LF - Low Flow
XLF - Extra Low Flow

* The clean out lift and the first lift with the crowder gates open are not included

Table 8. Continued.

Date	28 Jun			29 Jun		30 Jun			Total			Total	
No. Lifts	3	2	2	3	3	4	3						
Fishing Time (hr)	1.5	1.0	1.0	1.5	1.5	2.0	1.5	45.7	41.1	61.1	57.1	33.2	40.8
Velocity + Volume	LV-XLF	LV-LF	HV-HF	HV-XLF	LV-XLF	HV-XLF	LV-XLF	HV-HF	LV-HF	HV-LF	LV-LF	HV-XLF	LV-XLF
Species													
Blueback herring	1	-	-	2	-	-	1	120	126	574	9372	1107	6418
Alewife	-	-	-	-	-	-	-	-	23	3	7	1	3
American shad	-	-	-	-	-	-	-	19	9	19	19	11	6
Gizzard shad	148	156	15	128	9	92	7	82373	45058	67334	60870	19709	20249
Carp	11	2	-	1	1	4	4	1517	2690	2184	1887	144	579
Quillback	-	-	-	-	-	-	2	2981	611	2328	3113	29	259
Channel catfish	188	588	87	98	93	202	90	12585	11665	1959	9508	1845	4109
White perch	13	-	-	7	2	25	2	4587	22594	19033	92310	15805	29430
Total	361	746	102	236	105	323	106	104182	82776	93434	177086	38651	61053

HV - High Velocity
LV - Low Velocity
HF - High Flow
LF - Low Flow
XLF - Extra Low Flow

* The clean out lift and the first lift with the crowder gates open are not included

Table 9. Catch per hour for eight selected species taken in the Conowingo Dam Fish Collection Facility under various conditions of velocity and flow, 24 April-30 June 1976.

Blueback herring					Alewife					American shad					Gizzard shad				
	Flow					Flow					Flow					Flow			
Velocity	HF	LF	XLF	Total	Velocity	HF	LF	XLF	Total	Velocity	HF	LF	XLF	Total	Velocity	HF	LF	XLF	Total
HV	2.6	9.4	33.3	45.3	HV	-	0.05	0.03	0.08	HV	0.4	0.3	0.3	1.0	HV	1802.5	1102.0	593.6	3498.1
LV	3.1	164.1	157.3	324.5	LV	0.6	0.1	0.1	0.8	LV	0.2	0.3	0.1	0.6	LV	1096.3	1066.0	496.3	2658.6
Total	5.7	173.5	190.6	369.8	Total	0.6	0.15	0.13	0.88	Total	0.6	0.6	0.4	1.6	Total	2898.8	2168.0	1089.9	6156.7

Carp					Quillback					Channel catfish					White perch				
	Flow					Flow					Flow					Flow			
Velocity	HF	LF	XLF	Total	Velocity	HF	LF	XLF	Total	Velocity	HF	LF	XLF	Total	Velocity	HF	LF	XLF	Total
HV	33.2	35.7	4.3	73.2	HV	65.2	38.1	0.9	104.2	HV	275.4	32.1	55.6	363.1	HV	100.4	311.5	476.0	887.9
LV	65.4	33.0	14.2	112.6	LV	14.9	54.5	6.3	75.7	LV	283.8	166.5	100.7	551.0	LV	549.7	1616.6	721.3	2887.6
Total	98.6	68.7	18.5	185.8	Total	80.1	92.6	7.2	179.9	Total	559.2	198.6	156.3	914.1	Total	650.1	1928.1	1197.3	3775.5

HV - High Velocity
LV - Low Velocity
HF - High Flow
LF - Low Flow
XLF - Extra Low Flow

Table 10. Time of day American shad, Alosa sapidissima, were taken in the Conowingo Dam Fish Collection Facility, 21 April- 19 June 1976.

Date	21 Apr	22 Apr	25 Apr	27 Apr	11 May	14 May	15 May	16 May	17 May	18 May	21 May	23 May	25 May	27 May	28 May	29 May	30 May	1 Jun
Water Temp. (F)	59.0	62.0	68.0	67.0	61.0	62.0	63.0	64.0	64.0	66.0	66.0	65.5	65.0	63.5	65.0	65.5	65.5	65.0
Time (EST)																		
0400-0459	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
0500-0559	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
0600-0659	-	-	-	1	-	-	-	1	-	4	-	-	-	-	2	-	-	1
0700-0759	4	-	2	-	-	-	1	1	-	3	-	-	1	-	-	2	-	1
0800-0859	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-
0900-0959	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-
1000-1059	-	-	-	-	2	1	-	-	-	-	1	-	-	1	-	-	-	1
1100-1159	-	-	-	-	-	-	1	-	1	-	-	1	-	-	1	-	-	-
Total	4	1	3	1	2	1	3	3	1	8	1	2	1	1	3	2	1	4

Date	4 Jun	5 Jun	6 Jun	8 Jun	9 Jun	10 Jun	12 Jun	13 Jun	14 Jun	15 Jun	16 Jun	17 Jun	18 Jun	19 Jun	Total	%
Water Temp. (F)	66.0	67.0	67.5	68.0	68.0	68.5	71.0	72.0	73.0	74.5	75.0	76.0	75.5	76.5		
Time (EST)																
0400-0459	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1.1
0500-0559	-	-	-	-	-	1	-	-	2	-	-	-	-	1	7	7.7
0600-0659	1	-	-	1	-	-	-	-	-	-	-	-	-	1	12	13.2
0700-0759	-	-	-	3	2	1	8	2	-	-	1	-	1	-	33	36.3
0800-0859	1	-	-	-	-	2	4	3	1	1	-	4	1	-	19	20.9
0900-0959	-	1	1	-	-	-	-	-	-	-	-	-	-	-	4	4.4
1000-1059	-	1	-	1	1	-	-	-	-	1	-	-	-	-	10	11.0
1100-1159	-	-	-	-	1	-	-	-	-	-	-	-	-	-	5	5.5
Total	2	2	1	5	4	4	12	5	3	2	1	4	2	2	91	

Table 11. Comparison of the numbers of American shad, Alosa sapidissima, taken in the Conowingo Dam Fish Collection Facility with water temperature, 1972-1976.

Temperature	1972		1973		1974		1975		1976		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
56	0	-	0	-	6	4.7	0	-	0	-	6	0.9
58	0	-	2	2.6	3	2.3	-	-	0	-	5	0.7
59	2	0.7	0	-	0	-	0	-	4	4.4	6	0.9
60	2	0.7	1	1.3	0	-	0	-	0	-	3	0.4
61	0	-	0	-	3	2.3	0	-	2	2.2	5	0.7
62	2	0.7	3	3.9	0	-	0	-	2	2.2	7	1.0
63	0	-	1	1.3	0	-	0	-	3	3.3	4	0.6
64	1	0.3	3	3.9	0	-	0	-	5	5.5	9	1.3
65	0	-	1	1.3	0	-	0	-	8	8.8	9	1.3
66	0	-	0	-	1	0.8	0	-	16	17.6	17	2.5
67	4	1.4	4	5.2	0	-	1	1.2	3	3.3	12	1.8
68	17	5.8	0	-	1	0.8	0	-	17	18.7	35	5.2
69	24	8.2	10	13.0	2	1.6	2	2.3	0	-	38	5.6
70	116	39.6	17	22.1	88	68.8	7	8.3	0	-	228	33.9
71	57	19.5	0	-	17	13.3	0	-	12	13.2	86	12.8
72	3	1.0	0	-	0	-	6	7.1	5	5.5	14	2.1
73	0	-	7	9.1	0	-	2	2.3	3	3.3	12	1.8
74	65	27.2	1	1.3	2	1.6	47	56.0	2	2.2	117	17.4
75	0	-	22	28.6	0	-	16	19.0	1	1.1	39	5.8
76	0	-	0	-	4	3.1	3	3.5	8	8.8	15	2.2
77	0	-	1	1.3	1	0.8	0	-	0	-	2	0.3
79	0	-	4	5.2	0	-	0	-	0	-	4	0.6
Total	293		77		128		84		91		673	

Table 12. Age composition of adult American shad, Alosa sapidissima, taken in the Conowingo Dam Fish Collection Facility and by shore anglers, 1972-1976.

Age Group	Collection Facility Males	Collection Facility Females	Anglers Males	Anglers Females	Total	%
		1972				
III	10	-	-	-	10	10.1
IV	37	19	-	-	56	56.6
V	8	21	-	-	29	29.3
VI	-	4	-	-	4	4.0
		1973				
IV	2	1	-	-	3	50.0
V	-	1	-	-	1	16.7
VI	-	1	-	-	1	16.7
VII	-	1	-	-	1	16.7
		1974				
III	2	-	6	3	11	24.4
IV	2	3	7	12	24	53.3
V	1	1	-	8	10	22.2
		1975				
III	-	1	7	4	12	23.5
IV	2	4	13	11	30	58.8
V	-	1	2	6	9	17.6
		1976				
III	1	-	6	-	7	14.6
IV	5	8	3	14	30	62.5
V	2	4	1	2	9	18.8
VI	-	-	1	-	1	2.1
VII	-	1	-	-	1	2.1
Total	72	71	46	60	249	

Table 13. Daily numbers of alewife, Alosa pseudoharengus, blueback herring, Alosa aestivalis, and American eels, Anguilla rostrata, transported from the Conowingo Dam Fish Collection Facility to Conowingo Pond, 19 April - 30 June 1976.

Date	Alewife	Blueback herring	American eel
April 19	66	0	0
20	24	2362	0
21	0	2422	0
22	0	805	0
25	0	1033	0
June 25	0	0	265
26	0	0	805
27	0	0	395
28	0	0	367
29	0	0	308
30	0	0	244
Total	90	6622	2384

Total Fish = 9096

Table 14. Numbers of fishes taken in the Conowingo Dam Fish Collection Facility, 8 and 26 July 1976.

Dates	8 Jul	26 Jul	Totals
No. Lifts	9	9	18
Fishing Time (hr)	3.2	3.5	6.7
Water Temperature(F)	78.0	78.5	
Species			
Freshwater eels			
American eel	405	237	642
Herrings			
Blueback herring	115	4	119
Gizzard shad	4875	4481	9356
Minnows and carps			
Carp	260	818	1078
Golden shiner	72	264	336
Spotfin shiner	25	62	87
Suckers			
Quillback	30	41	71
Freshwater catfishes			
White catfish	-	4	4
Brown bullhead	15	-	15
Channel catfish	1785	904	2689
Temperate basses			
White perch	920	1228	2148
Striped bass	1	6*	7
Sunfishes			
Redbreast sunfish	32	94	126
Pumpkinseed	25	57	82
Bluegill	85	194	279
Smallmouth bass	8	9	17
White crappie	115	457	572
Perches			
Yellow perch	95	48	143
Walleye	17	21	38
Totals	8880	8929	17809

* 3 Observed

$N = \frac{(251+1)(38604+1)}{251+1}$ → # caught 6/11 – 30/76.

N = 486,423 Gizzard shad

Table 15. Fishes tagged at the Conowingo Dam Fish Collection Facility on 10 June and recaptured from 11-30 June 1976.

Species	No. Fish in 7 lifts	No. Fish Tagged	% Tagged	No. Fish Recaptured 11-30 June
Blueback herring	26	11	42	0
Gizzard shad	1904 (2249 = # in 345 seen)	251	13	19
Brown trout	10	3	33	0
Carp	132	5	4	0
Quillback	940	66	6	0
White sucker	8	2	25	0
Channel catfish	114	7	6	1
White perch	2052	10	0.5	0
Redbreast sunfish	34	2	6	1
Green sunfish	5	1	20	0
Smallmouth bass	32	1	3	0
Walleye	96	14	15	0
Total	5353	373	7	21

est. pop. 486,423

Table 16. Hourly catch of American shad, Alosa sapidissima, by anglers fishing from shore just downstream from the Conowingo Dam Fish Collection Facility, 21 April-25 May 1976.

Date	21 Apr	23 Apr	24 Apr	25 Apr	26 Apr	29 Apr	30 Apr	1 May	9 May	10 May	11 May	12 May	14 May	15 May	16 May	17 May	18 May	19 May	20 May	21 May	22 May	23 May	25 May	
Water Temp. (F)	59.0	64.5	68.0	68.0	68.0	62.0	61.5	60.0	60.0	60.0	61.0	61.5	62.0	63.0	64.0	64.0	66.0	66.5	65.0	66.0	66.0	65.5	65.0	Total
Time (EST)																								
0400-0459	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0500-0559	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	2	3	1	-	-	-	9
0600-0659	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	4	-	1	5	1	1	-	15
0700-0759	-	-	6	4	1	-	-	1	-	-	-	-	2	1	4	-	1	-	2	1	1	-	-	24
0800-0859	-	-	2	15	1	1	1	-	-	-	1	-	-	1	3	3	8	-	1	2	-	-	1	40
0900-0959	-	5	-	17	1	-	-	3	-	-	-	-	4	2	1	1	7	-	-	-	-	-	-	41
1000-1059	-	-	-	4	-	-	-	-	1	-	-	1	2	-	2	-	6	-	2	-	-	-	-	18
1100-1159	4	2	-	-	-	-	-	-	-	1	-	-	1	-	3	1	4	-	-	1	-	-	-	17
Total	4	7	8	40	6	1	1	4	1	1	1	1	9	5	15	5	30	2	9	10	2	1	1	164

Table 17. Status of generation of Conowingo Hydro-electric Station in relation to shore angler catch of American shad, Alosa sapidissima for 1973-1976. No angler survey in 1972.

No. Units Operating		Status of	Status of	No. of Shad Caught					% of Catch				
Small*	Large**	Unit No. 1	Unit No. 2	1973	1974	1975	1976	Total	1973	1974	1975	1976	Total
1	0	OFF	ON	10	14	22	51	97	7.0	27.5	53.7	31.1	24.4
2	0	OFF	ON	0	2	3	3	8	-	3.9	7.3	1.8	2.0
3	0	OFF	ON	0	2	2	8	12	-	3.9	4.9	4.9	3.0
4	0	OFF	ON	0	5	1	1	7	-	9.8	2.4	0.6	1.8
4	0	Reduced	ON	0	0	0	14	14	-	-	-	8.5	3.5
4	0	ON	ON	0	0	0	2	2	-	-	-	1.2	0.5
4	1	OFF	ON	1	0	0	7	8	0.7	-	-	4.3	2.0
4	1	Reduced	ON	0	0	0	1	1	-	-	-	0.6	0.2
4	2	OFF	ON	2	0	0	1	3	1.4	-	-	0.6	0.8
4	2	ON	ON	0	0	0	3	3	-	-	-	1.8	0.8
4	2	ON	OFF	0	0	0	4	4	-	-	-	2.4	1.0
3	3	ON	ON	1	0	0	0	1	0.7	-	-	-	0.2
4	3	OFF	ON	1	1	0	6	8	0.7	2.0	-	3.6	2.0
4	3	ON	ON	0	0	0	7	7	-	-	-	4.3	1.8
4	4	OFF	ON	0	9	0	2	11	-	17.6	-	1.2	2.8
4	4	ON	ON	1	0	0	10	11	0.7	-	-	6.1	2.8
5	4	OFF	ON	1	6	2	0	9	0.7	11.8	4.9	-	2.3
5	4	ON	ON	1	0	0	2	3	0.7	-	-	1.2	0.8
5	3	Reduced	ON	0	0	0	6	6	-	-	-	3.6	1.5
5	1	Reduced	ON	0	0	0	1	1	-	-	-	0.6	0.2
6	4	OFF	ON	1	3	3	6	13	0.7	5.9	7.3	3.6	3.3
6	4	ON	ON	0	0	0	16	16	-	-	-	9.8	4.0
7	3	ON	ON	2	0	0	0	2	1.4	-	-	-	0.5
7	4	ON	ON	92	9	8	4	113	64.8	17.6	19.5	2.4	28.4
7	4	Reduced	ON	0	0	0	9	9	-	-	-	5.5	2.3
Changing			Changing	5	0	0	0	5	3.5	-	-	-	1.2
Undetermined				24	0	0	0	24	16.9	-	-	-	6.0
Total				142	51	41	164	398					

* 5,000 cfs unit
** 10,000 cfs unit

Table 18. The distribution of boats on the east side and west side of the Conowingo Dam tailrace under various conditions of generation of Conowingo Hydro-electric Station, 1973-1976.

No. Units Operating		No. Boat Hrs East Side					No. Boat Hrs West Side					% East Side					% West Side				
Small*	Large**	1973	1974	1975	1976	Total	1973	1974	1975	1976	Total	1973	1974	1975	1976	Total	1973	1974	1975	1976	Total
0	0	0	26	0	10	36	0	37	0	10	47	-	41.3	-	50.0	43.4	-	58.7	-	50.0	56.6
1	0	21	29	26	30	106	15	64	31	140	250	58.3	31.2	45.6	17.6	29.8	41.7	68.8	54.4	82.4	70.2
2	0	6	7	12	4	29	16	8	9	25	58	27.3	46.7	57.1	13.8	33.3	72.7	53.3	42.9	86.2	66.7
3	0	6	24	11	2	43	14	24	2	14	54	30.0	50.0	84.6	12.5	44.3	70.0	50.0	15.4	87.5	55.7
4	0	22	75	0	46	143	32	63	0	88	183	40.7	54.3	-	34.3	43.9	59.3	45.7	-	65.7	56.1
5	0	0	0	0	3	3	6	0	0	2	8	-	-	-	60.0	27.3	100.0	-	-	40.0	72.7
0	1	3	0	0	0	3	0	0	0	0	0	100.0	-	-	-	100.0	-	-	-	-	-
3	1	3	0	0	1	4	2	0	0	2	4	60.0	-	-	33.3	50.0	40.0	-	-	66.7	50.0
4	1	39	97	33	28	197	38	23	4	38	103	50.6	80.8	89.2	42.4	65.7	49.4	19.2	10.8	57.6	34.3
5	1	0	2	0	5	7	0	0	0	2	2	-	100.0	-	71.4	77.8	-	-	-	28.6	22.2
3	2	1	25	3	0	29	1	6	0	0	7	50.0	80.6	100.0	-	80.6	50.0	19.4	-	-	19.4
4	2	35	59	39	61	194	33	9	3	9	54	51.5	86.8	92.9	87.1	78.2	48.5	13.2	7.1	12.8	21.8
5	2	4	5	9	0	18	1	0	0	0	1	80.0	100.0	100.0	-	94.7	20.0	-	-	-	5.3
6	2	2	3	0	0	5	0	0	0	0	0	100.0	100.0	-	-	100.0	-	-	-	-	-
3	3	2	0	0	0	2	0	0	0	0	0	100.0	-	-	-	100.0	-	-	-	-	-
4	3	31	70	32	54	187	8	18	9	8	43	79.5	79.5	88.4	87.1	81.3	20.5	21.5	21.6	12.9	18.7
5	3	30	25	7	11	73	4	4	0	1	9	88.2	86.2	100.0	91.7	89.0	11.8	13.8	-	8.3	11.0
6	3	1	0	0	2	3	0	0	0	1	1	100.0	-	-	66.7	75.0	-	-	-	33.3	25.0
7	3	7	0	37	10	54	1	0	6	0	7	87.5	-	86.0	100.0	88.5	12.5	-	14.0	-	11.5
3	4	9	0	0	0	9	4	0	0	0	4	69.2	-	-	-	69.2	30.8	-	-	-	30.8
4	4	38	34	18	49	139	5	6	2	3	16	88.4	85.0	90.0	94.2	89.7	11.6	15.0	10.0	5.8	10.3
5	4	25	55	8	12	100	4	2	0	1	7	86.2	96.5	100.0	92.3	93.4	13.8	3.5	-	7.7	6.5
6	4	22	8	27	36	93	1	2	4	0	7	95.7	80.0	87.1	100.0	93.0	4.3	20.0	12.9	-	7.0
7	4	804	219	340	193	1556	129	43	55	23	250	86.2	83.6	86.1	89.4	86.2	13.8	16.4	13.9	10.6	13.8
Changing		40	0	0	0	40	3	0	0	0	3	93.0	-	-	-	93.0	7.0	-	-	-	7.0
Total		1151	763	602	557	3073	317	309	125	367	1118	78.4	72.5	82.8	60.3	73.3	21.6	27.5	17.2	39.7	26.7

* 5,000 cfs unit
** 10,000 cfs unit

Table 19. Numbers of fishes taken in the Conowingo Dam Fish Collection Facility, 1972-1976.

Year	1972			1973			1974			1975			1976			1972-1976		
Total No. Lifts	934			1645			929			514			839			4861		
Total Fishing Time (hr)	363.1			662.6			289.1			199.4			313.9			1828.1		
Species	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr
Lampreys																		
Sea lamprey	1	*	**	2	*	**	0	-	-	2	*	1	29	*	9	34	*	2
Freshwater eels																		
American eel	932	0.27	257	2248	0.16	339	126543	7.47	43771	64375	7.04	32284	187035	13.21	59584	381133	6.58	20849
Herrings																		
Blueback herring	76867	22.21	21170	354388	24.91	53484	333986	19.71	115526	69932	7.64	35071	39503	2.79	12585	874676	15.10	47846
Hickory shad	369	0.11	102	738	0.05	111	219	0.01	76	20	*	10	0	-	-	1346	0.02	74
Alewife	12218	3.53	3365	143880	10.11	21714	17052	1.01	5898	4311	0.47	2162	235	0.02	75	177696	3.07	9720
American shad	293	0.08	81	77	*	12	128	0.01	44	84	0.01	42	91	0.01	29	673	0.01	37
Atlantic menhaden	0	-	-	0	-	-	113	0.01	39	0	-	-	577	0.04	184	690	0.01	38
Gizzard shad	37191	10.74	10243	60103	4.22	9071	122491	7.23	42370	139156	15.21	69787	405510	28.64	129184	764451	13.19	41817
Trouts																		
Lake herring	0	-	-	1	*	**	0	-	-	0	-	-	0	-	-	1	*	**
Rainbow trout	36	0.01	10	68	*	10	21	*	7	22	*	11	60	*	19	207	*	11
Brown trout	147	0.04	40	300	0.02	45	625	0.04	216	219	0.02	110	494	0.03	157	1785	0.03	98
Brook trout	1	*	**	3	*	**	4	*	1	1	*	**	0	-	-	9	*	**
Pikes																		
Chain pickerel	0	-	-	1	*	**	10	*	3	0	-	-	0	-	-	11	*	**
Northern pike	0	-	-	2	*	**	2	*	**	0	-	-	0	-	-	4	*	**
Muskellunge	19	*	5	105	0.01	16	9	*	3	7	*	4	14	*	4	154	*	8
Minnows and carp																		
Goldfish	0	-	-	27	*	4	2	*	**	9	*	5	8	*	3	46	*	3
Carp	5478	1.58	1509	19473	1.37	2939	36766	2.17	12717	15114	1.65	7580	9452	0.67	3011	86283	1.49	4720
Golden shiner	180	0.05	50	832	0.06	126	516	0.03	178	751	0.08	377	1868	0.13	595	4147	0.07	227
Comely shiner	8	*	2	255	0.02	38	3870	0.23	1339	2079	0.23	1043	841	0.06	268	7053	0.12	386
Spottail shiner	34	0.01	9	137	0.01	21	2331	0.14	806	408	0.04	205	1743	0.12	555	4653	0.08	255
Rosyface shiner	0	-	-	0	-	-	0	-	-	1	*	**	0	-	-	1	*	**
Spotfin shiner	113	0.03	31	40	*	6	3585	0.21	1240	1091	0.12	547	59856	4.23	19068	64685	1.12	3538
Longnose dace	0	-	-	0	-	-	1	*	**	0	-	-	0	-	-	1	*	**

continued

Table 19. Continued.

Year	1972			1973			1974			1975			1976			1972-1976		
Total No. Lifts	934			1645			929			514			839			4861		
Total Fishing Time (hr)	363.1			662.6			289.1			199.4			313.9			1828.1		
	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr
Species																		
Suckers																		
Quillback	6679	1.93	1839	28784	2.02	4344	15179	0.90	5250	8391	0.92	4208	10217	0.72	3255	69250	1.20	3788
White sucker	369	0.11	102	1033	0.07	156	284	0.02	98	149	0.02	75	457	0.03	146	2292	0.04	125
Creek chubsucker	3	*	**	3	*	**	1	*	**	0	-	-	0	-	-	7	*	**
Northern hog sucker	0	-	-	2	*	**	0	-	-	0	-	-	5	*	2	7	*	**
Shorthead redhorse	1083	0.31	298	4419	0.31	667	434	0.02	150	448	0.05	225	1275	0.09	406	7659	0.13	419
Freshwater catfishes																		
White catfish	3695	1.07	1018	7393	0.52	1116	2424	0.14	838	6176	0.68	3097	2062	0.14	657	21750	0.38	1190
Yellow bullhead	7	*	2	45	*	7	5	*	2	32	*	16	10	*	3	99	*	5
Brown bullhead	483	0.14	133	7443	0.52	1123	1885	0.11	652	740	0.08	371	580	0.04	185	11131	0.19	609
Channel catfish	123413	35.66	33989	79576	5.92	12010	101573	5.99	35134	74042	8.09	37132	91715	6.48	29218	470319	8.12	25727
Killifishes																		
Mummichog	0	-	-	0	-	-	0	-	-	0	-	-	1	*	**	1	*	**
Needles Fishes																		
Atlantic needlefish	1	*	**	0	-	-	0	-	-	1	*	**	0	-	-	2	*	**
Temperate basses																		
White perch	57221	16.53	15759	688172	48.36	103859	907896	53.58	314042	509599	55.70	255566	581768	41.08	185335	2744656	47.37	150137
Striped bass	4571	1.32	1259	3384	0.24	511	2005	0.12	694	174	0.02	87	51	*	16	10185	0.18	557
Sunfishes																		
Rock bass	73	0.02	20	61	*	9	52	*	18	46	*	23	130	0.01	41	362	0.01	20
Redbreast sunfish	805	0.23	222	3158	0.22	47	1742	0.10	603	3040	0.33	1525	5432	0.38	1730	14177	0.24	776
Green sunfish	4	*	1	11	*	2	6	*	2	39	*	20	133	0.01	42	193	*	11
Pumpkinseed	277	0.08	76	6870	0.48	1037	3175	0.19	1098	976	0.11	489	1319	0.09	420	12617	0.22	690
Bluegill	701	0.20	193	2104	0.15	318	1513	0.09	523	3082	0.34	1546	3337	0.24	1063	10737	0.18	587
Smallmouth bass	156	0.04	43	304	0.02	46	127	0.01	44	137	0.01	69	332	0.02	106	1056	0.02	58
Largemouth bass	49	0.01	13	82	0.01	12	25	*	9	35	*	18	33	*	11	224	*	12
White crappie	4515	1.30	1243	2363	0.17	357	5337	0.31	1846	9290	1.02	4659	3836	0.27	1222	25341	0.44	1386
Black crappie	8	*	2	43	*	6	42	*	15	45	*	23	90	0.01	29	228	*	12
Perches																		
Tessellated darter	0	-	-	1	*	**	4	*	1	1	*	**	0	-	-	6	*	**
Yellow perch	5979	1.73	1647	1132	0.08	171	731	0.04	253	494	0.05	248	3316	0.23	1056	11652	0.20	637
Walleye	2113	0.61	582	3799	0.27	573	1805	0.11	624	369	0.04	185	2694	0.19	858	10780	0.19	590
Total	346092		95316	1422862		214739	1694519		586136	914888		458820	1416109		451134	5794470		316967

* Less than .005%
** Less than 1

Table 20. Comparison of the number of American shad, Alosa sapidissima, taken in the Conowingo Dam Fish Collection Facility with time of day, 1972-1976.

Time of Day	1972		1973		1974		1975		1976		Total**	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0400-0459	0	-	6	7.8	0	-	2	2.4	1	1.1	9	1.5
0500-0559	10	3.4	25	32.5	11	8.6	11*	13.3	7	7.7	64	10.6
0600-0659	113	38.6	22	28.6	24	18.8	42	50.6	12	13.2	213	35.3
0700-0759	66	22.6	6	7.8	20	15.6	9	10.8	33	36.3	134	22.2
0800-0859	64	21.8	2	2.6	17	13.3	9	10.8	19	20.9	111	18.4
0900-0959	5	1.7		3.9	8	6.3	8	9.6	4	4.4	28	4.6
1000-1059	2	0.7	2	2.6	7	5.5	2	2.4	10	11.0	23	3.8
1100-1159	1	0.3	2	2.6	13	10.2			5	5.5	21	3.5
1200-1259	3	1.0	2	2.6	7	5.5						
1300-1359	7	2.4	1	1.3	6	4.7						
1400-1459	4	1.4	0	-	5	3.9						
1500-1559	0	-	2	2.6	2	1.6						
1600-1659	3	1.0	2	2.6	2	1.6						
1700-1759	9	3.1	2	2.6	4	3.1						
1800-1859	6	2.0	0	-	2	1.6						
Total	293		77		128		83		91		603	

* Does not include 1 American shad collected dead
** Includes data from 0400-1159 hours only

Table 21. Comparison of the number of American shad, Alosa sapidissima, taken by shore anglers just downstream from the Conowingo Dam Fish Collection Facility with time of day, 1973-1976. No angler survey conducted in 1972.

Time of Day	1973		1974		1975		1976		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
0400-0459	1	0.7	0	-	0	-	0	-	1	0.3
0500-0559	1	0.7	2	3.9	12	29.3	9	5.5	24	6.9
0600-0659	10	7.0	10	19.6	14	34.1	15	9.1	49	14.1
0700-0759	14	9.9	12	23.5	6	14.6	24	14.6	56	16.1
0800-0859	10	7.0	4	7.8	4	9.7	40	24.4	58	16.7
0900-0959	18	12.7	9	17.6	4	9.7	41	25.0	72	20.7
1000-1059	17	12.0	11	21.6	0	-	18	11.0	46	13.3
1100-1159	20	14.1	3	5.9	1	2.4	17	10.4	41	11.8
1200-1259*	11	7.8								
1300-1359	8	5.6								
1400-1459	11	7.8								
1500-1559	13	9.1								
1600-1659	3	2.1								
1700-1759	4	2.8								
1800-1859	1	0.7								
Total	142		51		41		164		347	

* Creel census was not conducted after 1200 hr since 1974. Total column does not include American shad taken after 11:59 hr in 1973.

Table 22. Comparison of the percentage of American shad, Alosa sapidissima, taken by shore anglers just downstream of the Conowingo Dam Fish Collection Facility with water temperature 1973-1976. No angler survey conducted in 1972.

Temperature	1973		1974		1975		1976		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
56	0	-	0	-	1	2.4	0	-	1	0.3
57	1	0.7	1	2.0	2	4.8	0	-	4	1.0
58	4	2.8	3	5.9	1	2.4	0	-	8	2.0
59	10	7.0	3	5.9	0	-	4	2.4	17	4.3
60	8	5.6	7	13.7	0	-	6	3.7	21	5.3
61	33	23.2	8	15.7	0	-	1	0.6	42	10.5
62	27	19.0	14	27.5	0	-	12	7.3	53	13.3
63	56	39.4	3	5.9	0	-	5	3.0	64	16.1
64	3	2.1	0	-	0	-	27	16.5	30	7.5
65	0	-	0	-	2	4.8	10	6.1	12	3.0
66	0	-	0	-	6	14.6	45	27.4	51	12.8
67	0	-	0	-	1	2.4	0	-	1	0.3
68	0	-	1	2.0	2	4.8	54	32.9	57	14.3
69	0	-	1	2.0	0	-	0	-	1	0.3
70	0	-	10	19.6	0	-	0	-	10	2.5
72	0	-	0	-	12	29.3	0	-	12	3.0
74	0	-	0	-	14	36.6	0	-	14	3.5
Total	142		51		41		164		398	

Table 23. Daily Angler effort (hours) and number of American shad, Alosa sapidissima, caught along the west shore of the Conowingo Dam tailrace, 1973-1976. No angler survey conducted in 1972.

Hours of Creel Census

Date	1973 0400-2000 Angler Hours	1973 No. Shad caught	1974 0400-1100 Angler Hours	1974 No. Shad caught	1975 0400-1100 Angler Hours	1975 No. Shad caught	1976 0400-1200 Angler Hours	1976 No. Shad caught
18 Apr	-	-	46	0	-	-	-	-
19 Apr	-	-	88	0	-	-	-	-
20 Apr	-	-	35	0	-	-	-	-
21 Apr	-	-	-	-	-	-	31	4
22 Apr	-	-	90	0	-	-	72	0
23 Apr	-	-	83	0	-	-	122	7
24 Apr	656	5 60	113	0	-	-	317	8
25 Apr	546	2 62	133	0	-	-	321	40
26 Apr	594	0 61	159	0	-	-	79	6
27 Apr	405	1 61	281	1	-	-	41	0
28 Apr	1090	3 62	281	1	-	-	62	0
29 Apr	982	0	195	2	-	-	120	1
30 Apr	358	0	130	3	-	-	84	1
1 May	387	0	157	0	-	-	175	4
2 May	585	0	267	8	62	0	227	0
3 May	371	0	154	1	220	2	43	0
4 May	363	1	320	5	63	1	64	0
5 May	-	-	303	5	109	0	66	0
6 May	1288	0	218	4	77	0	85	0
7 May	514	0	99	0	123	0	43	0
8 May	421	0	173	3	214	1	113	0
9 May	422	0 59°F	113	0	99	0	94	1
10 May	635	9 59°	79	0	152	0	54	1
11 May	666	30 61	244	3	249	0	63	1
12 May	1206	24	147	0	80	0	46	1
13 May	1090	32 63	64	0	53	0	35	0
14 May	608	18 63	64	0	88	0	70	9
15 May	542	6 63	105	3	121	0	145	5
16 May	450	0 60	67	0	69	2	137	15
17 May	258	2	51	0	248	6	50	5
18 May	223	1	200	0	310	1	106	30
19 May	654	0	240	0	78	0	54	2
20 May	458	0	63	0	97	1	83	9
21 May	229	3	46	1	66	1	76	10
22 May	279	0	85	1	65	0	130	2
23 May	189	0	66	0	37	0	153	1
24 May	114	0	94	0	184	12	44	0
25 May	110	1	259	6	71	0	32	1
26 May	402	0	267	0	120	11	18	0
27 May	183	1	236	1	45	0	20	0
28 May	328	0	67	0	48	0	30	0
29 May	79	0	31	2	49	0	84	0
30 May	94	0	35	0	75	0	92	0
31 May	160	0	24	0	193	3	78	0

continued

Table 23. Continued.

Hours of Creel Census

Date	1973 0400-2000 Angler Hours	1973 No. Shad caught	1974 0400-1100 Angler Hours	1974 No. Shad caught	1975 0400-1100 Angler Hours	1975 No. Shad caught	1976 0400-1200 Angler Hours	1976 No. Shad caught
1 Jun	139	0	167	0	57	0	3	0
2 Jun	418	3	80	0	43	0	2	0
3 Jun	426	0	40	0	30	0	19	0
4 Jun	81	0	60	1	56	0	9	0
5 Jun	155	0	28	0	29	0	54	0
6 Jun	87	0	17	0	24	0	33	0
7 Jun	119	0	31	0	170	0	1	0
8 Jun	217	0	138	0	118	0	15	0
9 Jun	321	0	158	0	11	0	5	0
10 Jun	328	0	14	0	32	0	4	0
11 Jun	86	0	22	0	45	0	11	0
12 Jun	-	-	19	0	5	0	16	0
13 Jun	-	-	28	0	31	0	4	0
14 Jun	110	0	45	0	-	-	1	0
15 Jun	69	0	121	0	-	-	19	0
16 Jun	-	-	138	0	-	-	9	0
17 Jun	-	-	17	0	-	-	4	0
18 Jun	-	-	28	0	-	-	4	0
19 Jun	-	-	11	0	-	-	2	0
20 Jun	-	-	16	0	-	-	6	0
21 Jun	-	-	44	0	-	-	9	0
22 Jun	-	-	92	0	-	-	9	0
23 Jun	-	-	82	0	-	-	10	0
24 Jun	-	-	3	0	-	-	3	0
25 Jun	-	-	23	0	-	-	11	0
26 Jun	-	-	11	0	-	-	2	0
27 Jun	-	-	17	0	-	-	0	0
28 Jun	-	-	14	0	-	-	0	0
29 Jun	-	-	45	0	-	-	0	0
30 Jun	-	-	196	0	-	-	0	0
Total	20495	142	7675	51	4096	41	4024	164
Average Per Day	409.9	2.8	105.1	0.7	95.3	0.95	56.7	2.3
Catch Per Angler Hour		.007		.007		.010		.041

Table 24. Susquehanna River flows (expressed as 24-hr average) and water temperatures at Conowingo Dam from 1 April-30 June 1972-1976. River flow data provided by Susquehanna Electric Company. River temperatures taken at Conowingo Dam Fish Collection Facility. Dash indicates collection facility not operated.

Date		1972		1973		1974		1975		1976	
		Temp (F)	Flow (1000 cfs)	Temp (F)	Flow (1000 cfs)	Temp (F)	Flow (1000 cfs)	Temp (F)	Flow (1000 cfs)	Temp (F)	Flow (1000 cfs)
Apr	1	-	54.1	48.0	44.8	-	89.9	-	61.6	-	64.0
	2	-	56.1	50.0	54.8	-	94.0	-	58.1	-	75.1
	3	-	57.7	50.0	64.4	-	97.0	-	53.7	-	84.0
	4	-	62.6	51.0	87.6	-	147.4	-	54.9	-	89.7
	5	-	65.6	50.0	133.6	-	200.2	-	63.7	50.0	80.9
	6	-	60.6	-	155.7	-	193.5	-	73.5	-	71.5
	7	-	57.6	-	163.0	-	164.8	-	74.1	50.0	61.5
	8	-	55.2	-	144.7	-	133.6	-	68.8	-	54.3
	9	-	53.6	-	131.4	-	114.9	-	58.9	51.0	48.7
	10	-	49.5	-	118.5	-	104.4	-	53.1	-	46.1
	11	-	47.5	-	120.6	-	93.1	-	48.7	-	37.5
	12	46.0	45.2	-	112.6	-	81.0	-	45.5	50.0	34.6
	13	-	45.8	-	99.8	-	83.7	-	43.9	-	32.6
	14	49.0	51.5	-	88.4	-	94.9	-	37.5	-	30.3
	15	-	68.3	-	77.7	-	101.4	-	37.6	51.0	29.5
	16	-	103.1	50.0	65.4	-	101.4	-	34.3	-	29.1
	17	52.0	145.8	50.0	58.6	-	112.4	-	32.1	-	26.1
	18	52.0	225.6	51.0	50.9	54.0	97.3	51.0	32.5	-	25.6
	19	-	213.7	52.0	49.7	55.0	80.2	-	31.3	53.0	22.9
	20	-	168.6	55.0	42.5	53.0	68.1	-	30.6	55.0	24.4
	21	55.0	139.1	57.0	41.1	-	59.9	54.0	30.8	59.0	34.9
	22	-	121.5	58.0	40.9	56.0	53.0	54.0	30.3	62.0	30.3
	23	-	116.8	59.0	37.1	57.0	48.6	55.0	30.8	64.5	25.9
	24	53.0	107.6	60.0	34.9	56.0	44.1	56.0	32.5	68.0	24.3
	25	-	97.5	62.0	35.8	56.0	41.7	57.0	38.1	68.0	23.8
	26	53.0	86.5	61.0	42.6	58.0	38.5	59.0	53.3	68.0	22.7
	27	53.0	75.6	61.0	41.1	58.0	37.7	57.0	60.6	67.0	23.6
	28	53.0	67.6	62.0	53.7	57.0	36.1	58.0	55.9	64.5	23.4
	29	55.0	59.7	60.0	60.8	58.0	31.8	58.0	49.1	62.0	32.0
	30	55.0	53.3	56.0	63.0	59.0	30.8	57.0	45.7	61.5	39.1
May	1	56.0	47.3	55.0	65.3	60.0	26.9	57.0	42.4	60.0	38.5
	2	57.0	42.4	56.0	62.1	61.0	26.7	58.0	39.6	59.0	38.5
	3	59.0	43.6	57.0	55.7	60.0	29.6	57.0	35.2	58.0	35.2
	4	59.0	52.3	58.0	51.0	62.0	32.1	56.0	47.4	57.0	32.9
	5	60.0	76.8	-	46.9	62.0	32.7	57.0	65.5	59.0	32.9
	6	59.0	101.4	58.0	46.8	62.0	31.0	58.0	79.9	59.0	32.6
	7	61.0	102.2	58.0	40.9	63.0	28.9	58.0	91.9	60.0	32.9
	8	61.0	88.1	58.0	37.6	61.0	28.8	58.0	94.4	62.5	28.7
	9	61.0	75.0	59.0	38.2	63.0	28.2	59.0	106.9	60.0	26.1
	10	-	86.8	59.0	38.1	61.0	28.0	61.0	92.3	60.0	24.6
	11	-	107.7	61.0	40.9	60.0	27.1	61.0	79.0	61.0	22.9
	12	-	139.3	-	55.0	60.0	33.6	60.0	63.9	61.5	23.6
	13	59.0	118.7	63.0	58.9	60.0	43.9	62.0	60.1	62.5	22.3

ued

Table 24. Continued.

Date		1972 Temp (F)	1972 Flow (1000 cfs)	1973 Temp (F)	1973 Flow (1000 cfs)	1974 Temp (F)	1974 Flow (1000 cfs)	1975 Temp (F)	1975 Flow (1000 cfs)	1976 Temp (F)	1976 Flow (1000 cfs)
May	14	58.0	97.0	63.0	64.2	59.0	63.6	63.0	58.7	62.0	20.4
	15	59.0	81.4	63.0	60.1	63.0	88.7	64.0	55.5	63.0	22.1
	16	60.0	74.2	60.0	54.7	64.0	86.6	65.0	64.9	64.0	26.6
	17	62.0	76.9	60.0	48.9	65.0	70.8	66.0	64.5	64.0	25.2
	18	63.0	74.9	60.0	50.1	65.0	57.8	67.0	66.1	66.0	26.6
	19	65.0	75.6	59.0	48.5	66.0	49.8	68.0	61.5	66.5	32.3
	20	64.0	72.5	59.0	52.3	67.0	43.2	68.0	55.6	65.0	40.1
	21	66.0	68.3	58.0	52.1	68.0	41.7	68.0	49.7	66.0	37.2
	22	66.0	64.5	57.0	59.0	70.0	37.9	69.0	44.5	66.0	42.5
	23	66.0	59.7	60.0	69.3	71.0	37.7	70.0	41.4	65.5	49.9
	24	67.0	54.4	59.0	75.8	70.0	32.4	72.0	38.5	65.0	48.8
	25	68.0	47.6	59.0	73.9	70.0	29.5	73.0	38.5	65.0	40.0
	26	67.0	44.2	58.0	68.8	70.0	27.8	74.0	36.3	65.0	39.3
	27	68.0	37.9	57.0	65.3	70.0	27.3	74.0	36.2	63.5	36.5
	28	68.0	34.6	56.0	72.3	70.0	25.7	75.0	32.5	65.0	34.1
	29	69.0	30.6	58.0	86.6	70.0	23.1	75.0	32.1	65.5	31.6
	30	70.0	27.2	59.0	78.9	71.0	22.2	75.0	28.8	65.5	34.8
	31	70.0	30.5	-	75.4	70.0	21.7	74.0	29.3	65.0	35.8
Jun	1	70.0	47.5	63.0	66.2	70.0	22.3	74.0	35.4	65.0	37.1
	2	70.0	53.2	64.0	57.0	70.0	23.6	75.0	28.2	65.5	41.4
	3	71.0	53.5	65.0	52.5	69.0	22.8	76.0	26.7	66.0	40.0
	4	71.0	52.4	66.0	45.5	69.0	24.8	75.0	25.4	66.0	38.0
	5	71.0	50.7	67.0	43.9	70.0	20.9	76.0	26.1	67.0	36.0
	6	70.0	43.3	69.0	42.5	70.0	19.4	76.0	34.4	67.5	34.9
	7	71.0	42.3	70.0	44.5	70.0	17.0	75.0	54.2	67.5	29.5
	8	70.0	41.8	70.0	53.8	70.0	16.7	74.0	92.6	68.0	26.4
	9	70.0	39.7	74.0	50.2	70.0	15.8	71.0	91.8	68.0	25.1
	10	72.0	33.4	75.0	45.8	71.0	11.4	68.0	67.9	68.5	25.2
	11	70.0	31.5	77.0	40.9	72.0	14.5	67.0	53.1	70.5	26.5
	12	70.0	28.7	-	34.8	72.0	13.1	68.0	50.2	71.0	25.5
	13	70.0	28.6	-	33.5	72.0	12.4	68.0	52.0	72.0	24.5
	14	70.0	29.2	79.0	29.3	73.0	12.8	-	52.8	73.0	19.6
	15	70.0	25.2	79.0	27.1	73.0	11.7	-	55.9	74.5	19.1
	16	71.0	27.3	79.0	29.1	73.0	13.4	-	49.6	75.0	17.8
	17	71.0	30.0	79.0	30.2	74.0	14.8	-	45.6	76.0	18.2
	18	71.0	36.2	77.0	28.0	74.0	22.3	-	45.3	75.5	18.5
	19	72.0	40.2	76.0	25.4	76.0	24.8	-	43.2	76.5	19.0
	20	74.0	44.0	75.0	23.8	76.0	28.8	-	37.6	78.0	21.0
	21	74.0	47.3	75.0	22.5	76.0	22.1	-	33.8	78.0	25.1
	22	-	409.0	75.0	25.1	76.0	19.5	-	30.8	79.0	54.0
	23	-	868.4	75.0	26.5	76.0	20.0	-	25.6	80.0	118.6
	24	-	969.4	73.0	29.4	77.0	19.3	-	24.4	79.5	92.4
	25	-	801.4	73.0	27.0	75.0	19.7	-	21.6	77.0	64.6
	26	-	559.3	73.0	25.0	75.0	18.8	-	21.8	75.0	51.1
	27	-	365.6	74.0	26.4	75.0	16.8	-	26.1	74.0	40.3
	28	-	235.6	75.0	24.4	74.0	20.3	-	38.8	76.0	35.5
	29	-	198.5	75.0	33.9	74.0	21.5	-	41.2	76.0	30.9
	30	-	100.8	77.0	37.9	74.0	23.2	-	36.0	75.0	29.0