SUMMARY OF THE OPERATION OF THE CONOWINGO DAM FISH COLLECTION FACILITY DURING THE SPRING OF 1975

by

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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, 1973 and 1974 (Robbins, 1972; Foote and Robbins, 1973; Buchanan and Robbins, 1974). Operation in 1975 was according to procedures outlined by Robbins, Kotkas and Buchanan (1975) and approved by the Operations Subcommittee of the Susquehanna River Shad Advisory Committee.

The present report summarizes the 1975 operation. 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 1975 with that of 1972 through 1974.

METHODS

Schedule of Operation

The facility was operated from one-half hour before sunrise to 1100 hours (EST) from 21 April through 13 June, and from 2000 hr on 26 May to 0515 hr on 27 May. On 2 May it was out of service for 4 hours from 0433 to 0833 EST.

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.

Attraction Velocity

A standard attraction velocity was used from 21 April to 7 May. This was established by setting house unit No. 1 at approximately 35% gate, house unit No. 2 at 75% gate, and the weir gates at 6 feet below the tailrace.

An experimental schedule of attraction velocities and flow (volume of water through facility) was initiated on 8 May and continued through 13 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. The 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 24 April and 1 June (Kotkas, 1975). Complete shutdowns occurred on occasion after 1 June. The selection of the unit to operate was made by a biologist conducting a surveillance and depended upon the relative abundance and distribution of fishes (primarily blueback herring and alewife) in the tailrace. Main Generator No. 2 was operated to create suitable oxygen conditions and to enhance the attraction of shad along the west bank of the tailrace near the facility. Main Generator No. 2 was always one of the units run during the regular operation of the Conowingo Hydro-electric Station during the season when the facility was operated.

Station engineers were requested not to operate Main Generator No. 1, whenever possible, because of potential negative effects of the turbulence produced by the Unit No. 1 discharge on the attraction flow of the facility. This request was followed and Main Generator No. 1 was always the last unit to come on line when the facility was operating.

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 and condition of ripeness were noted. Shad were then released at Shures Landing.

Transplantation of alewife and blueback herring to Conowingo Pond began on 23 April and was terminated on 16 May. The 600 galloon plywood tank con-

structed 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 all American shad had been removed. Large catches were subsampled. An estimate of the numbers of fishes in the lift was made from a count of this subsample. All catches were counted or subsampled except when large numbers of herring were available for transport, or when it was necessary to spend a great amount of time looking for shad. Where mortalities due to an oxygen deficiency were likely, large catches were 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.

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 boat anglers 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 1100 hours (EST) between 2 May and 13 June. Changes in the distribution of boats was determined by a count of the number in east and west sections of the tailrace which were established by an imaginary line from Main Generator No. 6 to the northern tip of Rowland Island.

RESULTS

A total of 514 lifts yielded a catch of 893,147 fish representing 12 families and 40 species (Table 2). The white perch (488,081), gizzard shad (138,664), and channel catfish (74,162) were most common.

The anadromous clupeids (alewife, blueback herring, hickory shad and American shad) made up 8.3% of the catch (Table 2). Most of the alewife spawning run was missed because the facility started operation on 21 April. The largest peak in the blueback herring run occurred in the week of 19 May (water temperature 68-73 F); a large number were also taken in the week of 21 April (54-59 F). A total of 18,986 blueback herring and alewife were transported above Conowingo Dam. Only 20 hickory shad were taken during the season. The American shad was first collected on 18 May at a water temperature of 67 F. The last shad was taken on 7 June at a water temperature of 75 F.

American Shad Catch

A total of 84 American shad was collected between 18 May and 7 June. Four were tagged and released close to the facility and 68 were tagged and released at Shures Landing. Eight tagged shad died in transport, three died in the sorting tank, and one dead shad was collected in the facility. The mortalities occurred at water temperatures of 70-76 F. Eight of the eleven dead shad were green or spent females and three were ripe males.

Two tagged shad were recaptured in the facility. One was a multiple recapture. A ripe male (Tag No. 0005) was tagged on 22 May. It was recaptured on 3 June, transported to Shures Landing and captured again on 5 June. It was released again at Shures Landing. A green female (Tag No. 00052) was tagged and transported on 26 May. It was recaptured (still green) on 3 June. It died in retransport.

One tag was returned by a commercial fisherman. A green female was tagged (No. 00051) on 26 May, and was recaptured on 16 June. It was caught on the west shore of Chesapeake Bay near Deale, Maryland, a distance of approximately 65 miles south of Conowingo Dam.

The sex ratio of 83 shad caught was 1.4 males to 1.0 females. All of the males were ripe, and 88.2% of the females were green and 17.8% were spent (Table 3).

More shad (66.7%) were taken at an attraction velocity of 7 feet per second than at 4 feet per second. The data however, are not sufficient to suggest an optimum attraction velocity. Shad were obviously scarce in the tailrace. The mode of operation of the Station and time of day may be important factors in relation to catch of those present.

Conditions of operation in the lift before, at the time of and in the lift after shad were collected are given in Table 4. Most (60.2%) of the shad were collected when one small and no large units were operating (Table 5). Three (3.6%) were taken when all units were operating. The results of the velocity, volume and weir gate setting tests are presented in Tables 6, 7, and 8. At the intermediate gate position 0.5 fish/hr were taken and at the full-open position 0.4 fish/hr were caught (Table 6). The data suggest that a combination of high velocity and low flow are most suitable for attraction of shad. However, 26 shad were taken in one lift under these conditions and the results may be more a function of availability of shad than of test conditions. No common combination of velocity and flow explains the catch of other species.

The peak hourly catch of shad was between 0600 and 0659 hrs (EST) when forty-two shad (50.6%) were collected (Table 9). Few were taken before 0500 or after 1000 hrs. Most shad (75%) were taken at water temperatures of 74 and 75 F (Table 10).

Most of the shad taken in the facility from 1972 through 1975 were age IV. Of a total of 213 American shad aged, some 7.5% were age III, 56.3% were IV, 31% were V, 4.7% were VI and 0.5% were VII. These data indicate that fishes

of the 1972 year class (age III) would not be expected in large numbers in 1975. None of 51 fishes aged in 1975 were age III. Any assessment of the effects of Tropical Storm Agnes on shad production in 1972 would be best determined by the abundant of age IV fishes returning to the Susquehanna River in 1976.

Herring Transplantation

A total of 18,986 herring were transported to Conowingo Pond and released at the west side of the dam. Included were 16,721 blueback herring (88.1%), 2,262 alewife (11.9%) and 3 hickory shad. The largest number of herring carried in one load was 1,200, and the most transplanted in one day (23 April) was 7,000 (Table 11).

An estimate of the fish transported was made by estimating the number of fish in a dip net (half-full) and multiplying this by the number of samples placed in the transport tank. Under ideal conditions, the approximate time needed to handle one truckload of fish was 45 minutes. The goal of transporting 50,000 herring was not met because of the relatively small herring run and those available after the first week in May were mixed with large numbers of white perch. The long time needed for sorting would have seriously interfered with the attempt to collect shad. Thus the transplantation program was terminated even though herring were still present.

No herring were collected by Ichthyological Associates personnel in Conowingo Pond. Unsubstantiated reports were received of fishermen seeing herring at Conowingo Creek, Broad Creek and Holtwood Tailrace.

Creel Census

Results of the creel census indicate that few shad were taken by anglers along the west shore of the tailrace; 41 were taken from 3 May through 31 May.

Anglers were most successful on 24 and 26 May when 23 shad (56.1%) were taken (Table 12). Fishing effort for shad was highest during the first half of May. Most shad were caught between 0500 and 0659 hours. Overall conditions under which shad were taken by anglers and in the lift were similar in 1975.

Angling effort from boats was greatest on the east side of the tailrace (below the large units). Here, the count of anglers was 3.3 per hour compared with 1.3 per hour from boats on the west side of the tailrace (Table 13). More anglers in boats were observed on the west side of the tailrace only when there were no large units and one small unit was operating. Anglers fishing from the west shore took 68.3% of the shad catch when no large units were operating and four or fewer small units were operating (Table 14).

Many anglers continued to fish through 13 June, but little effort was expended to catch shad at this time. Most were fishing with bait by the end of May.

SUMMARY OF OPERATION, 1972-1975

Since 1972, 581 American shad have been taken in the Conowingo Dam Fish Collection Facility. The conditions under which they were taken each year were similar. Most shad (92.8%) which were collected in the period from 0400 to 1100 hrs (EST), were taken before 0900 hrs (EST) (Table 15). The percentage caught in each hour for this period was consistent for each of the four years. The catch of shad by anglers was more evenly distributed through the morning hours (Table 16).

Most shad (88.5%) collected in the facility were taken at water temperatures of 68-71 F and 74-75 F (Table 10). Anglers caught most shad (77.2%) at water temperatures of 57-63 F (Table 17).

In 1973-1975, 68.7% of the shad were taken in the facility when no large units were operating (Table 5). For the same time period, anglers

fishing from shore took 26.1% of their catch under similar conditions (Table 14). A total of 46.6% of the anglers catch was made when all units were operating.

Of the shad taken in the facility in 1973-1975, 49.1% were males and 50.9% were females (Table 3). Some 87.0% were either green or ripe and the remainder were spent.

Daily river flows and water temperatures, for April-June, 1972-1975, has been included to aid those who might attempt further analysis of the facilities past operation (Table 18).

Boat angler effort indicates a distinct preference for the east side of the tailrace. When the large units are running, 84.6% of the angler effort was on the east side of the tailrace. When no large units were operating, 54.8% of the effort was on the west side of the tailrace (Table 19).

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Table 1. Schedule of test velocities and volumes for the Conowingo Dam Fish Collection Facility, 8 May-13 June 1975.

Period No.	Test Conditions*	House Unit Setting		Entrance Weir Setting	
		No. 1	No. 2	Depth Below Tailwater	Velocity ft/sec(±0.5)
1	HV-HF	35%	75%	5.4 ft	7
2	LV-HF	35%	75%	9.5 ft	4
3	HV-LF	35%	35%	3.0 ft	7
4	LV-LF	35%	35%	5.0 ft	4
5	LV-LF	35%	35%	5.0 ft	4
6	HV-LF	35%	35%	3.0 ft	7
7	LV-HF	35%	75%	9.5 ft	4
8	HV-HF	35%	75%	5.4 ft	7
A*	HV	35%	35%	5.0 ft	4
B*	LV	35%	35%	3.0 ft	7

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

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

Table 2. Numbers of fishes taken in the Conowingo Dam Fish Collection Facility, 21 April through 13 June 1975.

Dates	21-27 Apr	28 Apr-4 May	5-11 May	12-18 May	19-25 May	26 May-1 Jun	2-8 Jun	9-13 Jun	Totals
No. Lifts	54	58	64	60	69	83	79	47	514
Fishing Time (hr)	19.7	23.4	26.3	20.0	23.8	33.5	23.9	18.8	199.4
Water Temperature (F)	54-59	56-58	57-61	60-67	68-73	74-75	74-76	71-67	
Petromyzontidae									
Petromyzon marinus	-	1	-	-	-	-	-	-	1
Anguillidae									
Anguilla rostrata	21	130	8	634	1394	20071	42022	300	64580
Clupeidae									
Alosa aestivalis	20099	2	2764	14546	23194	214	9101	12	69932
A. mediocris	2	18	-	-	-	-	-	-	20
A. pseudoharengus	1322	2376	498	44	16	-	-	-	4256
A. sapidissima	-	-	-	1	17	56	10	-	84
D. cepedianum	-	3715	4583	16804	31078	34031	31037	17416	138664
Salmonidae									
Salmo gairdneri	5	6	-	-	5	7	-	-	23
S. trutta	1	4	6	9	81	86	4	26	217
Salvelinus fontinalis	-	1	-	-	-	-	-	-	1
Salmonid Hybrid	-	-	-	-	2	-	-	-	2
Esocidae									
E. masquinongy	4	-	-	-	1	1	-	1	7
Cyprinidae									
Carassius auratus	-	8	1	-	-	-	-	-	9
Cyprinus carpio	6	2	998	3527	1607	7845	1083	44	15112
Notemigonus crysoleucas	44	14	1	17	119	110	440	8	753
Notropis amoenus	-	-	-	-	468	1437	172	-	2077
N. hudsonius	-	-	-	4	29	235	140	-	408
N. rubellus	1	-	-	-	-	-	-	-	1
N. spilopterus	-	2	-	-	37	1054	-	-	1093

continued

Table 2. Continued.

Dates	21-27 Apr	28 Apr-4 May	5-11 May	12-18 May	19-25 May	26 May-1 Jun	2-8 Jun	9-13 Jun	Totals
No. Lifts	54	58	64	60	69	83	79	47	514
Fishing Time (hr)	19.7	23.4	26.3	20.0	23.8	33.5	23.9	18.8	199.4
Water Temperature (F)	54-59	56-58	57-61	60-67	68-73	74-75	74-76	71-67	
Catostomidae									
Carpiodes cyprinus	2	21	652	1234	1184	4745	493	62	8393
Catostomus commersoni	79	8	27	18	18	1	-	-	151
Moxostoma macrolepidotum	54	20	202	93	82	-	-	-	451
Belonidae									
Stronglura marina	-	-	-	-	-	1	-	-	1
Ictaluridae									
Ictalurus catus	-	-	-	33	660	1524	3388	571	6176
I. natalis	-	-	-	-	-	32	-	-	32
I. nebulosus	-	-	2	9	138	494	93	4	740
I. punctatus	151	1884	430	2628	6486	25486	25442	11655	74162
Percichthydae									
Morone americana	-	44389	12221	127045	170377	38985	94042	1022	488081
M. saxatilis	-	-	-	8	8	36	110	4	166
Centrarchidae									
Ambloplites rupestris	3	1	-	4	9	16	13	-	46
Lepomis auritus	-	-	1	26	286	1549	1154	24	3040
L. cyanellus	-	-	-	-	-	10	29	-	39
L. gibbosus	4	2	-	11	94	616	245	4	976
L. macorchirus	11	12	9	72	544	1462	931	41	3082
Micropterus dolimieui	2	-	11	54	18	51	-	1	137
M. salmoides	3	2	1	16	5	8	-	-	35
Pomoxis annularis	4	30	13	110	348	1808	6630	347	9290
P. nigromaculatus	3	8	-	8	-	21	-	4	44
Percidae									
Etheostoma olmstedi	1	-	-	-	-	-	-	-	1
Perca flavescens	4	2	7	24	109	246	100	4	496
Stizostedion vitreum	94	28	12	20	18	105	54	37	368
Total	21920	52686	22447	166999	238432	142343	216733	31587	893147

Table 3. Sex ratio and spawning condition of American shad (*Alosa sapidissima*) collected in the Conowingo Dam Fish Collection Facility in 1973-1975.

Year	Male		Female				Undetermined	Total
	Ripe	Spent	Green	Ripe	Spent	Undetermined		
1973	34	1	22	1	12	0	5	75
%	45.3	1.3	29.3	1.3	16.0	-	6.7	
1974	48	0	41	9	6	12	12	128
%	37.5	-	32.0	7.0	4.7	9.4	9.4	
1975	49	0	30	0	4	0	1	84
%	58.3	-	35.7	-	4.8	-	1.2	
Total	131	1	93	10	22	12	18	287
%	45.6	0.3	32.4	3.5	7.7	4.2	6.3	
Total No. Males and Females	132			137				
%	49.1			50.9				

Table 4. 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, 18 May through 7 June 1975.

Date	18 May			22 May						23 May			
Lift Number	5	6	7	3	4	5	8	9	10	3	4	5	6
Parameters*													
Shad Taken	0	1	0	0	1	0	0	1	0	0	3	2	0
Total Fish	1172	735	526	4500	833	697	1824	862	708	1710	2608	4502	1600
Rel. Loc.	3	3	3	3	3	3	3	3	3	3	3	3	3
Lift Time	0650	0733	0815	0520	0535	0630	0840	0930	1000	0532	0555	0625	0655
Min. Fished	30	30	30	5	10	15	30	20	15	5	15	15	1.5
Air Temp.	61	62	63	68	68	72	75	78	78	67	67	70	70
Water Temp,	67	67	67	69	69	69	69	69	69	70	70	70	70
Weather	3	3	2	1	1	1	1	1	1	1	1	1	1
At. Pressure	30.05	30.03	30.03	29.90	29.90	29.93	29.93	29.93	29.93	29.90	29.90	29.90	29.90
Small Gen. on	7	7	7	2	2	4	7	7	7	3	3	4	4
Large Gen. on	4	4	4	0	0	2	4	4	4	2	0	1	1
Unit 1	1	1	1	2	2	2	1	1	1	2	2	2	2
Unit 2	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
River Flow	66.1	66.1	66.1	44.5	44.5	44.5	44.5	44.5	44.5	41.4	41.4	41.4	41.4
% Gate S.U.1	35	35	35	35	35	35	35	35	35	35	35	35	35
% Gate S.U. 2	25	25	25	35	35	35	35	35	35	35	35	35	35
Vel. Hld. Chan.	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6
Vel. Weir 1	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vel. Weir 2	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR													
Weir 1	2.6	2.6	2.6	2.6	3.0	3.0	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Weir 2	2.6	2.6	2.6	2.6	3.0	3.0	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Tailrace Elev.	20.1	20.5	20.5	14.6	14.6	18.0	20.6	20.6	20.6	15.6	15.6	-	-
Hld. Chan. Elev.	21.3	21.6	21.6	-	-	-	-	-	-	-	-	-	-
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	1	2	1	2	1	2	1	2	2	1	2	1

continued

Table 4. Continued.

Date	23 May			24 May					25 May				26 May
Lift Number	7	8	9	4	5	6	7	8	3	4	5	6	2
Parameters*													
Shad Taken	0	2	0	0	2	3	1	0	0	1	1	0	0
Total Fish	7000	2502	912	2416	4738	7424	1345	1112	2232	2545	5313	4016	8880
Rel. Loc.	3	3	3	3	3	3	3	3	3	3	3	3	3
Lift Time	0740	0925	1005	0600	0645	0730	0815	0910	0530	0625	0705	0750	0442
Min. Fished	30	30	30	20	30	30	30	40	10	30	30	30	5
Air Temp.	73	73	75	68	70	72	76	75	66	66	66	65	58
Water Temp.	70	70	70	72	72	72	72	72	73	73	73	73	74
Weather	1	1	1	1	1	1	1	1	3	3	3	3	2
At. Pressure	29.95	29.95	29.95	29.84	29.85	29.85	30.05	29.84	29.97	29.97	29.97	29.97	30.12
Small Gen. on	4	4	4	1	1	1	4	4	1	1	1	3	1
Large Gen. on	1	2	2	0	0	0	2	2	0	0	0	0	0
Unit 1	2	2	2	2	2	2	2	2	2	2	2	2	1
Unit 2	1	1	1	1	1	1	1	1	1	1	1	1	2
Spill Gates On	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	41.4	41.4	41.4	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	36.3
% Gate S.U. 1	35	35	35	35	35	35	35	35	35	35	35	35	35
% Gate S.U. 2	35	35	35	35	35	35	75	75	35	35	35	75	35
Vel. Hld. Chan.	.6	.6	.6	.6	.6	.6	1.4	1.4	.6	.6	.6	1.4	.6
Vel. Weir 1	4.0	7.0	7.0	4.0	4.0	4.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vel. Weir 2	4.0	7.0	7.0	4.0	4.0	4.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR													
Weir 1	5.3	3.0	3.0	5.6	5.6	5.6	5.4	5.4	3.2	3.2	3.2	5.4	3.2
Weir 2	5.3	3.0	3.0	5.6	5.6	5.6	5.4	5.4	3.2	3.2	3.2	5.4	3.2
Tailrace Elev.	-	-	-	14.0	14.0	14.0	17.0	18.0	13.8	13.8	13.8	15.0	13.8
Hld. Chan. Elev.	-	-	-	14.9	14.9	14.9	18.4	20.4	-	-	-	-	-
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	1	2	1	2	1	2	1	2	2	2	2	2

continued

Table 4 . Continued.

Date	26 May								27 May				29 May
Lift Number	3	4	5	6	7	8	10	11	6	7	8	9	3
Parameters*													
Shad Taken	1	6	26	0	6	0	0	1	0	1	2	0	0
Total Fish	1697	2300	2626	1420	3306	2500	574	1441	2048	4417	1690	4832	1192
Rel. Loc.	3	3	3	3	3	3	3	3	3	3	3	3	3
Lift Time	0525	0600	0645	0735	0826	0905	1000	1030	0415	0458	0540	0625	0540
Min. Fished	30	30	30	30	30	30	15	15	30	30	30	30	30
Air Temp.	57	57	60	61	61	64	65	65	66	65	66	66	63
Water Temp.	74	74	74	74	74	74	74	74	74	74	74	74	75
Weather	2	2	3	3	3	3	3	3	3	3	2	2	1
At. Pressure	30.12	30.12	30.12	30.12	30.12	30.12	30.12	30.12	29.75	29.75	29.75	29.75	30.05
Small Gen. on	1	1	1	3	3	4	6	7	1	1	1	5	1
Large Gen. on	0	0	0	0	1	3	4	4	0	0	0	2	0
Unit 1	2	2	2	2	2	2	2	1	2	2	2	2	2
Unit 2	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
River Flow	36.3	36.3	36.3	36.3	36.3	36.3	36.3	36.3	36.2	36.2	36.2	36.2	32.1
% Gate S.U. 1	35	35	35	35	35	35	35	35	35	35	35	35	35
% Gate S.U. 2	35	35	35	35	75	75	75	75	35	35	35	35	35
Vel. Hld. Chan.	.6	.6	.6	.6	.8	.8	.8	.8	.6	.6	.6	.6	.6
Vel. Weir 1	7.0	7.0	7.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	7.0
Vel. Weir 2	7.0	7.0	7.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	7.0
Weir Gates open	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR													
Weir 1	3.2	3.2	3.2	3.2	9.0	9.5	9.5	9.5	5.3	5.3	5.3	5.3	3.2
Weir 2	3.2	3.2	3.2	3.2	9.0	9.5	9.5	9.5	5.3	5.3	5.3	5.3	3.2
Tailrace Elev.	13.8	13.8	13.8	13.8	17.1	18.5	21.4	21.4	14.0	14.0	14.0	18.2	14.0
Hld. Chan. Elev.	-	-	-	-	-	-	-	-	14.8	14.8	14.8	18.8	-
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	2	2	2	1	1	1	1	1	2	1	2	2

continued

Table 4. Continued.

Date	29 May						30 May			31 May			
Lift Number	4	5	6	7	8	9	3	4	5	3	4	5	8
Parameters*													
Shad Taken	1	1	0	2	1	0	0	1	0	0	1	0	0
Total Fish	264	486	1184	810	817	615	624	247	155	1072	597	770	400
Rel. Loc.	3	3	3	3	3	3	3	3	3	3	3	3	3
Lift Time	0625	0710	0755	0840	0925	0950	0605	0650	0735	0545	0625	0705	0915
Min. Fished	30	30	30	30	30	15	30	30	30	30	30	30	30
Air Temp.	64	64	72	75	77	77	69	69	69	72	72	74	77
Water Temp.	75	75	75	75	75	75	75	75	75	74	74	74	74
Weather	2	2	2	2	2	2	3	3	3	3	3	3	3
At. Pressure	30.05	30.05	30.05	30.05	30.05	30.05	29.94	29.94	29.91	29.79	29.79	29.78	29.79
Small Gen. on	1	1	4	4	6	6	1	1	4	1	1	1	2
Large Gen. on	0	0	2	2	4	4	0	0	2	0	0	0	0
Unit 1	2	2	2	2	2	2	2	2	2	2	2	2	2
Unit 2	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
River Flow	32.1	32.1	32.1	32.1	32.1	32.1	28.8	28.8	28.8	29.3	29.3	29.3	29.3
% Gate S.U. 1	35	35	35	35	35	35	35	35	35	35	35	35	35
% Gate S.U. 2	35	35	75	75	75	75	35	35	35	35	35	35	35
Vel. Hld. Chan.	.6	.6	1.4	1.4	1.4	1.4	.6	.6	.6	.6	.6	.6	.6
Vel. Weir 1	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0	4.0	4.0
Vel. Weir 2	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0	4.0	4.0
Weir Gates open	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR													
Weir 1	3.2	3.2	5.4	5.4	5.4	5.4	3.2	3.2	3.2	5.6	5.6	5.6	5.6
Weir 2	3.2	3.2	5.4	5.4	5.4	5.4	3.2	3.2	3.2	5.6	5.6	5.6	5.6
Tailrace Elev.	14.0	14.0	18.0	18.0	20.2	20.2	14.0	14.0	18.0	13.8	13.8	13.8	14.6
Hld. Chan. Elev.	-	-	18.7	18.7	20.4	20.4	14.3	14.3	18.5	-	-	-	14.9
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	1	2	1	2	1	2	2	1	2	2	1	2	1

Table 4. Continued.

Date	31 May		1 June							2 June			
Lift Number	9	10	2	3	4	8	9	10	11	2	3	4	5
Parameters*													
Shad Taken	3	0	0	1	0	0	1	1	0	0	1	1	1
Total Fish	193	154	1720	357	278	456	916	1261	750	2250	926	433	281
Rel. Loc.	3	3	3	3	3	3	3	3	3	3	3	3	3
Lift Time	0958	1040	0455	0537	0620	0912	0955	1038	1120	0500	0542	0625	0709
Min. Fished	30	30	15	30	30	30	30	30	30	15	30	30	30
Air Temp.	77	80	72	72	72	73	73	73	73	62	62	65	67
Water Temp.	74	74	74	74	74	74	74	74	74	75	75	75	75
Weather	3	3	4	4	4	4	3	3	3	1	1	1	1
At. Pressure	29.76	29.76	29.74	29.74	29.74	29.76	29.76	29.73	29.68	30.04	30.05	30.07	30.07
Small Gen. on	2	4	1	1	1	4	4	4	4	1	1	1	3
Large Gen. on	0	4	0	0	0	1	1	1	1	0	0	0	0
Unit 1	2	2	2	2	2	2	2	2	2	2	2	2	2
Unit 2	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
River Flow	29.3	29.3	35.4	35.4	35.4	35.4	35.4	35.4	35.4	28.2	28.2	28.2	28.2
% Gate S.U. 1	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	75	35	35	35	35
Vel. Hld. Chan.	.6	.6	.6	.6	.6	1.4	1.4	1.4	1.4	.6	.6	.6	.6
Vel. Weir 1	7.0	7.0	4.0	4.0	4.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vel. Weir 2	7.0	7.0	4.0	4.0	4.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Weir Gates open	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR													
Weir 1	3.2	3.2	5.6	5.6	5.6	5.4	5.4	5.4	5.4	3.2	3.2	3.2	3.2
Weir 2	3.2	3.2	5.6	5.6	5.6	5.4	5.4	5.4	5.4	3.2	3.2	3.2	3.2
Tailrace Elev.	19.0	19.0	14.0	14.0	14.0	17.3	17.3	17.3	17.3	14.0	14.0	14.0	16.2
Hld. Chan. Elev.	19.3	19.3	14.4	14.4	14.4	18.1	18.1	18.1	18.1	14.7	14.7	14.7	16.8
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	1	1	2	1	1	2	1	2	1	2	1	2

continued

Table 4. Continued.

Date	2 June		3 June							4 June			5 June
Lift Number	6	7	2	3	4	5	8	9	10	1	2	3	4
Parameters*													
Shad Taken	1	0	0	1**	1+1**	0	0	1	0	0	1	0	0
Total Fish	185	900	7600	5000	4002	3300	1200	2001	4384	4100	20501	2500	8440
Rel. Loc.	3	3	3	3	3	3	3	3	3	3	3	3	3
Lift Time	0755	0834	0455	0523	0552	0610	0658	0744	0825	0430	0442	0507	0519
Min. Fished	30	30	15	15	15	5	3	30	30	0	2	1	3
Air Temp.	70	73	68	69	69	70	72	72	72	61	61	61	63
Water Temp.	75	75	76	76	76	76	76	76	76	75	75	75	76
Weather	1	1	2	2	2	2	2	2	2	1	1	1	3
At. Pressure	30.07	30.07	29.92	29.92	29.92	29.92	29.92	29.90	29.90	29.80	29.80	29.80	29.74
Small Gen. on	3	3	0	0	0	0	0	4	4	0	0	0	0
Large Gen. on	0	0	0	0	0	0	0	2	2	0	0	0	0
Unit 1	2	2	2	2	2	2	2	2	2	2	2	2	2
Unit 2	1	1	2	2	2	2	2	1	1	2	2	2	2
Spill gates open	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	28.2	28.2	26.7	26.7	26.7	26.7	26.7	26.7	26.7	25.4	25.4	25.4	26.1
% Gate S.U. 1	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	35	35	35	35	35
Vel. Hld. Chan.	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6
Vel. Weir 1	7.0	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0
Vel. Weir 2	7.0	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0
Weir Gates open	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR													
Weir 1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	5.3	5.3	5.0	5.0	5.0	5.0
Weir 2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	5.3	5.3	5.0	5.0	5.0	5.0
Tailrace Elev.	16.2	16.2	12.0	12.0	12.0	12.0	12.0	16.2	18.0	12.0	12.0	12.0	12.0
Hld. Chan. Elev.	16.8	16.8	-	-	-	-	-	-	18.5	-	-	-	-
Crowder Position	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	-	1	2	1

continued

Table 4. Continued.

Date	5 June		7 June			
Lift Number	5	6	1	2	3	4
Parameters*						
Shad Taken	1+1**	0	0	1***	1	0
Total Fish	8502	9256	3700	5088	1501	800
Rel. Loc.	3	3	3	3	3	3
Lift Time	0558	0632	0515	0532	0600	0635
Min. Fished	10	15	0	5	15	15
Air Temp.	63	63	61	61	65	65
Water Temp.	76	76	75	75	75	75
Weather	3	3	1	1	1	1
At. Pressure	29.74	29.78	29.49	29.49	29.50	29.50
Small Gen. on	0	4	0	0	0	7
Large Gen. on	0	0	0	0	0	3
Unit 1	2	1	2	2	2	1
Unit 2	2	2	2	2	2	1
Spill gates open	0	0	0	0	0	0
River Flow	26.1	26.1	54.2	54.2	54.2	54.2
% Gate S.U. 1	35	35	35	35	35	35
% Gate S.U. 2	35	35	0	35	35	35
Vel. Hld. Chan.	.6	.6	-	.6	.6	.6
Vel. Weir 1	4.0	4.0	-	7.0	7.0	7.0
Vel. Weir 2	4.0	4.0	-	7.0	7.0	7.0
Weir Gates open	3	3	3	3	3	3
Ft. Below TR						
Weir 1	5.0	5.0	5.0	3.0	3.0	3.0
Weir 2	5.0	5.0	5.0	3.0	3.0	3.0
Tailrace Elev.	12.0	16.0	12.0	12.0	12.0	19.5
Hld. Chan. Elev.	-	-	12.1	-	-	20.4
Crowder Position	1	1	1	1	1	1
Cr. Gate Position	2	1	-	1	2	1

* Explanation of abreviations and code numbers given on page 23.
** Recapture, not included in final total.
*** Shad had been dead 2-3 days at time of collection.

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, 3. 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
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

Table 5. Number of American shad (*Alosa sapidissima*) taken in the Conowingo Dam Fish Collection Facility, 1973-1975, under various conditions of generation of the Conowingo Hydro-electric Station.

No. Units Operating		Status of	Status of	No. of Shad Caught				% of Catch			
Small	Large	Unit No. 1	Unit No. 2	1973	1974	1975	Total	1973	1974	1975	Total
0	0	OFF	OFF	10	43	4	57	13.3	33.6	4.8	19.9
1	0	OFF	ON	3	15	50	68	4.0	11.7	60.2	23.8
1	0	OFF	OFF	37	0	0	37	49.3	-	-	12.9
1	0	ON	OFF	1	0	0	1	1.3	-	-	0.3
2	0	OFF	ON	0	1	4	5	-	0.8	4.8	1.7
3	0	OFF	ON	5	10	5	20	6.7	7.8	6.0	7.0
3	0	OFF	OFF	1	0	0	1	1.3	-	-	0.3
3	1	OFF	ON	0	0	6	6	-	-	7.2	2.1
4	0	OFF	ON	0	8	0	8	-	6.3	-	2.8
4	1	OFF	ON	0	12	4	16	-	9.4	4.8	5.6
4	1	ON	ON	0	1	0	1	-	0.8	-	0.3
4	2	OFF	OFF	1	0	0	1	1.3	-	-	0.3
4	2	OFF	ON	0	12	6	18	-	9.4	7.2	6.3
4	2	ON	ON	0	1	0	1	-	0.8	-	0.3
4	3	OFF	ON	2	0	0	2	2.7	-	-	0.7
4	4	OFF	ON	0	6	0	6	-	4.7	-	2.1
4	4	ON	ON	2	0	0	2	2.7	-	-	0.7
5	2	OFF	ON	0	3	0	3	-	2.3	-	1.0
5	3	OFF	ON	1	2	0	3	1.3	1.6	-	1.0
5	4	OFF	ON	1	4	0	5	1.3	3.1	-	1.7
6	1	OFF	ON	0	3	0	3	-	2.3	-	1.0
6	2	ON	ON	1	0	0	1	-	0.8	-	0.3
6	4	OFF	ON	0	5	1	6	-	3.9	1.2	2.1
7	4	ON	ON	8	1	3	12	10.7	0.8	3.6	4.2
Changing			Changing	3	0	0	3	4.0	-	-	1.0
Total				75	128	83*	286				

* Does not include 1 dead shad taken on 7 June 1975.

Table 6. Weir gate setting test results, for 8 selected species, 21 April through 13 June 1975.

Date	21 Apr		22 Apr		24 Apr		25 Apr		26 Apr		27 Apr		28 Apr		29 Apr	
No. Lifts	4	3	4	4	2	2	2	2	4	3	2	3	4	3	3	3
Fishing Time (hr)	1.8	2.0	1.7	1.4	1.0	1.0	1.0	1.0	2.0	1.5	1.0	1.5	1.8	1.5	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	-	-	7147	319	30	65	1	-	25	21	-	-	-	-	-	-
Alewife	3	6	104	10	-	-	115	9	34	115	73	104	9	2	-	-
American shad	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gizzard shad	9	2	17	19	38	20	380	46	94	38	131	66	186	111	147	111
Carp	1	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-
Quillback	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1
Channel catfish	4	1	-	1	-	4	-	-	3	-	2	1	137	34	124	61
White perch	2	-	-	-	-	-	332	11	98	19	149	58	164	31	33	20
Total	19	9	7268	350	68	89	828	66	254	193	355	229	516	179	305	173

continued

Table 6. Continued.

Date	30 Apr		1 May		3 May		4 May		5 May		6 May		7 May		8 May	
No. Lifts	4	4	3	3	4	4	4	3	4	3	3	4	4	3	6	5
Fishing Time (hr)	2.2	2.0	1.6	2.1	2.2	1.7	1.8	1.5	2.0	1.5	1.5	2.0	2.2	1.5	2.8	2.3
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	1	-	-	-	-	1	-	-	-	-	-	-	-	-	412	2329
Alewife	31	45	302	56	301	247	304	115	71	130	11	22	3	3	2	12
American shad	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gizzard shad	420	254	202	253	593	302	231	108	1061	504	133	236	143	67	359	356
Carp	-	1	-	-	-	-	-	-	-	7	9	42	47	116	34	73
Quillback	-	-	-	-	-	-	-	-	-	2	-	5	3	1	-	3
Channel catfish	13	16	8	4	4	2	-	-	4	1	7	3	8	5	4	4
White perch	80	65	147	65	724	139	362	54	271	147	1	6	1	1	52	27
Total	545	381	659	378	1672	691	897	277	1407	791	161	314	205	193	863	2804

continued

Table 6. Continued.

Date	9 May		10 May		11 May		12 May		13 May		14 May		16 May		17 May	
No. Lifts	3	3	3	3	4	3	3	5	4	4	4	4	3	3	4	4
Fishing Time (hr)	1.5	1.5	1.5	2.0	1.8	1.5	1.3	2.0	2.0	1.8	1.6	1.4	.8	.7	1.8	1.8
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	9	3	2	1	17	-	-	-	-	-	-	-	1092	3676	686	784
Alewife	1	3	13	11	129	52	8	1	3	3	1	1	-	8	-	-
American shad	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gizzard shad	21	41	186	312	501	433	262	302	291	212	371	341	5628	2816	1992	1498
Carp	3	-	4	37	118	308	57	632	23	22	11	8	56	704	36	1056
Quillback	1	-	1	27	537	67	96	283	62	111	-	23	-	124	8	232
Channel catfish	4	9	3	10	187	6	8	22	113	62	131	73	16	16	62	170
White perch	48	57	34	137	523	1153	159	265	49	29	1307	102	3848	3672	2456	2990
Total	87	113	243	535	2012	2019	590	1505	541	439	1821	548	10640	11016	5240	6730

continued

Table 6. Continued.

Date	18 May		19 May		20 May		21 May		22 May		23 May		24 May		25 May	
No. Lifts	4	4	3	4	4	4	4	4	4	5	5	3	4	4	3	4
Fishing Time (hr)	1.8	2.0	1.5	1.8	2.0	1.8	1.9	1.8	1.4	1.4	1.6	1.0	1.8	2.0	1.5	1.9
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	206	526	2	1	-	2	24	11	436	1797	7137	3700	1960	1456	24	32
Alewife	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-
American shad	-	1	-	-	-	-	-	-	1	1	2	5	3	3	1	1
Gizzard shad	918	834	404	376	940	1158	2500	1736	1272	1976	3134	800	1616	2920	3728	5120
Carp	94	810	140	236	110	482	24	52	168	358	16	-	-	8	5	8
Quillback	16	272	48	4	17	480	-	8	132	466	-	5	-	-	-	-
Channel catfish	112	84	244	678	770	1789	320	380	1152	44	13	-	4	4	131	608
White perch	3998	10926	598	1154	180	405	5856	1291	292	2837	4665	2200	6932	7728	3402	4328
Total	5344	13453	1436	2449	2017	4316	8724	3478	3469	7479	14967	6710	10515	12119	7291	10097

continued

Table 6. Continued.

Date	26 May		27 May		28 May		29 May		30 May		31 May		1 Jun		2 Jun	
No. Lifts	8	7	6	6	4	4	4	4	4	3	5	4	5	4	4	4
Fishing Time (hr)	3.5	3.0	2.7	3.0	2.0	1.5	1.8	1.8	1.8	1.5	2.3	2.0	2.5	2.0	1.8	1.8
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	7	13	32	8	24	29	-	18	16	-	14	9	13	3	15	17
Alewife	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
American shad	27	13	1	2	-	-	3	2	-	1	2	2	2	1	2	2
Gizzard shad	3940	7983	2477	2604	2732	1854	2409	1904	310	360	2153	730	1274	1663	752	783
Carp	62	330	119	4604	2000	290	55	36	-	-	-	-	357	7	200	657
Quillback	-	-	16	3032	1000	152	38	193	-	6	-	1	255	1	50	212
Channel catfish	3391	4390	1470	1694	-	15	13	70	96	155	141	41	172	97	614	447
White perch	2480	2099	6051	2928	812	956	156	216	380	191	609	185	216	64	358	570
Total	9907	14828	10166	14872	6568	3296	2671	2439	802	713	2919	867	2289	1836	1991	2688

continued

Table 6 . Continued.

Date	3 Jun		4 Jun		5 Jun		6 Jun		7 Jun		8 Jun		9 Jun		10 Jun	
No. Lifts	6	5	5	4	5	5	4	4	4	3	4	4	3	3	4	4
Fishing Time (hr)	1.9	1.3	1.6	1.3	1.7	1.6	1.5	1.5	2.0	1.3	1.8	2.0	1.5	1.5	2.0	1.8
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL	INT	FULL
Species																
Blueback herring	1108	882	528	384	780	122	-	8	100	-	-	-	-	-	-	-
Alewife	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
American shad	2	-	1	-	1	-	-	-	-	1	-	-	-	-	-	-
Gizzard shad	9540	4838	725	784	508	1008	1070	882	2756	700	1144	778	1884	516	744	335
Carp	24	32	-	-	4	38	52	26	32	12	-	4	4	2	2	4
Quillback	-	8	74	-	8	8	100	25	-	-	-	8	-	-	2	-
Channel catfish	520	460	14	52	96	130	4566	2028	1224	936	1805	3826	324	64	94	63
White perch	3592	5284	4074	3300	10036	6942	636	724	524	264	30	26	-	12	3	-
Total	14785	11506	5415	4520	11434	8248	6424	3693	4636	1913	2979	4642	2212	594	845	402

contined

Table 6. Continued.

Date	11 Jun		12 Jun		13 Jun		SEASON TOTALS			
No. Lifts	4	3	4	4	4	3				
Fishing Time (hr)	2.3	1.5	1.6	1.7	1.7	1.5	91.9	Fish/ Hour (INT)	Fish/ Hour (FULL)	86.0
Gate Setting	INT	FULL	INT	FULL	INT	FULL	INT			FULL
Species										
Blueback herring	2	-	8	-	-	2	25534	277.8	172.6	14847
Alewife	-	-	-	-	-	-	1534	16.7	28.9	2488
American shad	-	-	-	-	-	-	48	.5	.4	35
Gizzard shad	1146	986	1894	1136	1402	477	66768	726.5	624.3	53688
Carp	15	6	4	0	4	5	3881	42.2	128.1	11014
Quillback	4	-	-	-	32	36	2520	27.4	67.4	5796
Channel catfish	217	154	60	112	280	51	18685	203.3	219.4	18865
White perch	43	8	454	40	26	85	67243	731.7	741.8	63791
Total	1425	1154	2420	1288	1744	656				

				MEAN TOTAL HOURS
INT	186,212	HOURS	91.9	2026/hr
FULL	170,527		86.0	1982/hr

* First 2 lifts of each day and lifts when weir gate schedule could not be maintained are not included.
INT = Intermediate gate setting (12 in. opening)
FULL = Full open gate setting

Table 7. Velocity and volume schedule test results for eight selected species, 8 May through 13 June 1975.

Date	8 May		9 May		10 May		11 May		12 May		13 May	
No. Lifts*	9	2	3	3	3	4	4	4	4	5	5	4
Fishing Time (hr)	4.3	.8	1.5	1.5	2.0	1.8	1.8	1.8	1.8	1.8	2.3	1.9
Velocity + Volume	HV-HF	LV-HF	HV-LF	LV-LF	HV-LF	LV-LF	HV-HF	LV-HF	HV-HF	LV-HF	HV-LF	LV-LF
Species												
Blueback herring	701	2040	5	8	1	2	-	1	-	-	-	-
Alewife	9	0	3	0	13	11	4	68	2	15	3	3
American shad	-	-	-	-	-	-	-	-	-	-	-	-
Gizzard shad	532	231	20	42	313	204	505	401	251	448	216	327
Carp	108	1	-	3	28	13	128	493	70	619	3	42
Quillback	3	-	-	1	26	2	475	132	6	379	-	173
Channel catfish	37	1	6	7	3	37	186	60	120	11	357	98
White perch	57	20	29	76	97	95	357	1452	590	374	13515	43
Total	1447	2293	63	137	481	364	1655	2607	1039	1846	14094	686

continued

Table 7. Continued.

Date	14 May		15 May		17 May		18 May		19 May		20 May	
No. Lifts*	5	4	7	-	4	5	4	3	3	5	4	5
Fishing Time (hr)	2.2	1.1	1.5	-	1.5	2.3	2.0	1.5	1.6	1.9	2.0	1.9
Velocity + Volume	HV-LF	LV-LF	HV-HF	-	HV-HF	LV-HF	HV-LF	LV-LF	LV-LF	LV-LF	HV-HF	LV-HF
Species												
Blueback herring	-	-	5768	-	694	776	664	32	-	3	-	2
Alewife	1	1	8	-	-	-	-	-	-	-	-	-
American shad	-	-	-	-	-	-	1	-	-	-	-	-
Gizzard shad	436	312	8944	-	966	2624	996	648	284	496	1012	1386
Carp	22	7	760	-	4	1088	16	888	240	136	502	90
Quillback	24	-	124	-	-	240	-	288	48	28	496	1
Channel catfish	52	152	32	-	24	208	12	176	544	379	1486	1073
White perch	47	26362	15156	-	20686	4760	10800	2160	288	1464	108	10477
Total	582	26834	30792	-	22374	9696	12489	4192	1404	2506	3604	13029

continued

Table 7. Continued.

Date	21 May			22 May		23 May		24 May		25 May	
No. Lifts*	2	4	2	5	5	3	6	4	5	4	4
Fishing Time (hr)	1.0	2.3	0.3	1.1	1.9	1.3	1.5	2.2	1.7	2.3	1.3
Velocity + Volume	HV-HF	LV-HF	LV-LF	HV-LF	LV-LF	HV-LF	LV-LF	HV-HF	LV-LF	HV-HF	LV-LF
Species											
Blueback herring	-	16	19	6093	140	1772	11177	56	3610	-	56
Alewife	-	-	-	-	16	-	-	-	-	-	-
American shad	-	-	-	1	1	2	5	1	5	-	2
Gizzard shad	1328	2252	656	2780	1568	1724	2306	1928	3876	4216	4816
Carp	4	72	-	-	526	16	-	8	-	13	-
Quillback	-	8	-	-	598	-	5	-	-	-	-
Channel catfish	4	664	36	20	72	8	37	28	64	243	1008
White perch	3128	1284	2731	10620	1714	940	11749	2284	32376	3418	6896
Total	4464	4296	3442	19514	4635	4462	25279	4305	39931	7890	12778

continued

Table 7. Continued.

Date	26 May		27 May		28 May		29 May		30 May		31 May	
No. Lifts*	5	11	3	11	4	5	5	4	8	-	3	7
Fishing Time (hr)	1.8	4.9	1.2	5.0	1.8	1.9	2.0	1.8	3.5	-	1.3	3.3
Velocity + Volume	LV-HF	HV-LF	HV-LF	LV-LF	HV-HF	LV-LF	HV-HF	HV-LF	HV-LF	-	HV-LF	LV-LF
Species												
Blueback herring	10	10	-	40	24	29	16	15	21	-	1	32
Alewife	-	-	-	-	-	-	-	-	-	-	-	-
American shad	7	33	-	3	-	-	3	2	1	-	3	1
Gizzard shad	6014	6629	1276	4077	2068	2570	2761	1824	735	-	682	2266
Carp	144	248	4544	179	2184	90	42	73	-	-	-	-
Quillback	-	-	3016	32	1168	-	196	35	6	-	-	1
Channel catfish	307	10666	-	10316	-	67	81	106	391	-	25	402
White perch	1654	10020	228	9915	580	1820	238	1710	1326	-	17	1817
Total	8136	27606	9064	24562	6024	4576	3337	3765	2480	-	728	4519

continued

Table 7. Continued.

Date	1 Jun			2 Jun		3 Jun		4 Jun		5 Jun		
No. Lifts*	4	1	5	3	6	7	5	4	8	4	2	5
Fishing Time (hr)	2.0	0.5	2.3	1.0	2.8	1.0	2.5	2.0	1.0	1.8	1.0	0.5
Velocity + Volume	HV-HF	LV-HF	LV-LF	LV-HF	HV-LF	HV-LF	LV-LF	HV-LF	LV-LF	HV-HF	LV-HF	LV-LF
Species												
Blueback herring	5	-	11	4	78	2050	140	42	5145	8	8	1312
Alewife	-	-	-	-	-	-	-	-	-	-	-	13
American shad	2	-	1	-	3	2	1	-	1	-	-	1
Gizzard shad	2141	46	870	453	1182	10350	3728	317	2067	604	692	256
Carp	280	2	4	657	200	-	56	-	-	16	28	-
Quillback	255	-	1	212	50	-	8	74	-	16	-	-
Channel catfish	197	10	318	268	1093	900	280	34	32	106	56	64
White perch	204	8	1328	530	1798	9400	5976	826	24548	90	876	24012
Total	3084	66	2533	2124	4405	22702	10189	1293	31793	840	1660	25659

continued

Table 7. Continued.

Date	6 Jun			7 Jun		8 Jun		9 Jun		10 Jun	
No. Lifts*	5	5	1	4	4	4	5	2	6	5	4
Fishing Time (hr)	2.3	0.3	0.5	1.1	2.3	2.0	2.0	1.0	2.8	2.3	1.8
Velocity + Volume	LV-HF	HV-LF	LV-LF	HV-LF	LV-LF	HV-LF	LV-LF	HV-HF	LV-HF	HV-LF	LV-LF
Species											
Blueback herring	4	54	-	156	-	-	-	-	-	-	-
Alewife	-	-	-	-	-	-	-	-	-	-	-
American shad	-	-	-	2	-	-	-	-	-	-	-
Gizzard shad	1154	1598	600	1436	2228	896	2026	1264	2588	580	649
Carp	78	-	-	-	44	4	-	2	4	4	2
Quillback	125	-	-	-	-	8	-	-	-	-	-
Channel catfish	6502	444	48	396	1988	618	9013	86	4384	1170	37
White perch	152	10594	212	3760	212	20	36	2	-	28	2
Total	8015	12690	860	5750	4472	1546	11075	1354	6976	1782	690

continued

Table 7. Continued.

Date	11 Jun		12 Jun		13 Jun		SEASON TOTALS							
No. Lifts*	5	3	7	1	4	4	Total	Mean Per Hr	Total	Mean Per Hr	Total	Mean Per Hr	Total	Mean Per Hr
Fishing Time (hr)	2.3	1.8	3.2	0.1	2.0	1.8	29.3		25.3		40.2		41.4	
Velocity + Volume	HV-HF	LV-HF	LV-HF	LV-LF	HV-LF	LV-LF	HV-HF		LV-HF		HV-LF		LV-LF	
Species														
Blueback herring	-	2	-	-	-	2	7272	248.2	2863	113.2	10962	272.7	21758	525.6
Alewife	-	-	-	-	-	-	23	0.8	83	3.3	20	0.5	44	1.1
American shad	-	-	-	-	-	-	6	0.2	7	0.3	50	1.2	21	0.5
Gizzard shad	5054	1078	2302	432	1501	1170	33574	1145.9	21669	856.5	35775	889.9	38190	922.5
Carp	11	10	4	-	1	8	4132	141.0	3290	130.0	5399	134.3	1998	48.3
Quillback	-	4	-	-	-	58	2739	93.5	1101	43.5	3287	81.8	1195	28.9
Channel catfish	1233	138	156	56	1155	274	2544	86.8	13838	547.0	18000	447.8	24961	602.9
White perch	5	46	46	144	287	16	46903	1600.8	21679	856.9	76350	1899.3	155704	3761.0
Total	6303	1278	2508	632	2944	1528	98512	3362.2	67548	2669.9	149844	2727.5	243902	5891.4

* The first lift of each day and lifts when the velocity volume schedule could not be followed are not included.

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

Table 8. Comparison of the mean catch per hour with respect to velocity and volume of flow for eight selected species, 8 May through 13 June 1975.

Blueback Herring				Alewife				American shad				Gizzard shad			
	Flows				Flows				Flows				Flows		
Velocities	HF	LF	Total	Velocities	HF	LF	Total	Velocities	HF	LF	Total	Velocities	HF	LF	Total
HV	248.2	272.7	520.9	HV	0.8	0.5	1.3	HV	0.2	1.3	1.5	HV	1145.9	889.9	2035.8
LV	113.2	525.6	638.8	LV	3.3	1.1	4.4	LV	0.3	0.5	0.8	LV	856.5	922.5	1779.0
Total	361.4	798.3		Total	4.1	1.6		Total	0.5	1.8		Total	2002.4	1812.4	

Table 8. Continued.

Carp				Quillback				Channel catfish				White perch			
	Flows				Flows				Flows				Flows		
Velocities	HF	LF	Total	Velocities	HF	LF	Total	Velocities	HF	LF	Total	Velocities	HF	LF	Total
HV	141.0	134.3	275.3	HV	93.5	447.8	541.3	HV	160.8	1899.3	2060.1	HC	3362.2	3727.5	7089.7
LV	130.0	48.3	178.3	LV	43.5	602.9	646.4	LV	856.9	3761.0	4617.9	LV	2669.9	5891.4	8561.3
Total	271.0	182.6		Total	137.0	1049.7		Total	1017.7	5660.3		Total	6032.1	9618.9	

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

Table 9. Time of day American shad (Alosa sapidissima) were taken in the Conowingo Dam Fish Collection Facility, 18 May through 7 June 1975.

Date	18 May	22 May	23 May	24 May	25 May	26 May	27 May	29 May	30 May	31 May	1 Jun	2 Jun	3 Jun	4 Jun	5 Jun	7 Jun		
Water Temp (F)	67	69	70.	72	73	74	74	75	75	74	75	75	76	75	76	75	Total	%
Time (EST)																		
0400-0459	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	2	2.4
0500-0559	-	1	3	-	-	1	2	-	-	-	1	1	1	-	1	-	11	13.3
0600-0659	-	-	2	2	1	32	-	1	1	1	-	1	-	-	-	1	42	50.6
0700-0759	1	-	-	3	1	-	-	1	-	-	-	2	1	-	-	-	9	10.8
0800-0859	-	-	-	1	-	6	-	2	-	-	-	-	-	-	-	-	9	10.8
0900-0959	-	1	2	-	-	-	-	1	-	3	1	-	-	-	-	-	8	9.6
1000-1059	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	2	2.4
Total	1	2	7	6	2	40	3	5	1	4	3	4	2	1	1	1*	83	

* One shad collected at 0532 hr not included. Shad had been dead 2-3 days at time of collection.

Table 10 . Comparison of the percentage of American shad (*Alosa sapidissima*) taken in the Conowingo Dam Fish Collection Facility with water temperature, 1972-1975.

Temperature	1972		1973		1974		1975		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
56	0	-	0	-	6	4.7	0	-	6	1.0
58	0	-	2	2.7	3	2.3	0	-	5	0.9
59	2	0.7	0	-	0	-	0	-	2	0.3
60	2	0.7	1	1.3	0	-	0	-	3	0.5
61	0	-	0	-	3	2.3	0	-	3	0.5
62	2	0.7	3	2.3	0	-	0	-	5	0.9
63	0	-	1	2.3	0	-	0	-	1	0.2
64	1	0.3	3	4.0	0	-	0	-	4	0.7
65	0	-	1	1.3	0	-	0	-	1	0.2
66	0	-	0	-	1	0.8	0	-	1	0.2
67	4	1.4	4	4.3	0	-	1	1.2	9	1.6
68	17	5.8	0	-	1	0.8	0	-	18	3.1
69	24	8.2	10	13.3	2	1.6	2	2.3	38	6.6
70	116	39.6	17	22.7	88	68.8	7	8.3	228	39.3
71	57	19.5	0	-	17	13.3	0	-	74	12.8
72	3	1.0	0	-	0	-	6	7.1	9	1.6
73	0	-	5	6.7	0	-	2	2.3	7	1.2
74	65	27.2	1	1.3	2	1.6	47	56.0	115	19.8
75	0	-	22	29.3	0	-	16	19.0	38	6.8
76	0	-	0	-	4	3.1	3	3.5	7	1.2
77	0	-	1	1.3	1	0.8	0	-	2	0.3
78	0	-	0	-	0	-	0	-	0	-
79	0	-	4	5.3	0	-	0	-	4	0.7
Total	293		75		128		84		580	

Table 11. Daily totals of blueback herring, alewife and hickory shad transported from the Conowingo Dam Fish Collection Facility to Conowingo Pond, 23 April through 16 May 1975.

Date	Alewife	Blueback Herring	Hickory Shad
April 23	0	7000	0
24	0	1105	0
25	224	0	2
26	163	52	0
27	302	0	0
30	60	0	0
May 1	358	0	0
2	209	0	1
3	426	0	0
4	308	0	0
5	130	0	0
6	28	0	0
8	14	1841	0
9	4	19	0
10	24	3	0
11	12	1	0
15	0	4800	0
16	0	1900	0
Total	2262	16721	3
Total Fish	18,986		

Table 12 . Time of day American shad (*Alosa sapidissima*) were taken by anglers fishing from shore just downstream from the Conowingo Dam Fish Collection Facility, 3 May through 31 May 1975.

Date	3 May	4 May	8 May	16 May	17 May	18 May	20 May	21 May	24 May	26 May	31 May	Total
Water Temp (F)	57	56	58	65	66	67	68	68	72	74	74	
Time (EST)												
0500-0559	-	-	-	-	-	1	-	-	3	8	-	12
0600-0659	-	-	-	1	3	-	-	-	8	1	1	14
0700-0759	-	1	-	-	1	-	-	-	1	2	1	6
0800-0859	-	-	-	-	2	-	1	-	-	-	1	4
0900-0959	2	-	-	1	-	-	-	1	-	-	-	4
1000-1059	-	-	-	-	-	-	-	-	-	-	-	-
1100-1159	-	-	1	-	-	-	-	-	-	-	-	1
Total	2	1	1	2	6	1	1	1	12	11	3	41

Table 13. Count of effort for anglers fishing from shore and by boat in the Conowingo Dam tailrace, 2 May - 13 June 1975.

Shore Angler Effort (Hours)				Boat Angler Effort (Hours)			
				East Side		West Side	
Date	Total	Mean	No. Shad Caught	Total	Mean	Total	Mean
2 May	62	16	0	0	0	0	0
3 May	220	31	2	25	8	0	0
4 May	63	13	1	0	0	0	0
5 May	109	18	0	0	0	0	0
6 May	77	13	0	0	0	0	0
7 May	123	21	0	2	2	0	0
8 May	214	24	1	2	2	2	2
9 May	99	20	0	0	0	0	0
10 May	152	30	0	4	4	8	4
11 May	249	42	0	12	3	8	3
12 May	60	12	0	0	0	4	2
13 May	53	9	0	0	0	0	0
14 May	88	15	0	22	7	0	0
15 May	121	17	0	0	0	0	0
16 May	69	12	2	0	0	0	0
17 May	248	35	6	64	9	8	4
18 May	310	34	1	74	9	19	3
19 May	78	11	0	32	6	0	0
20 May	97	16	1	14	5	0	0
21 May	66	9	1	68	11	2	2
22 May	65	9	0	32	5	4	2
23 May	37	7	0	22	7	0	0
24 May	184	26	12	51	9	0	0
25 May	71	10	0	12	4	14	4
26 May	120	17	11	32	6	3	3
27 May	45	6	0	35	6	2	2
28 May	48	7	0	30	8	8	2
29 May	49	8	0	12	4	6	2
30 May	75	8	0	2	2	2	2
31 May	193	28	3	16	4	4	2
1 Jun	57	8	0	2	2	9	3
2 Jun	43	6	0	6	2	3	1
3 Jun	30	5	0	0	0	0	0
4 Jun	56	14	0	9	9	2	2
5 Jun	29	5	0	0	0	8	2
6 Jun	24	6	0	0	0	0	0
7 Jun	170	24	0	12	4	0	0
8 Jun	118	17	0	8	2	0	0
9 Jun	11	4	0	0	0	5	5

continued

Table 13 . Continued.

Date	Shore Angler Effort (Hours) Total	Mean	No. Shad Caught	Boat Angler Effort (Hours) East Side Total	Mean	West Side Total	Mean
10 Jun	32	5	0	0	0	0	0
11 Jun	45	6	0	6	3	4	2
12 Jun	5	1	0	0	0	0	0
13 Jun	31	4	0	0	0	0	0
Total	4096		41	602		125	
Average Per Day	95.3	14.6	0.95	14.0	3.3	2.9	1.3

NOTE: Mean calculated on the basis of the number of hours fishermen were present, not the number of hours in the census period.

Table 14. Status of generation of Conowingo Hydroelectric Station in relation to shore angler catch of American shad (*Alosa sapidissima*) for 1973-1975.

No. Units Operating Small	Large	Status of Unit No. 1	Status of Unit No. 2	No. of Shad Caught 1973	1974	1975	Total	% of Catch 1973	1974	1975	Total
1	0	OFF	ON	10	14	22	46	7.0	27.5	53.7	19.7
2	0	OFF	ON	0	2	3	5	-	3.9	7.3	2.1
3	0	OFF	ON	0	2	2	4	-	3.9	4.9	1.7
4	0	OFF	ON	0	5	1	6	-	9.8	2.4	2.6
4	1	OFF	ON	1	0	0	1	0.7	-	-	0.4
4	2	OFF	ON	2	0	0	2	1.4	-	-	0.9
3	3	ON	ON	1	0	0	1	0.7	-	-	0.4
4	3	OFF	ON	1	1	0	2	0.7	2.0	-	0.9
4	4	OFF	ON	0	9	0	9	-	17.6	-	3.8
4	4	ON	ON	1	0	0	1	0.7	-	-	0.4
5	4	OFF	ON	1	6	2	9	0.7	11.8	4.9	3.8
5	4	ON	ON	1	0	0	1	0.7	-	-	0.4
6	4	OFF	ON	1	3	3	7	0.7	5.9	7.3	3.0
7	3	ON	ON	2	0	0	2	1.4	-	-	0.9
7	4	ON	ON	92	9	8	109	64.8	17.6	19.5	46.6
Changing		Changing		5	0	0	5	3.5	-	-	2.1
Undetermined				24	0	0	24	16.9	-	-	10.6
Total				142	51	41	234				

Table 15. Comparison of the percentage of American shad (*Alosa sapidissima*) taken in the Conowingo Dam Fish Collection Facility with time of day, 1972-1975.

Time of Day	1972		1973		1974		1975		Total**	
	No.	%	No.	%	No.	%	No.	%	No.	%
0400-0459	0	-	6	8.0	0	-	2	2.4	8	1.6
0500-0559	10	3.4	25	33.3	11	8.6	11*	13.3	57	11.5
0600-0659	113	38.6	22	29.3	24	18.8	42	50.6	201	40.7
0700-0759	66	22.6	6	8.0	20	15.6	9	10.8	101	20.4
0800-0859	64	21.8	2	2.7	17	13.3	9	10.8	92	18.6
0900-0959	5	1.7	1	1.3	8	6.3	8	9.6	22	4.5
1000-1059	2	0.7	2	2.7	7	5.5	2	2.4	13	2.6
1100-1159	1	0.3	2	2.7	13	10.2				
1200-1259	3	1.0	2	2.7	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	2.7	2	1.6				
1600-1659	3	1.0	2	2.7	2	1.6				
1700-1759	9	3.1	2	2.7	4	3.1				
1800-1859	6	2.0	0	-	2	1.6				
Total	293		75		128		83		494	

* Does not include 1 American shad collected dead
** Total column includes data from 0400-1059 hours only

Table 16. Comparison of the percentage of American shad (*Alosa sapidissima*) taken by shore anglers with time of day, 1973-1975.

Time of Day	1973		1974		1975		Total	
	No.	%	No.	%	No.	%	No.	%
0400-0459	1	0.7	0	-	0	-	1	.5
0500-0559	1	0.7	2	3.9	12	29.3	15	8.1
0600-0659	10	7.0	10	19.6	14	34.1	34	18.6
0700-0759	14	9.9	12	23.5	6	14.6	32	17.5
0800-0859	10	7.0	4	7.8	4	9.7	18	9.8
0900-0959	18	12.7	9	17.6	4	9.7	31	16.9
1000-1059	17	12.0	11	21.6	0	-	28	15.3
1100-1159	20	14.1	3	5.9	1	2.4	24	13.1
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		183	

* Creel census was not conducted past 1200 hours in 1974 and 1975. Total column does not include American shad taken after 11:59 hours in 1973.

Table 17. Comparison of the percentage of American shad (*Alosa sapidissima*) taken by shore anglers with water temperature 1973-1975.

Temperature	1973		1974		1975		Total	
	No.	%	No.	%	No.	%	No.	%
56	0	-	0	-	1	2.4	1	0.4
57	1	0.7	1	2.0	2	4.8	4	1.7
58	4	2.8	3	5.9	1	2.4	8	3.4
59	10	7.0	3	5.9	0	-	13	5.5
60	8	5.6	7	13.7	0	-	15	6.4
61	33	23.2	8	15.7	0	-	41	17.5
62	27	19.0	14	27.5	0	-	41	17.5
63	56	39.4	3	5.9	0	-	59	25.2
64	3	2.1	0	-	0	-	3	1.3
65	0	-	0	-	2	4.8	2	0.8
66	0	-	0	-	6	14.6	6	2.6
67	0	-	0	-	1	2.4	1	0.4
68	0	-	1	2.0	2	4.8	3	1.3
69	0	-	1	2.0	0	-	1	0.4
70	0	-	10	19.6	0	-	10	2.3
72	0	-	0	-	12	29.3	12	5.1
74	0	-	0	-	14	36.6	14	6.0
	142		51		41		234	

Table 18. Susquehanna River flows (expressed as a 24-hr average) and water temperatures at Conowingo Dam from 1 April-30 June 1972-1975. River flow data provided by Susquehanna Electric Company. River temperatures taken at Conowingo Dam Fish Collection Facility.

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)
Apr 1	-	54.1	48.0	44.8	-	89.9	-	61.6
2	-	56.1	50.0	54.8	-	94.0	-	58.1
3	-	57.7	50.0	64.4	-	97.0	-	53.7
4	-	62.6	51.0	87.6	-	147.4	-	54.9
5	-	65.6	50.0	133.6	-	200.2	-	63.7
6	-	60.6	-	155.7	-	193.5	-	73.5
7	-	57.6	-	163.0	-	164.8	-	74.1
8	-	55.2	-	144.7	-	133.6	-	68.8
9	-	53.6	-	131.4	-	114.9	-	58.9
10	-	49.5	-	118.5	-	104.4	-	53.1
11	-	47.5	-	120.6	-	93.1	-	48.7
12	46.0	45.2	-	112.6	-	81.0	-	45.5
13	-	45.8	-	99.8	-	83.7	-	43.9
14	49.0	51.5	-	88.4	-	94.9	-	37.5
15	-	68.3	-	77.7	-	101.4	-	37.6
16	-	103.1	50.0	65.4	-	101.4	-	34.3
17	52.0	145.8	50.0	58.6	-	112.4	-	32.1
18	52.0	225.6	51.0	50.9	54.0	97.3	51.0	32.5
19	-	213.7	52.0	49.7	55.0	80.2	-	31.3
20	-	168.6	55.0	42.5	53.0	68.1	-	30.6
21	55.0	139.1	57.0	41.1	-	59.9	54.0	30.8
22	-	121.5	58.0	40.9	56.0	53.0	54.0	30.3
23	-	116.8	59.0	37.1	57.0	48.6	55.0	30.8
24	53.0	107.6	60.0	34.9	56.0	44.1	56.0	32.5
25	-	97.5	62.0	35.8	56.0	41.7	57.0	38.1
26	53.0	86.5	61.0	42.6	58.0	38.5	59.0	53.3
27	53.0	75.6	61.0	41.1	58.0	37.7	57.0	60.6
28	53.0	67.6	62.0	53.7	57.0	36.1	58.0	55.9
29	55.0	59.7	60.0	60.8	58.0	31.8	58.0	49.1
30	55.0	53.3	56.0	63.0	59.0	30.8	57.0	45.7
May 1	56.0	47.3	55.0	65.3	60.0	26.9	57.0	42.4
2	57.0	42.4	56.0	62.1	61.0	26.7	58.0	39.6
3	59.0	43.6	57.0	55.7	60.0	29.6	57.0	35.2
4	59.0	52.3	58.0	51.0	62.0	32.1	56.0	47.4
5	60.0	76.8	-	46.9	62.0	32.7	57.0	65.5
6	59.0	101.4	58.0	46.8	62.0	31.0	58.0	79.9
7	61.0	102.2	58.0	40.9	63.0	28.9	58.0	91.9
8	61.0	88.1	58.0	37.6	61.0	28.8	58.0	94.4
9	61.0	75.0	59.0	38.2	63.0	28.2	59.0	106.9
10	-	86.8	59.0	38.1	61.0	28.0	61.0	92.3
11	-	107.7	61.0	40.9	60.0	27.1	61.0	79.0
12	-	139.3	-	55.0	60.0	33.6	60.0	63.9
13	59.0	118.7	63.0	58.9	60.0	43.9	62.0	60.1
14	58.0	97.0	63.0	64.2	59.0	63.6	63.0	58.7
15	59.0	81.4	63.0	60.1	63.0	88.7	64.0	55.5
16	60.0	74.2	60.0	54.7	64.0	86.6	65.0	64.9
17	62.0	76.9	60.0	48.9	65.0	70.8	66.0	64.5
18	63.0	74.9	60.0	50.1	65.0	57.8	67.0	66.1
19	65.0	75.6	59.0	48.5	66.0	49.8	68.0	61.5
20	64.0	72.5	59.0	52.3	67.0	43.2	68.0	55.6
21	66.0	68.3	58.0	52.1	68.0	41.7	68.0	49.7

continued

Table 18. 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)
May 22	66.0	64.5	57.0	59.0	70.0	37.9	69.0	44.5
23	66.0	59.7	60.0	69.3	71.0	37.7	70.0	41.4
24	67.0	54.4	59.0	75.8	70.0	32.4	72.0	38.5
25	68.0	47.6	59.0	73.9	70.0	29.5	73.0	38.5
26	67.0	44.2	58.0	68.8	70.0	27.8	74.0	36.3
27	68.0	37.9	57.0	65.3	70.0	27.3	74.0	36.2
28	68.0	34.6	56.0	72.3	70.0	25.7	75.0	32.5
29	69.0	30.6	58.0	86.6	70.0	23.1	75.0	32.1
30	70.0	27.2	59.0	78.9	71.0	22.2	75.0	28.8
31	70.0	30.5	-	75.4	70.0	21.7	74.0	29.3
Jun 1	70.0	47.5	63.0	66.2	70.0	22.3	74.0	35.4
2	70.0	53.2	64.0	57.0	70.0	23.6	75.0	28.2
3	71.0	53.5	65.0	52.5	69.0	22.8	76.0	26.7
4	71.0	52.4	66.0	45.5	69.0	24.8	75.0	25.4
5	71.0	50.7	67.0	43.9	70.0	20.9	76.0	26.1
6	70.0	43.3	69.0	42.5	70.0	19.4	76.0	34.4
7	71.0	42.3	70.0	44.5	70.0	17.0	75.0	54.2
8	70.0	41.8	70.0	53.8	70.0	16.7	74.0	92.6
9	70.0	39.7	74.0	50.2	70.0	15.8	71.0	91.8
10	72.0	33.4	75.0	45.8	71.0	11.4	68.0	67.9
11	70.0	31.5	77.0	40.9	72.0	14.5	67.0	53.1
12	70.0	28.7	-	34.8	72.0	13.1	68.0	50.2
13	70.0	28.6	-	33.5	72.0	12.4	68.0	52.0
14	70.0	29.2	79.0	29.3	73.0	12.8	-	52.8
15	70.0	25.2	79.0	27.1	73.0	11.7	-	55.9
16	71.0	27.3	79.0	29.1	73.0	13.4	-	49.6
17	71.0	30.0	79.0	30.2	74.0	14.8	-	45.6
18	71.0	36.2	77.0	28.0	74.0	22.3	-	45.3
19	72.0	40.2	76.0	25.4	76.0	24.8	-	43.2
20	74.0	44.0	75.0	23.8	76.0	28.8	-	37.6
21	74.0	47.3	75.0	22.5	76.0	22.1	-	33.8
22	-	409.0	75.0	25.1	76.0	19.5	-	30.8
23	-	868.4	75.0	26.5	76.0	20.0	-	25.6
24	-	969.4	73.0	29.4	77.0	19.3	-	24.4
25	-	801.4	73.0	27.0	75.0	19.7	-	21.6
26	-	559.3	73.0	25.0	75.0	18.8	-	21.8
27	-	365.6	74.0	26.4	75.0	16.8	-	26.1
28	-	235.6	75.0	24.4	74.0	20.3	-	38.8
29	-	198.5	75.0	33.9	74.0	21.5	-	41.2
30	-	100.8	77.0	37.9	74.0	23.2	-	36.0

Table 19. The distribution of boats in the tailrace of Conowingo Dam, under various conditions of generation of Conowingo Hydro-electric Station, 1973-1975.

No. Units Operating		No. Boat Hrs East Side				No. Boat Hrs West Side				% East Side				% West Side			
Small	Large	1973	1974	1975	Total	1973	1974	1975	Total	1973	1974	1975	Total	1973	1974	1975	Total
0	0	0	26	0	26	0	37	0	37	-	41.3	-	41.3	-	58.7	-	58.7
1	0	21	29	26	76	15	64	31	110	58.3	31.2	45.6	40.9	41.7	68.8	54.4	59.1
2	0	6	7	12	25	16	8	9	33	27.3	46.7	57.1	43.1	72.7	53.3	42.9	56.9
3	0	6	24	11	41	14	24	2	40	30.0	50.0	84.6	50.6	70.0	50.0	15.4	49.4
4	0	22	75	0	97	32	63	0	95	40.7	54.3	-	50.5	59.3	45.7	-	49.5
5	0	0	0	0	0	6	0	0	6	-	-	-	-	100.0	-	-	100.0
0	1	3	0	0	3	0	0	0	0	100.0	-	-	100.0	-	-	-	-
3	1	3	0	0	3	2	0	0	2	60.0	-	-	60.0	40.0	-	-	40.0
4	1	39	97	33	169	38	23	4	65	50.6	80.8	89.2	72.2	49.4	19.2	10.8	27.8
5	1	0	2	0	2	0	0	0	0	-	100.0	-	100.0	-	-	-	-
3	2	1	25	3	29	1	6	0	7	50.0	80.6	100.0	80.6	50.0	19.4	-	19.4
4	2	35	59	39	133	33	9	3	45	51.5	86.8	92.9	74.7	48.5	13.2	7.1	25.3
5	2	4	5	9	18	1	0	0	1	80.0	100.0	100.0	94.7	20.0	-	-	5.3
6	2	2	3	0	5	0	0	0	0	100.0	100.0	-	100.0	-	-	-	-
3	3	2	0	0	2	0	0	0	0	100.0	-	-	100.0	-	-	-	-
4	3	31	70	32	133	8	18	9	35	79.5	79.5	88.4	79.2	20.5	21.5	21.6	20.8
5	3	30	25	7	62	4	4	0	8	88.2	86.2	100.0	88.6	11.8	13.8	-	11.4
6	3	1	0	0	1	0	0	0	0	100.0	-	-	100.0	-	-	-	-
7	3	7	0	37	44	1	0	6	7	87.5	-	86.0	86.3	12.5	-	14.0	13.7
3	4	9	0	0	9	4	0	0	4	69.2	-	-	69.2	30.8	-	-	30.8
4	4	38	34	18	90	5	6	2	13	88.4	85.0	90.0	87.4	11.6	15.0	10.0	12.6
5	4	25	55	8	88	4	2	0	6	86.2	96.5	100.0	93.6	13.8	3.5	-	6.4
6	4	22	8	27	57	1	2	4	7	95.7	80.0	87.1	89.1	4.3	20.0	12.9	10.9
7	4	804	219	340	1363	129	43	55	227	86.2	83.6	86.1	86.2	13.8	16.4	13.9	13.8
Changing		40	0	0	40	3	0	0	3	93.0	-	-	93.0	7.0	-	-	7.0
Total		1151	763	602	2516	317	309	125	732	78.4	72.5	82.8	77.5	21.6	27.5	17.2	22.5