SUMMARY OF THE OPERATION OF THE CONOWINGO DAM FISH COLLECTION FACILITY DURING THE SPRING OF 1977

by

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FISH FACILITY OPERATION REPORT 6

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INTRODUCTION

The Conowingo Dam Fish Collection Facility was operated from 1972 to 1976 as part of a five-year program "for restoration of the American shad to the Susquehanna River". This program was initiated by an agreement signed on 29 September 1970 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 U. S. Department of the Interior. The Susquehanna River Anadromous Fish Restoration Committee was established to direct the program. Results of the operation of the Fish Facility were reported by: Robbins, 1972, Foote and Robbins, 1973, Buchanan and Robbins, 1974, Buchanan, 1975 and Kotkas and McGhan, 1976.

The above agreement terminated in 1976. On the recommendation of the Restoration Committee, Philadelphia Electric Company agreed to continue operation of the fish facility in 1977 according to procedures outlined by Foote and Robbins (1977).

This report summarizes the 1977 operation. Items discussed include: (1) schedule of operation, (2) attraction velocity, (3) disposition of catch, including transportation of fishes above Conowingo and York Haven dams, (4) a creel census below Conowingo Dam, (5) statistics on the catch of the American shad, and (6) a comparison of data obtained in 1977 with that of 1972 through 1976.

METHODS

Schedule of Operation

The 1977 operation of the fish collection facility began on 16 April. Required maintenance work limited operation to 0800-1200 EST. High river flows prior to 16 April prevented operation designed to check for the presence of alewife or blueback herring in the tailrace. Daily operation of the facility (sunrise to 1200 EST) began on 17 April and continued through 30 June. Operation was extended to 1300 EST on 21, 23, 25, 28 and 29 May, and on 4 and 7 June when catches of American shad occurred between 1100 and 1200 EST.

Mechanical problems which prevented operation were few. Binding of the hopper mechanism as it traveled vertically from the holding channel prevented operation on 30 April. Repairs on the weir gates prevented sampling from 0430-0530 EST on 3 June.

The length of fishing time per lift ranged from 1 to 60 minutes depending on the relative abundance of fishes in the tailrace. One to five minute sets were used when large numbers of gizzard shad were present. Sets of thirty minutes were most common.

The fish collection facility was also operated from 0430-1200 EST on 5 July and from 0700-1200 EST on 30 July, to determine the abundance of striped bass in the Conowingo Dam tailrace. When present in sufficient numbers in the catch, they were transported above the dam. Plant personnel were asked to census the daily angler catch of striped bass on the stoplog gallery and the west shore of the tailrace at 0700, 1000 and 1400 hrs during July. Close contact was also maintained with Mr. Frank Carter (local fishman and guide) to obtain catch reports. Information from these sources was used to select days when striped bass would most likely be taken in the fish facility.

Attraction Velocity

A standard entrance velocity averaging 6 fps was maintained from 16 April through 2 June, but high and low flows (volume of attraction water) were alternated. Low flow conditions existed when both station service units were set at 35% gate. High flow conditions were established by operating station service units 1 and 2 at 35% and 75% gate.

When striped bass appeared in the catch in early June a velocity averaging 4 fps was initiated. A high and low velocity schedule was run daily. This procedure began on 3 June and continued through 30 June. Velocity and flow conditions were subject to slight changes since the discharge of one service unit varies depending on plant demand. The schedule of test conditions is summarized on Table 1.

Past records revealed that the intermediate crowder gate position (V-trap) was more efficient than the full open position for collection of anadromous fishes. Therefore this gate position was used throughout the 1977 season.

Operation of the Conowingo Hydroelectric 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 mortalities due to oxygen depletion, a generator was operated continuously between 22 April and 20 June (Shuman, 1977). In 1977, Main Generating Unit 2 was operated to provide oxygenated water from Conowingo Pond and provide an attraction current along the west shore of the tailrace, near the fish facility.

Station engineers were requested to modify the operation of Main Generating Unit 1, within their capacity to do so, to prevent excessive turbulence near the entrance of the collection facility. When Unit 1 was scheduled for operation it was the last unit on line.

Disposition of Catch

All catches were released into a 6' x 12' x 4' sorting tank. The catch was then examined for diadromous fishes (American shad, hickory shad, alewife, blueback herring, American eel, and striped bass). If sufficient numbers of any of these fishes were available for transportation, they were hand sorted from the sorting tanks and placed into tank trucks.

Three tank trucks were available for transportation of fish to points above Conowingo Dam. One truck carried a 600 gallon plywood tank equipped with air pumps and constructed by the Pennsylvania Fish Commission in 1972. A second truck had a new 1,000 gallon circular fiberglass transport tank added in 1977 to increase the capacity to move fish above the dams. This tank was equipped with water pumps with bleeder values to provide both circulation and aeration. The third truck contained a 460 gallon fiberglass transport tank which was equipped with an oxygen cylinder for aeration. This truck was used for transporting striped bass to Conowingo Pond and to move tagged American shad to Shures Landing (3/4 mi downstream from Conowingo Dam).

American shad were transported above York Haven Dam whenever a minimum of 10 shad could be obtained in a relatively short time (about 2 h). If fewer than 10 shad were collected they were either tagged with a fly anchor tag (FD-67) and released at Shures Landing, transported with other species if available, or transported to Conowingo Pond if 7 or 8 could be collected in about 2 h.

All catches were counted or subsampled except when large number of fishes were available for transport and a visual estimate was made. 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 used to partition off 1/8, 1/5, 1/4, or 1/2 of the catch. Fishes not included in the subsample were 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. Visual estimates were also made whenever there were large catches that might result in mortalities due to oxygen deficiency. These catches were immediately released into the tailrace.

Collection of data other than numbers of fishes, included length, weight, sex, and scale samples from alosids (blueback herring and those American shad that died during transportation) and other resident fishes. Length and scale samples were also taken from American shad caught by west shore anglers and boat anglers coming ashore at Shures Landing.

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 1977 is given in Table 2.

Tagging Program

A tagging program was recommended by the Evaluation Subcommittee to determine the numbers of fishes recaptured in the facility. John R. Sheridan of the U. S. Fish and Wildlife Service, and Richard W. Marshall and staff of the Pennsylvania Fish Commission tagged fishes on 1 and 2 June. The fishes were tagged with floy anchor tags and released into the tailrace from the sorting tank. Numbers and species recaptured in the facility were recorded from 1 to 29 June. The tags of recaptured fish were partially clipped so that multiple recaptures could be identified.

Creel Census

A creel census was conducted below Conowingo Dam to determine: (1) angler effort and overall angler success, (2) if the distribution of shad changes in the tailrace with the phases of operation of Conowingo Hydroelectric Station and (3) if a relationship existed between the angler catch and the collection of shad in the fish facility.

The number of anglers fishing from the west shore of the tailrace, the catch of American shad by these anglers and the number and distribution of boats were counted. These data and the status of generation of Conowingo Station were recorded once an hour from sunrise until termination of daily operation of the fish facility. Daily shore angler effort (hours) was determined by adding the number of fishermen counted in each hour of the daily census period. The census began 16 April and continued through 30 June. The tailrace was divided into east and west sections by an imaginary line from Unit No. 6 to the northern tip of Rowland Island. This facilitated recording the changes in distribution of boats in relation to status of generation.

RESULTS

A total of 975 lifts yielded a catch of 1,274,807 fish representing 12 families and 40 species (Table 3). A new species was collected in 1977. A tidewater silverside (Menidia beryllina) was taken on 24 June. The predominate species was gizzard shad (784,301), followed by white perch (234,277), channel catfish (112,940) and blueback herring (30,742). The anadromous clupeids (alewife, blueback herring, hickory shad, and American shad) made up 2.4% of the catch. From 1972 through 1976, these species have respectively comprised 25.9%, 35.1%, 20.7%, 8.1% and 2.8% of the catch. Annual comparison of catch per 100 hr demonstrates this downward trend (Fig. 1). The only species to show sustained increases in population is the gizzard shad.

The catch of blueback herring in 1977 was the lowest observed since operation of the facility began in 1972. Three peaks in blueback herring abundance were noted. These occurred during the weeks of 16 April, 23 May and 20 June. Water temperatures during these weeks ranged from 57-64 F, 70-76 F and 70-75 F.

Alewife abundance was the lowest observed in six years of facility operation. A total of 188 alewife was collected. Most were taken the week of 30 May at water temperatures of 73 to 76 F.

It is possible that runs of "herring" (alewife and blueback herring) occurred before operation of the facility began (16 April). However, runs into Deer Creek (a tributary 3.3 miles downstream from Conowingo Dam) appeared smaller than in previous years. Ichthyological Associates personnel made observations at Deer Creek three days per week throughout March and early April. Low numbers of herring (2 or 3) were first observed on 30 March. The most herring observed at any one time (about 100) were present on 13 April. No more than several dozen herring were observed at any other time in early April. Contacts were made with commercial fishermen working the Susquehanna Flats and they reported only low catches of herring in March and early April.

Hickory shad were absent from the catch for the second consecutive year. The hickory shad catch in the facility has declined steadily since 1973 when 738 individuals were collected.

Relatively few American eel were taken in 1977 compared with previous years. Eels comprised 1.2% at the 1977 catch. The greatest numbers were taken between 16 and 29 May when water temperatures ranged from 61 to 76 F.

The catch of striped bass in 1977 was the highest since 1973. A total of 2,126 was collected. Most were taken during the weeks of 30 May and 20 June when water temperature ranged from 73-76 F and 70-75 F. A low velocity

schedule (4 fps) was used through most of June to facilitate the catch of striped bass. The catch per hour of striped bass was slightly higher under low velocity conditions (Table 4). However, results of a one-way analysis of variance indicate that the difference in catch per hour was not significant.

Data from the clean out lift and the first lift with the crowder gates open were not included in Tables 4 and 9 where the effects of velocity and volume are compared. 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 periods of operation. The first lift with the crowder gates open usually contained large numbers of fishes which had gathered behind the crowder gates. These fishes were collected independent of attraction velocity or volume of water.

Operation of the facility in July to check for the presence of striped bass resulted in a catch of 444 (Table 5). Most of these were young-of-year between 50-80 mm. Two American shad were collected on 5 July. One (female) was tagged and released at Shures Landing while the other, a spent female, died prior to release. Of the 11,898 fish collected in July, 6,792 were gizzard shad. Approximately 90% of these were young-of-year between 65-93 mm.

American Shad Catch

A total of 191 American shad was collected between 20 April and 29 June. This was the largest catch since 1972 when 293 were taken. A total of 29 shad were transported to Conowingo Pond. Fifteen were released at the Muddy Creek Boat Access (upper Conowingo Pond) while the remainder (14) were released at Broad Creek. Sixty shad were transported to York Haven Pond. A total of 78 tagged fish were released at Shures Landing. Nine individuals were released to the tailrace without a tag when the tag gun was inoperable. Sixteen shad died prior to release.

Two recaptures of tagged shad were made in the facility. The first was a female tagged on 23 May and recaptured on 28 May. It was transported to York Haven with a load of other shad. The second recapture occurred on 27 June when a male returned after being tagged on 7 June. This fish was released at Shures Landing. No tags have been returned by anglers.

The sex ratio of 190 shad examined in 1977 was 0.51 males to 1.00 females (Table 6). All of the males were ripe while most of the females were green. Five ripe females were observed in the catch.

Conditions of operation associated with the collection of shad are given in Table 7. Data from the lift proceeding and following one(s) which contained shad are included to show which variables may have changed. Most (64.8%) of the shad were collected when one small and no large units were operating (Table 8). No shad were collected when there was full generation. Table 9 shows the difference in collection of fishes under high and low flow conditions. Results of a one-way analysis of variance indicate no significant difference in catch per hour between flow conditions for the American shad. Similar results were obtained with blueback herring.

The peak hourly catch of shad occurred between 0700 and 0800 EST when 53 fish (27.5%) were collected (Table 10). No shad were collected before 0500 EST and 10 were taken between 1100 and 1200 EST. Most (106) shad were taken at a water temperature of 75 F (Table 11).

Age determinations were made on 18 American shad collected in the facility and 78 shad taken by anglers. Ages ranged from III to V; most (65.6%) were age IV (Table 12). Females comprised 66.7% and 84.2% of the four and five year olds, while males comprised 92.8% of the three year olds. Six shad (2 males and 4 females) had returned as repeat spawners (6.2% of those aged). Both males and two females were age IV. The other females were age V.

Fish Transportation

From 17 April to 29 June, a total of 5,328 fish was transported to points above Conowingo Dam (Table 13). Release locations were: Muddy Creek and Broad Creek boat access areas on the west shore of Conowingo Pond, and the public boat access in Goldsboro, Pennsylvania on the west shore of York Haven Pond.

Transportation of blueback herring occurred in two priods; from 17 to 20 April and from 22 to 29 June. A total of 4,656 blueback herring were transported to either Conowingo Pond or York Haven Pond. The largest number of herring carried in one load was 1,054, and the most transported in one day (20 April) was 1,405. The goal of transporting 50,000 herring was not met due to an unusually small herring run and the time-consuming process of hand sorting the herring from large catches of gizzard shad and white perch.

A total of 583 striped bass was transported to Conowingo Pond from 1 to 29 June. The most transported in one day was 102 on 26 June. An additional 300 juvenile striped bass were collected and transported to Conowingo Pond on 30 July (Table 5). Most were young-of-year between 50-80 mm. Creel census data provided by plant personnel showed that few striped bass were taken by anglers off the stoplog gallery and along the west shore of the tailrace during most of July. The largest daily catch reported was 45 fish (150 to 280 mm) on 28 July.

Mortalities during transportation were few. The largest mortality (about 150) occurred on 17 April when 996 blueback herring were transported to York Haven Pond. Less than a dozen blueback herring died during other trips to Conowingo or York Haven ponds. Only one American shad died during transportation. This occurred on 27 May when 11 shad were transported to York Haven Pond.

The results of fish transportation were inconclusive. One young-of-year blueback herring (32 mm) was collected in Conowingo Pond on 15 June. No evidence of American shad reproduction in the Pond was detected. Emigrating

American shad were taken in Conowingo Pond. One shad (103 mm) was taken by trawl on 18 October. Impingement sampling at Peach Bottom Atomic Power Station on 19 and 20 October resulted in the collection of 16 shad (98 mm-118 mm FL). Their origin may be from either the 6 million eggs or sixty adult shad released above York Haven Dam, or from the Van Dyke Shad Hatchery.

Tagging Program

A total of 201 fish was recaptured between 1 and 29 June (Table 14). This represents 7.4% of the 2,731 tagged. Most (184) were gizzard shad, with 13 bluegill and one each of golden shiner, redbreast sunfish, white crappie and walleye. The greatest number of returns for one day was 35 on 7 June. Recaptures normally averaged about six or seven per day.

Of the 184 gizzard shad returns, eight were gizzard shad recaptured a second time. Of the 13 bluegill returns, six were recaptured twice and one recaptured a third time.

Creel Census

A total of 71 American shad was taken by west shore anglers from 16 April to 27 May. Most were caught from 0600 to 0800 EST (Table 15). Anglers were most successful on 23 May when 13 shad were taken. Anglers caught 69.0% of the shad when one small unit (5,000 cfs) and no large units (10,000 cfs) were operating (Table 16). Only 7.0% of the shad were taken by shore anglers at full generation. Shore angler effort averaged 89.1 hours per day while the success rate was 0.010 shad per hour (Table 17). The greatest fishing pressure (57.4%) occurred on weekend days.

Angling effort from boats was greatest on the east side of the tailrace below the large generating units. Approximately 57% of all boat hours were recorded on the east side (Table 18). The total boat hours of effort was slightly higher in 1977 than in 1975 and 1976 but lower than in 1973 and 1974.

SUMMARY OF THE SHAD CATCH, 1972-1977

Since 1972, 864 American shad have been taken in the Conowingo Dam Fish Collection Facility (Table 19). Most shad (83.9%) 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 six years. The catch of shad by shore anglers was more evenly distributed through the morning hours (Table 21).

Most shad (80.8%) collected in the facility were taken at water temperatures of 68-71 F and 74-75 F (Table 11). Shad catches by shore anglers were more evenly distributed with water temperature though most (71.8%) were taken between water temperatures of 61 and 68 F (Table 22).

In 1973-1977, 74.2% of the shad were taken in the facility when no large generating units were operating (Table 8). Anglers fishing from shore took 41.8% of their catch under similar conditions (Table 16). A total of 27.1% of the anglers catch was made when all units were operating.

Shore angler effort steadily declined from 1973 to 1976. In 1977 there was a small increase in angler effort. The catch of American shad per angler hour was the highest in 1976 (0.041). In the remaining years, catch per angler hour ranged from 0.007 to 0.010 (Table 17). Weekend angling effort comprised 43 to 57% of the total angler effort from 1973 through 1977.

The sex ratio of shad taken in the facility from 1972 to 1977, was 42.8% male and 57.2% female (Table 6). Almost all males were ripe. Approximately 67% of all females were green, 11% ripe and 22% were spent.

Age composition of adult shad caught in the collection facility and by anglers was similar for each years catch (Table 12). Most shad taken were age IV. The rest of the catch was divided between three and five year olds. Three year olds consisted mostly of males (45 of 54 specimens collected since 1972) while the five year olds consisted mostly of females (60 of 77 shad collected since 1972).

The catch of repeat spawners ranged from a high of 18.8% of the catch in 1976 to a low of 5.9% in 1975. Repeat spawners comprised 9.5% of the 1972 catch and 15.6% of the 1974 catch. Only six scale samples were taken in 1973 preventing a valid estimate of repeat spawners. Most repeat spawners were age IV and had one spawning mark. One five year old and two seven year olds had two spawning marks.

Daily river flows and water temperatures, for April-June, 1972-1977 (Table 23), has been included to aid those who might attempt further analysis of past facility operation. River flows in 1977 were below normal. This may have facilitated the shad catch since generation often did not begin until after 0900 EST.

SUMMARY OF FISH TRANSPORTATION-1972-1977

The goal of transporting fishes above Conowingo Dam has differed from 1972 to 1977. From 1972 through 1974 the main objective was to transport American shad to Conowingo Pond. In 1975 and 1976 the goal was to tag and release American shad at Shures Landing and to transport all other anadromous species (blueback herring, hickory shad and alewife) to Conowingo Pond. In 1977 the emphasis was to transport all anadromous species to points above Conowingo Dam. American eel and striped bass were also transported, when available in sufficient numbers, in 1976 and 1977. A total of 36,218 fishes was transported above Conowingo Dam from 1972 through 1977. Most of these were blueback herring with 29,499 transported (Table 24).

Ichthyological Associates monitoring studies in Conowingo Pond have provided evidence of successful alewife and blueback herring reproduction above Conowingo Dam. Prior to 1977 a total of eleven young-of-year was collected,

all in 1976; three alewife and three blueback herring were collected by trawl and five alewife were found on the vertical traveling screens of the Peach Bottom Atomic Power Station (Ichthyological Associates, Inc., 1977). No adult alosids have been collected.

In 1972, 2,500± white perch and 100± gizzard shad were inadvertently introduced into Conowingo Pond during testing for transplantation of the American shad. Since this introduction, only two white perch have been collected by Ichthyological Associates. Both were members of the 1970 year class and perhaps were from the original group transported. A successful population has not been established in Conowingo Pond. Since 1972 all white perch and gizzard shad were sorted from fish being transported above Conowingo Dam.

The gizzard shad has become established in Conowingo Pond and connecting waters (Muddy Run Pumped Storage Pond and Muddy Run Recreation Lake). The spawning success of the gizzard shad population has been monitored by the larval fish sampling program in Conowingo Pond (Tables 25 and 26). In 1973, 4% of the fish larvae obtained were gizzard shad. Since 1973 the percentage of larval gizzard shad has increased to 96% of the catch in 1975 and 89% in 1976 (Table 27).

Gizzard shad gained access to the Muddy Run Pumped Storage Pond as eggs or larvae during pumping from Conowingo Pond in 1972. The Muddy Run population of shad has increased since 1972 when only three were taken in block net cove samples. By the fall of 1975 the catch had increased tc 18,745 fish per acre (Table 28). The catch was mostly young-of-year; adults may prefer deeper water and avoid coves. Studies are now underway to determine effects of the gizzard shad population on the biota of Conowingo Pond, the Pumped Storage Pond and the Muddy Run Recreation Lake.

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Table 1. Schedule of test velocities and volumes for the Conowingo Dam Fish Collection Facility, 16 April-30 June 1977.

Period No.	Condition	Service Unit Gate Settings No. 1	Service Unit Gate Settings No. 2	Entrance Weir Setting: Depth below tailrace (ft)	Entrance Weir Setting: Velocity (ft/sec)
1	High Flow	35%	75%	5.1	6.0
2	Low Flow	35%	35%	3.1	6.0
3	Extra Low Flow	35%	0%	1.7	6.0
4*	Low Velocity - Low Flow	35%	35%	5.7	4.0

* Used after 2 June when striped bass were in the tailrace

Table 2. List of scientific and common names of fishes collected in the Conowingo Dam Fish Collection Facility, 1972-1977 (according to Bailey, 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 - Belonidae	Needlefishes
Alosa aestivalis	Blueback herring	*Strongylura marina*	Atlantic needlefish
Alosa mediocris	Hickory shad		
Alosa pseudoharengus	Alewife	Family - Cyprinodontidae	Killifishes
Alosa sapidissima	American shad	*Fundulus heteroclitus*	Mummichog
Brevoortia tyrannus	Atlantic menhaden		
Dorosoma cepedianum	Gizzard shad	Family - Atherinidae	Silversides
		Menidia beryllina	Tidewater silverside
Family - Salmonidae	Trouts		
Coregonus artedii	Lake herring	Family - Percichthyidae	Temperate basses
Salmo gairdneri	Rainbow trout	*Morone americana*	White perch
Salmo trutta	Brown trout	*Morone saxatilis*	Striped bass
Salvelinus fontinalis	Brook trout		
		Family - Centrarchidae	Sunfishes
Family - Esocidae	Pikes	*Ambloplites rupestris*	Rock bass
Esox niger	Chain pickerel	*Lepomis auritus*	Redbreast sunfish
Esox lucius	Northern pike	*Lepomis cyanellus*	Green sunfish
Esox masquinongy	Muskellunge	*Lepomis gibbosus*	Pumpkinseed
		Lepomis macrochirus	Bluegill
Family - Cyprinidae	Minnows and carps	*Micropterus dolomieui*	Smallmouth bass
Carassius auratus	Goldfish	*Micropterus salmoides*	Largemouth bass
Cyprinus carpio	Carp	*Pomoxis annularis*	White crappie
Notemigonus crysoleucas	Golden shiner	*Pomoxis nigromaculatus*	Black crappie
Notropis amoenus	Comely shiner		
Notropis hudsonius	Spottail shiner	Family - Pereidae	Perches
Notropis rubellus	Rosyface shiner	*Etheostoma olmstedi*	Tessellated darter
Notropis spilopterus	Spotfin shiner	*Perca flavescens*	Yellow perch
Rhinichthys cataractae	Longnose dace	*Stizostedion vitreum*	Walleye
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, 16 April-30 June 1977.

Dates	16-24 Apr	25 Apr-1 May	2-8 May	9-15 May	16-22 May	23-29 May
No. Lifts	88	66	85	83	93	95
Fishing Time (hr)	25.8	25.7	28.7	30.1	28.7	30.9
Water Temperature (F)	57-64	56-66	58-63	60-63	61-69	70-76
Lampreys						
Sea lamprey	2	9	-	-	-	-
Freshwater Eels						
American eel	857	266	101	111	4,637	6,876
Herrings						
Blueback herring	19,471	10	107	-	960	3,354
Alewife	8	-	4	4	20	-
American shad	7	-	-	-	20	126
Atlantic menhaden	-	-	-	-	-	-
Gizzard shad	124,931	45,238	137,042	68,798	150,926	114,769
Trouts						
Rainbow trout	11	6	37	36	56	80
Brown trout	21	8	130	21	179	241
Brook trout	-	-	1	-	-	-
Pikes						
Chain pickerel	-	-	-	-	-	1
Northern pike	-	-	1	1	-	-
Muskellunge	26	3	7	2	5	-
Minnows and carps						
Goldfish	-	-	-	-	-	-
Carp	1,100	2,195	255	177	2,268	5,823
Golden shiner	139	82	28	8	133	112
Comely shiner	-	100	-	50	225	-
Spottail shiner	4,161	2,940	-	-	100	50
Spotfin shiner	7	-	-	100	1,065	5,325
Suckers						
Quillback	-	162	-	-	469	5,737
White sucker	-	-	36	34	46	130
Shorthead redhorse	449	69	262	157	688	91
Freshwater catfishes						
White catfish	133	8	132	105	114	588
Yellow bullhead	-	-	-	-	-	2
Brown bullhead	137	267	159	85	84	286
Channel catfish	8,937	19,418	4,091	2,416	2,763	6,174
Silversides						
Tidewater silverside	-	-	-	-	-	-
Temperate Basses						
White perch	105,215	12,959	53,516	21,714	14,423	5,220
Striped bass	-	-	-	-	-	177
Sunfishes						
Rock bass	40	14	9	-	22	53
Redbreast sunfish	65	268	269	365	1,186	2,818
Green sunfish	-	-	15	17	16	32
Pumpkinseed	1	4	63	86	215	399
Bluegill	60	31	146	121	691	974
Lepomis hybrid	-	-	-	-	4	-
Smallmouth bass	135	54	84	47	259	59
Largemouth bass	6	1	-	2	5	-
White crappie	78	1	1	23	46	207
Black crappie	18	-	37	22	30	92
Perches						
Yellow perch	37	11	61	7	125	265
Walleye	282	36	206	74	350	414
Total	266,334	84,160	196,800	94,583	182,130	160,475

continued

Table 3. Continued.

Dates	30 May-5 Jun	6-12 Jun	13-19 Jun	20-26 Jun	27-30 Jun	Totals
No. Lifts	83	81	77	80	44	875
Fishing Time (hr)	30.3	32.3	31.5	33.3	18.5	315.8
Water Temperature (F)	73-76	69-74	69-71	70-75	74.5-77	
Lampreys						
Sea lamprey	-	-	-	-	-	11
Freshwater Eels						
American eel	1,025	493	322	509	446	15,643
Herrings						
Blueback herring	425	35	34	4,524	1,822	30,742
Alewife	140	12	-	-	-	183
American shad	5	7	2	15	11	193*
Atlantic menhaden	1,100	492	-	2,996	7,263	11,851
Gizzard shad	59,951	34,187	17,110	27,703	3,646	784,301
Trouts						
Rainbow trout	64	1	1	14	-	306
Brown trout	64	30	37	7	-	738
Brook trout	-	1	-	-	-	2
Pikes						
Chain pickerel	-	-	-	-	-	1
Northern pike	-	-	-	-	-	2
Muskellunge	3	2	-	-	-	48
Minnows and Carps						
Goldfish	1	-	-	-	-	1
Carp	3,178	190	314	659	93	16,252
Golden shiner	93	42	35	228	136	1,036
Comely shiner	450	-	-	-	-	825
Spottail shiner	-	-	-	-	-	7,251
Spotfin shiner	625	588	350	2,054	550	10,664
Suckers						
Quillback	364	-	72	-	4	6,808
White sucker	9	-	6	4	-	265
Shorthead redhorse	-	8	1	-	-	1,725
Freshwater catfishes						
White catfish	1,572	174	259	43	34	3,162
Yellow bullhead	36	8	1	-	-	47
Brown bullhead	1,071	182	659	51	63	3,044
Channel catfish	16,965	13,652	31,857	2,819	3,848	112,940
Silversides						
Tidewater silverside	-	-	-	1	-	1
Temperate Basses						
White perch	8,652	2,819	919	4,499	4,341	234,277
Striped bass	661	262	183	570	273	2,126
Sunfishes						
Rock bass	10	-	1	-	-	149
Redbreast sunfish	2,602	643	321	1,115	518	10,170
Green sunfish	77	6	10	30	34	237
Pumpkinseed	425	245	492	1,337	674	3,941
Bluegill	2,149	789	1,088	1,720	1,025	8,794
Lepomis hybrid	-	-	-	-	-	4
Smallmouth bass	51	9	-	14	-	712
Largemouth bass	1	3	-	-	-	18
White crappie	370	162	181	440	306	1,815
Black crappie	17	4	17	157	74	468
Perches						
Yellow perch	86	79	51	186	85	993
Walleye	329	366	279	476	244	3,056
Total	102,571	55,490	54,602	52,171	25,490	1,274,807

* Includes two recaptures of tagged American shad on 28 May and 27 June.

Table 4. Numbers of eight selected species taken in the Conowingo Dam Fish Collection Facility under high and low entrance velocity conditions, 3 June-30 June 1977.

Date	3 Jun		4 Jun		5 Jun		6 Jun		7 Jun	
No. Lifts*	5	4	6	6	4	5	5	4	5	6
Fishing Time (hr)	1.0	2.3	1.8	3.2	2.0	2.7	1.9	2.0	2.1	3.2
Velocity	HV	LV	HV	LV	LV	HV	HV	LV	LV	HV
Species										
American eel	-	-	-	12	12	-	48	-	-	4
Blueback herring	60	22	64	46	8	24	5	-	-	-
American shad	-	-	1	1	-	2	1	-	2	2
Gizzard shad	8,679	748	13,204	1,440	528	584	2,210	728	1,761	6,086
Carp	108	91	-	188	40	160	8	120	4	21
Channel catfish	30	15	72	32	52	8	81	20	15	117
White perch	43	40	4	488	212	144	79	356	204	45
Striped bass	39	15	-	37	99	45	14	28	41	36
Totals	8,959	931	13,345	2,244	951	967	2,446	1,252	2,027	6,311

Table 4. Continued.

Date	8 Jun		9 Jun		10 Jun		11 Jun		12 Jun	
No. Lifts*	5	4	5	4	6	4	5	5	5	4
Fishing Time (hr)	2.2	2.2	2.2	2.3	2.5	2.2	2.2	2.5	2.0	2.0
Velocity	HV	LV	LV	HV	HV	LV	LV	HV	HV	LV
Species										
American eel	-	-	4	8	24	10	4	-	4	1
Blueback herring	-	8	8	-	-	-	4	-	-	-
American shad	1	-	-	1	-	-	-	-	-	-
Gizzard shad	2,227	876	826	818	4,544	40	1,276	492	1,854	290
Carp	-	-	-	4	-	5	-	3	2	3
Channel catfish	8	40	94	93	460	87	38	12	206	47
White perch	94	564	52	3	8	10	78	42	20	9
Striped bass	10	28	8	4	29	6	22	4	17	3
Totals	2,340	1,516	992	931	5,065	158	1,422	553	2,103	353

continued

Table 4. Continued.

Date	13 Jun		14 Jun		15 Jun		16 Jun		17 Jun	
No. Lifts*	4	5	4	4	5	4	6	4	5	4
Fishing Time (hr)	1.8	2.7	1.4	2.4	2.2	2.5	2.8	2.0	2.2	2.5
Velocity	LV	HV	HV	LV	LV	HV	HV	LV	LV	HV
Species										
American eel	42	4	-	3	-	4	4	-	5	3
Blueback herring	15	-	14	-	4	-	-	-	1	-
American shad	-	-	-	-	-	-	-	1	-	-
Gizzard shad	919	276	1,135	469	3,070	402	2,184	1,868	848	673
Carp	-	15	-	10	-	5	4	4	2	-
Channel catfish	64	26	109	44	562	98	222	40	50	220
White perch	86	13	20	53	58	17	8	36	58	13
Striped bass	24	7	7	12	22	8	20	1	18	5
Totals	1,150	341	1,285	591	3,716	534	2,442	1,950	982	914

Table 4. Continued.

Date	18 Jun		19 Jun		20 Jun		21 Jun		22 Jun	
No. Lifts*	4	5	5	4	5	4	6	4	6	4
Fishing Time (hr)	1.8	2.8	2.2	2.2	2.2	2.5	2.1	2.5	2.1	2.3
Velocity	HV	LV	HV	LV	LV	HV	HV	LV	HV	LV
Species										
American eel	-	-	-	8	8	5	10	4	-	19
Blueback herring	-	-	-	-	-	-	1,361	2	489	6
American shad	-	-	-	-	-	-	2	-	-	-
Gizzard shad	395	748	1,460	426	951	581	6,238	758	3,630	1,308
Carp	2	67	136	63	6	9	4	213	10	21
Channel catfish	33	27	44	5	34	4	61	82	30	205
White perch	2	70	20	11	101	2	183	137	85	49
Striped bass	4	11	19	5	5	2	128	13	8	9
Totals	436	923	1,679	518	1,105	603	7,987	1,209	4,252	1,617

continued

Table 4. Continued.

Date	23 Jun	24 Jun		25 Jun		26 Jun		27 Jun	
No. Lifts*	10	5	4	4	5	5	4	5	4
Fishing Time (hr)	4.4	2.2	2.2	1.8	2.7	2.5	2.2	2.0	2.0
Velocity	HV	HV	LV	LV	HV	HV	LV	HV	LV
Species									
American eel	54	14	49	84	10	-	-	25	20
Blueback herring	56	48	-	-	45	130	1,795	317	782
American shad	-	1	-	-	2	7	2	4	4
Gizzard shad	1,952	789	543	40	231	476	1,946	906	552
Carp	124	-	125	-	1	48	68	8	9
Channel catfish	75	33	409	262	122	16	-	15	-
White perch	315	376	60	4	81	172	1,122	217	2,028
Striped bass	14	35	16	1	21	52	244	68	150
Totals	2,590	1,296	1,202	391	513	901	5,177	1,560	3,545

Table 4. Continued.

Date	28 Jun		29 Jun		30 Jun		Total			
No. Lifts*	4	5	4	5	5	4	65.0	Catch/	60.8	Catch/
Fishing Time (hr)	2.0	2.7	2.0	2.7	2.5	2.2	HV	Hour	LV	Hour
Velocity	HV	LV	HV	LV	HV	LV				
Species										
American eel	8	25	38	47	17	48	284	4.4	405	6.7
Blueback herring	84	228	240	16	12	-	2,949	45.4	2,945	48.4
American shad	1	-	1	-	-	-	26	0.40	10	0.16
Gizzard shad	284	412	258	506	34	38	62,602	963.1	23,915	393.3
Carp	-	37	-	16	4	7	676	10.4	1,099	18.1
Channel catfish	104	393	80	1,090	77	1,611	2,456	37.8	5,318	87.5
White perch	184	118	140	435	22	23	2,352	36.2	6,462	106.3
Striped bass	12	5	2	9	2	-	612	9.4	832	13.7
Totals	677	1,218	759	2,119	168	1,727	71,957	1107.0	40,986	674.1

HV = High Velocity
LV = Low Velocity
* The clean out lift and the first lift with the crowder gates open are not included

Table 5. Numbers of fishes taken in the Conowingo Dam Fish Collection Facility, 5 and 30 July 1977.

Dates	5 Jul	30 Jul	Totals
No. Lifts	11	7	18
Fishing Time (hr)	4.9	2.6	7.5
Water Temperature (F)	79.0	79.0	
Species			
Freshwater eels			
American eel	832	85	917
Herrings			
Blueback herring	14	-	14
American shad	2*	-	2
Gizzard shad	692	6,100	6,792
Minnows and Carps			
Carp	29	109	138
Golden shiner	8	7	15
Spotfin shiner	-	519	519
Suckers			
Quillback	-	5	5
Freshwater catfishes			
White catfish	18	-	18
Brown bullhead	4	1	5
Channel catfish	434	1,081	1,515
Temperate Basses			
White perch	159	115	274
Striped bass	8	436**	444
Sunfishes			
Rock bass	1	-	1
Redbreast sunfish	84	150	234
Green sunfish	2	-	2
Pumpkinseed	111	125	236
Bluegill	82	183	265
Smallmouth bass	1	-	1

continued

Table 5. Continued.

Dates	5 Jul	30 Jul	Totals
No. Lifts	11	7	18
Fishing Time (hr)	4.9	2.6	7.5
Water Temperature (F)	79.0	79.0	
Species			
White crappie	75	212	287
Black crappie	4	25	29
Perches			
Yellow perch	9	163	172
Walleye	7	6	13
Totals	2,576	9,322	11,898

* One spent female died prior to release, the other shad (female) was tagged and released at Shures Landing

** Three hundred striped bass were transported to Broad Creek. Most were young-of-the-year

Table 6. Sex ratio and spawning conditions of American shad, Alosa sapidissima, collected in the Conowingo Dam Fish Collection Facility, 1972-1977.

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	
1977	64	0	0	5	8	113	1	191
%	33.5	0	0	2.6	4.2	59.2	0.5	
Total	226	1	93	15	30	165	334	864
	26.2	0.1	10.8	1.7	3.5	19.1	38.6	

Males 227 (42.8%)
Females 303 (57.2%)

Table 7. 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, 20 April-29 June 1977.

Date	20 Apr				21 Apr			22 Apr			24 Apr		
Lift Number	1	2	3	4	1	2	3	9	10	11	9	10	11
Parameters													
Shad Taken	0	1	3	0	0	1	0	0	1	0	0	1	0
Total Fish	8448	8101	8204	4000	9856	6301	5697	496	4226	2401	5824	5386	5076
Rel. Loc.	-	1	1	-	-	2	-	-	2	-	-	2	-
Lift Time	0525	0554	0645	0825	0540	0613	0626	1010	1045	1130	0942	1025	1105
Min. Fished	0	5	5	5	0	1	3	30	30	30	30	30	30
Air Temp.	53.0	53.0	55.0	57.0	52.0	52.0	53.0	78.0	80.0	82.0	71.0	71.0	72.0
Water Temp.	60.0	60.0	60.0	60.0	62.0	62.0	62.0	63.0	63.0	63.0	64.0	64.0	64.0
Weather	3	3	3	2	6	6	6	2	2	1	3	3	3
At. Pressure	30.01	30.02	30.02	30.03	30.10	30.10	30.12	29.95	29.93	29.93	29.39	29.39	29.39
Small Gen. On	0	0	0	3	0	0	0	5	6	6	1	1	1
Large Gen. On	0	0	0	2	0	0	0	4	4	4	0	0	0
Unit 1	2	2	2	2	2	2	2	2	1	1	2	2	2
Unit 2	2	2	2	1	2	2	2	1	1	1	1	1	1
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	29.7	29.7	29.7	29.7	28.9	28.9	28.9	27.3	27.3	27.3	25.4	25.4	25.4
% Gate S.U. 1	35	35	35	35	35	35	35	35	35	35	35	35	35
% Gate S.U. 2	0	35	35	35	0	35	35	75	75	75	75	75	75
Vel. Hld. Chan.	-	1.1	1.1	1.1	-	1.1	1.1	1.3	1.3	1.3	1.3	1.3	1.3
Vel. Weir 1	-	6.0	6.0	6.0	-	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vel. Weir 2	-	6.0	6.0	6.0	-	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR													
Weir 1	-	3.1	3.1	3.1	-	3.1	3.1	5.1	5.1	5.1	5.1	5.1	5.1
Weir 2	-	3.1	3.1	3.1	-	3.1	3.1	5.1	5.1	5.1	5.1	5.1	5.1
Tailrace Elev.	-	12.0	12.0	17.2	-	12.0	12.0	19.7	20.8	20.8	14.0	14.0	14.0
Hld. Chan. Elev.	-	12.6	12.6	17.6	-	12.6	12.6	20.3	21.5	21.5	14.9	14.9	14.9
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	-	2	2	2	-	2	2	2	2	2	2	2	2

continued

Table 7. Continued.

Date	17 May			20 May			21 May										
Lift Number	8	9	10	4	5	6	1	2	3	6	7	8	9	10	11	12	13
Parameters																	
Shad Taken	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0
Total Fish	490	1461	3136	692	1985	3061	1232	861	504	1608	2177	198	338	609	1075	291	2368
Rel. Loc.	-	2	-	-	2	-	-	2	-	-	2	-	-	2	-	2	-
Lift Time	0825	0912	0948	0542	0616	0650	0510	0528	0557	0730	0815	0855	0925	1015	1100	1137	1235
Min. Fished	30	30	30	10	20	20	0	3	5	20	30	30	30	30	30	30	45
Air Temp.	63.0	66.0	70.0	57.0	58.0	60.0	64.0	64.0	67.0	65.5	72.0	72.0	74.0	77.0	78.0	78.0	79.0
Water Temp.	61.0	61.0	61.0	68.0	68.0	68.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0
Weather	1	1	1	6	3	3	1	1	1	1	1	1	1	1	1	1	1
At. Pressure	29.87	29.86	29.87	29.84	29.85	29.84	29.91	29.91	29.91	29.92	29.94	29.94	29.94	29.94	29.94	29.94	29.95
Small Gen. On	4	4	7	1	1	1	1	1	1	1	1	4	4	4	4	4	1
Large Gen. On	3	3	4	0	0	0	0	0	0	0	0	2	4	4	4	4	0
Unit 1	2	2	1	2	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	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	26.8	26.8	26.8	21.7	21.7	21.7	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4
% Gate S.U. 1	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
% Gate S.U. 2	35	75	75	75	75	75	0	35	35	35	35	35	75	75	75	75	75
Vel. Fld. Chan.	1.1	1.3	1.3	1.3	1.3	1.3	-	1.1	1.1	1.1	999	1.1	999	1.3	1.3	1.3	1.3
Vel. Weir 1	6.0	6.0	6.0	6.0	6.0	6.0	-	6.0	6.0	6.0	999	6.0	999	6.0	6.0	6.0	6.0
Vel. Weir 2	6.0	6.0	6.0	6.0	6.0	6.0	-	6.0	6.0	6.0	999	6.0	999	6.0	6.0	6.0	6.0
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	3.1	5.1	5.1	5.1	5.1	5.1	-	3.1	3.1	3.1	999	3.1	999	5.1	5.1	5.1	5.1
Weir 2	3.1	5.1	5.1	5.1	5.1	5.1	-	3.1	3.1	3.1	999	3.1	999	5.1	5.1	5.1	5.1
Tailrace Elev.	18.8	19.0	20.6	13.9	13.9	13.9	13.9	13.9	13.9	13.9	999	17.9	999	19.5	19.5	19.5	13.9
Fld. Chan. Elev.	19.3	19.9	21.5	14.9	14.9	14.9	-	14.3	14.3	14.3	999	18.7	999	20.2	20.2	20.2	14.4
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	2	2

continued

Table 7. Continued.

Date	22 May										23 May					
Lift Number	6	7	8	9	10	11	12	13	14	15	3	4	5	6	7	8
Parameters																
Shad Taken	0	1	3	4	1	3	0	1	1	0	0	1	1	0	0	1
Total Fish	1728	769	3427	7115	3585	2211	1369	2465	2497	1527	640	314	881	2816	1408	1921
Sel. Loc.	-	2	2	1	1	1	-	2	2	-	-	2	2	-	-	-
Lift Time	0650	0709	0731	0752	0815	0845	0912	0945	1018	1052	0525	0550	0622	0705	0746	0817
Min. Fished	5	5	10	10	10	10	15	20	20	30	5	10	20	30	30	15
Air Temp.	64.0	65.0	67.0	70.0	70.0	71.0	74.0	74.0	76.0	77.0	62.0	62.0	63.0	64.0	69.0	71.0
Water Temp.	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	70.0	70.0	70.0	70.0	70.0	70.0
Weather	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	2
Bt. Pressure	30.02	30.02	30.02	30.03	30.03	30.03	30.03	30.03	30.03	30.04	30.01	30.02	30.02	30.02	30.02	30.03
Small Gen. On	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1
Large Gen. On	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unit 1	2	2	2	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	1	1	1
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	17.5	17.5	17.5	17.5	17.5	17.5
% 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	35	35	35	35	35	35	35	35	35	35	35
Vel. Hld. Chan.	1.3	1.3	1.3	1.3	1.3	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Vel. Weir 1	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vel. Weir 2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR																
Weir 1	5.1	5.1	5.1	5.1	5.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Weir 2	5.1	5.1	5.1	5.1	5.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Tailrace Elev.	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	14.6	14.9	13.9	13.9	13.9	13.9	13.9	13.9
Hld. Chan. Elev.	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.3	14.3	14.3	14.3	14.3	14.3	14.3
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

continued

Table 7. Continued.

Date	23 May								24 May					
Lift Number	9	10	11	12	13	14	15	16	8	9	10	11	12	13
Parameters														
Shad Taken	1	1	3	2	0	0	1	0	0	3	3	2	1	0
Total Fish	4993	3441	1163	3104	1760	1920	2945	1504	1760	3075	2147	1858	1293	1690
Rel. Loc.	2	2	2	2	-	-	2	-	-	1	1	1	2	-
Lift Time	0845	0918	0940	1005	1029	1055	1122	1147	0803	0834	0915	1006	1037	1137
Min. Fished	20	5	10	10	10	15	15	15	20	20	30	30	30	45
Air Temp.	73.0	74.0	76.0	75.0	77.0	77.0	77.0	78.0	72.0	73.0	75.0	78.0	78.0	78.0
Water Temp.	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	71.0	71.0	71.0	71.0	71.0	71.0
Weather	2	2	3	3	1	1	1	1	2	2	2	2	1	2
At. Pressure	30.04	30.34	30.04	30.04	30.04	30.04	30.04	30.03	30.03	30.03	30.02	30.02	30.02	30.00
Small Gen. On	2	4	4	4	4	4	4	4	1	1	1	1	4	4
Large Gen. On	0	0	0	1	1	1	1	3	0	0	0	0	1	1
Unit 1	2	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	1
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	16.3	16.3	16.3	16.3	16.3	16.3
% Gate S.U. 1	35	35	35	35	35	35	35	35	35	35	35	35	35	35
% Gate S.U. 2	75	75	75	75	75	75	75	75	75	75	35	35	35	35
Vel. Hld. Chan.	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.1	1.1	1.1	1.1
Vel. Weir 1	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vel. Weir 2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR														
Weir 1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	3.1	3.1	3.1	3.1
Weir 2	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	3.1	3.1	3.1	3.1
Tailrace Elev.	14.0	16.2	16.2	17.4	17.4	17.4	17.4	19.0	14.0	14.0	14.0	14.0	17.0	17.3
Hld. Chan. Elev.	14.9	16.9	17.0	18.1	18.1	18.1	18.1	19.9	15.0	15.0	15.0	15.0	17.7	17.9
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	2	2	2	2	2	2	2	2	2	2	2	2	2

continued

Table 7. Continued.

Date	25 May											26 May				
Lift Number	4	5	6	7	8	9	10	11	12	13	14	4	5	6	7	8
Parameters																
Shad Taken	0	1	0	2	1	0	4	1	2	1	0	0	23	8	7	1
Total Fish	612	1569	2400	658	1505	5344	2436	2273	1634	3553	1280	385	2359	1928	2887	177
Rel. Loc.	-	2	-	2	2	-	2	2	2	0	-	-	1	1	2	-
Lift Time	0604	0636	0717	0758	0845	0927	0955	1035	1116	1157	1245	0602	0643	0715	0757	0839
Min. Fished	10	20	30	30	30	30	20	30	30	30	20	15	30	20	30	30
Air Temp.	67.0	67.0	68.0	68.0	66.0	68.0	70.0	73.0	73.0	74.0	74.0	65.0	68.5	69.0	72.0	72.0
Water Temp.	73.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0	75.0	75.0	75.0	75.0	75.0
Weather	3	3	3	4	4	4	4	3	3	3	3	1	1	1	1	1
At. Pressure	29.80	29.79	29.80	29.80	29.80	29.80	29.78	29.78	29.76	29.75	29.75	29.56	29.57	29.57	29.57	29.62
Small Gen. On	1	1	1	1	1	1	1	4	4	4	4	1	1	1	4	3
Large Gen. On	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0
Unit 1	2	2	2	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	1	1	1
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.8	15.8	15.8	15.8	15.8
% Gate S.U. 1	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	75	75	75	75	75	75	75	75
Vel. Mid. Chan.	1.1	1.1	1.1	1.1	1.1	1.3	1.3	999	1.3	999	1.3	1.3	1.3	1.3	999	1.1
Vel. Weir 1	6.0	6.0	6.0	6.0	6.0	6.0	6.0	999	6.0	999	6.0	6.0	6.0	6.0	999	6.0
Vel. Weir 2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	999	6.0	999	6.0	6.0	6.0	6.0	999	6.0
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR																
Weir 1	3.1	3.1	3.1	3.1	3.1	5.1	5.1	999	5.1	999	5.1	5.1	5.1	5.1	999	3.1
Weir 2	3.1	3.1	3.1	3.1	3.1	5.1	5.1	999	5.1	999	5.1	5.1	5.1	5.1	999	3.1
Tailrace Elev.	13.9	13.9	13.9	13.9	13.9	13.9	13.9	999	16.2	999	18.2	14.0	14.0	14.0	999	15.5
Mid. Chan. Elev.	14.6	14.6	14.6	14.6	14.6	14.8	14.8	999	17.0	999	19.0	14.9	14.9	14.9	999	16.2
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

continued

Table 7. Continued.

Date	26 May			27 May											
Lift Number	9	10	11	1	2	3	4	5	6	7	8	9	10	11	12
Parameters															
Shad Taken	0	1	0	0	2	0	0	3	3	9	2	0	2	1	0
Total Fish	211	401	342	1148	1802	720	761	728	2884	1769	4126	808	650	393	236
Rel. Loc.	-	2	-	-	2	-	-	2	2	1	1	-	-	2	-
Lift Time	0920	1001	1044	0510	0519	0531	0621	0702	0741	0822	0850	0920	1005	1043	1135
Min. Fished	30	30	30	-	3	5	15	30	30	30	20	10	30	30	40
Air Temp.	74.0	76.0	79.0	57.0	57.0	59.0	60.0	62.0	67.0	71.0	74.0	76.0	78.0	79.5	80.0
Water Temp.	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Weather	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
At. Pressure	29.62	29.60	29.60	29.60	29.60	29.60	29.60	29.60	29.60	29.60	29.60	29.60	29.60	29.56	29.56
Small Gen. On	4	6	6	1	1	1	1	1	1	1	4	4	5	4	3
Large Gen. On	1	4	4	0	0	0	0	0	0	0	1	1	1	3	0
Unit 1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2
Unit 2	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
River Flow	15.8	15.8	15.8	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5
% Gate S.U. 1	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
% Gate S.U. 2	35	35	35	0	35	35	35	35	35	35	75	75	75	75	75
Vel. Hld. Chan.	1.1	999	1.1	-	1.1	1.1	1.1	1.1	1.1	1.1	999	1.3	999	1.3	999
Vel. Weir 1	6.0	999	6.0	-	6.0	6.0	6.0	6.0	6.0	6.0	999	6.0	999	6.0	999
Vel. Weir 2	6.0	999	6.0	-	6.0	6.0	6.0	6.0	6.0	6.0	999	6.0	999	6.0	999
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR															
Weir 1	3.1	999	3.1	-	3.1	3.1	3.1	3.1	3.1	3.1	999	5.1	999	5.1	999
Weir 2	3.1	999	3.1	-	3.1	3.1	3.1	3.1	3.1	3.1	999	5.1	999	5.1	999
Tailrace Elev.	17.3	999	20.2	13.9	14.0	14.0	14.0	14.0	14.0	14.0	999	17.4	999	18.9	999
Hld. Chan. Elev.	17.9	999	20.9	-	14.6	14.6	14.6	14.6	14.6	14.6	999	18.2	999	19.7	999
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	2	2	-	2	2	2	2	2	2	2	2	2	2	2

continued

Table 7. Continued.

Date	28 May										29 May						
Lift Number	3	4	5	6	7	8	9	11	12	13	7	8	9	10	11	12	13
Parameters																	
Shad Taken	0	1	0	4	10	5	0	0	1	0	0	1	2	6	1	1	0
Total Fish	1504	1241	1305	809	2596	1255	366	299	468	1120	280	1161	262	934	433	473	164
Rel. Loc.	-	2	-	1	1	1	-	-	2	-	-	2	2	1	1	-	-
Lift Time	0552	0613	0639	0715	0750	0830	0910	1035	1120	1220	0835	0915	0957	1038	1120	1200	1240
Min. Fished	2	5	10	20	30	30	30	30	30	45	30	30	30	30	30	30	30
Air Temp.	61.0	61.0	63.0	63.0	65.0	76.0	76.0	79.0	81.0	81.0	69.0	71.0	72.0	72.0	74.0	74.0	75.0
Water Temp.	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0
Weather	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
At. Pressure	29.43	29.43	29.43	29.42	29.42	29.42	29.42	29.42	29.41	29.41	29.44	29.50	29.50	29.50	29.54	29.54	29.54
Small Gen. On	1	1	1	1	1	1	3	3	4	4	1	1	1	1	1	1	1
Large Gen. On	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unit 1	2	2	2	2	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	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	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	13.9	13.9	13.9	13.9	13.9	13.9	13.9
% Gate S.U. 1	35	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	35	75	75	75	75	75	75
Vel. Hld. Chan.	1.3	1.3	1.3	1.3	1.3	1.3	999	1.1	1.1	1.1	1.1	1.3	1.3	1.3	1.3	1.3	1.3
Vel. Weir 1	6.0	6.0	6.0	6.0	6.0	6.0	999	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vel. Weir 2	6.0	6.0	6.0	6.0	6.0	6.0	999	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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	5.1	5.1	5.1	5.1	5.1	5.1	999	3.1	3.1	3.1	3.1	5.1	5.1	5.1	5.1	5.1	5.1
Weir 2	5.1	5.1	5.1	5.1	5.1	5.1	999	3.1	3.1	3.1	3.1	5.1	5.1	5.1	5.1	5.1	5.1
Tailrace Elev.	14.0	14.0	14.0	14.0	14.0	14.0	999	16.2	16.2	16.2	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Hld. Chan. Elev.	14.9	14.9	14.9	14.9	14.9	14.9	999	16.7	16.8	16.8	14.6	14.8	14.8	14.8	14.8	14.8	14.8
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

continued

Table 7. Continued.

Date	30 May			4 Jun						5 Jun				6 Jun		
Lift Number	6	7	8	6	7	8	12	13	14	7	8	9	10	3	4	5
Parameters																
Shad Taken	0	1	0	0	1	0	0	1	0	0	1	1	0	0	1	0
Total Fish	560	387	384	2080	913	6592	450	401	504	277	203	288	177	810	317	560
Rel. Loc.	-	2	-	-	-	-	-	2	-	-	2	2	-	-	-	-
Lift Time	0720	0802	0843	0655	0735	0815	1101	1142	1240	0845	0925	1005	1046	0527	0555	0634
Min. Fished	30	30	30	25	30	30	30	30	40	30	30	30	30	10	15	30
Air Temp.	60.0	60.0	63.0	59.0	63.0	66.0	73.0	75.0	75.0	66.0	72.0	72.0	74.0	63.0	60.0	60.0
Water Temp.	75.0	75.0	75.0	73.0	73.0	73.0	73.0	73.0	73.0	74.0	74.0	74.0	74.0	73.0	73.0	73.0
Weather	3	3	3	1	1	1	1	1	1	3	3	3	3	4	4	4
At. Pressure	29.78	29.77	29.78	29.90	29.89	29.89	29.83	29.85	29.81	29.58	29.50	29.50	29.50	29.29	29.28	29.28
Small Gen. On	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Large Gen. On	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unit 1	2	2	2	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	1	1	1
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	13.7	13.7	13.7	11.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0	9.7	9.7	9.7
% 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	35	35	35	75	75	75
Vel. Hld. Chan.	1.3	1.3	1.3	1.3	1.3	1.3	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.3	1.3	1.3
Vel. Weir 1	6.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vel. Weir 2	6.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR																
Weir 1	5.1	5.1	5.1	5.1	5.1	5.1	5.7	5.7	5.7	3.1	3.1	3.1	3.1	5.1	5.1	5.1
Weir 2	5.1	5.1	5.1	5.1	5.1	5.1	5.7	5.7	5.7	3.1	3.1	3.1	3.1	5.1	5.1	5.1
Tailrace Elev.	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	13.9	13.9	13.9	13.9	13.9	13.9	13.9
Hld. Chan. Elev.	14.7	14.7	14.7	15.2	15.2	15.2	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

continued

Table 7. Continued.

Date	7 Jun									8 Jun			9 Jun		
Lift Number	4	5	6	7	8	9	11	12	13	6	7	8	9	10	11
Parameters															
Shad Taken	0	1	0	1	1	0	0	1	0	0	1	0	0	1	0
Total Fish	414	563	558	454	2593	1578	340	421	712	396	570	433	127	67	166
Rel. Loc.	-	2	-	2	2	-	-	2	-	-	2	-	-	2	-
Lift Time	0611	0640	0731	0813	0853	0934	1055	1136	1232	0745	0827	0908	0934	1025	1132
Min. Fished	30	30	30	30	30	30	30	30	40	30	30	30	30	30	50
Air Temp.	57.0	59.0	62.0	62.0	63.0	67.0	66.0	68.0	68.0	57.0	68.0	61.0	62.5	62.0	62.0
Water Temp.	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	72.0	72.0	72.0	72.0	72.0	72.0
Weather	2	2	2	2	1	2	2	2	2	1	1	1	4	4	4
At. Pressure	29.15	29.15	29.16	29.16	29.16	29.16	29.17	29.17	29.18	29.36	29.37	29.37	29.35	29.31	29.32
Small Gen. On	1	1	1	1	1	1	4	4	4	1	1	1	4	4	4
Large Gen. On	0	0	0	0	0	0	1	1	1	0	0	0	3	3	3
Unit 1	2	2	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	1	1
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Flow	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	9.7	9.7	9.7	10.7	10.7	10.7
% Gate S.U. 1	35	35	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	75	35	35	35	75	75	75
Vel. Hld. Chan.	1.0	1.0	1.0	1.0	1.3	1.3	1.3	1.3	1.3	1.1	1.1	999	1.3	1.3	999
Vel. Weir 1	4.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	999	6.0	6.0	999
Vel. Weir 2	4.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	999	6.0	6.0	999
Weir Gates Open	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	5.1	5.1	5.1	5.1	5.1	3.1	3.1	999	5.1	5.1	999
Weir 2	5.7	5.7	5.7	5.7	5.1	5.1	5.1	5.1	5.1	3.1	3.1	999	5.1	5.1	999
Tailrace Elev.	14.0	14.0	14.0	14.0	14.0	14.0	17.3	17.3	17.3	13.9	13.9	999	18.8	19.0	999
Hld. Chan. Elev.	14.5	14.5	14.5	14.5	14.9	14.9	18.2	18.2	18.2	14.4	14.4	999	19.5	20.0	999
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

continued

Table 7. Continued.

Date	16 Jun			18 Jun			21 Jun				23 Jun			24 Jun		
Lift Number	9	10	11	7	8	9	4	5	6	7	1	2	3	4	5	6
Parameters																
Shad Taken	0	1	0	0	1	0	0	1	1	0	0	1	0	0	1	0
Total Fish	645	349	572	120	301	250	1136	406	1941	1985	2360	1125	530	297	315	454
Rel. Loc.	-	2	-	-	2	-	-	2	2	-	-	2	-	-	2	-
Lift Time	0941	1023	1105	0830	0915	1000	0543	0610	0652	0734	0445	0502	0528	0631	0713	0755
Min. Fished	30	30	30	30	30	30	10	15	30	30	-	2	5	30	30	30
Air Temp.	78.0	79.0	82.0	72.0	76.0	76.0	63.0	65.0	69.0	75.0	56.0	59.0	59.0	65.5	67.5	72.0
Water Temp.	71.0	71.0	71.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	73.0	73.0	73.0
Weather	1	1	1	1	1	1	1	1	1	1	2	2	2	3	2	2
At. Pressure	29.81	29.81	29.82	29.58	29.58	29.58	29.44	29.47	29.47	29.48	29.80	29.80	29.80	29.80	29.80	29.81
Small Gen. On	2	4	4	1	1	1	0	0	0	4	0	0	0	0	0	0
Large Gen. On	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Unit 1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Unit 2	1	1	1	1	1	1	2	2	2	1	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
River Flow	10.6	10.6	10.6	10.4	10.4	10.4	9.8	9.8	9.8	9.8	9.9	9.9	9.9	10.2	10.2	10.2
% Gate S.U. 1	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	35	35	0	35	35	35	35	35
Vel. Hld. Chan.	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	-	1.0	1.0	1.0	1.0	1.0
Vel. Weir 1	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	-	6.0	6.0	6.0	6.0	6.0
Vel. Weir 2	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	-	6.0	6.0	6.0	6.0	6.0
Weir Gates Open	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	5.7	3.1	3.1	3.1	3.1	-	3.1	3.1	3.1	3.1	3.1
Weir 2	5.7	5.7	5.7	5.7	5.7	5.7	3.1	3.1	3.1	3.1	-	3.1	3.1	3.1	3.1	3.1
Tailrace Elev.	14.7	14.9	14.9	14.0	14.0	14.0	11.7	11.7	11.7	16.2	11.7	11.7	11.7	11.8	11.8	11.8
Hld. Chan. Elev.	15.8	15.3	15.3	14.4	14.4	14.4	12.6	12.6	12.6	16.7	-	12.6	12.6	12.6	12.6	12.6
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

continued

Table 7. Continued.

Date	25 Jun				26 Jun							27 Jun					
Lift Number	7	8	9	10	4	5	6	7	8	9	10	1	2	3	4	5	6
Parameters																	
Shad Taken	0	1	1	0	0	1	2	4	0	2	0	0	1	0	1	0	2
Total Fish	135	104	152	128	154	160	239	336	3650	1597	1570	1508	373	352	381	229	368
Rel. Loc.	-	2	2	-	-	2	2	2	-	1	-	-	2	-	-	-	2
Lift Time	0835	0916	0957	1039	0628	0711	0752	0833	0915	0957	1040	0455	0509	0530	0602	0643	0724
Min. Fished	30	30	30	30	30	30	30	30	30	30	30	-	5	10	20	30	30
Air Temp.	73.0	74.0	75.0	79.0	69.0	75.0	76.0	78.0	81.0	80.0	82.0	62.0	62.0	62.0	65.0	69.0	76.0
Water Temp.	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	74.5	74.5	74.5	74.5	74.5	74.5
Weather	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1
At. Pressure	29.61	29.61	29.60	29.58	29.40	29.40	29.44	29.46	29.46	29.46	29.46	29.64	29.64	29.64	29.64	29.64	29.64
Small Gen. On	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Gen. On	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unit 1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Unit 2	2	2	2	2	2	2	2	2	2	2	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
River Flow	8.4	8.4	8.4	8.4	11.1	11.1	11.1	11.1	11.1	11.1	11.1	16.9	16.9	16.9	16.9	16.9	16.9
% Gate S.U. 1	35	35	35	35	35	35	35	35	35	35	35	0	35	35	35	35	35
% Gate S.U. 2	35	35	35	35	35	35	35	35	35	35	35	0	35	35	35	35	35
Vel. Hld. Chan.	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-	1.0	1.0	1.0	1.0	1.0
Vel. Weir 1	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0	-	6.0	6.0	6.0	6.0	6.0
Vel. Weir 2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0	-	6.0	6.0	6.0	6.0	6.0
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	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	5.7	5.7	5.7	-	3.1	3.1	3.1	3.1	3.1
Weir 2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	5.7	5.7	5.7	-	3.1	3.1	3.1	3.1	3.1
Tailrace Elev.	13.8	13.8	13.8	13.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	-	11.7	11.7	11.7	11.7	11.7
Hld. Chan. Elev.	14.7	14.7	14.7	14.7	12.6	12.6	12.6	12.6	12.3	12.3	12.3	-	12.6	12.6	12.6	12.6	12.6
Crowder Position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

continued

Table 7. Continued.

Date	27 Jun					28 Jun			29 Jun		
Lift Number	7	8	9	10	11	4	5	6	4	5	6
Parameters											
Shad Taken	1	3	0	1	0	0	1	0	0	1	0
Total Fish	459	551	911	8993	614	240	214	195	259	273	170
Rel. Loc.	2	2	-	1	-	-	2	-	-	1	-
Lift Time	0805	0846	0927	1009	1050	0645	0727	0807	0632	0714	0755
Min. Fished	30	30	30	30	30	30	30	30	30	30	30
Air Temp.	78.0	80.0	81.0	81.0	83.0	69.0	69.0	72.0	72.0	73.0	75.0
Water Temp.	74.5	74.5	74.5	74.5	74.5	75.0	75.0	75.0	75.0	75.0	75.0
Weather	1	1	1	1	1	4	4	4	2	3	3
At. Pressure	29.64	29.64	29.64	29.64	29.64	29.62	29.62	29.62	29.38	29.38	29.38
Small Gen. On	0	0	0	4	4	0	0	0	0	0	0
Large Gen. On	0	0	0	2	2	0	0	0	0	0	0
Unit 1	2	2	2	2	2	2	2	2	2	2	2
Unit 2	2	2	2	1	1	2	2	2	2	2	2
Spill Gates Open	0	0	0	0	0	0	0	0	0	0	0
River Flow	16.9	16.9	16.9	16.9	16.9	15.0	15.0	15.0	13.7	13.7	13.7
% Gate S.U. 1	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
Vel. Hld. Chan.	1.0	1.0	1.0	999	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Vel. Weir 1	6.0	4.0	4.0	999	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Vel. Weir 2	6.0	4.0	4.0	999	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Weir Gates Open	3	3	3	3	3	3	3	3	3	3	3
Ft. Below TR											
Weir 1	3.1	5.7	5.7	999	5.7	3.1	3.1	3.1	3.1	3.1	3.1
Weir 2	3.1	5.7	5.7	999	5.7	3.1	3.1	3.1	3.1	3.1	3.1
Tailrace Elev.	11.7	11.7	11.7	999	18.6	11.8	11.8	11.8	11.7	11.7	11.7
Hld. Chan. Elev.	12.6	12.6	12.6	999	19.2	12.9	12.9	12.9	12.8	12.8	12.8
Crowder Position	1	1	1	1	1	1	1	1	1	1	1
Cr. Gate Position	2	2	2	2	2	2	2	2	2	2	2

continued

Table 7. 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.	°F
Water Temperature	Water Temp.	°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 8. 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, 1973-1977.

No. Units Operating		Status of	Status of	No. Shad Caught						% of Catch					
Small*	Large**	Unit No. 1	Unit No. 2	1973	1974	1975	1976	1977	Total	1973	1974	1975	1976	1977	Total
0	0	Off	Off	12	43	4	31	30	120	15.6	33.6	4.8	34.1	15.5	21.0
1	0	Off	On	3	15	50	10	125	203	3.9	11.7	60.2	11.0	64.8	35.5
1	0	Off	Off	37	0	0	0	0	37	48.0	-	-	-	-	6.5
1	0	On	Off	1	0	0	0	0	1	1.3	-	-	-	-	0.2
2	0	Off	On	0	1	4	4	2	11	-	0.8	4.8	4.4	1.0	1.9
3	0	Off	On	5	10	5	7	1	28	6.5	7.8	6.0	7.7	0.5	4.9
3	0	Off	Off	1	0	0	0	0	1	1.3	-	-	-	-	0.2
3	1	Off	On	0	0	6	0	0	6	-	-	7.2	-	-	1.0
4	0	Off	On	0	8	0	0	7	15	-	6.3	-	-	3.6	2.6
4	0	Reduced	On	0	0	0	8	0	8	-	-	-	8.8	-	1.4
4	1	Off	On	0	12	4	4	6	26	-	9.4	4.8	4.4	3.1	4.5
4	1	Reduced	On	0	0	0	5	0	5	-	-	-	5.5	-	0.9
4	1	On	On	0	1	0	0	0	1	-	0.8	-	-	-	0.2
4	2	Off	Off	1	0	0	0	0	1	1.3	-	-	-	-	0.2
4	2	Off	On	0	12	6	3	0	21	-	9.4	7.2	3.3	-	3.7
4	2	On	On	0	1	0	0	0	1	-	0.8	-	-	-	0.2
4	2	Reduced	On	0	0	0	1	0	1	-	-	-	1.1	-	0.2
4	3	Off	On	2	0	0	3	3	8	2.6	-	-	3.3	1.6	1.4
4	3	Reduced	On	0	0	0	1	0	1	-	-	-	1.1	-	0.2
4	4	Off	On	0	6	0	2	2	10	-	4.7	-	2.2	1.0	1.7
4	4	On	On	2	0	0	4	0	6	2.6	-	-	4.4	-	1.0
5	2	Off	On	0	3	0	0	0	3	-	2.3	-	-	-	0.5
5	3	Off	On	1	2	0	0	0	3	1.3	1.6	-	-	-	0.5
5	4	Off	On	1	4	0	0	0	5	1.3	3.1	-	-	-	0.9
6	1	Off	On	0	3	0	0	0	3	-	2.3	-	-	-	0.5
6	2	On	On	0	1	0	0	0	1	-	0.8	-	-	-	0.2
6	4	Off	On	0	5	1	1	0	7	-	3.9	1.2	1.1	-	1.2
6	4	On	On	0	0	0	0	1	1	-	-	-	-	0.5	0.2
7	4	On	On	8	1	3	3	0	15	10.4	0.8	3.6	3.3	-	2.6
7	4	Reduced	On	0	0	0	4	0	4	-	-	-	4.4	-	0.7
Changing		Changing		3	0	0	0	16	19	3.9	-	-	-	8.3	3.3
Total				77	128	83***	91	193****	572						

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

56.5%

Table 9. Number of eight selected species taken in the Conowingo Dam Fish Collection Facility at high and low attraction flows, 16 April-2 June 1977.

Date	16 Apr	17 Apr	18 Apr		19 Apr		20 Apr		21 Apr		22 Apr		23 Apr		24 Apr		25 Apr	
No. Lifts*	3	6	4	4	6	3	4	3	4	5	4	5	6	3	5	5	5	5
Fishing Time (hr)	0.8	0.8	1.0	2.0	1.1	1.5	0.7	1.2	0.9	2.5	0.6	2.5	2.2	1.8	1.7	2.2	1.6	2.5
Volume	XLF	LF	LF	HF	LF	HF	LF	HF	LF	HF	LF	HF	HF	LF	LF	HF	HF	LF
Species																		
American eel	2	32	8	10	-	-	15	-	-	4	-	5	20	3	-	-	2	24
Blueback herring	-	4912	1000	51	344	64	2150	30	16	-	8	-	-	-	400	1314	4	5
American shad	-	-	-	-	-	-	3	-	-	-	-	1	-	-	-	1	-	-
Gizzard shad	524	6238	2640	2074	5976	6304	6205	3322	4552	8386	3792	7088	5968	2610	7076	20864	2446	2265
Carp	2	4	4	5	-	32	-	72	-	700	16	2	-	96	60	82	21	434
Quillback	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Channel catfish	-	-	-	-	8	-	5	62	-	14	24	85	20	21	60	114	39	166
White perch	6	560	754	180	1830	704	5470	381	6744	578	5200	1413	3720	1085	5016	3638	1281	616
Total	534	11746	4406	2320	8158	7104	13848	3867	11312	9682	9040	8594	9728	3815	12612	26013	3793	3510

Date	26 Apr		27 Apr		28 Apr		29 Apr		1 May		2 May		3 May		4 May		5 May	
No. Lifts*	5	4	4	5	4	5	3	5	4	5	5	4	5	5	5	4	6	5
Fishing Time (hr)	1.8	2.2	1.8	2.4	2.0	2.5	1.5	2.2	2.0	2.5	2.2	2.0	2.2	2.2	1.8	2.3	1.2	2.3
Volume	LF	HF	HF	LF	LF	HF	HF	LF	HF	LF	LF	HF	HF	LF	LF	HF	HF	LF
Species																		
American eel	17	-	-	-	1	-	14	-	20	4	-	-	2	-	-	-	-	32
Blueback herring	-	-	-	-	-	-	-	-	1	-	-	-	18	-	2	10	37	-
American shad	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gizzard shad	2357	9188	3064	1742	1495	7408	930	1030	2466	1791	1684	7864	5248	4734	885	1760	16034	6824
Carp	42	1344	164	40	4	-	-	2	20	3	-	8	-	10	-	1	-	60
Quillback	-	128	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Channel catfish	509	1189	296	244	344	314	142	6	21	13	102	32	100	20	64	15	305	14
White perch	469	202	4	46	16	20	5	12	294	170	1716	144	224	98	1414	92	2016	164
Total	3394	12051	3528	2072	1860	7742	1091	1050	2822	1981	3502	8048	5592	4862	2365	1878	18392	7094

continued

Table 9. Continued.

Date	6 May		7 May		8 May		9 May		10 May		11 May		12 May		13 May		14 May	
No. Lifts*	6	5	7	4	6	4	7	3	5	4	6	4	6	4	6	4	4	5
Fishing Time (hr)	2.1	2.4	1.6	2.2	2.0	1.5	2.2	1.4	1.8	2.2	2.5	2.0	2.1	2.2	2.3	2.2	1.7	2.4
Volume	LF	HF	HF	LF	LF	HF	HF	LF	LF	HF	HF	LF	HF	LF	LF	HF	HF	LF
Species																		
American eel	10	-	-	37	5	-	24	11	8	16	8	1	-	8	12	-	2	-
Blueback herring	24	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
American shad	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gizzard shad	4488	13408	11956	8170	9356	22452	10294	1153	1860	5476	10016	689	4392	3009	2374	9984	1270	3119
Carp	-	32	-	128	16	-	96	35	3	-	8	5	-	10	-	-	-	20
Quillback	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Channel catfish	-	32	20	34	5	-	452	85	54	272	28	26	22	39	30	16	26	25
White perch	1278	96	300	840	2169	352	1742	99	463	32	82	93	102	237	1266	144	56	159
Total	5800	13568	12292	9209	11551	22804	12608	1383	2388	5796	10142	814	4516	3303	3682	10144	1354	3323

Date	15 May		16 May		17 May		18 May		19 May		20 May		21 May		22 May		23 May	
No. Lifts*	5	4	4	5	6	6	6	4	6	6	6	5	6	5	8	6	6	10
Fishing Time (hr)	1.8	2.0	1.5	2.8	2.0	2.1	2.0	2.2	2.1	1.8	1.6	2.7	2.0	2.8	0.8	2.1	1.8	2.2
Volume	LF	HF	HF	LF	LF	HF	HF	LF	LF	HF	HF	LF	LF	HF	HF	LF	LF	HF
Species																		
American eel	-	4	-	16	10	16	42	12	10	21	80	24	588	146	2368	204	344	154
Blueback herring	-	-	4	-	-	-	30	-	143	50	36	-	147	-	292	192	156	112
American shad	-	-	-	-	-	1	-	-	-	-	1	-	1	2	9	5	3	8
Gizzard shad	1509	3760	2235	5960	3351	13188	6166	1828	9508	22377	8732	6964	6465	3064	25640	9148	6032	22920
Carp	-	-	-	336	-	106	-	4	-	25	8	468	30	619	64	520	256	984
Quillback	-	-	-	-	-	-	-	-	-	-	-	104	-	161	-	140	912	780
Channel catfish	36	28	26	16	20	-	2	16	5	32	112	280	4	42	-	-	-	80
White perch	86	48	191	352	1026	84	120	63	430	52	164	412	212	53	96	64	28	256
Total	1622	3840	2456	6680	4407	13395	6360	1923	10096	22557	9133	8252	7447	4087	28469	10273	7731	25294

continued

Table 9. Continued.

Date	24 May		25 May		26 May		27 May		28 May		29 May		30 May		31 May		1 Jun		
No. Lifts*	7	4	6	6	5	5	5	5	6	5	5	6	6	4	6	4	2	3	5
Fishing Time (hr)	1.8	2.2	2.1	2.7	1.7	2.6	1.8	2.2	1.6	2.8	2.2	3.0	2.3	2.2	2.3	2.2	0.8	1.5	2.3
Volume	HF	LF	LF	HF	HF	LF	LF	HF	HF	LF	LF	HF	HF	LF	LF	HF	XLF	LF	HF
Species																			
American eel	984	250	516	48	298	42	125	336	500	800	304	260	170	58	34	3	2	2	6
Blueback herring	556	716	36	272	168	2	213	74	693	15	4	8	45	-	-	-	-	-	-
American shad	3	6	4	8	38	2	15	5	20	1	-	11	1	-	-	-	-	-	-
Gizzard shad	12856	4150	5160	13344	7527	397	5398	5076	7046	315	1428	1728	2242	191	1875	2359	95	1580	3380
Carp	32	110	120	1200	45	427	126	108	73	528	100	492	146	482	263	237	2	96	628
Quillback	1080	715	800	256	80	30	452	292	-	128	4	208	-	312	4	24	-	4	-
Channel catfish	104	236	283	288	138	36	39	118	32	7	72	40	20	1	28	28	21	12	112
White perch	264	488	801	608	-	106	158	56	93	178	188	148	96	242	869	253	23	20	44
Total	15879	6671	7720	16024	8294	1042	6526	6065	8457	1972	2100	2895	2720	1286	3073	2904	143	1714	4172

Date	2 Jun		Total					
No. Lifts*	5	4						
Fishing Time (hr)	0.9	2.0	1.6	Catch/	90.1	Catch/	89.3	Catch/
Volume	HF	LF	XLF	Hour	LF	Hour	HF	Hour
Species								
American eel	5	1	4	2.5	3568	39.6	5570	62.4
Blueback herring	21	2	-	-	10487	116.4	3906	43.7
American shad	-	-	-	-	40	0.44	109	1.22
Gizzard shad	10052	130	619	386.9	169494	1881.2	373354	4180.9
Carp	8	19	4	2.5	4877	54.1	7362	82.4
Quillback	4	-	-	-	3605	40.0	3013	33.7
Channel catfish	904	164	21	13.1	3153	35.0	5722	64.1
White perch	9	28	29	18.1	43735	485.4	20437	228.8
Total	11003	344	677	423.1	238959	2552.2	419473	4697.3

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 10. Time of day American shad, *Alosa sapidissima*, were taken in the Conowingo Dam Fish Collection Facility, 20 April-29 June 1977.

Date	20 Apr	21 Apr	22 Apr	24 Apr	17 May	20 May	21 May	22 May	23 May	24 May	25 May	26 May	27 May	28 May	29 May	30 May	4 Jun
Water Temp (F)	60	62	63	64	61	68	69	69	70	71	73	75	75	75	76	75	73
Time (EST)																	
0500-0559	1	-	-	-	-	-	1	-	1	-	-	-	2	-	-	-	-
0600-0659	3	1	-	-	-	1	-	-	1	-	1	23	3	1	-	-	-
0700-0759	-	-	-	-	-	-	-	8	-	-	2	15	3	14	-	1	1
0800-0859	-	-	-	-	-	-	1	4	2	3	1	1	11	5	-	-	-
0900-0959	-	-	-	-	1	-	-	1	4	3	4	1	2	-	3	-	-
1000-1059	-	-	1	1	-	-	1	1	2	3	1	-	1	-	6	-	-
1100-1159	-	-	-	-	-	-	1	-	1	-	3	-	-	1	2	-	1
Total	4	1	1	1	1	1	4	14	11	9	12	40	22	21	11	1	2

Date	5 Jun	6 Jun	7 Jun	8 Jun	9 Jun	16 Jun	18 Jun	21 Jun	23 Jun	24 Jun	25 Jun	26 Jun	27 Jun	28 Jun	29 Jun	Total	%
Water Temp (F)	74	73	74	72	71	71	70	70	70	73	75	75	74.5	75	75		
Time (EST)																	
0500-0559	-	1	-	-	-	-	-	-	1	-	-	-	2	-	-	9	4.7
0600-0659	-	-	1	-	-	-	-	2	-	-	-	-	-	-	-	37	19.2
0700-0759	-	-	-	-	-	-	-	-	-	1	-	3	3	1	1	53	27.5
0800-0859	-	-	2	1	-	-	-	-	-	-	-	4	3	-	-	38	19.7
0900-0959	2	-	-	-	-	-	1	-	-	-	2	2	1	-	-	27	14.0
1000-1059	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	19	9.8
1100-1159	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	10	5.2
Total	2	1	4	1	1	1	1	2	1	1	2	9	9	1	1	193	

Table 11. Comparison of the numbers of American shad, Alosa sapidissima, taken in the Conowingo Dam Fish Collection Facility with water temperature, 1972-1977.

Temperature	1972		1973		1974		1975		1976		1977		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
56	0	-	0	-	6	4.7	0	-	0	-	0	-	6	0.7
58	0	-	2	2.6	3	2.3	0	-	0	-	0	-	5	0.6
59	2	0.7	0	-	0	-	0	-	4	4.4	0	-	6	0.7
60	2	0.7	1	1.3	0	-	0	-	0	-	4	2.1	7	0.8
61	0	-	0	-	3	2.3	0	-	2	2.2	1	0.5	6	0.7
62	2	0.7	3	3.9	0	-	0	-	2	2.2	1	0.5	8	0.9
63	0	-	1	1.3	0	-	0	-	3	3.3	1	0.5	5	0.6
64	1	0.3	3	3.9	0	-	0	-	5	5.5	1	0.5	10	1.2
65	0	-	1	1.3	0	-	0	-	8	8.8	0	-	9	1.0
66	0	-	0	-	1	0.8	0	-	16	17.6	0	-	17	2.0
67	4	1.4	4	5.2	0	-	1	1.2	3	3.3	0	-	12	1.4
68	17	5.8	0	-	1	0.8	0	-	17	18.7	1	0.5	36	4.2
69	24	8.2	10	13.0	2	1.6	2	2.3	0	-	18	9.3	56	6.5
70	116	39.6	17	22.1	88	68.8	7	8.3	0	-	15	7.8	243	28.1
71	57	19.5	0	-	17	13.3	0	-	12	13.2	11	5.7	97	11.2
72	3	1.0	0	-	0	-	6	7.1	5	5.5	1	0.5	15	1.7
73	0	-	7	9.1	0	-	2	2.3	3	3.3	16	8.3	28	3.2
74	65	27.2	1	1.3	2	1.6	47	56.0	2	2.2	6	3.1	123	14.2
75	0	-	22	28.6	0	-	16	19.0	1	1.1	106	54.9	145	16.7
76	0	-	0	-	4	3.1	3	3.5	8	8.8	11	5.7	26	3.0
77	0	-	1	1.3	1	0.8	0	-	0	-	0	-	2	0.2
79	0	-	4	5.2	0	-	0	-	0	-	0	-	4	0.5
Total	293		77		128		84		91		193		866	

Table 12. Age composition of adult American shad, Alosa sapidissima, taken in the Conowingo Dam Fish Collection Facility and by anglers, 1972-1977.

Age Group	Collection Facility		Anglers		Total	%
	Males	Females	Males	Females		
			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
			1977			
III	-	1	13	-	14	14.6
IV	4	11	17	31	63	65.6
V	-	2	3	14	19	19.8
Total	76	85	79	105	345	

Table 13. Daily numbers and release locations of blueback herring, Alosa aestivalis, American shad, Alosa sapidissima, and striped bass, Morone saxatilis, transported from the Conowingo Dam Fish Collection Facility, 17 April-29 June 1977.

Date	Species	Release Location	
		Conowingo Pond	York Haven Pond
17 Apr	Blueback herring	0	996
18 Apr	Blueback herring	0	425
19 Apr	Blueback herring	373	0
20 Apr	Blueback herring	351	1054
	American shad	3	1
22 May	American shad	8	0
24 May	American shad	8	0
26 May	American shad	0	31
27 May	American shad	0	10
28 May	American shad	0	18
29 May	American shad	7	0
1 Jun	Striped bass	23	0
2 Jun	Striped bass	15	0
3 Jun	Striped bass	15	0
4 Jun	Striped bass	8	0
5 Jun	Striped bass	59	0
6 Jun	Striped bass	13	0
7 Jun	Striped bass	26	0
8 Jun	Striped bass	19	0
10 Jun	Striped bass	10	0
11 Jun	Striped bass	10	0
13 Jun	Striped bass	15	0
14 Jun	Striped bass	15	0
15 Jun	Striped bass	12	0
16 Jun	Striped bass	10	0
17 Jun	Striped bass	21	0
19 Jun	Striped bass	9	0
21 Jun	Striped bass	41	0
22 Jun	Striped bass	8	0
	Blueback herring	351	0
23 Jun	Striped bass	8	0
24 Jun	Striped bass	28	0
25 Jun	Striped bass	13	0
26 Jun	Striped bass	102	0
	American shad	1	0
	Blueback herring	566	0
27 Jun	Striped bass	88	0
	American shad	1	0
	Blueback herring	153	0
28 Jun	Striped bass	12	0
	Blueback herring	209	0
29 Jun	Striped bass	3	0
	American shad	1	0
	Blueback herring	178	0
Total	Blueback herring	2181	2475
	American shad	29	60
	Striped bass	583	0
	Total	2793	2535

Table 14. Fishes tagged at the Conowingo Dam Fish Collection Facility on 1 and 2 June and recaptured from 1-29 June 1977.

	Catch on 1 and 2 Jun	No. Fish Tagged	% Tagged	No. Fish Recaptured 1-29 Jun	Recapture Rate (%)
American eel	83	-	-	-	-
Blueback herring	23	6	26.1	0	
Gizzard shad	15,379	2,328	15.1	184	7.9
Rainbow trout	17	-	-	-	-
Brown trout	12	2	16.7	0	-
Goldfish	1	1	100	0	-
Carp	759	176	23.2	0	-
Golden shiner	79	3	3.8	1	33.3
Spotfin shiner	50	-	-	-	-
Quillback	8	5	62.5	0	-
White sucker	1	3	-	0	-
White catfish	1,064	6	0.6	0	-
Brown bullhead	421	4	1.0	0	-
Channel catfish	12,651	80	0.6	0	-
White perch	559	22	3.9	0	-
Striped bass	59	4	6.8	0	-
Rock bass	2	1	50	0	-
Redbreast sunfish	685	11	1.6	1	9.1
Pumpkinseed	139	1	0.7	0	-
Bluegill	600	47	7.8	13	27.7
Smallmouth bass	5	-	-	-	-
Largemouth bass	1	1	100.0	0	-
White crappie	46	5	10.9	1	20.0
Black crappie	1	-	-	-	-
Yellow perch	7	2	28.6	0	-
Walleye	99	23	23.2	1	4.4
Total	32,751	2,731	8.3	201	7.4

Table 15. Hourly catch of American shad, Alosa sapidissima, by anglers fishing from shore just downstream from the Conowingo Dam Fish Collection Facility, 16 April-27 May 1977.

Date Water Temp (F)	16 Apr 58	17 Apr 57	18 Apr 57	22 Apr 63	23 Apr 64	24 Apr 64	7 May 62.5	17 May 61	18 May 63	19 May 66	20 May 68	21 May 69	22 May 69	23 May 70	24 May 71	25 May 73	26 May 75	27 May 75	Total
Time (EST)																			
0500-0559	-	-	-	-	-	1	-	-	-	1	2	-	-	-	-	1	1	-	6
0600-0659	-	-	-	-	1	-	-	-	-	3	5	9	1	9	-	-	-	-	28
0700-0759	-	-	-	-	-	-	1	-	-	2	1	-	-	-	2	5	-	1	12
0800-0859	1	-	-	2	-	-	-	-	-	-	-	-	1	-	1	1	2	-	8
0900-0959	1	-	-	-	-	1	-	-	1	-	-	-	-	2	-	-	-	-	5
1000-1059	1	-	-	-	2	1	-	-	1	1	-	-	-	1	-	-	-	-	7
1100-1159	-	2	1	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	5
Total	3	2	1	2	3	3	1	1	2	7	8	9	2	13	3	7	3	1	71

Table 15. Status of generation of Conowingo Hydro-electric station in relation to shore angler catch of American shad, Alosa sapidissima, for 1973-1977. 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	1977	Total	1973	1974	1975	1976	1977	Total
1	0	Off	On	10	14	22	51	49	146	7.0	27.5	53.7	31.1	69.0	31.1
2	0	Off	On	0	2	3	3	0	8	-	3.9	7.3	1.8	-	1.7
3	0	Off	On	0	2	2	8	2	14	-	3.9	4.9	4.9	2.8	3.0
4	0	Off	On	0	5	1	1	5	12	-	9.8	2.4	0.6	7.0	2.6
4	0	Reduced	On	0	0	0	14	0	14	-	-	-	8.5	-	3.0
4	0	On	On	0	0	0	2	0	2	-	-	-	1.2	-	0.4
4	1	Off	On	1	0	0	7	1	9	0.7	-	-	4.3	1.4	1.9
4	1	Reduced	On	0	0	0	1	0	1	-	-	-	0.6	-	0.2
4	2	Off	On	2	0	0	1	3	6	1.4	-	-	0.6	4.2	1.3
4	2	On	On	0	0	0	3	2	5	-	-	-	1.8	2.8	1.1
4	2	On	Off	0	0	0	4	0	4	-	-	-	2.4	-	0.8
3	3	On	On	1	0	0	0	0	1	0.7	-	-	-	-	0.2
4	3	Off	On	1	1	0	6	2	10	0.7	2.0	-	3.6	2.8	2.1
4	3	On	On	0	0	0	7	0	7	-	-	-	4.3	-	1.5
4	4	Off	On	0	9	0	2	0	11	-	17.6	-	1.2	-	2.3
4	4	On	On	1	0	0	10	0	11	0.7	-	-	6.1	-	2.3
5	4	Off	On	1	6	2	0	0	9	0.7	11.8	4.9	-	-	1.9
5	4	On	On	1	0	0	2	1	4	0.7	-	-	1.2	1.4	0.8
5	3	Reduced	On	0	0	0	6	0	6	-	-	-	3.6	-	1.3
5	1	Reduced	On	0	0	0	1	0	1	-	-	-	0.6	-	0.2
5	4	Off	On	1	3	3	6	0	13	0.7	5.9	7.3	3.6	-	2.8
6	4	On	On	0	0	0	16	1	17	-	-	-	9.8	1.4	3.6
7	3	On	On	2	0	0	0	0	2	1.4	-	-	-	-	0.4
7	4	On	On	92	9	8	4	5	118	64.8	17.6	19.5	2.4	7.0	25.2
7	4	Reduced	On	0	0	0	9	0	9	-	-	-	5.5	-	1.9
Changing		Changing		5	0	0	0	0	5	3.5	-	-	-	-	1.1
Undetermined				24	0	0	0	0	24	16.9	-	-	-	-	5.1
Total				142	51	41	164	71	469						

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

Table 17. Daily angler effort (hours) and number of American shad, Alosa sapidissima, caught along the west shore of the Conowingo Dam tailrace, 1973-1977. No angler survey conducted in 1972.

Hours of Creel Census

Date	1973 0400-2000		1974 0400-1100		1975 0400-1100		1976 0400-1200		1977 0400-1200	
	Angler Hours	No. Shad caught	Angler Hours	No. Shad caught	Angler Hours	No. Shad caught	Angler Hours	No. Shad caught	Angler Hours	No. Shad caught
16 Apr	-	-	-	-	-	-	-	-	117	3
17 Apr	-	-	-	-	-	-	-	-	254	2
18 Apr	-	-	46	0	-	-	-	-	66	1
19 Apr	-	-	88	0	-	-	-	-	57	0
20 Apr	-	-	35	0	-	-	-	-	76	0
21 Apr	-	-	-	-	-	-	31	4	103	0
22 Apr	-	-	90	0	-	-	72	0	124	2
23 Apr	-	-	83	0	-	-	122	7	281	3
24 Apr	656	5	113	0	-	-	317	8	277	3
25 Apr	546	2	133	0	-	-	321	40	76	0
26 Apr	594	0	159	0	-	-	79	6	85	0
27 Apr	405	1	281	1	-	-	41	0	96	0
28 Apr	1090	3	281	1	-	-	62	0	94	0
29 Apr	982	0	195	2	-	-	120	1	48	0
30 Apr	358	0	130	3	-	-	84	1	70	0
1 May	387	0	157	0	-	-	175	4	264	0
2 May	585	0	267	8	62	0	227	0	89	0
3 May	371	0	154	1	220	2	43	0	77	0
4 May	363	1	320	5	63	1	64	0	93	0
5 May	-	-	303	5	109	0	66	0	69	0
6 May	1288	0	218	4	77	0	85	0	88	0
7 May	514	0	99	0	123	0	43	0	204	1
8 May	421	0	173	3	214	1	113	0	189	0
9 May	422	0	113	0	99	0	94	1	10	0
10 May	635	9	79	0	152	0	54	1	36	0
11 May	666	30	244	3	249	0	63	1	56	0
12 May	1206	24	147	0	80	0	46	1	70	0
13 May	1990	32	64	0	53	0	35	0	42	0
14 May	608	18	64	0	88	0	70	9	132	0
15 May	542	6	105	3	121	0	145	5	211	0
16 May	450	0	67	0	69	2	137	15	72	0
17 May	258	2	51	0	248	6	50	5	96	1
18 May	223	1	200	0	310	1	106	30	53	2
19 May	654	0	240	0	78	0	54	2	65	7
20 May	458	0	63	0	97	1	83	9	53	8
21 May	229	3	46	1	66	1	76	10	160	9
22 May	279	0	85	1	65	0	130	2	181	2
23 May	189	0	66	0	37	0	153	1	84	13
24 May	114	0	94	0	184	12	44	0	55	3
25 May	110	1	259	6	71	0	32	1	89	7
26 May	402	0	267	0	120	11	18	0	67	3
27 May	183	1	236	1	45	0	20	0	46	1
28 May	328	0	67	0	48	0	30	0	140	0
29 May	79	0	31	2	49	0	84	0	213	0
30 May	94	0	35	0	75	0	92	0	193	0
31 May	160	0	24	0	193	3	78	0	56	0
1 Jun	139	0	167	0	57	0	3	0	19	0
2 Jun	418	3	80	0	43	0	2	0	44	0
3 Jun	426	0	40	0	30	0	19	0	6	0
4 Jun	81	0	60	1	56	0	9	0	179	0
5 Jun	155	0	28	0	29	0	54	0	209	0

continued.

Table 17. Continued.

Hours of Creel Census

Date	1973 0400-2000 Angler Hours	1973 0400-2000 No. Shad caught	1974 0400-1100 Angler Hours	1974 0400-1100 No. Shad caught	1975 0400-1100 Angler Hours	1975 0400-1100 No. Shad caught	1976 0400-1200 Angler Hours	1976 0400-1200 No. Shad caught	1977 0400-1200 Angler Hours	1977 0400-1200 No. Shad caught
6 Jun	87	0	17	0	24	0	33	0	15	0
7 Jun	119	0	31	0	170	0	1	0	0	0
8 Jun	217	0	138	0	118	0	15	0	18	0
9 Jun	321	0	158	0	11	0	5	0	8	0
10 Jun	328	0	14	0	32	0	4	0	31	0
11 Jun	86	0	22	0	45	0	11	0	109	0
12 Jun	-	-	19	0	5	0	16	0	164	0
13 Jun	-	-	28	0	31	0	4	0	21	0
14 Jun	110	0	45	0	-	-	1	0	30	0
15 Jun	69	0	121	0	-	-	19	0	27	0
16 Jun	-	-	138	0	-	-	9	0	30	0
17 Jun	-	-	17	0	-	-	4	0	46	0
18 Jun	-	-	28	0	-	-	4	0	93	0
19 Jun	-	-	11	0	-	-	2	0	173	0
20 Jun	-	-	16	0	-	-	6	0	27	0
21 Jun	-	-	44	0	-	-	9	0	41	0
22 Jun	-	-	92	0	-	-	9	0	18	0
23 Jun	-	-	82	0	-	-	10	0	15	0
24 Jun	-	-	3	0	-	-	3	0	40	0
25 Jun	-	-	23	0	-	-	11	0	159	0
26 Jun	-	-	11	0	-	-	2	0	111	0
27 Jun	-	-	17	0	-	-	0	0	9	0
28 Jun	-	-	14	0	-	-	0	0	29	0
29 Jun	-	-	45	0	-	-	0	0	6	0
30 Jun	-	-	196	0	-	-	0	0	16	0
Total	20495	142	7675	51	4096	41	4024	164	6770	71
Average Per Day	409.9	2.8	105.1	0.7	95.3	0.95	56.7	2.3	89.1	0.93
Catch Per Angler hr		.007		.007		.010		.041		.010

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 Hydroelectric Station; 1973-1977.

No. Units Operating		No. Boat Hrs East Side						No. Boat Hrs West Side					
Small*	Large**	1973	1974	1975	1976	1977	Total	1973	1974	1975	1976	1977	Total
0	0	0	26	0	10	17	53	0	37	0	10	8	55
1	0	21	29	26	30	79	185	15	64	31	140	276	526
2	0	6	7	12	4	6	35	16	8	9	25	27	85
3	0	6	24	11	2	7	50	14	24	2	14	13	67
4	0	22	75	0	46	17	160	32	63	0	88	23	206
5	0	0	0	0	3	0	3	6	0	0	2	0	8
0	1	3	0	0	0	0	3	0	0	0	0	0	0
3	1	3	0	0	1	3	7	2	0	0	2	1	5
4	1	39	97	33	28	26	223	38	23	4	38	8	111
5	1	0	2	0	5	0	7	0	0	0	2	0	2
3	2	1	25	3	0	0	29	1	6	0	0	0	7
4	2	35	59	39	61	43	237	33	9	3	9	11	65
5	2	4	5	9	0	0	18	1	0	0	0	2	3
6	2	2	3	0	0	2	7	0	0	0	0	0	0
3	3	2	0	0	0	4	6	0	0	0	0	1	1
4	3	31	70	32	54	34	221	8	18	9	8	6	49
5	3	30	25	7	11	1	74	4	4	0	1	0	9
6	3	1	0	0	2	3	6	0	0	0	1	0	1
7	3	7	0	37	10	3	57	1	0	6	0	0	7
3	4	9	0	0	0	1	10	4	0	0	0	0	4
4	4	38	34	18	49	31	170	5	6	2	3	1	17
5	4	25	55	8	12	10	110	4	2	0	1	1	8
6	4	22	8	27	36	17	110	1	2	4	0	3	10
7	4	804	219	340	193	241	1797	129	43	55	23	27	277
Changing		40	0	0	0	0	40	3	0	0	0	0	3
Total		1151	763	602	557	545	3618	317	309	125	367	408	1526

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

continued

Table 18. Continued.

No. Units Operating		% East Side						% West Side					
Small*	Large**	1973	1974	1975	1976	1977	Total	1973	1974	1975	1976	1977	Total
0	0	-	41.3	-	50.0	68.0	49.1	-	58.7	-	50.0	32.0	60.9
1	0	58.3	31.2	45.6	17.6	22.3	26.0	41.7	68.8	54.4	82.4	77.7	74.0
2	0	27.3	46.7	57.1	13.8	18.2	29.2	72.7	53.3	42.9	86.2	81.8	70.8
3	0	30.0	50.0	84.6	12.5	35.0	42.7	70.0	50.0	15.4	87.5	65.0	57.3
4	0	40.7	54.3	-	34.3	42.5	43.7	59.3	45.7	-	65.7	57.5	56.3
5	0	-	-	-	60.0	-	27.3	100.0	-	-	40.0	-	72.7
0	1	100.0	-	-	-	-	100.0	-	-	-	-	-	-
3	1	60.0	-	-	33.3	75.0	58.3	40.0	-	-	66.7	25.0	41.7
4	1	50.6	80.8	89.2	42.4	76.5	66.8	49.4	19.2	10.8	57.6	23.5	33.2
5	1	-	100.0	-	71.4	-	77.8	-	-	-	28.6	-	22.2
3	2	50.0	80.6	100.0	-	-	80.6	50.0	19.4	-	-	-	19.4
4	2	51.5	86.8	92.9	87.1	79.6	78.5	48.5	13.2	7.1	12.8	20.4	21.5
5	2	60.0	100.0	100.0	-	-	85.7	20.0	-	-	-	100.0	14.3
6	2	100.0	100.0	-	-	100.0	100.0	-	-	-	-	-	-
3	3	100.0	-	-	-	80.0	85.7	-	-	-	-	20.0	14.3
4	3	79.5	79.5	88.4	87.1	85.0	81.8	20.5	21.5	21.6	12.9	15.0	18.1
5	3	88.2	86.2	100.0	91.7	100.0	89.2	11.8	13.8	-	8.3	-	10.8
6	3	100.0	-	-	66.7	100.0	85.7	-	-	-	33.3	-	14.3
7	3	87.5	-	86.0	100.0	100.0	89.1	12.5	-	14.0	-	-	10.9
3	4	69.2	-	-	-	100.0	71.4	30.8	-	-	-	-	28.6
4	4	88.4	85.0	90.0	94.2	96.9	90.9	11.6	15.0	10.0	5.8	3.1	9.1
5	4	86.2	96.5	100.0	92.3	90.9	93.2	13.8	3.5	-	7.7	9.1	6.8
6	4	95.7	80.0	87.1	100.0	85.0	91.7	4.3	20.0	12.9	-	15.0	8.3
7	4	86.2	83.6	86.1	89.4	89.9	86.6	13.8	16.4	13.9	10.6	10.1	13.4
Changing		93.0	-	-	-	-	93.0	7.0	-	-	-	-	7.0
Total		78.4	72.5	82.8	60.3	57.2	70.3	21.6	27.5	17.2	39.7	42.8	29.7

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

Table 13. Number of fishes taken in the Conowingo Dam Fish Collection Facility, 1972-1977.

Year	1972			1973			1974		
Total No.	934			1645			929		
Total Fishing Time(hr)	363.1			662.6			289.1		
	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr
Species									
Lampreys									
Sea lamprey	1	*	**	2	*	**	0	-	-
Freshwater eels									
American eel	932	0.27	257	2,248	0.16	339	126,543	7.47	43,771
Herrings									
Blueback herring	76,867	22.21	21,170	354,338	24.91	53,484	333,986	19.71	115,526
Hickory shad	369	0.11	102	738	0.05	111	219	0.01	76
Alewife	12,218	3.53	3,365	143,880	10.11	21,714	17,052	1.01	5,898
American shad	293	0.08	81	77	*	12	128	0.01	44
Atlantic menhaden	0	-	-	0	-	-	113	0.01	39
Gizzard shad	37,191	10.74	10,243	60,103	4.22	9,071	122,491	7.23	42,370
Trouts									
Lake herring	0	-	-	1	*	**	0	-	-
Rainbow trout	36	0.01	10	68	*	10	21	*	7
Brown trout	147	0.04	40	300	0.02	45	625	0.04	216
Brook trout	1	*	**	3	*	**	4	*	1
Pikes									
Chain pickerel	0	-	-	1	*	**	10	*	3
Northern pike	0	-	-	2	*	**	2	*	**
Muskellunge	19	*	5	105	0.01	16	9	*	3
Minnows and Carp									
Goldfish	0	-	-	27	*	4	2	*	**
Carp	5,478	1.58	1,509	19,473	1.37	2,939	36,766	2.17	12,717
Golden shiner	180	0.05	50	832	0.06	126	516	0.03	178
Comely shiner	8	*	2	255	0.02	38	3,870	0.23	1,339
Spottail shiner	34	0.01	9	137	0.01	21	2,331	0.14	806
Rosyface shiner	0	-	-	0	-	-	0	-	-
Spotfin shiner	113	0.03	31	40	*	6	3,585	0.21	1,240
Longnose dace	0	-	-	0	-	-	1	*	**
Suckers									
Quillback	6,679	1.93	1,839	28,784	2.02	4,344	15,179	0.90	5,250
White sucker	369	0.11	102	1,023	0.07	156	284	0.02	98
Creek chubsucker	3	*	**	3	*	**	1	*	**
Northern hog sucker	0	-	-	2	*	**	0	-	-
Shorthead redhorse	1,083	0.31	298	4,419	0.31	667	434	0.02	150
Freshwater catfishes									
White catfish	3,695	1.07	1,018	7,393	0.52	1,116	2,424	0.14	838
Yellow bullhead	7	*	2	45	*	7	5	*	2
Brown bullhead	483	0.14	133	7,443	0.52	1,123	1,885	0.11	652
Channel catfish	123,413	35.66	33,989	79,576	5.92	12,010	101,573	5.99	35,134
Killifishes									
Mummichog	0	-	-	0	-	-	0	-	-
Needle Fishes									
Atlantic needlefish	1	*	**	0	-	-	0	-	-
Silversides									
Tidewater silverside	-	-	-	-	-	-	-	-	-
Temperate basses									
White perch	57,221	16.53	15,759	688,172	48.36	103,859	907,896	53.58	314,042
Striped bass	4,571	1.32	1,259	3,384	0.24	511	2,005	0.12	694
Sunfishes									
Rock bass	73	0.02	20	61	*	9	52	*	18
Redbreast sunfish	805	0.23	222	3,158	0.22	47	1,742	0.10	603
Green sunfish	4	*	1	11	*	2	6	*	2
Pumpkinseed	277	0.08	76	6,870	0.48	1,037	3,175	0.19	1,098
Bluegill	701	0.20	193	2,104	0.15	318	1,513	0.09	523
Smallmouth bass	156	0.04	43	304	0.02	46	127	0.01	44
Largemouth bass	49	0.01	13	82	0.01	12	25	*	9
White crappie	4,515	1.30	1,243	2,363	0.17	357	5,337	0.31	1,846
Black crappie	8	*	2	43	*	6	42	*	15
Lepomis hybrid									
Perches									
Tessellated darter	0	-	-	1	*	**	4	*	1
Yellow perch	5,979	1.73	1,647	1,132	0.08	171	731	0.04	253
Walleye	2,113	0.61	582	3,799	0.27	573	1,805	0.11	624
Total	346,092		95,316	1,422,862		214,739	1,694,519		586,136

* Less than 0.005%
** Less than 1

TABLE 19

Continued.

Year	1975			1976		
Total No.	514			839		
Total Fishing Time(hr)	199.4			313.9		
	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr
Species						
Lampreys						
Sea lamprey	2	*	1	29	*	9
Freshwater eels						
American eel	64,375	7.04	32,284	187,035	13.21	59,584
Herrings						
Blueback herring	69,932	7.64	35,071	39,503	2.79	12,585
Hickory shad	20	*	10	0	-	-
Alewife	4,311	0.47	2,162	235	0.02	75
American shad	84	0.01	42	91	0.01	29
Atlantic menhaden	0	-	-	577	0.04	184
Gizzard shad	139,156	15.21	69,787	405,510	28.64	129,184
Trouts						
Lake herring	0	-	-	0	-	-
Rainbow trout	22	*	11	60	*	19
Brown trout	219	0.02	110	494	0.03	157
Brook trout	1	*	**	0	-	-
Pikes						
Chain pickerel	0	-	-	0	-	-
Northern pike	0	-	-	0	-	-
Muskellunge	7	*	4	14	*	4
Minnows and Carp						
Goldfish	9	*	5	8	*	3
Carp	15,114	1.65	7,580	9,452	0.67	3,011
Golden shiner	751	0.08	377	1,868	0.13	595
Comely shiner	2,079	0.23	1,043	841	0.06	268
Spottail shiner	408	0.04	205	1,743	0.12	555
Rosyface shiner	1	*	**	0	-	-
Spotfin shiner	1,091	0.12	547	59,856	4.23	19,068
Longnose dace	0	-	-	0	-	-
Suckers						
Quillback	8,391	0.92	4,208	10,217	0.72	3,255
White sucker	149	0.02	75	457	0.03	146
Creek chubsucker	0	-	-	0	-	-
Northern hog sucker	0	-	-	5	*	2
Shorthead redhorse	448	0.05	225	1,275	0.09	406
Freshwater catfishes						
White catfish	6,176	0.68	3,097	2,062	0.14	657
Yellow bullhead	32	*	16	10	*	3
Brown bullhead	740	0.08	371	580	0.04	185
Channel catfish	74,042	8.09	37,132	91,715	6.48	29,218
Killifishes						
Mummichog	0	-	-	1	*	**
Needle Fishes						
Atlantic needlefish	1	*	**	0	-	-
Silversides						
Tidewater silverside	-	-	-	-	-	-
Temperate basses						
White perch	509,599	55.70	255,566	581,768	41.08	185,335
Striped bass	174	0.02	87	51	*	16
Sunfishes						
Rock bass	46	*	23	130	0.01	41
Redbreast sunfish	3,040	0.33	1,525	5,432	0.38	1,730
Green sunfish	39	*	20	133	0.01	42
Pumpkinseed	976	0.11	489	1,319	0.09	420
Bluegill	3,082	0.34	1,546	3,337	0.24	1,063
Smallmouth bass	137	0.01	69	332	0.02	106
Largemouth bass	35	*	18	33	*	11
White crappie	9,290	1.02	4,659	3,836	0.27	1,222
Black crappie	45	*	23	90	0.01	29
Lepomis hybrid						
Perches						
Tessellated darter	1	*	**	0	-	-
Yellow perch	494	0.05	248	3,316	0.23	1,056
Walleye	369	0.04	185	2,694	0.19	858
Total	914,888		458,820	1,416,109		451,134

* Less than 0.005%
** Less than 1

TABLE 19

Continued.

Year	1977			1972-1977		
Total No.	875			5736		
Total Fishing Time(hr)	315.8			2143.9		
	Total Fish	%	Fish/ 100 hr	Total Fish	%	Fish/ 100 hr
Species						
Lampreys						
Sea lamprey	11	*	3	45	*	2
Freshwater eels						
American eel	15,643	1.23	4,953	396,776	5.61	18,507
Herrings						
Blueback herring	30,742	2.41	9,735	905,418	12.81	42,232
Hickory shad	0	-	-	1,346	0.02	63
Alewife	188	0.01	60	177,884	2.52	8,297
American shad	191	0.01	60	864	0.01	40
Atlantic menhaden	11,851	0.93	3,753	12,541	0.18	585
Gizzard shad	784,301	61.52	248,353	1,548,752	21.91	72,240
Trouts						
Lake herring	0	-	-	1	*	**
Rainbow trout	306	0.02	97	513	0.01	24
Brown trout	738	0.06	234	2,523	0.04	118
Brook trout	2	*	1	11	*	**
Pikes						
Chain pickerel	1	*	**	12	*	**
Northern pike	2	*	1	6	*	**
Muskellunge	48	*	15	202	*	9
Minnows and Carp						
Goldfish	1	*	**	47	*	2
Carp	16,252	1.27	5,146	102,535	1.45	4,783
Golden shiner	1,036	0.08	328	5,183	0.07	242
Comely shiner	825	0.06	261	7,878	0.11	367
Spottail shiner	7,251	0.57	2,296	11,904	0.17	555
Rosyface shiner	0	-	-	1	*	**
Spotfin shiner	10,664	0.84	3,377	75,349	1.06	753
Longnose dace	0	-	-	1	*	**
Suckers						
Quillback	6,808	0.53	2,156	76,058	1.08	3,548
White sucker	265	0.02	84	2,557	0.04	119
Creek chubsucker	0	-	-	7	*	**
Northern hog sucker	0	-	-	7	*	**
Shorthead redhorse	1,725	0.14	546	9,384	0.13	438
Freshwater catfishes						
White catfish	3,162	0.25	1,001	24,912	0.35	1,162
Yellow bullhead	47	*	15	146	*	7
Brown bullhead	3,044	0.24	964	14,175	0.20	661
Channel catfish	112,940	8.86	35,763	583,259	8.25	27,206
Killifishes						
Mummichog	0	-	-	1	*	**
Needle Fishes						
Atlantic needlefish	0	-	-	2	*	**
Silversides						
Tidewater silverside	1	*	**	1	*	**
Temperate basses						
White perch	234,277	18.38	74,185	2,978,933	42.14	138,949
Striped bass	2,126	0.17	673	12,311	0.17	574
Sunfishes						
Rock bass	149	0.01	47	511	0.01	24
Redbreast sunfish	10,170	0.80	3,220	24,347	0.34	1,136
Green sunfish	237	0.02	75	430	0.01	20
Pumpkinseed	3,941	0.31	1,248	16,558	0.23	772
Bluegill	8,794	0.69	2,785	19,531	0.28	911
Smallmouth bass	712	0.06	225	1,768	0.02	82
Largemouth bass	18	*	6	242	*	11
White crappie	1,815	0.14	575	27,156	0.38	1,267
Black crappie	468	0.04	148	696	0.01	32
Lepomis hybrid	4	*	1	4	*	**
Perches						
Tessellated darter	0	-	-	6	*	**
Yellow perch	993	0.08	314	12,645	0.18	590
Walleye	3,056	0.24	968	13,836	0.20	645
Total	1,274,805		403.675	7,069,275		329,739

* Less than 0.005%

** 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, 1972-1977.

Time of Day	1972		1973		1974		1975		1976		1977		Total***	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0400-0459	0	-	6	7.8	0	-	2	2.4	1	1.1	0	-	9	1.1
0500-0559	10	3.4	25	32.5	11	8.6	11*	13.3	7	7.7	9	4.7	73	9.2
0600-0659	113	38.6	22	28.6	24	18.8	42	50.6	12	13.2	37	19.2	250	31.4
0700-0759	66	22.6	6	7.8	20	15.6	9	10.8	33	36.3	53	27.5	187	23.5
0800-0859	64	21.8	2	2.6	17	13.3	9	10.8	19	20.9	38	19.7	149	18.7
0900-0959	5	1.7	3	3.9	8	6.3	8	9.6	4	4.4	27	14.0	55	6.9
1000-1059	2	0.7	2	2.6	7	5.5	2	2.4	10	11.0	19	9.8	42	5.3
1100-1159	1	0.3	2	2.6	13	10.2			5	5.5	10	5.2	31	3.9
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		193**		796	

* Does not include one dead American shad
** Includes two recaptured American shad
*** 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, 1973-1977. No angler survey conducted in 1972.

Time of Day	1973		1974		1975		1976		1977		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0400-0459	1	0.7	0	-	0	-	0	-	0	-	1	0.2
0500-0559	1	0.7	2	3.9	12	29.3	9	5.5	6	8.4	30	7.2
0600-0659	10	7.0	10	19.6	14	34.1	15	9.1	28	39.4	77	18.4
0700-0759	14	9.9	12	23.5	6	14.6	24	14.6	12	16.9	68	16.3
0800-0859	10	7.0	4	7.8	4	9.7	40	24.4	8	11.3	66	15.8
0900-0959	18	12.7	9	17.6	4	9.7	41	25.0	5	7.0	77	18.4
1000-1059	17	12.0	11	21.6	0	-	18	11.0	7	9.8	53	12.7
1100-1159	20	14.1	3	5.9	1	2.4	17	10.4	5	7.0	46	11.0
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		71		418	

* Creel census was not conducted after 1200 hr since 1974. Total column does not include American shad taken after 1159 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 1973-1977. No angler survey conducted in 1972.

Temperature	1973		1974		1975		1976		1977		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
56	0	-	0	-	1	2.4	0	-	0	-	1	0.2
57	1	0.7	1	2.0	2	4.8	0	-	3	4.2	7	1.5
58	4	2.8	3	5.9	1	2.4	0	-	3	4.2	11	2.3
59	10	7.0	3	5.9	0	-	4	2.4	0	-	17	3.6
60	8	5.6	7	13.7	0	-	6	3.7	0	-	21	4.5
61	33	23.2	8	15.7	0	-	1	0.6	1	1.4	43	9.2
62	27	19.0	14	27.5	0	-	12	7.3	0	-	53	11.3
63	56	39.4	3	5.9	0	-	5	3.0	5	7.0	69	14.7
64	3	2.1	0	-	0	-	27	16.5	6	8.4	36	7.7
65	0	-	0	-	2	4.8	10	6.1	0	-	12	2.6
66	0	-	0	-	6	14.6	45	27.4	7	9.8	58	12.4
67	0	-	0	-	1	2.4	0	-	0	-	1	0.2
68	0	-	1	2.0	2	4.8	54	32.9	8	11.3	65	13.8
69	0	-	1	2.0	0	-	0	-	11	15.5	12	2.6
70	0	-	10	19.6	0	-	0	-	13	18.3	23	4.9
71	0	-	0	-	0	-	0	-	3	4.2	3	0.6
72	0	-	0	-	12	29.3	0	-	0	-	12	2.6
73	0	-	0	-	0	-	0	-	7	9.8	7	1.5
74	0	-	0	-	14	36.6	0	-	0	-	14	3.0
75	0	-	0	-	0	-	0	-	4	5.6	4	0.8
Total	142		51		41		164		71		469	

Table 23. Susquehanna River flows (expressed as 24-hr average) and water temperatures at Conowingo Dam from 1 April-30 June 1972-1977. 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		1977	
		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)	Temp (F)	Flow (1000 cfs)
Apr	1	-	54.1	48.0	44.8	-	89.9	-	61.6	-	64.0	-	143.7
	2	-	56.1	50.0	54.8	-	94.0	-	58.1	-	75.1	-	139.9
	3	-	57.7	50.0	64.4	-	97.0	-	53.7	-	84.0	-	161.4
	4	-	62.6	51.0	87.6	-	147.4	-	54.9	-	89.7	-	212.4
	5	-	65.6	50.0	133.6	-	200.2	-	63.7	50.0	80.9	-	222.1
	6	-	60.6	-	155.7	-	193.5	-	73.5	-	71.5	-	180.2
	7	-	57.6	-	163.0	-	164.8	-	74.1	50.0	61.5	-	144.2
	8	-	55.2	-	144.7	-	133.6	-	69.8	-	54.3	-	118.6
	9	-	53.6	-	131.4	-	114.9	-	58.9	51.0	48.7	-	100.1
	10	-	49.5	-	118.5	-	104.4	-	53.1	-	46.1	-	85.5
	11	-	47.5	-	120.6	-	93.1	-	48.7	-	37.5	-	71.6
	12	46.0	45.2	-	112.6	-	81.0	-	45.5	50.0	34.6	-	61.5
	13	-	45.8	-	99.8	-	83.7	-	43.9	-	32.6	-	55.3
	14	49.0	51.5	-	88.4	-	94.9	-	37.5	-	30.3	-	50.0
	15	-	68.3	-	77.7	-	101.4	-	37.6	51.0	29.5	-	45.8
	16	-	103.1	50.0	65.4	-	101.4	-	34.3	-	29.1	58.0	40.9
	17	52.0	145.8	50.0	58.6	-	112.4	-	32.1	-	26.1	57.0	39.3
	18	52.0	225.6	51.0	50.9	54.0	97.3	51.0	32.5	-	25.6	57.0	35.4
	19	-	213.7	52.0	49.7	55.0	80.2	-	31.3	53.0	22.9	59.0	31.6
	20	-	168.6	55.0	42.5	53.0	68.1	-	30.6	55.0	24.4	60.0	29.7
	21	55.0	139.1	57.0	41.1	-	59.9	54.0	30.8	59.0	34.9	62.0	28.9
	22	-	121.5	58.0	40.9	56.0	53.0	54.0	30.3	62.0	30.3	63.0	27.3
	23	-	116.8	59.0	37.1	57.0	48.6	55.0	30.8	64.5	25.9	64.0	26.7
	24	53.0	107.6	60.0	34.9	56.0	44.1	56.0	32.5	68.0	24.3	64.0	25.4
	25	-	97.5	62.0	35.8	56.0	41.7	57.0	38.1	68.0	23.8	65.0	30.8
	26	53.0	86.5	61.0	42.6	58.0	38.5	59.0	53.3	68.0	22.7	64.0	72.8
	27	53.0	75.6	61.0	41.1	58.0	37.7	57.0	60.6	67.0	23.6	66.0	87.8
	28	52.0	67.6	62.0	53.7	57.0	36.1	58.0	55.9	64.5	23.4	65.0	83.2
	29	55.0	59.7	60.0	60.8	58.0	31.8	58.0	49.1	62.0	32.0	59.0	69.5
	30	55.0	53.3	56.0	63.0	59.0	30.8	57.0	45.7	61.5	39.1	58.0	54.8
May	1	56.0	47.3	55.0	65.3	60.0	26.9	57.0	42.4	60.0	38.5	56.0	49.3
	2	57.0	42.4	56.0	62.1	61.0	26.7	58.0	39.6	59.0	38.5	58.0	43.2
	3	59.0	43.6	57.0	55.7	60.0	29.6	57.0	35.2	58.0	35.2	58.0	36.9
	4	59.0	52.3	58.0	51.0	62.0	32.1	56.0	47.4	57.0	32.9	60.0	34.6

continued

Table 23 . 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)	1977 Temp (F)	1977 Flow (1000 cfs)
May	5	60.0	76.8	-	46.9	62.0	32.7	57.0	65.5	59.0	32.9	60.0	32.4
	6	59.0	101.4	58.0	46.8	62.0	31.0	58.0	79.9	59.0	32.6	61.0	31.6
	7	61.0	102.2	58.0	40.9	63.0	28.9	58.0	91.9	60.0	32.9	62.5	34.0
	8	61.0	88.1	58.0	37.6	61.0	28.8	58.0	94.4	62.5	28.7	63.0	42.8
	9	61.0	75.0	59.0	38.2	63.0	28.2	59.0	106.9	60.0	26.1	63.0	40.2
	10	-	86.8	59.0	38.1	61.0	28.0	61.0	92.3	60.0	24.6	60.0	36.3
	11	-	107.7	61.0	40.9	60.0	27.1	61.0	79.0	61.0	22.9	60.0	33.0
	12	-	139.3	-	55.0	60.0	33.6	60.0	63.9	61.5	23.6	60.0	32.9
	13	59.0	118.7	63.0	58.9	60.0	43.9	62.0	60.1	62.5	22.3	61.0	32.9
	14	58.0	97.0	63.0	64.2	59.0	63.6	63.0	58.7	62.0	20.4	61.0	34.3
	15	59.0	81.4	63.0	60.1	63.0	88.7	64.0	55.5	63.0	22.1	61.0	32.8
	16	60.0	74.2	60.0	54.7	64.0	86.6	65.0	64.9	64.0	26.6	61.0	29.8
	17	62.0	76.9	60.0	48.9	65.0	70.8	66.0	64.5	64.0	25.2	61.0	26.8
	18	63.0	74.9	60.0	50.1	65.0	57.8	67.0	66.1	66.0	26.6	63.0	24.8
	19	65.0	75.6	59.0	48.5	66.0	49.8	68.0	61.5	66.5	32.3	66.0	23.5
	20	64.0	72.5	59.0	52.3	67.0	43.2	68.0	55.6	65.0	40.1	68.0	21.7
	21	66.0	68.3	58.0	52.1	68.0	41.7	68.0	49.7	66.0	37.2	69.0	20.4
	22	66.0	64.5	57.0	59.0	70.0	37.9	69.0	44.5	66.0	42.5	69.0	20.0
	23	66.0	59.7	60.0	69.3	71.0	37.7	70.0	41.4	65.5	49.9	70.0	17.5
	24	67.0	54.4	59.0	75.8	70.0	32.4	72.0	38.5	65.0	48.8	71.0	16.3
	25	68.0	47.6	59.0	73.9	70.0	29.5	73.0	38.5	65.0	40.0	73.0	15.5
	26	67.0	44.2	58.0	68.8	70.0	27.8	74.0	36.3	65.0	39.3	75.0	15.8
	27	68.0	37.9	57.0	65.3	70.0	27.3	74.0	36.2	63.5	36.5	75.0	16.5
	28	68.0	34.6	56.0	72.3	70.0	25.7	75.0	32.5	65.0	34.1	75.0	10.8
	29	69.0	30.6	58.0	86.6	70.0	23.1	75.0	32.1	65.5	31.6	76.0	13.9
	30	70.0	27.2	59.0	78.9	71.0	22.2	75.0	28.8	65.5	34.8	75.0	13.7
	31	70.0	30.5	-	75.4	70.0	21.7	74.0	29.3	65.0	35.8	75.0	12.3
Jun	1	70.0	47.5	63.0	66.2	70.0	22.3	74.0	35.4	65.0	37.1	76.0	17.2
	2	70.0	53.2	64.0	57.0	70.0	23.6	75.0	28.2	65.5	41.4	74.0	8.7
	3	71.0	53.5	65.0	52.5	69.0	22.8	76.0	26.7	66.0	40.0	75.0	9.5
	4	71.0	52.4	66.0	45.5	69.0	24.8	75.0	25.4	66.0	38.0	73.0	11.0
	5	71.0	50.7	67.0	43.9	70.0	20.9	76.0	26.1	67.0	36.0	74.0	10.0
	6	70.0	43.3	69.0	42.5	70.0	19.4	76.0	34.4	67.5	34.9	73.0	9.7
	7	71.0	42.3	70.0	44.5	70.0	17.0	75.0	54.2	67.5	29.5	74.0	8.7
	8	70.0	41.8	70.0	53.8	70.0	16.7	74.0	92.6	68.0	26.4	72.0	9.7
	9	70.0	39.7	74.0	50.2	70.0	15.8	71.0	91.8	68.0	25.1	71.0	10.7
	10	72.0	33.4	75.0	45.8	71.0	11.4	68.0	67.9	68.5	25.2	71.0	10.2

continued

Table 23. 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)	1977 Temp (F)	1977 Flow (1000 cfs)
Jun 11	70.0	31.5	77.0	40.9	72.0	14.5	67.0	53.1	70.5	26.5	69.0	11.7
12	70.0	28.7	-	34.8	72.0	13.1	68.0	50.2	71.0	25.5	70.0	10.3
13	70.0	28.6	-	33.5	72.0	12.4	68.0	52.0	72.0	24.5	69.0	12.8
14	70.0	29.2	79.0	29.3	73.0	12.8	-	52.8	73.0	19.6	69.0	13.0
15	70.0	25.2	79.0	27.1	73.0	11.7	-	55.9	74.5	19.1	70.0	10.9
16	71.0	27.3	79.0	29.1	73.0	13.4	-	49.6	75.0	17.8	71.0	10.6
17	71.0	30.0	79.0	30.2	74.0	14.8	-	45.6	76.0	18.2	71.0	10.8
18	71.0	36.2	77.0	28.0	74.0	22.3	-	45.3	75.5	18.5	70.0	10.4
19	72.0	40.2	76.0	25.4	76.0	24.8	-	43.2	76.5	19.0	70.0	10.6
20	74.0	44.0	75.0	23.8	76.0	28.8	-	37.6	78.0	21.0	71.0	10.1
21	74.0	47.3	75.0	22.5	76.0	22.1	-	33.8	78.0	25.1	70.0	9.8
22	-	409.0	75.0	25.1	76.0	19.5	-	30.3	79.0	54.0	70.0	9.6
23	-	868.4	75.0	26.5	76.0	20.0	-	25.6	80.0	118.6	70.0	9.9
24	-	969.4	73.0	29.4	77.0	19.3	-	24.4	79.5	92.4	73.0	10.2
25	-	801.4	73.0	27.0	75.0	19.7	-	21.6	77.0	64.6	75.0	8.4
26	-	559.3	73.0	25.0	75.0	18.8	-	21.8	75.0	51.1	75.0	11.1
27	-	365.6	74.0	26.4	75.0	16.8	-	26.1	74.0	40.3	74.5	16.9
28	-	235.6	75.0	24.4	74.0	20.3	-	38.8	76.0	35.5	75.0	15.0
29	-	198.5	75.0	33.9	74.0	21.5	-	41.2	76.0	30.9	75.0	13.7
30	-	100.8	77.0	37.9	74.0	23.2	-	36.0	75.0	29.0	77.0	14.3

Table 24 Annual summary of the species and numbers of fish transported above Conowingo Dam, 1972-1977.

	1972			1973			1974			1975		
	Total Catch	No. Transported	%	Total Catch	No. Transported	%	Total Catch	No. Transported	%	Total Catch	No. Transported	%
Species												
American eel	932	0	-	2,248	0	-	126,543	0	-	64,375	0	-
Blueback herring	76,867	1,500	1.95	354,388	0	-	333,986	0	-	69,932	16,721	23.91
Hickory shad	369	6	1.63	738	0	-	219	0	-	20	3	15.00
Alewife	12,218	1,000	8.18	143,880	0	-	17,052	0	-	4,311	2,262	52.47
American shad	293	125	42.66	77	64	83.12	128	112	87.50	84	0	-
Striped bass	4,571	0	-	3,384	0	-	2,005	0	-	174	0	-
Totals	95,250	2,631	2.76	504,715	64	0.01	479,933	112	0.02	138,896	18,986	13.67

	1976			1977			1972-1977		
	Total Catch	No. Transported	%	Total Catch	No. Transported	%	Total Catch	No. Transported	%
Species									
American eel	187,035	2,384	1.27	15,643	0	-	396,776	2,384	0.60
Blueback herring	39,503	6,622	16.76	30,742	4,656	15.14	905,418	29,499	3.26
Hickory shad	0	0	-	0	0	-	1,344	9	0.67
Alewife	235	90	38.30	188	0	-	177,884	3,352	1.88
American shad	91	1	1.10	191	89	46.60	804	371	45.25
Striped bass	51	0	-	2,126	583	27.42	12,311	583	4.74
Totals	226,915	9,097	4.01	48,890	5,328	10.90	1,494,599	36,218	2.42

Table 25. Catch per 10-min plankton meter net tow of larval (≤ 25 mm) gizzard shad (Dorosoma cepedianum) at transect and inshore stations, Conowingo Pond, 1972-1976.

Year	1972		1973		1974		1975		1976	
	No. Collections	C/E	No. Collections	C/E	No. Collections	C/E	No. Collections	C/E	No. Collections	C/E
Transects	327	<.01	628	0.31	696	0.06	691	43.69	686	55.18
Inshore	316	3.04	192	1.08	192	1.96	288	663.04	268	322.82

Table 26. Catch per 10-min plankton meter net tow of larval (≤ 25 mm) gizzard shad (Dorosoma cepedianum) at various inshore stations, 1972-1976.

Location	Muddy Creek	West shore off Peach Bottom Station Above Discharge	West shore Peach Bottom Discharge to Maryland line	Broad Creek	Glen Cove	Hopkins Cove	Conowingo Creek
Year							
1972	0.00	0.64	-	21.64	2.08	0.96	2.72
1973	0.00	-	-	12.80	0.00	0.00	0.00
1974	1.12	-	-	22.72	0.48	0.48	0.00
1975	0.12	-	28.88	2127.92	499.24	599.00	526.24
1976	0.57	-	4.58	883.60	543.73	83.87	474.80

Table 27. Yearly comparison of the catch of larval fishes (≤ 25 mm) per plankton net tow for both inshore and transect stations in Conowingo Pond, 1972-1976.

Year	1972		1973		1974		1975		1976	
No. Samples	643		820		888		979		934	
No. Species	22	%	28	%	27	%	26	%	31	%
Species										
Herring	-	-	-	-	-	-	-	-	*	**
Gizzard shad	3.04	6.3	1.39	4.9	2.56	5.4	706.73	96.0	378.00	89.0
Carp	6.37	13.3	5.43	19.3	4.09	8.7	4.66	0.6	14.26	3.4
Golden shiner	0.12	0.2	0.04	0.1	0.20	0.4	0.04	**	0.04	**
Comely shiner	0.02	**	0.16	0.6	1.84	3.9	1.97	0.3	0.80	0.2
Spottail shiner	0.01	**	0.01	**	*	**	0.01	**	0.08	**
Rosyface shiner	0.01	**	0.04	0.1	-	-	*	**	0.01	**
Spotfin shiner	0.03	0.1	0.18	0.6	1.39	3.0	0.20	**	0.29	0.1
Bluntnose minnow	-	-	*	**	0.01	**	0.02	**	*	**
Fallfish	*	**	-	-	-	-	-	-	-	-
Blacknose dace	-	-	-	-	-	-	-	-	*	**
Longnose dace	-	-	-	-	-	-	-	-	*	**
Quillback	19.12	39.8	8.27	29.3	4.28	9.1	6.32	0.8	15.41	3.6
White sucker	0.20	0.4	0.20	0.7	0.31	0.6	0.14	**	0.29	0.1
Hog sucker	-	-	-	-	-	-	-	-	*	**
White catfish	0.04	0.1	0.01	**	*	**	-	-	0.01	**
Yellow bullhead	-	-	0.01	**	0.02	**	0.03	**	0.02	**
Brown bullhead	-	-	*	**	*	**	*	**	-	-
Channel catfish	*	**	1.87	6.6	1.49	3.2	5.10	0.7	2.71	0.6
Rock bass	0.01	**	*	**	0.01	**	0.01	**	0.09	**
Redbreast sunfish	-	-	*	**	0.04	0.1	0.02	**	1.40	0.3
Green sunfish	-	-	-	-	*	**	*	**	*	**
Pumpkinseed	0.17	0.4	0.01	**	0.02	**	0.01	**	*	**
Bluegill	0.03	0.1	0.03	0.1	0.08	0.2	0.03	**	*	**
Smallmouth bass	-	-	*	**	0.01	**	*	**	0.11	**
Largemouth bass	-	-	*	**	*	**	-	-	*	**
White crappie	10.73	22.3	1.80	6.4	4.63	9.8	0.53	0.1	0.21	**
Black crappie	-	-	0.01	**	-	-	-	-	-	-
Sunfishes	5.52	11.5	7.53	26.7	8.06	17.1	4.93	0.7	8.51	2.0
Tessellated darter	2.15	4.5	0.63	2.2	17.12	36.4	3.23	0.4	1.52	0.4
Yellow perch	0.04	0.1	*	**	0.10	0.2	0.01	**	0.04	**
Log perch	0.04	0.1	0.04	0.1	0.66	1.4	0.47	0.1	0.17	**
Shield darter	0.16	0.3	0.21	0.7	0.35	0.7	1.37	0.2	1.03	0.2
Walleye	0.12	0.2	0.31	1.1	0.05	0.1	0.32	**	0.08	**
Total	48.02		28.18		47.09		736.17		424.44	

* Less than 0.01
** Less than 0.1

Table 28. Length frequency distribution of the gizzard shad (Dorosoma cepedianum) collected by block net in Muddy Run Pumped Storage Pond, 1972-1975. Samples taken in Moyer (3.1 acres), Groff House (1.2 acres) and Northwest (2.0 acres) coves.

Year	1972	1973		1974			1975		
	Fall	Spring	Fall	Spring	Summer	Fall	Spring	Summer	Fall
No. Samples	2	3	3	3	3	3	2	3	3
No. Acres	4.2*	6.3	6.3	6.3	6.3	6.3	4.2*	6.3	6.3
Fork Length (mm)									
50-60	-	-	-	-	-	-	-	40	447
61-70	-	-	-	-	-	-	-	836	7,046
71-80	-	-	-	-	-	-	-	2,603	12,404
81-90	-	-	-	-	-	-	-	3,127	17,809
91-100	-	-	1	-	1	55	-	3,077	30,422
101-110	-	-	-	-	2	114	-	1,725	26,235
111-120	-	-	2	-	8	109	-	1,156	12,815
121-130	-	-	2	-	8	502	-	343	4,238
131-140	2	-	8	-	1	228	-	73	2,392
141-150	-	-	16	-	-	9	-	-	1,935
151-160	-	-	24	-	-	109	-	-	1,669
161-170	-	-	81	1	-	118	-	-	447
171-180	-	-	133	1	-	292	-	2	-
181-190	1	1	93	-	-	337	-	-	149
191-200	-	1	28	1	-	556	1	-	-
201-210	-	-	17	-	-	552	1	2	-
211-220	-	-	14	-	-	588	1	5	-
221-230	-	-	51	-	-	1,180	1	3	-
231-240	-	-	27	-	1	747	-	5	2
241-250	-	-	4	-	-	64	-	3	2
251-260	-	-	-	-	-	5	-	6	12
261-270	-	-	1	-	-	-	-	2	17
271-280	-	-	-	-	-	-	-	8	37
281-290	-	-	-	-	-	-	-	-	10
291-300	-	-	-	-	-	1	1	-	4
Total	3	2	502	3	21	5,566	5	13,016	118,092
Catch/acre	**	**	78	**	3	883	1	2,066	18,745

* = includes only Moyer and Groff House coves
** = less than 1.0

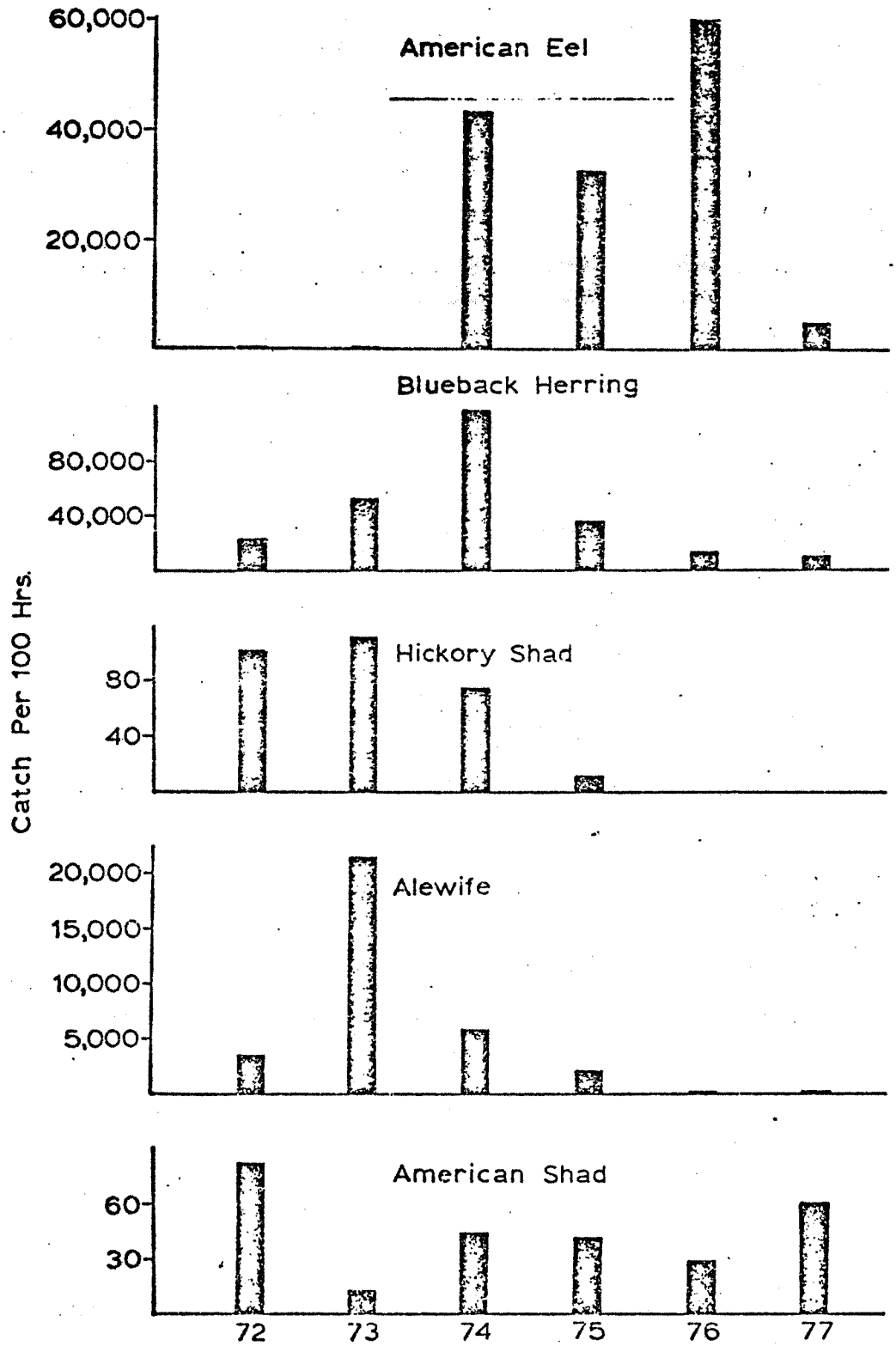

FIGURE 1

Annual comparison of catch per 100 hr of eight selected species taken in the Conowingo Dam Fish Collection Facility, 1972-1977.

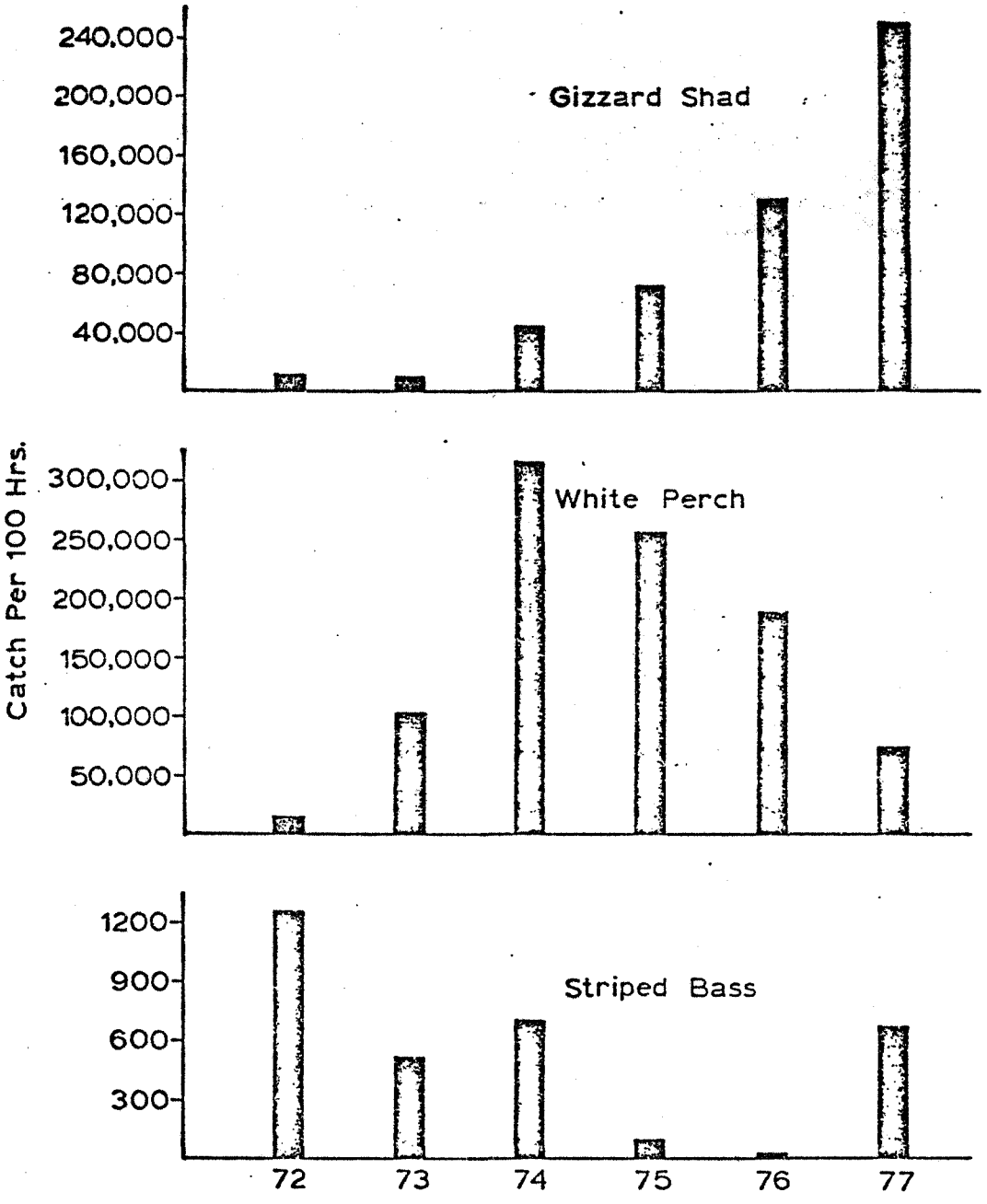

FIGURE 1

Continued.