

**CONOWINGO HYDROELECTRIC PROJECT
FERC PROJECT NUMBER 405**

**FISHWAY OPERATION AND MAINTENANCE PLAN
2023 ANNUAL REPORT**



Prepared for:



Prepared by:



and



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LIST OF ABBREVIATIONS

cfs	cubic feet per second
Conowingo Project or Project Constellation	Conowingo Hydroelectric Project (FERC Project Number 405)
CWECF	Constellation Energy Generation, LLC
EFL	Conowingo West Eel Collection Facility
°F	East Fish Lift
FERC	degrees Fahrenheit
FOMP	Federal Energy Regulatory Commission
gpm	Fishway Operation and Maintenance Plan
MDNR	gallon per minute
mg/L	Maryland Department of Natural Resources
OCECF	milligrams per liter
PADEP	Octoraro Creek Eel Collection Facility
SRBC	Pennsylvania Department of Environmental Protection
USGS	Susquehanna River Basin Commission
WFL	United States Geological Survey
	West Fish Lift

EXECUTIVE SUMMARY

Constellation Energy Generation, LLC (Constellation), has operated fish collection facilities at its Conowingo Hydroelectric Project (Conowingo Project or Project) since 1972. These operations are part of a cooperative private, state, and federal effort to restore American Shad (*Alosa sapidissima*) and other migratory fishes to the Susquehanna River Basin.

The start of operation for the West Fish Lift (WFL) and East Fish Lift (EFL) began on March 30, 2023, and operations continued to June 6, 2023.

The WFL operated for 65 days in 2023 collecting American Shad for transporting upriver to the Columbia Riverfront Park Boat Ramp and the Canal Lock Boat Ramp. The number of lifts conducted in 2023 was 1,388 and fishing time totaled 758 hours and 58 minutes. A total of 399,365 fish of 37 species along with three (3) Tiger Trout (*Salmo trutta* × *Salvelinus fontinalis*), two (2) Splake (*Salvelinus namaycush* × *Salvelinus fontinalis*), eight (8) Tiger Muskellunge (*Esox masquinongy* × *Esox Lucius*) and two (2) Striped Bass (*Morone saxatilis*) hybrids were collected and identified in the WFL sorting tank. Gizzard Shad (*Dorosoma cepedianum*, 381,157), American Shad (4,390), Channel Catfish (*Ictalurus punctatus*, 3,627), and Shorthead Redhorse (*Moxostoma macrolepidotum*, 2,781) dominated the catch and comprised nearly 98.1% of the total fish collected. Gizzard Shad alone accounted for 95.4% of the total fish collected.

The Conowingo East Fish Lift (EFL) operated for 66 days in 2023 collecting American Shad for transporting upriver to the Columbia Riverfront Park Boat Ramp and the Canal Lock Boat Ramp. The number of lifts conducted in 2023 was 1,590 and fishing time totaled 790 hours and 31 minutes. A total of 1,464,405 fish of 38 species along with one (1) Tiger Trout, two (2) Splake, thirteen (13) Tiger Muskellunge, and one (1) Striped Bass hybrid were collected and identified in the EFL sorting tank. Gizzard Shad (1,449,363), American Shad (5,632), Channel Catfish (3,586), and Smallmouth Bass (*Micropterus dolomieu*, 1,306) dominated the catch and comprised nearly 99.7% of the total fish collected. Gizzard Shad alone accounted for 98.9% of the total fish collected.

The Conowingo West Eel Collection Facility (CWECEF) began operation on May 1, 2023, and the first collection check took place on May 2, 2023. The facility operated for a total of 211 days from May 1 to November 27, 2023. A total of 217,035 juvenile eels were collected at the CWECEF.

1 INTRODUCTION

Constellation Energy Generation, LLC (Constellation), is the licensee for the 570.15-megawatt Conowingo Hydroelectric Project (Conowingo Project or Project). The Project is operated under a Federal Energy Regulatory Commission (FERC) license (Project No. 405)¹. The Project is located on the Susquehanna River in Pennsylvania and Maryland. Conowingo Dam is located at river mile 10 in Maryland connecting Cecil and Harford counties, as is the lowermost six miles of the Project reservoir, Conowingo Pond. The remaining eight miles of Conowingo Pond are in Pennsylvania, within York and Lancaster counties.

Constellation filed an Initial Fishway Operation and Maintenance Plan (FOMP) describing Constellation's fish passage operations and maintenance activities with FERC on February 2, 2021. An annual update to the FOMP was filed on January 31, 2023. Project operations through 2023 were in accordance with the January 31, 2023, version of the FOMP, as described within this annual report. Note the FERC license issued on March 19, 2021, was vacated by a DC Circuit Court decision on December 22, 2022. Constellation is currently operating under an annual license. As a result, a notification was filed with FERC on March 1, 2023, stating that due to aquatic invasive species and concern over spreading, the EFL would not operate in volitional mode and instead both the EFL and WFL would operate in trap and transport mode². Although the license was vacated, Constellation continued to operate the fish lifts in accordance with the FOMP filed with FERC on January 31, 2023.

2 IMPLEMENTATION

2.1 Project Operational and Supporting Data

2.1.1 Flow Data USGS Marietta Gage

Maximum, average, median, and minimum daily Susquehanna River stream flows in cubic feet per second (cfs) from United States Geological Survey (USGS) streamflow gage located at Marietta, PA (USGS gage no. 01576000) are shown in [Table 2.1.1-1](#) for the 2023 fish passage season (March 30 through June 6). [Figure 2.1.1-1](#) shows a time series of the data, and all values are contained in [Appendix A](#).

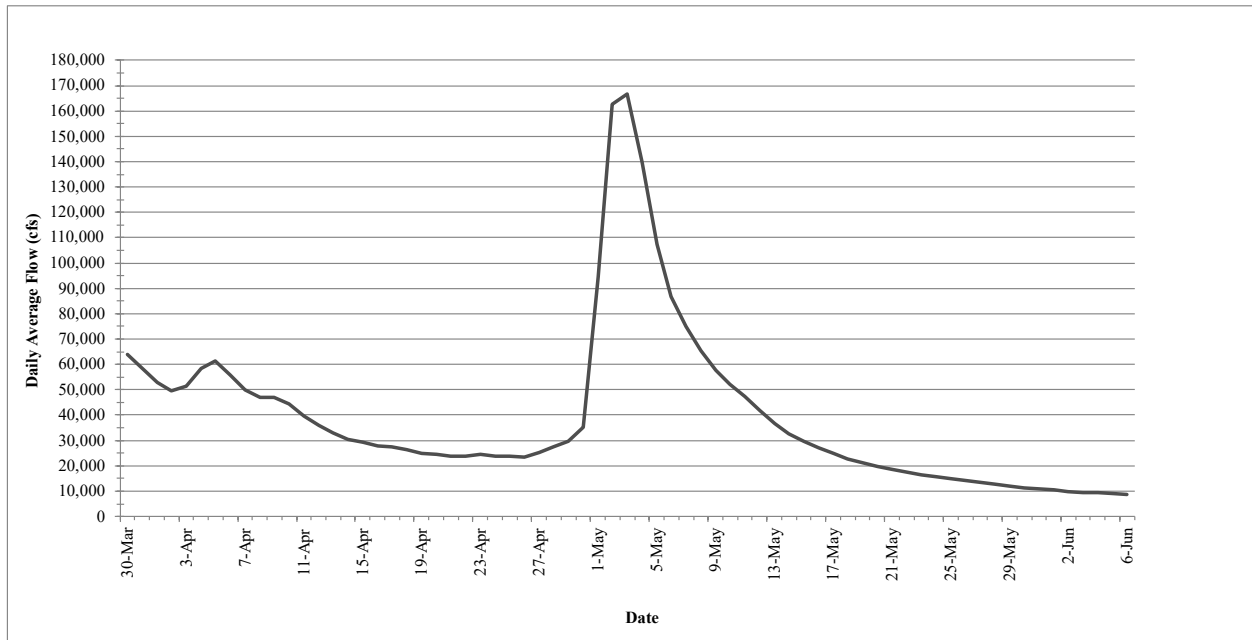
Table 2.1.1-1. Summary of 2023 Susquehanna River Stream Flow Data USGS Marietta Gage

Period	Maximum Daily Flow (cfs)	Average Daily Flow (cfs)	Median Daily Flow (cfs)	Minimum Daily Flow (cfs)
March 30 - June 6, 2023	166,646	39,532	27,831	8,855

¹ The Project's license issued in March 2021 and subsequent approved plans were vacated with the DC Circuit Court decision on December 22, 2022. As such, this report is to be filed with the Maryland Department of the Environment, Maryland Department of Natural Resources (MDNR), Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, United States Fish and Wildlife Service, and the Susquehanna River Basin Commission (SRBC), but will not be filed with FERC.

² FERC Accession No.: https://elibrary.ferc.gov/eLibrary/docinfo?accession_number=20230301-5074

Figure 2.1.1-1. 2023 Average Daily Flow Data USGS Marietta Gage



2.1.2 Water Quality Data

The maximum, average, median, and minimum daily dissolved oxygen concentrations³ (mg/L) and water temperature⁴ (°F) collected from the West Fish Lift (WFL) are shown in [Table 2.1.2-1](#) and [Table 2.1.2-2](#), respectively, for the 2023 fish passage season (March 30 through June 6). [Figure 2.1.2-1](#) shows a time series of dissolved oxygen data, and [Figure 2.1.2-2](#) contains a time series of recorded water temperature data. All water quality values are contained in [Appendix B](#).

Table 2.1.2-1. Summary of 2023 Dissolved Oxygen Data

Period	Maximum Daily Dissolved Oxygen (mg/L)	Average Daily Dissolved Oxygen (mg/L)	Median Daily Dissolved Oxygen (mg/L)	Minimum Daily Dissolved Oxygen (mg/L)
March 30 - June 6, 2023	12.9	9.7	9.4	7.8

³ Beginning May 1 and for the remaining portion of the 2023 fish passage season, dissolved oxygen values were recorded on a 30-minute interval at Monitoring Station 643 located in the Conowingo tailrace, approximately 0.6 miles downstream from the dam. Station 643 water quality data is included in [Appendix B](#).

⁴ For the entire 2023 fish passage season, temperature values and dissolved oxygen concentrations were recorded once daily by a grab sample just outside the WFL (at 11:00 daily).

Table 2.1.2-2. Summary of 2023 Water Temperature Data

Period	Maximum Daily Water Temperature (°F)	Average Daily Water Temperature (°F)	Median Daily Water Temperature (°F)	Minimum Daily Water Temperature (°F)
March 30 -June 6, 2023	78.4	63.8	64.4	49.1

Figure 2.1.2-1. 2023 Dissolved Oxygen Data

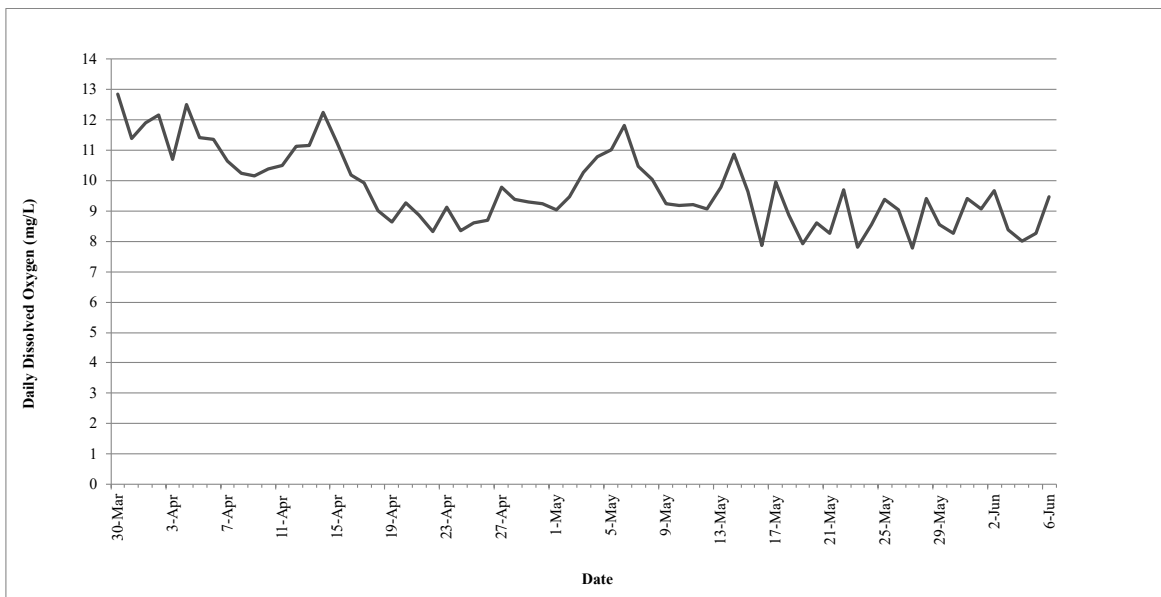
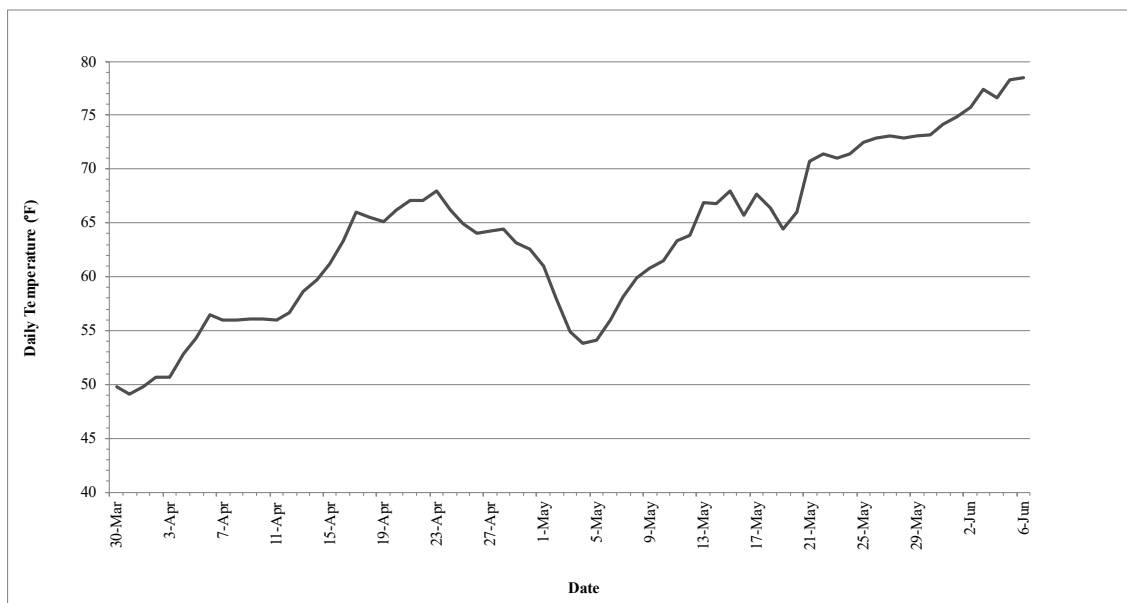


Figure 2.1.2-2. 2023 Water Temperature Data



2.1.3 Project Operations Data

Hourly individual turbine unit operations information, recorded as part of Project operations data, is provided in [Appendix C](#). For each hourly increment throughout the 2023 fish passage season, the operational status of each turbine is presented as “on” or “off”. Turbines generally began or ended their operation at or near the end of hourly intervals. In instances where turbines are operated less than 30 minutes throughout an hourly period, they are considered “off”.

The planned sequences of turbine operation are provided in [Table 2.1.3-1](#) and [Table 2.1.3-2](#) below. The Standing Orders to Operations, dated March 13, 2023, specifies the preferential unit operating schedule during the 2023 fish passage season as well as the define hours of operation for each month during the fish passage season ([Table 2.1.3-3](#)). As stated in the January 31, 2023, FOMP, the schedule may be altered based on unit outages and other operational requirements. Deviations from this sequence occurred in approximately 44% of operating hour time intervals (434 of 987 hourly intervals)⁵ during the 2023 fish season. The following equipment outages ([Table 2.1.3-4](#)) accounted for approximately 51% of the deviations (220 of 434 hourly intervals).

Table 2.1.3-1: Turbine Operating Sequence (March 30 – May 15, 2023)

Sequence ON/OFF	Unit No. ON	Unit No. OFF
1 st	5**	1
2 nd	7	2
3 rd	3	4
4 th	6	8
5 th	10	9

⁵ The WFL ran for 758 hours and 58 minutes of total time and reflect partial hourly intervals (e.g., end time at 1603 hours), however the turbine operation data reflect whole hourly intervals (e.g., end time at 1700 hours).

Sequence ON/OFF	Unit No. ON	Unit No. OFF
6 th	11	11
7 th	9	10
8 th	8	6
9 th	4	3
10 th	2**	7
11 th	1	5

***Preferable Unit for minimum flow @ 5,000 cfs = Unit 5 or Unit 6. (#2 Unit may be run in place of #5 Unit for D.O. Compliance if necessary).*

Table 2.1.3-2: Turbine Operating Sequence (During Unit 7 Outage May 16 – June 6, 2023)

Sequence ON/OFF	Unit No. ON	Unit No. OFF
1 st	5**	1
2 nd	6	2
3 rd	3	8
4 th	4	9
5 th	10	11
6 th	11	10
7 th	9	4
8 th	8	3
9 th	2**	6
10 th	1	5

***Preferable Unit for minimum flow @ 5,000 cfs = Unit 5 or Unit 6. (#2 Unit may be run in place of #5 Unit for D.O. Compliance if necessary).*

Table 2.1.3-3: Hours of Fish Lift Operation for Turbine Operating Sequence

Month	Daily Start Time	Daily Stop Time
March	7:00	19:00
April	6:30	19:30
May	6:00	20:00
June	6:00	20:00

Table 2.1.3-4: Planned, Unplanned, and Maintenance Outages during 2023 Fish Passage Season (March 30 - June 6, 2023)⁶

Unit No.	Outage Start Time	Outage End Time
1	4/4/2023 11:00	4/4/2023 15:47
8	4/28/2023 18:00	4/29/2023 18:20
9	4/28/2023 18:00	4/29/2023 14:02
4	5/8/2023 4:52	5/8/2023 7:13
4	5/10/2023 13:08	5/10/2023 14:16
6	5/12/2023 6:31	5/16/2023 16:23
1	5/17/2023 13:00	5/17/2023 14:10
2	5/17/2023 13:00	5/17/2023 14:10
3	5/10/2023 13:08	5/10/2023 14:16
3	5/18/2023 4:00	5/23/2023 15:11
4	5/22/2023 1:00	5/27/2023 15:24
9	5/30/2023 4:00	6/4/2023 15:46
5	5/31/2023 13:00	5/31/2023 13:57
6	5/31/2023 13:00	5/31/2023 13:57
10	6/5/2023 4:00	6/9/2023 18:03

The hourly individual turbine discharge data and the hourly discharge through the spillway gates for the 2023 American Shad and American Eel passage seasons (March 30-November 27, 2023) is provided in [Appendix C](#). Constellation records the daily average discharge of each individual turbine rather than recording each turbine's hourly total discharge. Therefore, the discharge data provided is calculated using each turbine's daily average discharge and the hourly "on" or "off" status. These values were compared to the Project's recorded hourly total discharge, which is a record of the discharge from the powerhouse and through the spillway and were generally in agreement. However, values were observed differing at the start and end of a turbine's operational period. This difference is a result of the calculated data incorporating daily average discharge and therefore not capturing the ramping up or down of the turbine as it begins or ends operation. Additionally, values differ during periods of spillage (e.g., May 1 through May 2, 2023), as the recorded plant discharge includes spillage information.

Minimum flows of 3,500 and 10,000 cfs or natural river flow (whichever is less), as measured at the USGS gage at Marietta, PA were maintained for the periods of March 30 to 31 and April 1 to 30, respectively. A minimum flow of 7,500 cfs or natural river flow (as previously noted) was maintained for the period of May 1 to 31. A minimum flow of 5,000 cfs or natural river flow (as previously noted) was maintained for the period of June 1 to September 14. A minimum flow of 3,500 cfs or natural river flow (as previously noted) was maintained for the period of September 15 to November 27.

⁶ Note that several of the outage periods listed in Table 2.1.3-4 occurred outside of the normal fish lift operating times. Also, an outage occurrence does not necessarily always translate to a variance from the operating protocol, especially during low flow periods. For example, there could be outage at Unit 3 that occurred during a stable low flow period. During this period, the operating protocol only would have required two other units (5 and 7) to operate continuously, thus no variance would have occurred due to the outage at Unit 3.

2.2 Fish Passage Facilities

2.2.1 Conowingo West Fish Lift

2.2.1.1 Staffing

During the 2023 fish passage facility operating season, trained and qualified individuals were on site to operate the WFL. The WFL operating crew included a supervising biologist, lift operator, and biological technicians. All fishway operational personnel reviewed and understood the FOMP.

The supervising biologists and lift operators were responsible for operating mechanical and electrical equipment associated with the WFL. The lift operators set the equipment as directed by the supervising biologist. The lift operators adjusted equipment settings throughout the course of each day as hydraulic conditions changed so attraction flows from, and in, the WFL were optimized. The supervising biologists provided technical guidance on all aspects of daily operation at the WFL and were responsible for fine tuning the operation to assure the best possible efficiency. In addition, the supervising biologist was responsible for establishing fishing time and lift frequency, and mobilizing transport units and personnel, which is based on fish abundance that can change throughout the day and the season. The supervising biologist oversaw the collection of all data, ensured their accuracy, and produced and distributed a daily report via email to all pertinent Constellation and Resource Agency personnel at the end of each day.

2.2.1.2 Maintenance

Pre-season maintenance and post-season maintenance measures took place as outlined in the January 31, 2023, version of the FOMP.

Constellation utilizes an electronic work management platform to manage maintenance tasks including tasks associated with the pre-season and post-season maintenance activities of the fish passage facilities. Several tasks are set up in the work orders for pre- and post-season maintenance. Completion of activities is recorded in the work management system as well as any findings and follow-up required. Work orders are included in [Appendix D](#) and are scheduled well in advance of the completion date to allow time for vendors to be on-site. Pre-season and post-season maintenance checklists from this work management platform were completed in accordance with the FOMP.

2.2.1.3 Operation

Throughout the 2023 season, the WFL supervising biologist notified pertinent Station personnel of the WFL crew arrival each day, conducted a pre-job safety briefing, and informed the Station that WFL operations will commence. The 2023 fish passage season at the WFL began on March 30 and continued through June 6⁷. The WFL operated for a total of 758 hours and 58 minutes over 65 days and completed 1,388 lifts for the 2023 season ([Table 2.2.1.3-1](#)). The hours of daily operation, including the starting and ending time of daily fish operations, are listed in [Appendix E](#).

Table 2.2.1.3-1: Summary of Operations at the Conowingo West Fish Lift, March 30 – June 6, 2023

Total Number of Days Operations Occurred	Total Time of Operation (hr:min)	Total Number of Lifts Operated
65	758:58	1,388

⁷ The WFL did not operate on May 2-5, 2023.

2.2.1.3.1 Fish Counts, Transport, and Stocking

A total of 399,365 fish of 37 species along with three Tiger Trout (*Salmo trutta* × *Salvelinus fontinalis*), two Splake (*Salvelinus namaycush* × *Salvelinus fontinalis*), eight Tiger Muskellunge (*Esox masquinongy* × *Esox Lucius*) and two Striped Bass (*Morone saxatilis*) hybrids were collected and identified in the WFL sorting tank.

Target native and non-native fish counts are summarized in [Table 2.2.1.3.1-1](#). Of the 4,410 target native species collected, 87 were sacrificed and there was a total of 31 mortalities. All target non-native species collected were sacrificed. No Silver Carp (*Hypophthalmichthys molitrix*), Bighead Carp (*Hypophthalmichthys nobilis*) or Grass Carp (*Ctenopharyngodon idella*) were observed at the WFL. The count⁸ of all fish species captured at the lift are additionally contained in [Appendix E](#). The number of fish species trapped and transported, including date, time, and location of release is additionally provided in [Appendix F](#).

During the 2023 season, the WFL collected 11 American Shad (*Alosa sapidissima*) that were previously captured, Floy-tagged and released downstream of Conowingo Dam by the Maryland Department of Natural Resources (MDNR). Per the 2023 FOMP operational guidelines, all re-captured MDNR tagged American Shad from the current year (2023) are to be transported upriver. Any MDNR tagged American Shad collected from previous years (prior to 2023) are to be sacrificed for study. A summary of Floy-tagged American Shad collected at the WFL is provided in [Table 2.2.1.3.1-2](#).

⁸ During trap and transport operations, the counts are recorded per each lift, not by the hour.

Table 2.2.1.3.1-1: Conowingo West Fish Lift Counts, March 30 - June 6, 2023

Species	Total Collected	Percent of Total Collected	Total Transported	Total Stocked	Total Sacrificed	Holding Mortalities	Lift Mortalities	Transport Mortalities
<i>Target Native Species</i>								
Alewife	17	<0.01%	15 ⁹	15	0	0	0	0
American Shad	4,390	1.10%	4,138	4,128	87	18	3	10
Blueback Herring	3	<0.01%	3	3	0	0	0	0
<i>Target Non-native Species</i>								
Blue Catfish	1	<0.01%	0	0	1	n/a	n/a	n/a
Flathead Catfish	503	0.13%	0	0	503	n/a	n/a	n/a
Northern Snakehead	778	0.19%	0	0	778	n/a	n/a	n/a
<i>Dominant Species</i>								
Gizzard Shad	381,157	95.44%	0	0	n/a	n/a	n/a	n/a
Channel Catfish	3,627	0.91%	0	0	n/a	n/a	n/a	n/a
Shorthead Redhorse	2,781	0.70%	0	0	n/a	n/a	n/a	n/a
<i>All Species</i>	<i>399,365</i>							

⁹ Two of the collected Alewife were released back to the river due to poor condition; therefore only 15 Alewife were transported.

Table 2.2.1.3.1-2: Summary of Floy-tagged American Shad Collected at the Conowingo West Fish Lift, March 30 - June 6, 2023

Tag Number	Sex of Fish	Date Tagged ¹⁰	Date Collected	Days at Large	Disposition
03338	M	4/17/2023	4/23/2023	6	Transported
03362	M	4/24/2023	4/27/2023	3	Transported
N/A ¹¹	M	N/A	5/9/2023	N/A	Transported
03411	F	5/9/2023	5/13/2023	4	Transported
04467	F	4/24/2023	5/18/2023	24	Transported
03453	F	5/16/2023	5/18/2023	2	Transported
03558	F	5/17/2023	5/18/2023	1	Transported
03555	F	5/17/2023	5/20/2023	3	Transported
03464	F	5/16/2023	5/20/2023	4	Transported
03616	F	5/17/2023	5/25/2023	8	Transported
03517	F	5/25/2023	5/28/2023	3	Transported

2.2.1.4 Biological Sampling

Life history information (length, weight, sex, spawning condition, scales and otolith samples) was taken from American Shad that were sacrificed or died (lift, holding, or transport mortalities). During the 2023 season, a total of three lift mortalities, 18 holding mortalities, and ten transport mortalities of American Shad occurred at WFL ([Table 2.2.1.3.1-1](#)). A total of 87 American Shad were sacrificed from the WFL catch for life history information, comprised of 47 males and 40 females.

A small number of river herring, [17 Alewife (*Alosa pseudoharengus*) and three Blueback Herring (*Alosa aestivalis*)] were collected during the 2023 season. There were no Alewife or Blueback Herring sacrificed from the WFL catch for life history information in 2023, as the minimum number to warrant a sacrifice was not reached.

The collected biological sampling information from sacrificed adult American Shad and river herring is provided in [Appendix G](#). Additionally, summaries of American Shad mortalities are included in [Appendix F](#).

2.2.2 *Conowingo East Fish Lift*

2.2.2.1 Staffing

During the 2023 fish passage facility operating season, trained and qualified individuals were on site to operate the East Fish Lift (EFL). The EFL operating crew included a supervising biologist, lift operator, and biological technicians. All fishway operational personnel reviewed and understood the FOMP.

¹⁰ Date Floy tagged provided by Maryland Department of Natural Resources (MDNR).

¹¹ The number on the Floy-tag was recorded incorrectly; therefore, the missing information is unavailable.

The supervising biologists and lift operators were responsible for operating mechanical and electrical equipment associated with the EFL. The lift operators set the equipment as directed by the supervising biologist. The lift operators adjusted equipment settings throughout the course of each day as hydraulic conditions changed so attraction flows from, and in, the EFL were optimized. The supervising biologists provided technical guidance on all aspects of daily operation at the EFL and were responsible for fine tuning the operation to assure the best possible efficiency. In addition, the supervising biologist was responsible for establishing fishing time and lift frequency, and mobilizing transfer units and personnel, which is based on fish abundance that can change throughout the day and the season. The supervising biologist oversaw the collection of all data, ensured their accuracy, and produced and distributed a daily report via email to all pertinent Constellation and Resource Agency personnel at the end of each day.

2.2.2.2 Maintenance

Pre-season maintenance and post-season maintenance measures took place as outlined in the January 31, 2023, version of the FOMP. Work orders are included in [Appendix D](#). Pre-season and post-season maintenance checklists from this work management platform were completed in accordance with the FOMP.

2.2.2.3 Operation

Throughout the 2023 season, the EFL supervising biologist notified pertinent Station personnel of the EFL crew arrival each day, conducted a pre-job safety briefing, and informed the Station that EFL operations will commence. The 2023 fish passage season at the EFL began on March 30 and continued through June 6¹². The EFL operated for a total of 790 hours and 31 minutes over 66 days and completed 1,590 lifts for the 2023 season ([Table 2.2.2.3-1](#)). The hours of daily operation, including the starting and ending time of daily fish operations, are listed in [Appendix E](#).

Table 2.2.2.3-1: Summary of Operations at the Conowingo East Fish Lift, March 30 – June 6, 2023

Total Number of Days Operations Occurred	Total Time of Operation (hr:min)	Total Number of Lifts Operated
66	790:31	1,590

2.2.2.3.1 Fish Counts, Transport, and Stocking

A total of 1,464,405 fish of 38 species along with one (1) Tiger Trout, two (2) Splake, thirteen (13) Tiger Muskellunge, and one (1) Striped Bass hybrid were collected and identified in the EFL sorting tank during the 2023 season. Gizzard Shad (1,449,363), American Shad (5,632), Channel Catfish (3,586), and Smallmouth Bass (*Micropterus dolomieu*, 1,306) dominated the catch and comprised nearly 99.7% of the total fish collected. Gizzard Shad alone accounted for nearly 99.0% of the total fish collected.

Target native and non-native fish counts are summarized in [Table 2.2.2.3.1-1](#). Of the 6, 024 target native species collected, 135 were sacrificed and there was a total of 65 mortalities. All target non-native species collected were sacrificed. No Silver Carp (*Hypophthalmichthys molitrix*), Bighead Carp (*Hypophthalmichthys nobilis*) or Grass Carp (*Ctenopharyngodon idella*) were observed at the WFL. The count¹³ of all fish species captured at the lift are additionally contained in [Appendix E](#). The number of fish

¹² The EFL did not operate on May 3-5, 2023.

¹³ During trap and transport operations, the counts are recorded per each lift, not by the hour.

species trapped and transported, including date, time, and location of release is additionally provided in [Appendix F](#).

During the 2023 season, the EFL collected fifteen (15) American Shad that were previously captured, Floy-tagged and released downstream of Conowingo Dam by MDNR, of which two (2) of these American Shad were collected and Floy-tagged in 2022. Per the 2023 FOMP operational guidelines, all re-captured MDNR tagged American Shad from the current year (2023) are to be transported upriver. Any MDNR tagged American Shad collected from previous years (prior to 2023) are to be sacrificed for study. Therefore, the two 2022 MDNR tagged American Shad collected in 2023 were sacrificed. A summary of Floy-tagged American Shad collected at the EFL is provided in [Table 2.2.2.3.1-2](#).

Table 2.2.2.3.1-1: Conowingo East Fish Lift Counts, March 30 - June 6, 2023

Species	Total Collected	Percent of Total Collected	Total Transported	Total Stocked	Total Sacrificed	Holding Mortalities	Lift Mortalities	Transfer Mortalities
<i>Target Native Species</i>								
Alewife	1	<0.01%	1	0	1	0	0	0
American Shad	5,632	0.38%	5,284	5,284	115	28	20	14
Blueback Herring	391	0.03%	367	367	19	0	3	0
<i>Target Non-native Species</i>								
Blue Catfish	1	<0.01%	0	0	1	n/a	n/a	n/a
Flathead Catfish	1	<0.01%	0	0	1	n/a	n/a	n/a
Northern Snakehead	47	<0.01%	0	0	47	n/a	n/a	n/a
<i>Dominant Species</i>								
Gizzard Shad	1,449,363	98.97%	0	0	n/a	n/a	n/a	n/a
Channel Catfish	3,586	0.24%	0	0	n/a	n/a	n/a	n/a
Smallmouth Bass	1,306	0.09%	0	0	n/a	n/a	n/a	n/a
<i>All Species</i>	<i>1,464,405</i>							

Table 2.2.2.3.1-2: Summary of Floy-tagged American Shad Collected at the Conowingo East Fish Lift, March 30 - June 6, 2023

Tag Number	Sex of Fish	Date Tagged ¹⁴	Date Collected	Days at Large	Disposition
10053	M	2022	4/15/2023	380	Sacrificed
10012	M	2022	4/23/2023	387	Sacrificed
03350	F	4/20/2023	4/27/2023	7	Transported
03388	F	4/24/2023	4/28/2023	4	Transported
03353	M	4/24/2023	4/30/2023	6	Transported
03356	M	4/24/2023	4/30/2023	6	Transported
04480	F	4/24/2023	5/12/2023	18	Transported
04433	F	4/27/2023	5/13/2023	16	Transported
03347	F	4/17/2023	5/13/2023	26	Transported
03622	M	5/17/2023	5/20/2023	3	Transported
03502	F	5/18/2023	5/23/2023	5	Transported
04446	M	5/9/2023	5/23/2023	14	Transported
03520	F	5/25/2023	5/27/2023	2	Transported
03523	M	5/25/2023	5/28/2023	3	Transported
03513	F	5/22/2023	6/2/2023	11	Transported

2.2.2.4 Biological Sampling

Life history information (length, weight, sex, spawning condition, scales and otolith samples) was taken from American Shad that were sacrificed or died (lift, holding, or transfer mortalities). During the 2023 season, a total of 20 lift mortalities, 28 holding mortalities, and 14 transfer mortality of American Shad occurred at EFL. A total of 115 American Shad were sacrificed from the EFL catch for life history information, including two 2022 MDNR Floy-tagged American Shad that were collected in 2023. The sacrificed American Shad were comprised of 69 males and 46 females.

Several river herring (1 Alewife and 391 Blueback Herring) were collected during the 2023 season. A total of one (1) Alewife and nineteen (19) Blueback Herring were sacrificed from the EFL catch for life history information.

The collected biological sampling information from sacrificed adult American Shad and river herring is provided in [Appendix G](#). Additionally, summaries of American Shad mortalities are included in [Appendix E](#).

¹⁴ Date Floy tagged provided by Maryland Department of Natural Resources (MDNR).

2.2.3 Conowingo West Eel Collection Facility

The Conowingo West Eel Collection Facility (CWECF) was operated as described in the January 31, 2023, FOMP. Operation began on May 1, 2023, and continued to November 27, 2023.

2.2.3.1 Staffing

Trained and qualified individuals operated the facility throughout the eel passage season. A supervising biologist oversaw all operations with the assistance of biologists and biological technicians. Daily facility checks were completed by a crew of two trained personnel. All personnel had reviewed and understood the FOMP.

2.2.3.2 Maintenance

Pre-season Maintenance

In April 2023, all eel passage facility components, including the eel ramp, collection, overflow, and holding tanks, as well as the associated water lines were installed and tested. All components were in working order before the facility was placed into service on May 1, 2023.

Post-season Maintenance

After the season ended on November 27, 2023, the eel facility components were dismantled, cleaned and stored. The collection, overflow, and holding tanks, as well as the water lines were stored appropriately for the winter period.

2.2.3.3 Operation

Throughout the 2023 season, the eel passage facility monitoring crew notified pertinent Station personnel of their arrival each day, conducted a pre-job safety briefing, informed the Station that eel passage operations will commence, and asked for a dissolved oxygen (DO) tailrace reading prior to November 2, 2023¹⁵, and if any issues have been recorded since completion of the last eel passage facility check.

Flow rates for the trapping, collecting, and holding processes are the primary metric used to evaluate whether the facility is operating within design parameters. If flows are within the design parameters, then the facility would be operating properly. Additionally, continuous measurements of water temperature and dissolved oxygen as well as visual inspections during daily operation determine if the facility is operating normally and that conditions are suitable for collecting and holding juvenile eels. The continuous monitors are equipped with alarms that alert personnel when any of the measured parameters are not within the design parameters. The proper operation of the continuous monitors and associated alarms was verified regularly. When daily eel sampling was complete, the eel passage facility monitoring crew notified pertinent Station personnel of any major changes to the facility and that the crew is leaving the site.

There were no significant problems encountered with the trapping, collecting, or holding systems. The total attraction flow of the facility varied throughout the season dependent upon which tanks were in-service, but an attraction flow was always being discharged down the ramp and shoreline. Periodically throughout the season, low flow alarms did occur. Slight adjustments made to the individual tank feed pipes to adjust the output to these feed pipes to obtain a constant water flow into the tanks resolved this issue. Cleaning and calibration activities were conducted at least weekly during the season. [Table 2.2.3.3-1](#) provides a summary of the alarm notifications and corrective action taken during the season.

¹⁵ Between November 2 and November 27, DO readings were obtained from the Shures Landing boat ramp as Station 643 was not in service after October 31, 2023.

The statistics of the operational parameters for the main components of the CWECF are provided in [Table 2.2.3.3-2](#). The total attraction flow, collection tank fill, and collection tank drain information was collected as part of the calibration of flows at the CWECF. Calibration of the ramp flow was executed each week after cleaning, using a 19-L graduated bucket. Multiple locations at the facility were checked for calibration purposes - the spray bar, the collection tank fill and drain, scent line, and the drains of each of the holding tanks that were in-service. Some of the water from the spray bar that was not used for attracting eels up the ramp but used to help slide eels into the collection tank was identified as the backside of ramp flow. The backside of ramp flow was calculated by adding the scent line to the collection tank drain and subtracting the collection tank fill. The attraction flow at the top of the ramp (top attraction) was calculated by subtracting the backside of ramp flow from the spray bar amount. Bottom of ramp attraction is a sum of the collection tank drain and the drains of the in-service holding tanks. Total attraction flow is equal to the collection tank fill, the spray bar and the drains of the holding tanks. Details and calibration records are provided in [Appendix H](#). After calibration readings were taken adjustments, if necessary, were made to the facility to ensure that at least 70 gallon per minute (gpm) of attraction flow was provided.

Daily temperature measurements were taken in the CWECF collection tank and the dissolved oxygen records were collected from the Project control room (Station 643)¹⁶.

Table 2.2.3.3-1. Conowingo West Eel Collection Facility 2023 Alarms and Corrective Actions

Date	Time	Alarm	Corrective Action
8/10/2023	0051	Collection Tank – Low Flow	Increased flow into tank
8/10/2023	0232	Collection Tank – Low Flow	Increased flow into tank
9/14/2023	1308	Holding Tank 1 – DO	False alarm – no action needed; sensor error
9/20/2023	0237	Collection Tank – Low Flow	Increased flow into tank
9/21/2023	0721	Main Flow – Low Flow	False alarm – no action needed, Operation working in MCC cabinet
9/28/2023	0734	Main Flow – Low Flow	False alarm – no action needed, Operation working in MCC cabinet
10/7/2023	0630	Holding Tank 3 – Low Flow	False alarm – no action needed; tank was not enabled
10/7/2023	2249	Main Flow – Low Flow	False alarm – no action needed
10/7/2023	2249	Collection Tank – Low Flow	False alarm – no action needed
10/8/2023	0053	Main Flow – Low Flow	False alarm – no action needed
10/8/2023	0053	Collection Tank – Low Flow	False alarm – no action needed
11/15/2023	0515	Holding Tank 2 – Low Flow	Increased flow into tank

¹⁶ Between November 2 and November 27, DO readings were obtained from the Shures Landing boat ramp as Station 643 is not in service after October 31, 2023.

Table 2.2.3.3-2. Conowingo West Eel Collection Facility 2023 Operations Summary

Operational Parameter	Maximum Value	Average Value	Minimum Value
Total Attraction Flow (gpm)	81.3	67.0	46.0 ¹⁷
Collection Tank Fill (gpm)	19.0	13.7	8.7
Collection Tank Drain (gpm)	19.0	14.0	8.6
Collection Tank Temperature (°F)	84.0	70.3	46.0
Dissolved Oxygen at Station 643 (mg/L)	12.60	8.80	6.57

2.2.3.3.1 Eel Counts, Transport and Stocking

A total of 217,035 American Eel (*Anguilla rostrata*) were collected and 216,473 were stocked from the CWECF during the 2023 season. When including the 62,095 American Eel captured at the Octoraro Creek Eel Collection Facility (OCECF) and transported to the CWECF, a total of 278,545 American Eel were stocked within the Susquehanna River watershed in 2023. [Figure 2.2.3.3.1-1](#) provides a summary of the annual American Eel catches at the CWECF from the 2017 through 2023 seasons. There was a total of 50 (0.02% mortality) juvenile eels observed dead during collection and 112 (0.19% mortality) juvenile eels that were recovered dead from the holding tanks over the entire 2023 season¹⁸. A total of 300 eels were removed by the Susquehanna River Basin Commission (SRBC) to be used in their Eels in the Classroom program, in which SRBC provides juvenile American eels to educators to raise in their classrooms and ultimately release back into the Susquehanna River. [Table 2.2.3.3.1-1](#) summarizes the CWECF counts.

The CWECF data required as part of this annual report (i.e., the estimated number of juvenile eels captured each day, number of eels in the holding tanks, and calibration records) has been extracted from the 2023 Conowingo West Eel Collection Facility report and are provided in [Appendix I](#).

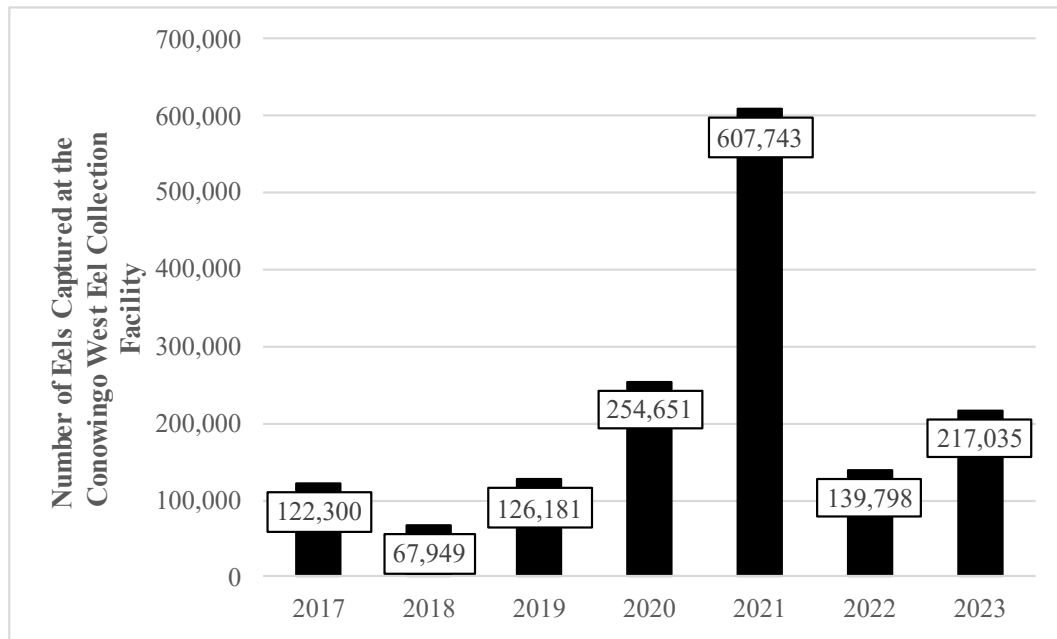
Table 2.2.3.3.1-1. Conowingo West Eel Collection Facility Counts, May 1 – November 27, 2023

Total Collected at CWECF	Total Transported to CWECF from OCECF	Collection Mortalities	Holding Mortalities	Transport Tank Mortalities	Sacrificed for Analysis	Removed by SRBC	Total Stocked
217,035	62,095	50 (0.02%)	112 (0.19%)	23 (<0.01%)	100	300	278,545

¹⁷ Note that attraction flows are turned down during calibration to get an accurate reading but turned to approximately 70 gpm afterwards.

¹⁸ The original collection location of mortalities is not able to be identified as eels from both the CWECF and OCECF are combined in the holding tank.

Figure 2.2.3.3.1-1: Annual Number of Eels Captured at the Conowingo West Eel Collection Facility, 2017-2023



3 DEVIATIONS

Aside from the turbine operation sequence deviations noted in [Section 2.1.3](#), the Conowingo upstream fish passage facilities experienced no deviations from the approved January 31, 2023 FOMP during the 2023 fish passage season, and operations and maintenance of the facilities were conducted in conformance with the FOMP.

4 PROPOSED MODIFICATIONS

No major modifications are proposed for the 2024 fish passage at either the EFL, WFL, or CWEFC. The Resource Agencies and Constellation agreed that Constellation will continue to implement sorting of all fish that enter the EFL and WFL, and no volitional passage will occur in 2024. Constellation will file an additional notification with FERC detailing 2024 fish passage operation especially where it differs from the annual license. The notification will be similar to the notification filed with FERC on March 1, 2023, regarding the 2023 season¹⁹. Constellation will continue to follow the January 31, 2023, FOMP with the addition of one extra aquatic invasive species will be collected (Freshwater Drum).

The EFL and WFL will be operated for trap and transport using existing sorting and holding tank(s). Constellation will trap and transport up to 80% of the American Shad and river herring run above York Haven Dam (RM 56.1). However, the remaining portion of the American Shad and river herring run will be transported and stocked upstream of the Safe Harbor Dam (RM 32.2), rather than pass volitionally. To accomplish this, Constellation will transport American Shad and river herring from every fifth transport (20%) above Safe Harbor Dam, and the remaining four transports (80%) will be made above York Haven Dam. As the season progresses, the transport targets will be assessed on a weekly basis, and transports will be adjusted as needed to achieve the 80%/20% proportion.

Constellation will also continue to monitor and remove the following invasive species during the 2024 fish passage season: Northern Snakehead (*Channa argus*), Blue Catfish (*Ictalurus furcatus*), and Flathead Catfish (*Pylodictis olivaris*). Constellation will collect these species from both the EFL and WFL and place them in totes and in a refrigeration unit that will be provided by MDNR. MDNR will remove the totes and beneficially reuse the aquatic invasive species. Constellation will also continue to monitor and alert the Resource Agencies if any of the following invasives are observed in the EFL or WFL during the 2024 fish passage season: Silver Carp, Bighead Carp, Grass Carp, and Freshwater Drum (*Aplodinotus grunniens*).

¹⁹ FERC Accession No.: https://elibrary.ferc.gov/eLibrary/docinfo?accession_number=20230301-5074

5 REFERENCES

- Exelon Generation Company, LLC. (2016). *Conowingo Hydropower Project Settlement Agreement Between Exelon Generation Company, LLC and the United States Department of the Interior Fish & Wildlife Service*.
- Exelon Generation Company, LLC and the Maryland Department of the Environment. (2019). *Joint Offer of Settlement and Explanatory Statement Of Exelon Generation Company, LLC and the Maryland Department of the Environment*.
- Federal Energy Regulatory Commission. (2015). *Final Multi-Project Environmental Impact Statement For Hydropower Licenses*. Federal Energy Regulatory Commission, Office of Energy Projects, Division of Hydropower Licensing. Washington, DC: Federal Energy Regulatory Commission.

**APPENDIX A. SUSQUEHANNA RIVER STREAM FLOW DATA USGS MARIETTA
GAGE**

Appendix A. Flow Data USGS Marietta Gage

Date	Average Daily Flow (cfs) (USGS Marietta Gage)
3/30/2023	63,835
3/31/2023	58,367
4/1/2023	53,031
4/2/2023	49,660
4/3/2023	51,521
4/4/2023	58,494
4/5/2023	61,208
4/6/2023	55,977
4/7/2023	50,113
4/8/2023	46,827
4/9/2023	46,869
4/10/2023	44,475
4/11/2023	39,681
4/12/2023	36,063
4/13/2023	33,033
4/14/2023	30,548
4/15/2023	29,221
4/16/2023	27,831
4/17/2023	27,479
4/18/2023	26,444
4/19/2023	25,050
4/20/2023	24,494
4/21/2023	23,806
4/22/2023	23,702
4/23/2023	24,623
4/24/2023	23,910
4/25/2023	23,765
4/26/2023	23,265
4/27/2023	25,442
4/28/2023	27,473
4/29/2023	29,656
4/30/2023	35,340
5/1/2023	94,369
5/2/2023	162,625
5/3/2023	166,646
5/4/2023	139,833
5/5/2023	107,327
5/6/2023	86,675
5/7/2023	75,125
5/8/2023	65,496
5/9/2023	57,773
5/10/2023	52,246
5/11/2023	47,471
5/12/2023	41,748
5/13/2023	36,523

Appendix A. Flow Data USGS Marietta Gage

Date	Average Daily Flow (cfs) (USGS Marietta Gage)
5/14/2023	32,619
5/15/2023	29,623
5/16/2023	27,054
5/17/2023	24,754
5/18/2023	22,769
5/19/2023	21,035
5/20/2023	19,763
5/21/2023	18,738
5/22/2023	17,433
5/23/2023	16,477
5/24/2023	15,648
5/25/2023	15,023
5/26/2023	14,208
5/27/2023	13,521
5/28/2023	12,821
5/29/2023	12,079
5/30/2023	11,390
5/31/2023	10,819
6/1/2023	10,350
6/2/2023	9,844
6/3/2023	9,470
6/4/2023	9,279
6/5/2023	9,098
6/6/2023	8,855

APPENDIX B. WATER QUALITY DATA

Appendix B. Water Quality Data

Date	Daily DO (mg/L)	Daily Water Temperature (°F)	Station 643 Daily Avg. DO (mg/L)	Station 643 Daily Avg. Water Temperature (°F)
30-Mar	12.9	49.8		
31-Mar	11.4	49.1		
1-Apr	11.9	49.8		
2-Apr	12.2	50.7		
3-Apr	10.7	50.7		
4-Apr	12.5	52.9		
5-Apr	11.4	54.3		
6-Apr	11.4	56.5		
7-Apr	10.7	55.9		
8-Apr	10.3	55.9		
9-Apr	10.2	56.1		
10-Apr	10.4	56.1		
11-Apr	10.5	55.9		
12-Apr	11.1	56.7		
13-Apr	11.2	58.6		
14-Apr	12.2	59.7		
15-Apr	11.3	61.2		
16-Apr	10.2	63.4		
17-Apr	9.9	66.0		
18-Apr	9.0	65.5		
19-Apr	8.6	65.1		
20-Apr	9.3	66.2		
21-Apr	8.9	67.1		
22-Apr	8.3	67.1		
23-Apr	9.1	68.0		
24-Apr	8.3	66.2		
25-Apr	8.6	64.9		
26-Apr	8.7	64.0		
27-Apr	9.8	64.2		
28-Apr	9.4	64.4		
29-Apr	9.3	63.1		
30-Apr	9.3	62.6		
1-May	9.1	61.0	9.4	58.6
2-May	9.5	57.9	10.2	55.5
3-May	10.3	54.9	10.8	52.5
4-May	10.8	53.8	11.1	51.2
5-May	11.0	54.1	11.0	51.7
6-May	11.8	55.9	10.6	53.3
7-May	10.5	58.1	10.2	54.7
8-May	10.1	59.9	9.8	56.5
9-May	9.2	60.8	9.5	57.8
10-May	9.2	61.5	9.3	58.7
11-May	9.2	63.4	9.4	60.0
12-May	9.1	63.9	9.6	60.9

Appendix B. Water Quality Data

Date	Daily DO (mg/L)	Daily Water Temperature (°F)	Station 643 Daily Avg. DO (mg/L)	Station 643 Daily Avg. Water Temperature (°F)
13-May	9.8	66.9	9.9	63.0
14-May	10.9	66.7	10.0	63.8
15-May	9.7	68.0	10.1	64.5
16-May	7.9	65.7	10.0	65.4
17-May	10.0	67.6	9.7	66.8
18-May	8.9	66.4	8.6	66.1
19-May	7.9	64.4	8.3	65.7
20-May	8.6	66.0	8.0	66.0
21-May	8.3	70.7	8.0	66.8
22-May	9.7	71.4	8.4	67.0
23-May	7.8	71.1	8.0	67.3
24-May	8.6	71.4	9.2	67.7
25-May	9.4	72.5	9.3	69.0
26-May	9.1	72.9	9.4	69.2
27-May	7.8	73.0	9.3	69.3
28-May	9.4	72.9	9.1	69.2
29-May	8.6	73.0	9.1	69.2
30-May	8.3	73.2	8.8	69.5
31-May	9.4	74.1	9.0	70.2
1-Jun	9.1	74.8	9.2	70.7
2-Jun	9.7	75.7	8.9	71.7
3-Jun	8.4	77.4	8.5	73.7
4-Jun	8.0	76.6	8.1	73.3
5-Jun	8.3	78.3	8.3	74.7
6-Jun	9.5	78.4	8.1	74.8

**APPENDIX E. CONOWINGO WEST AND EAST FISH LIFTS OPERATION DATA AND
FISH COUNTS**

APPENDIX E. CONOWINGO WEST AND EAST FISH LIFT OPERATION DATA AND FISH COUNTS

Conowingo WFL			
Date	Start Time (First Lift)	End Time (Last Lift)	Operation Time (hours)
30-Mar	8:05	18:35	8:50
31-Mar	7:20	18:35	10:55
1-Apr	7:40	17:40	9:10
2-Apr	6:55	19:05	12:05
3-Apr	6:45	19:05	11:48
4-Apr	6:45	19:05	11:45
5-Apr	6:45	19:10	11:22
6-Apr	6:45	19:00	11:45
7-Apr	6:50	19:05	10:40
8-Apr	6:45	19:05	11:37
9-Apr	7:00	19:00	12:02
10-Apr	6:30	19:10	10:42
11-Apr	6:50	19:00	11:35
12-Apr	6:43	19:11	11:05
13-Apr	7:00	19:05	12:10
14-Apr	6:45	19:05	11:32
15-Apr	6:45	18:55	10:25
16-Apr	7:00	19:00	10:47
17-Apr	7:15	19:00	9:30
18-Apr	6:45	18:50	11:20
19-Apr	7:15	19:00	12:00
20-Apr	14:30	19:07	12:02
21-Apr	8:20	18:45	11:30
22-Apr	6:55	19:08	11:27
23-Apr	7:00	19:01	12:10
24-Apr	7:00	19:10	10:15
25-Apr	7:15	19:15	10:53
26-Apr	6:57	18:57	10:04
27-Apr	6:55	19:00	10:15
28-Apr	7:00	18:37	11:17
29-Apr	7:00	18:55	12:02
30-Apr	6:55	19:00	12:00
1-May	6:30	19:20	10:55
2-May			
3-May			
4-May			
5-May			
6-May	8:25	19:35	10:45
7-May	6:10	19:30	11:58
8-May	6:20	19:30	13:02
9-May	6:15	19:30	11:50
10-May	6:25	19:30	12:12
11-May	6:10	19:35	12:18

APPENDIX E. CONOWINGO WEST AND EAST FISH LIFT OPERATION DATA AND FISH COUNTS

Date	Start Time (First Lift)	End Time (Last Lift)	Operation Time (hours)
12-May	6:24	19:30	12:09
13-May	6:20	19:40	11:20
14-May	6:30	19:30	11:50
15-May	6:20	19:25	12:13
16-May	6:20	19:20	11:35
17-May	6:20	19:29	12:10
18-May	6:20	19:28	13:03
19-May	6:20	19:25	12:25
20-May	6:15	19:15	12:15
21-May	6:30	19:30	11:48
22-May	6:20	19:32	12:29
23-May	6:05	19:40	12:20
24-May	6:20	19:22	12:47
25-May	6:22	19:27	11:49
26-May	6:30	19:35	12:02
27-May	6:15	19:32	12:46
28-May	6:20	19:24	12:24
29-May	6:20	19:25	12:45
30-May	6:30	19:20	12:35
31-May	6:20	19:30	12:23
1-Jun	6:25	19:25	12:05
2-Jun	6:20	19:27	12:02
3-Jun	6:20	19:30	12:17
4-Jun	6:20	19:30	12:31
5-Jun	6:20	19:20	12:20
6-Jun	6:20	19:20	12:35

Conowingo West Fish Lift, Hourly Counts of Fish Species Captured

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

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APPENDIX E. CONOWINGO WEST AND EAST FISH LIFT OPERATION DATA AND FISH COUNTS

Catch of fishes at the Conowingo Dam West Fish Lift, 2023		
Number of Days		65
Number of Lifts		1,388
Fishing Time (hours : minutes)		758:58
Number of Taxa	37	% of Total
AMERICAN SHAD	4,390	1.10%
BLUEBACK HERRING	3	0.00%
ALEWIFE	17	0.00%
BLUE CATFISH	1	0.00%
FLATHEAD CATFISH	503	0.13%
NORTHERN SNAKEHEAD	778	0.19%
GIZZARD SHAD	381,157	95.45%
HICKORY SHAD	1	0.00%
STRIPED BASS	14	0.00%
CHANNEL CATFISH	3,627	0.91%
SHORTHEAD REDHORSE	2,781	0.70%
WALLEYE	887	0.22%
SMALLMOUTH BASS	2,117	0.53%
CARP	687	0.17%
WHITE PERCH	51	0.01%
AMERICAN EEL	71	0.02%
HYBRID STRIPED BASS*	2	0.00%
ROCK BASS	29	0.01%
REDBREAST SUNFISH	12	0.00%
GREEN SUNFISH	5	0.00%
PUMPKINSEED	5	0.00%
BLUEGILL	118	0.03%
LARGEMOUTH BASS	126	0.03%
BLACK CRAPPIE	13	0.00%
QUILLBACK	37	0.01%
RAINBOW TROUT	4	0.00%
BROWN TROUT	29	0.01%
BROOK TROUT	2	0.00%
Tiger Trout (Brook x Brown Trout)	3	0.00%
SPLAKE (Brook x Lake Trout)*	2	0.00%
MUSKELLUNGE	1	0.00%
TIGER MUSKELLUNGE*	8	0.00%
COMELY SHINER	1,821	0.46%
SPOTTAIL SHINER	8	0.00%
SPOTFIN SHINER	13	0.00%
TESSELLATED DARTER	2	0.00%
YELLOW PERCH	1	0.00%
GREENSIDE DARTER	6	0.00%
SHIELD DARTER	1	0.00%
ATLANTIC NEEDLEFISH	1	0.00%
SEA LAMPREY	31	0.01%
Total	399,334	

American Shad sex ratio information, Conowingo Dam West Fish Lift, 2023.**No operation on May 2 - 5, 2023**

Date	Sample size	Males	Females	Male:Female Ratio
3/30/2023	0	0	0	N/A
3/31/2023	0	0	0	N/A
4/1/2023	0	0	0	N/A
4/2/2023	1	0	1	N/A
4/3/2023	0	0	0	N/A
4/4/2023	0	0	0	N/A
4/5/2023	4	3	1	1:
4/6/2023	8	3	5	1:
4/7/2023	11	5	6	1:
4/8/2023	7	3	4	1:
4/9/2023	2	1	1	1:
4/10/2023	7	5	2	1:
4/11/2023	21	10	11	1:
4/12/2023	42	19	23	1:
4/13/2023	32	11	21	1:
4/14/2023	16	6	10	1:
4/15/2023	120	65	55	1:
4/16/2023	103	59	44	1:
4/17/2023	128	68	60	1:
4/18/2023	42	19	23	1:
4/19/2023	66	36	30	1:
4/20/2023	102	52	50	1:
4/21/2023	102	50	52	1:
4/22/2023	103	46	57	1:
4/23/2023	100	54	46	1:
4/24/2023	102	44	58	1:
4/25/2023	100	43	57	1:
4/26/2023	106	45	61	1:
4/27/2023	107	55	52	1:
4/28/2023	100	49	51	1:
4/29/2023	20	13	7	1:
4/30/2023	41	30	11	1:
5/1/2023	1	0	1	N/A
5/2/2023	DID NOT OPERATE			
5/3/2023	DID NOT OPERATE			
5/4/2023	DID NOT OPERATE			
5/5/2023	DID NOT OPERATE			
5/6/2023	0	0	0	N/A
5/7/2023	117	72	45	1:
5/8/2023	29	24	5	1:
5/9/2023	100	65	35	1:
5/10/2023	101	51	50	1:
5/11/2023	100	42	58	1:

APPENDIX E. CONOWINGO WEST AND EAST FISH LIFT OPERATION DATA AND FISH COUNTS

Date	Sample size	Males	Females	Male:Female Ratio	
5/12/2023	62	39	23	1:	0.59
5/13/2023	90	42	48	1:	1.14
5/14/2023	100	54	46	1:	0.85
5/15/2023	23	6	17	1:	2.83
5/16/2023	3	2	1	1:	0.50
5/17/2023	28	13	15	1:	1.15
5/18/2023	129	41	88	1:	2.15
5/19/2023	53	20	33	1:	1.65
5/20/2023	115	40	75	1:	1.88
5/21/2023	103	37	66	1:	1.78
5/22/2023	76	23	53	1:	2.30
5/23/2023	16	9	7	1:	0.78
5/24/2023	27	5	22	1:	4.40
5/25/2023	11	1	10	1:	10.00
5/26/2023	32	16	16	1:	1.00
5/27/2023	3	0	3	N/A	
5/28/2023	34	12	22	1:	1.83
5/29/2023	27	8	19	1:	2.38
5/30/2023	10	2	8	1:	4.00
5/31/2023	18	0	18	N/A	
6/1/2023	5	2	3	1:	1.50
6/2/2023	4	1	3	1:	3.00
6/3/2023	0	0	0	N/A	
6/4/2023	0	0	0	N/A	
6/5/2023	0	0	0	N/A	
6/6/2023	0	0	0	N/A	
TOTAL	2,747	1,421	1,589	1:	1.12

**Catch and effort of American Shad collected at the Conowingo Dam West Fish Lift during
primary collection periods,* 1985-2023**

Year	Number Days	Number Lifts	Fishing Hours	Total Catch	Catch Per Day	Catch Per Lift	Catch Per Hour
1985	37	839	328.6	1,518	41	2	4.6
1986	53	737	431.5	5,136	97	7	11.9
1987	49	1,295	506.5	7,659	156	6	15.1
1988	54	1,166	471.7	5,137	95	4	10.9
1989	46	1,034	447.2	8,216	179	8	18.4
1990	62	1,247	541	15,958	257	13	29.5
1991	59	1,123	478.5	13,273	225	12	27.7
1992	61	1,517	566	10,323	169	7	18.2
1993	41	971	398	5,328	130	5	13.4
1994	44	918	414	5,595	127	6	13.5
1995	64	1,216	632.2	15,588	244	13	24.7
1996	27	441	245.2	11,458	424	26	46.7
1997	44	611	295.1	12,974	295	21	44.0
1998	26	476	238.6	6,577	253	14	27.6
1999	43	709	312.6	9,658	225	14	30.9
2000	34	424	206.5	9,785	288	23	47.4
2001	41	425	195.1	10,940	267	26	56.1
2002	31	417	147.1	9,347	302	22	63.5
2003	31	637	171.8	9,802	316	27	57.0
2004	14	151	74.3	3,426	245	23	46.1
2005	30	295	165.9	3,896	130	13	23.5
2006	37	394	214.9	3,970	107	10	18.5
2007	29	288	135.3	4,272	147	15	31.6
2008	34	481	174.4	2,627	77	5	15.1
2009	28	282	144.1	6,534	233	23	45.3
2010	27	238	138.2	5,605	208	24	40.6
2011	15	144	85.6	3,074	205	21	35.9
2012	37	404	244	1,486	40	4	6.1
2013	24	288	134.1	2,030	85	7	15.1
2014	27	321	173.1	513	19	2	3.0
2015	19	194	100.5	875	46	4	8.7
2016	11	131	58.2	861	78	7	14.8
2017	13	123	56.4	736	56	6	13.0
2018	15	200	84.7	465	31	2	5.5
2019	20	227	124.3	390	19	2	3.1
2020	DID NOT OPERATE DUE TO COVID-19 PANDEMIC						
2021	59	1,378	552.5	6,825	115	5	12.3
2022	70	1,397	812.1	2,314	33	2	2.8
2023	65	1,388	759.0	4,390	67	3	5.8

*Only applies to 1985-1995 data. Excludes early and late season catch and effort when less than 10 shad/day were taken.

APPENDIX E. CONOWINGO WEST AND EAST FISH LIFT OPERATION DATA AND FISH COUNTS

Operations and fish catch at Conowingo Dam West Fish Lift, 1985 - 2023

Year	Number of Days	Total Fish (Millions)	Number of Taxa	American Shad	Hickory Shad	Alewife	Blueback Herring
1985	55	2.318	41	1,546	9	377	6,763
1986	59	1.831	43	5,195	45	2,822	6,327
1987	60	2.593	43	7,667	35	357	5,861
1988	60	1.602	49	5,169	64	712	14,570
1989	53	1.066	45	8,311	28	1,902	3,611
1990	72	1.188	44	15,964	77	425	9,658
1991	63	0.533	45	13,330	120	2,649	15,616
1992	64	1.560	46	10,335	376	3,344	27,533
1993	45	0.713	37	5,343	0	572	4,052
1994	47	0.564	46	5,615	1	70	2,603
1995	68	0.995	44	15,588	36	5,405	93,859
1996	28	1.233	39	11,473	0	1	871
1997	44	0.346	39	12,974	118	11	133,257
1998	41	0.575	38	6,577	6	31	5,511
1999	43	0.722	34	9,658	32	1,795	8,546
2000	34	0.458	37	9,785	1	9,189	14,326
2001	41	0.310	38	10,940	36	7,824	16,320
2002	31	0.419	35	9,347	0	141	428
2003	31	0.147	30	9,802	1	16	183
2004	14	0.039	30	3,426	0	0	1
2005	30	0.094	36	3,896	0	0	0
2006	37	0.163	38	3,970	0	2	6
2007	29	0.159	36	4,272	0	7	153
2008	34	0.733	37	2,627	0	2	7
2009	28	0.226	39	6,534	4	20	165
2010	27	0.158	36	5,605	1	1	81
2011	15	0.100	32	3,074	0	0	0
2012	37	0.322	38	1,486	0	0	7
2013	24	0.489	33	2,030	0	0	2
2014	27	0.597	33	513	0	13	233
2015	19	0.242	29	875	0	29	17
2016	11	0.179	25	861	0	20	14
2017	13	0.177	29	736	0	5	0
2018	15	0.315	29	465	3	6	21
2019	20	0.228	31	390	1	0	13
2020	DID NOT OPERATE DUE TO COVID-19 PANDEMIC						
2021	59	1.476	39	6,825	7	14	13
2022	70	0.489	36	2,314	0	778	183
2023	65	0.399	37	4,390	1	17	3

**American Shad and Gizzard Shad ratio information,
Conowingo Dam West Fish Lift, 2023.**

No operation on May 2 - 5, 2023

Date	AMS	GS	AMS:GS Ratio	
3/30/2023	0	2,499	N/A	
3/31/2023	0	163	N/A	
4/1/2023	0	968	N/A	
4/2/2023	1	1,140	1:	1,140
4/3/2023	0	7,170	N/A	
4/4/2023	0	3,391	N/A	
4/5/2023	4	10,264	1:	2,566
4/6/2023	8	2,860	1:	358
4/7/2023	11	4,867	1:	442
4/8/2023	7	9,575	1:	1,368
4/9/2023	2	11,010	1:	5,505
4/10/2023	7	8,165	1:	1,166
4/11/2023	21	5,775	1:	275
4/12/2023	42	4,715	1:	112
4/13/2023	32	7,450	1:	233
4/14/2023	16	14,330	1:	896
4/15/2023	164	6,690	1:	41
4/16/2023	214	10,750	1:	50
4/17/2023	139	9,040	1:	65
4/18/2023	42	8,893	1:	212
4/19/2023	66	8,260	1:	125
4/20/2023	102	7,525	1:	74
4/21/2023	130	8,559	1:	66
4/22/2023	149	7,185	1:	48
4/23/2023	198	10,850	1:	55
4/24/2023	283	4,780	1:	17
4/25/2023	138	7,220	1:	52
4/26/2023	211	4,083	1:	19
4/27/2023	228	3,290	1:	14
4/28/2023	105	7,050	1:	67
4/29/2023	20	7,095	1:	355
4/30/2023	41	6,540	1:	160
5/1/2023	1	10,345	1:	10,345
5/2/2023	DID NOT OPERATE			
5/3/2023	DID NOT OPERATE			
5/4/2023	DID NOT OPERATE			
5/5/2023	DID NOT OPERATE			
5/6/2023	0	12,555	N/A	
5/7/2023	150	9,425	1:	63
5/8/2023	29	19,454	1:	671
5/9/2023	191	6,815	1:	36
5/10/2023	103	14,220	1:	138
5/11/2023	117	9,340	1:	80

APPENDIX E. CONOWINGO WEST AND EAST FISH LIFT OPERATION DATA AND FISH COUNTS

Date	AMS	GS	AMS:GS Ratio	
5/12/2023	62	9,660	1:	156
5/13/2023	90	6,520	1:	72
5/14/2023	106	2,855	1:	27
5/15/2023	23	7,125	1:	310
5/16/2023	3	11,285	1:	3,762
5/17/2023	28	3,590	1:	128
5/18/2023	534	3,032	1:	6
5/19/2023	53	8,008	1:	151
5/20/2023	137	8,340	1:	61
5/21/2023	119	2,520	1:	21
5/22/2023	76	3,079	1:	41
5/23/2023	16	4,795	1:	300
5/24/2023	27	1,172	1:	43
5/25/2023	11	5,065	1:	460
5/26/2023	32	2,480	1:	78
5/27/2023	3	300	1:	100
5/28/2023	34	776	1:	23
5/29/2023	27	553	1:	20
5/30/2023	10	570	1:	57
5/31/2023	18	1,038	1:	58
6/1/2023	5	1,348	1:	270
6/2/2023	4	650	1:	163
6/3/2023	0	1,732	N/A	
6/4/2023	0	32	N/A	
6/5/2023	0	171	N/A	
6/6/2023	0	155	N/A	
TOTAL	4,390	381,157	1:	87

APPENDIX E. CONOWINGO WEST AND EAST FISH LIFT OPERATION DATA AND FISH COUNTS

Conowingo EFL			
Date	Start Time (First Lift)	End Time (Last Lift)	Operation Time (hours)
30-Mar	10:15	14:45	4:05
31-Mar	7:19	18:45	11:07
1-Apr	7:36	18:20	12:12
2-Apr	7:00	19:10	12:12
3-Apr	7:04	19:04	11:52
4-Apr	6:57	19:07	13:06
5-Apr	7:00	19:00	11:58
6-Apr	6:50	19:02	11:56
7-Apr	7:00	19:00	11:54
8-Apr	6:45	19:05	12:45
9-Apr	6:45	19:05	12:15
10-Apr	7:00	19:00	12:16
11-Apr	6:45	19:00	12:03
12-Apr	7:00	19:00	12:14
13-Apr	7:00	19:00	11:18
14-Apr	6:50	19:00	12:32
15-Apr	7:00	19:00	10:52
16-Apr	7:00	19:02	13:29
17-Apr	7:00	16:32	8:43
18-Apr	7:50	19:00	13:15
19-Apr	6:50	19:05	13:24
20-Apr	6:50	16:30	9:52
21-Apr	7:25	18:53	11:40
22-Apr	7:01	19:12	12:59
23-Apr	7:00	18:53	12:52
24-Apr	7:03	19:03	13:23
25-Apr	7:25	19:00	12:00
26-Apr	6:48	19:10	11:32
27-Apr	7:00	19:00	11:47
28-Apr	7:00	18:55	11:54
29-Apr	6:50	18:53	12:05
30-Apr	6:55	18:50	12:12
1-May	6:20	19:30	12:57
2-May	6:15	10:48	5:06
3-May			
4-May			
5-May			
6-May	8:30	19:30	12:05
7-May	6:30	19:30	13:12
8-May	6:32	19:32	13:27
9-May	6:15	19:30	12:54
10-May	6:30	19:20	13:00
11-May	6:30	19:30	12:32

APPENDIX E. CONOWINGO WEST AND EAST FISH LIFT OPERATION DATA AND FISH COUNTS

Date	Start Time (First Lift)	End Time (Last Lift)	Operation Time (hours)
12-May	6:15	19:30	13:25
13-May	6:20	19:20	13:00
14-May	6:27	19:27	11:36
15-May	6:20	19:20	12:09
16-May	6:15	19:30	13:27
17-May	6:30	19:30	11:26
18-May	6:20	18:20	11:47
19-May	6:30	19:30	12:52
20-May	6:20	19:30	12:41
21-May	6:20	19:30	12:59
22-May	6:30	19:30	12:56
23-May	6:20	19:30	12:35
24-May	6:30	19:30	12:41
25-May	6:30	19:30	12:57
26-May	6:30	19:20	12:58
27-May	6:20	19:30	12:57
28-May	6:20	19:30	12:57
29-May	6:30	19:30	12:58
30-May	6:30	14:00	8:00
31-May	15:30	19:25	4:01
1-Jun	6:30	19:30	12:47
2-Jun	6:20	19:25	12:58
3-Jun	6:30	19:30	12:52
4-Jun	6:20	19:20	12:42
5-Jun	6:30	19:30	12:52
6-Jun	6:20	19:22	13:01

Conowingo East Fish Lift, Hourly Counts of Fish Species Captured

[illegible]

[illegible]

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APPENDIX E. CONOWINGO WEST AND EAST FISH LIFT OPERATION DATA AND FISH COUNTS

Catch of fishes at the Conowingo Dam East Fish Lift, 2023		
Number of Days		66
Number of Lifts		1,590
Fishing Time (hours : minutes)		790:31
Number of Taxa	38	% of Total
AMERICAN SHAD	5,632	0.38%
BLUEBACK HERRING	391	0.03%
ALEWIFE	1	0.00%
BLUE CATFISH	1	0.00%
FLATHEAD CATFISH	1	0.00%
NORTHERN SNAKEHEAD	47	0.00%
GIZZARD SHAD	1,449,363	98.97%
HICKORY SHAD	3	0.00%
STRIPED BASS	31	0.00%
CHANNEL CATFISH	3,586	0.24%
SHORthead REDHORSE	949	0.06%
WALLEYE	412	0.03%
SMALLMOUTH BASS	1,306	0.09%
CARP	795	0.05%
WHITE PERCH	25	0.00%
AMERICAN EEL	83	0.01%
ATLANTIC MENHADEN	1	0.00%
HYBRID STRIPED BASS*	1	0.00%
ROCK BASS	4	0.00%
REDBREAST SUNFISH	1	0.00%
GREEN SUNFISH	5	0.00%
PUMPKINSEED	9	0.00%
BLUEGILL	83	0.01%
LARGEMOUTH BASS	19	0.00%
BLACK CRAPPIE	2	0.00%
QUILLBACK	604	0.04%
WHITE SUCKER	1	0.00%
RAINBOW TROUT	3	0.00%
BROWN TROUT	9	0.00%
TIGER TROUT* (Brook x Brown Trout)	1	0.00%
SPLAKE* (Brook x Lake Trout)	2	0.00%
MUSKELLUNGE	2	0.00%
TIGER MUSKIE*	13	0.00%
GOLDEN SHINER	1	0.00%
COMELY SHINER	944	0.06%
SPOTTAIL SHINER	22	0.00%
SPOTFIN SHINER	3	0.00%
YELLOW BULLHEAD	1	0.00%
TESSELLATED DARTER	21	0.00%
YELLOW PERCH	2	0.00%
GREENSIDE DARTER	5	0.00%
SEA LAMPREY	20	0.00%
TOTAL	1,464,405	

APPENDIX E. CONOWINGO WEST AND EAST FISH LIFT OPERATION DATA AND FISH COUNTS

American Shad sex ratio information, Conowingo Dam East Fish Lift, 2023.

No operation on May 3 - 5, 2023

Date	Sample size	Males	Females		Male:Female Ratio
3/30/2023	0	0	0	N/A	
3/31/2023	0	0	0	N/A	
4/1/2023	0	0	0	N/A	
4/2/2023	0	0	0	N/A	
4/3/2023	0	0	0	N/A	
4/4/2023	3	0	3	N/A	
4/5/2023	1	0	1	N/A	
4/6/2023	0	0	0	N/A	
4/7/2023	2	1	1	1:	1.00
4/8/2023	1	1	0	1:	0.00
4/9/2023	8	5	3	1:	0.60
4/10/2023	1	1	0	1:	0.00
4/11/2023	1	0	1	N/A	
4/12/2023	0	0	0	N/A	
4/13/2023	12	6	6	1:	1.00
4/14/2023	173	49	52	1:	1.06
4/15/2023	332	57	83	1:	1.46
4/16/2023	295	48	56	1:	1.17
4/17/2023	8	2	6	1:	3.00
4/18/2023	1	0	1	N/A	
4/19/2023	56	22	34	1:	1.55
4/20/2023	214	70	77	1:	1.10
4/21/2023	160	55	57	1:	1.04
4/22/2023	164	53	55	1:	1.04
4/23/2023	211	4	0	1:	0.00
4/24/2023	46	26	20	1:	0.77
4/25/2023	130	67	50	1:	0.75
4/26/2023	168	56	68	1:	1.21
4/27/2023	84	39	45	1:	1.15
4/28/2023	361	46	71	1:	1.54
4/29/2023	13	4	9	1:	2.25
4/30/2023	456	61	39	1:	0.64
5/1/2023	7	2	5	1:	2.50
5/2/2023	0	0	0	N/A	
5/3/2023	DID NOT OPERATE				
5/4/2023	DID NOT OPERATE				
5/5/2023	DID NOT OPERATE				
5/6/2023	0	0	0	N/A	
5/7/2023	13	9	4	1:	0.44
5/8/2023	76	47	29	1:	0.62
5/9/2023	79	50	29	1:	0.58
5/10/2023	38	17	21	1:	1.24
5/11/2023	145	63	47	1:	0.75
5/12/2023	340	64	81	1:	1.27

APPENDIX E. CONOWINGO WEST AND EAST FISH LIFT OPERATION DATA AND FISH COUNTS

Date	Sample size	Males	Females	Male:Female Ratio	
5/13/2023	356	65	42	1:	0.65
5/14/2023	46	27	19	1:	0.70
5/15/2023	289	45	73	1:	1.62
5/16/2023	284	50	52	1:	1.04
5/17/2023	244	54	64	1:	1.19
5/18/2023	37	17	20	1:	1.18
5/19/2023	107	42	65	1:	1.55
5/20/2023	63	26	37	1:	1.42
5/21/2023	51	20	31	1:	1.55
5/22/2023	219	48	57	1:	1.19
5/23/2023	147	33	87	1:	2.64
5/24/2023	98	24	74	1:	3.08
5/25/2023	10	3	7	1:	2.33
5/26/2023	2	1	1	1:	1.00
5/27/2023	12	3	9	1:	3.00
5/28/2023	17	6	11	1:	1.83
5/29/2023	4	0	4	N/A	
5/30/2023	1	0	1	N/A	
5/31/2023	3	1	2	1:	2.00
6/1/2023	2	0	2	N/A	
6/2/2023	3	1	2	1:	2.00
6/3/2023	5	0	5	N/A	
6/4/2023	11	4	7	1:	1.75
6/5/2023	13	1	12	1:	12.00
6/6/2023	9	1	8	1:	8.00
TOTAL	5,632	1,397	1,646	1: 1.18	

**Catch and effort of American Shad collected at the Conowingo Dam East Fish Lift during
primary collection periods,* 1991-2023**

Year	Number Days	Number Lifts	Fishing Hours	Total Catch	Catch Per Day	Catch Per Lift	Catch Per Hour
1991	60	1,168	647.2	13,897	232	12	21.5
1992	70	599	454.1	15,386	220	26	33.9
1993	42	848	463.5	8,203	195	10	17.7
1994	55	955	574.8	26,715	486	28	46.5
1995	68	986	706.2	46,062	677	47	65.2
1996	49	599	454.1	26,040	531	43	57.3
1997	64	652	640	90,971	1,421	140	142.1
1998	50	460	640	39,904	798	87	62.4
1999	52	610	467	69,712	1,341	114	149.3
2000	45	570	367.8	153,546	3,412	269	417.5
2001	43	559	359.8	193,574	4,502	346	538.0
2002	49	560	440.7	108,001	2,204	193	245.1
2003	44	645	416.6	125,135	2,844	194	300.4
2004	44	590	390.3	109,360	2,485	185	280.2
2005	52	541	434.3	68,926	1,326	127	158.7
2006	61	619	429.8	56,899	933	92	132.4
2007	39	479	335.3	25,464	653	53	75.9
2008	51	483	407	19,914	390	41	48.9
2009	57	618	495.6	29,272	514	47	59.1
2010	59	685	526.2	37,757	640	55	71.8
2011	15	259	142.4	20,571	1,371	79	144.5
2012	62	1,230	633.7	22,143	357	18	34.9
2013	60	925	575.6	12,733	212	14	22.1
2014	54	988	509	10,425	193	11	20.5
2015	46	674	433	8,341	181	12	19.3
2016	55	860	536	14,276	260	17	26.6
2017	46	849	463	16,265	354	19	35.1
2018	48	714	416	6,992	146	10	16.8
2019	46	788	415	4,787	104	6	11.5
2020*	4	64	34.6	485	121	8	14.0
2021	DID NOT OPERATE DUE TO INVASIVE SPECIES CONTROL						
2022	74	1,599	818.2	2,283	31	1	2.8
2023	66	1,590	790.5	5,632	85	4	7.1

* Lift operation ceased after 4 days due to the COVID-19 pandemic

APPENDIX E. CONOWINGO WEST AND EAST FISH LIFT OPERATION DATA AND FISH COUNTS

Operations and fish catch at Conowingo Dam East Fish Lift, 1985 - 2023

Year	Number of Days	Total Fish (Millions)	Number of Taxa	American Shad	Hickory Shad	Alewife	Blueback Herring
1991	60	0.651	42	13,897	0	323	13,149
1992	70	2.395	35	15,386	20	285	7,347
1993	42	0.530	29	8,203	0	0	4,574
1994	55	1.063	36	26,715	1	5	248
1995	68	1.796	36	46,062	1	170	4,004
1996	49	0.492	35	26,040	0	3	261
1997	64	0.719	36	90,971	0	63	242,815
1998	50	0.713	33	39,904	0	6	700
1999	52	1.184	31	69,712	0	14	130,625
2000	45	0.494	30	153,546	0	2	14,963
2001	43	0.922	30	193,574	0	7,458	284,921
2002	49	0.657	31	108,001	6	74	2,037
2003	44	0.589	25	125,135	0	21	530
2004	44	0.716	30	109,360	0	89	101
2005	52	0.378	30	68,926	0	0	4
2006	61	0.715	32	56,899	4	0	0
2007	39	0.539	31	25,464	0	429	460
2008	51	0.944	29	19,914	0	4	1
2009	57	0.915	30	29,272	0	160	71
2010	59	0.857	38	37,757	0	1	4
2011	15	0.289	24	20,571	20	2	17
2012	62	1.110	35	22,143	0	27	25
2013	60	1.095	27	12,733	1	0	7
2014	54	1.193	34	10,425	2	111	25
2015	46	0.754	28	8,341	8	10	3
2016	55	0.865	27	14,276	0	0	34
2017	46	0.845	32	16,265	0	6	59
2018	48	1.041	25	6,992	0	58	2
2019	46	0.833	22	4,787	0	0	15
2020*	4	0.049	16	485	0	1	0
2021	DID NOT OPERATE DUE TO COVID-19 PANDEMIC						
2022	74	1.468	35	2,283	2	1	94
2023	66	1.464	38	5,632	3	1	391

* Lift operation ceased after 4 days due to invasive species catch

**American Shad and Gizzard Shad ratio information,
Conowingo Dam East Fish Lift, 2023.**

No operation on May 3 - 5, 2023

Date	AMS	GS	AMS:GS Ratio	
3/30/2023	0	57	N/A	
3/31/2023	0	58	N/A	
4/1/2023	0	486	N/A	
4/2/2023	0	995	N/A	
4/3/2023	0	1,183	N/A	
4/4/2023	3	1,222	1:	407
4/5/2023	1	967	1:	967
4/6/2023	0	2,197	N/A	
4/7/2023	2	4,254	1:	2,127
4/8/2023	1	39,371	1:	39,371
4/9/2023	8	11,995	1:	1,499
4/10/2023	1	13,145	1:	13,145
4/11/2023	1	11,809	1:	11,809
4/12/2023	0	10,545	N/A	
4/13/2023	12	19,193	1:	1,599
4/14/2023	173	12,475	1:	72
4/15/2023	332	26,730	1:	81
4/16/2023	295	17,510	1:	59
4/17/2023	8	18,585	1:	2,323
4/18/2023	1	58,675	1:	58,675
4/19/2023	56	42,000	1:	750
4/20/2023	214	23,825	1:	111
4/21/2023	160	42,517	1:	266
4/22/2023	164	58,000	1:	354
4/23/2023	211	38,300	1:	182
4/24/2023	46	33,700	1:	733
4/25/2023	130	20,450	1:	157
4/26/2023	168	12,700	1:	76
4/27/2023	84	23,100	1:	275
4/28/2023	361	13,820	1:	38
4/29/2023	13	35,220	1:	2,709
4/30/2023	456	32,950	1:	72
5/1/2023	7	22,935	1:	3,276
5/2/2023	0	2,017	N/A	
5/3/2023	DID NOT OPERATE			
5/4/2023	DID NOT OPERATE			
5/5/2023	DID NOT OPERATE			
5/6/2023	0	1,160	N/A	
5/7/2023	13	5,070	1:	390
5/8/2023	76	33,705	1:	443
5/9/2023	79	63,250	1:	801
5/10/2023	38	76,800	1:	2,021
5/11/2023	145	76,200	1:	526

APPENDIX E. CONOWINGO WEST AND EAST FISH LIFT OPERATION DATA AND FISH COUNTS

Date	AMS	GS	AMS:GS Ratio	
5/12/2023	340	59,300	1:	174
5/13/2023	356	40,650	1:	114
5/14/2023	46	50,900	1:	1,107
5/15/2023	289	19,767	1:	68
5/16/2023	284	9,150	1:	32
5/17/2023	244	5,900	1:	24
5/18/2023	37	16,435	1:	444
5/19/2023	107	7,510	1:	70
5/20/2023	63	15,000	1:	238
5/21/2023	51	14,560	1:	285
5/22/2023	219	6,925	1:	32
5/23/2023	147	19,750	1:	134
5/24/2023	98	25,000	1:	255
5/25/2023	10	27,050	1:	2,705
5/26/2023	2	45,400	1:	22,700
5/27/2023	12	22,250	1:	1,854
5/28/2023	17	28,375	1:	1,669
5/29/2023	4	28,780	1:	7,195
5/30/2023	1	9,725	1:	9,725
5/31/2023	3	6,240	1:	2,080
6/1/2023	2	20,200	1:	10,100
6/2/2023	3	21,300	1:	7,100
6/3/2023	5	25,120	1:	5,024
6/4/2023	11	6,580	1:	598
6/5/2023	13	6,540	1:	503
6/6/2023	9	1,785	1:	198
TOTAL	5,632	1,449,363	1:	257

APPENDIX F. CONOWINGO WEST AND EAST FISH LIFTS TRANSPORTS AND MORTALITIES

APPENDIX F. CONOWINGO WEST AND EAST FISH LIFT TRANSPORTS AND MORTALITIES

**American Shad Transport Summary to Canal Lock Boat Ramp for the Conowingo
Dam East and West Fish Lift, March 30 - June 6, 2023**

Date	East Fish Lift Number Transported	West Fish Lift Number Transported	Number of Transport Mortalities	Number Stocked	Total Number of Fish Stocked for Season
4/10/2023	11	19	0	30	30
4/12/2023	2	37	0	39	69
4/13/2023	1	54	0	55	124
4/14/2023	99	14	0	113	237
4/15/2023	190	31	3	218	455
4/16/2023	0	200	4	196	651
4/17/2023	190	9	1	198	849
4/17/2023	4	69	0	73	922
4/20/2023	0	199	0	199	1,121
4/21/2023	100	98	0	198	1,319
4/22/2023	99	100	0	199	1,518
4/23/2023	100	100	0	200	1,718
4/23/2023	99	89	0	188	1,906
4/24/2023	80	120	0	200	2,106
4/24/2023	0	142	0	142	2,248
4/25/2023	83	86	0	169	2,417
4/26/2023	97	116	0	213	2,630
4/26/2023	44	160	0	204	2,834
4/27/2023	100	100	0	200	3,034
4/28/2023	72	129	0	201	3,235
4/28/2023	200	5	1	204	3,439
4/29/2023	61	13	0	74	3,513
4/30/2023	180	33	0	213	3,726
5/1/2023	56	7	0	63	3,789
5/7/2023	0	139	0	139	3,928
5/9/2023	94	105	0	199	4,127
5/10/2023	76	80	0	156	4,283
5/11/2023	57	121	0	178	4,461
5/12/2023	123	35	0	158	4,619
5/13/2023	154	31	0	185	4,804
5/13/2023	173	27	0	200	5,004
5/14/2023	147	63	0	210	5,214
5/15/2023	92	95	0	187	5,401
5/16/2023	196	8	0	204	5,605
5/17/2023	129	15	0	144	5,749
5/17/2023	123	10	0	133	5,882
5/18/2023	0	192	0	192	6,074
5/18/2023	0	200	0	200	6,274
5/18/2023	31	117	0	148	6,422
5/19/2023	50	66	0	116	6,538
5/20/2023	77	93	0	170	6,708

APPENDIX F. CONOWINGO WEST AND EAST FISH LIFT TRANSPORTS AND MORTALITIES

Date	East Fish Lift Number Transported	West Fish Lift Number Transported	Number of Transport Mortalities	Number Stocked	Total Number of Fish Stocked for Season
5/21/2023	55	102	0	157	6,865
5/22/2023	124	76	1	199	7,064
5/22/2023	94	31	0	125	7,189
5/23/2023	61	28	0	89	7,278
5/24/2023	129	19	0	148	7,426
5/29/2023	23	44	0	67	7,493
TOTAL	3,876	3,627	10	7,493	

**American Shad Transport Summary to Columbia Riverfront Park Boat
Ramp for the Conowingo Dam
East and West Fish Lift, March 30 - June 6, 2023**

Date	East Fish Lift Number Transported	West Fish Lift Number Transported	Number of Transport Mortalities	Number Stocked	Total Number of Fish Stocked for Season
4/7/2023	4	14	0	18	18
4/15/2023	98	34	0	132	150
4/16/2023	189	0	0	189	339
4/21/2023	174	14	0	188	527
4/23/2023	100	109	0	209	736
4/27/2023	51	110	0	161	897
4/30/2023	206	6	0	212	1,109
5/9/2023	0	112	0	112	1,221
5/12/2023	185	16	0	201	1,422
5/16/2023	198	0	0	198	1,620
5/16/2023	96	1	0	97	1,717
5/25/2023	72	23	0	95	1,812
5/27/2023	12	33	0	45	1,857
5/30/2023	0	18	0	18	1,875
5/31/2023	2	21	0	23	1,898
6/5/2023	21	0	0	21	1,919
TOTAL	1,408	511	0	1,919	

Appendix F-WFL and EFL Transport and Mortalities

**Alewife Transport Summary to Canal Lock Boat Ramp for the Conowingo Dam
East and West Fish Lift, March 30 - June 6, 2023**

Date	East Fish Lift Number Transported	West Fish Lift Number Transported	Number of Transport Mortalities	Number Stocked	Total Number of Fish Stocked for Season
4/16/2023	0	6	0	6	6
4/17/2023	0	2	0	2	8
5/7/2023	0	1	0	1	9
5/9/2023	0	2	0	2	11
5/15/2023	0	1	0	1	12
5/16/2023	0	1	0	1	13
TOTAL	0	13	0	13	

**Alewife Transport Summary to Columbia Riverfront Park Boat Ramp for
the Conowingo Dam**

East and West Fish Lift, March 30 - June 6, 2023

Date	East Fish Lift Number Transported	West Fish Lift Number Transported	Number of Transport Mortalities	Number Stocked	Total Number of Fish Stocked for Season
4/7/2023	1	0	0	1	1
4/15/2023	0	2	0	2	3
TOTAL	1	2	0	3	

**Blueback Herring Transport Summary to Canal Lock Boat Ramp for the Conowingo
Dam East and West Fish Lift, March 30 - June 6, 2023**

Date	East Fish Lift Number Transported	West Fish Lift Number Transported	Number of Transport Mortalities	Number Stocked	Total Number of Fish Stocked for Season
5/15/2023	0	1	0	1	1
5/16/2023	32	0	0	32	33
5/17/2023	38	0	0	38	71
5/17/2023	2	0	0	2	73
5/18/2023	1	0	0	1	74
5/19/2023	4	0	0	4	78
5/20/2023	24	0	0	24	102
5/22/2023	3	1	0	4	106
5/22/2023	3	0	0	3	109
5/23/2023	131	0	0	131	240
5/24/2023	103	0	0	103	343
5/29/2023	6	0	0	6	349
TOTAL	347	2	0	349	

**Blueback Herring Transport Summary to Columbia Riverfront Park Boat
Ramp for the Conowingo Dam**

East and West Fish Lift, March 30 - June 6, 2023

Date	East Fish Lift Number Transported	West Fish Lift Number Transported	Number of Transport Mortalities	Number Stocked	Total Number of Fish Stocked for Season
5/9/2023	0	1	0	1	1
5/16/2023	3	0	0	3	4
5/25/2023	9	0	0	9	13
5/27/2023	6	0	0	6	19
5/31/2023	2	0	0	2	21
TOTAL	20	1	0	21	

Appendix F-WFL and EFL Transport and Mortalities

2023 WFL American Shad and River Herring Holding Mortality Sheet						2023 EFL American Shad and River Herring Holding Mortality Sheet					
Date	Number	Total Length (mm)	Weight (g)	Sex	Species	Date	Number	Total Length (mm)	Weight (g)	Sex	Species
4/16/2023	1	544	1,521	Female	American Shad	4/16/2023	1	525	1,258	Female	American Shad
	2	482	1,109	Female	American Shad		2	510	1,276	Female	American Shad
4/18/2023	1	490	899	Male	American Shad		3	443	842	Male	American Shad
4/19/2023	1	489	1,138	Female	American Shad		4	474	1,067	Female	American Shad
	2	475	992	Male	American Shad		5	445	818	Male	American Shad
	3	555	1,011	Male	American Shad		6	550	1,569	Female	American Shad
	4	460	1,066	Female	American Shad		7	501	1,505	Female	American Shad
4/20/2023	1	495	1,051	Female	American Shad		8	394	507	Male	American Shad
4/21/2023	1	436	882	Male	American Shad	4/17/2023	1	451	970	Female	American Shad
	2	473	1,053	Female	American Shad	4/19/2023	1	515	1,353	Female	American Shad
4/22/2023	1	469	862	Male	American Shad	4/21/2023	1	443	707	Male	American Shad
4/23/2023	1	492	1,276	Female	American Shad		2	507	1,255	Female	American Shad
4/24/2023	1	424	684	Male	American Shad	4/22/2023	1	428	219	Male	American Shad
4/25/2023	1	479	1,093	Female	American Shad	4/23/2023	1	508	1,513	Female	American Shad
4/30/2023	1	490	1,226	Male	American Shad		2	490	1,095	Female	American Shad
5/11/2023	1	452	1,149	Female	American Shad	4/24/2023	1	491	1,123	Female	American Shad
5/15/2023	1	494	1,029	Female	American Shad	5/1/2023	1	488	1,176	Female	American Shad
5/27/2023	1	468	1,355	Female	American Shad	5/9/2023	1	458	884	Female	American Shad
						5/10/2023	1	414	583	Male	American Shad
						5/12/2023	1	403	561	Male	American Shad
							2	425	722	Male	American Shad
						5/13/2023	1	482	1,013	Female	American Shad
							2	480	895	Male	American Shad
						5/14/2023	1	428	725	Male	American Shad
						5/16/2023	1	505	1,139	Male	American Shad
						5/25/2023	1	425	657	Male	American Shad
							2	478	920	Male	American Shad
							3	532	1,598	Male	American Shad

Appendix F-WFL and EFL Transport and Mortalities

2023 WFL American Shad and River Herring Transport Mortality Sheet						2023 EFL American Shad and River Herring Transport Mortality Sheet					
Date	Number	Total Length (mm)	Weight (g)	Sex	Species	Date	Number	Total Length (mm)	Weight (g)	Sex	Species
4/15/2023	1	446	765	Male	American Shad	4/15/2023	1	495	1,080	Female	American Shad
4/16/2023	1	431	890	Female	American Shad	4/15/2023	2	425	649	Male	American Shad
4/16/2023	2	530	1,285	Female	American Shad	4/16/2023	1	441	670	Male	American Shad
4/16/2023	3	514	1,264	Female	American Shad	4/16/2023	2	480	1,063	Female	American Shad
4/16/2023	4	460	895	Female	American Shad	4/16/2023	3	504	1,288	Female	American Shad
4/17/2023	1	442	873	Male	American Shad	4/16/2023	4	530	1,454	Female	American Shad
4/28/2023	1	445	714	Male	American Shad	4/24/2023	1	442	683	Male	American Shad
						5/14/2023	1	475	1,004	Female	American Shad
						5/15/2023	1	514	1,750	Female	American Shad
						5/22/2023	1	491	1,004	Female	American Shad
						5/22/2023	2	478	983	Female	American Shad
						5/22/2023	3	449	927	Female	American Shad
						5/24/2023	1	466	898	Male	American Shad

Note: Three (3) additional Transport Morts observed at the WFL but unable to retrieve; Total transport mortalities=10

Appendix F-WFL and EFL Transport and Mortalities

2023 WFL American Shad and River Herring Lift Mortality Sheet						2023 EFL American Shad and River Herring Lift Mortality Sheet					
Date	Number	Total Length (mm)	Weight (g)	Sex	Species	Date	Number	Total Length (mm)	Weight (g)	Sex	Species
4/17/2023	1	457	1,067	Female	American Shad	4/21/2023	1	516	1,147	Female	American Shad
	2	521	1,200	Female	American Shad		2	506	1,245	Female	American Shad
5/13/2023	1	435	691	Male	American Shad		3	457	864	Female	American Shad
							4	478	1,164	Female	American Shad
							5	443	728	Male	American Shad
							6	516	1,291	Female	American Shad
							7	434	716	Male	American Shad
							8	466	983	Female	American Shad
							9	516	1,212	Female	American Shad
							10	465	1,115	Female	American Shad
							11	467	982	Female	American Shad
						4/21/2023	12	485	1,044	Female	American Shad
						4/27/2023	1	435	751	Male	American Shad
						5/12/2023	1	479	1,039	Female	American Shad
							2	478	1,028	Female	American Shad
							3	438	712	Male	American Shad
						5/15/2023	1	414	525	Male	American Shad
						5/16/2023	1	270	154	Male	Blueback Herring
						5/20/2023	1	445	721	Male	American Shad
							1	267	154	Male	Blueback Herring
						5/21/2023	1	486	1,077	Female	American Shad
						5/23/2023	1	253	127	Male	Blueback Herring
						5/25/2023	1	455	682	Female	American Shad

2023 American Shad and River Herring Transfer Skid Mortality Sheet

Date	Number	Total Length (mm)	Weight (g)	Sex	Species
4/15/2023	1	495	1,080	Female	American Shad
	2	425	649	Male	American Shad
4/16/2023	1	441	670	Male	American Shad
	2	480	1,063	Female	American Shad
	3	504	1,288	Female	American Shad
	4	530	1,454	Female	American Shad
4/24/2023	1	442	683	Male	American Shad
5/14/2023	1	475	1,004	Female	American Shad
5/15/2023	1	514	1,750	Female	American Shad
5/22/2023	1	491	1,004	Female	American Shad
	2	478	983	Female	American Shad
	3	449	927	Female	American Shad
5/24/2023	1	466	898	Male	American Shad

**American Shad, Alewife, and Blueback Herring Transport and Stocking Summary to Canal Lock Boat Ramp and Columbia Riverfront
Park Boat Ramp for the Conowingo Dam Fish Lifts, March 30 - June 6, 2023.**

Date	Transport Number	Stocking Location	American Shad Stocked	Alewife Stocked	Blueback Herring Stocked	Transport Mortalities	Min. Temperature (°F)	Max. Temperature (°F)	Min. Dissolved Oxygen (mg/L)	Max. Dissolved Oxygen (mg/L)
4/7/2023	1	Columbia	18	-	-	-	56.8	56.8	10.3	13.5
4/10/2023	2	Canal Lock	30	-	-	-	57.7	57.9	9.3	9.6
4/12/2023	3	Canal Lock	39	-	-	-	60.6	61.0	13.6	14.0
4/13/2023	4	Canal Lock	55	-	-	-	60.1	60.4	10.7	10.8
4/14/2023	5	Canal Lock	113	-	-	-	61.3	61.5	11.3	11.7
4/15/2023	6	Columbia	132	-	-	-	61.7	62.1	10.9	11.7
4/15/2023	7	Canal Lock	218	-	-	3*	61.7	62.2	9.6	13.4
4/16/2023	8	Columbia	189	1	-	-	62.8	63.1	11.4	14.5
4/16/2023	9	Canal Lock	196	6	-	4 A. Shad	62.6	63.3	10.9	17.6
4/17/2023	10	Canal Lock	198	-	-	1 A. Shad	64.6	64.6	9.9	20.0
4/17/2023	11	Canal Lock	73	2	-	-	64.2	64.6	13.0	16.6
4/20/2023	12	Canal Lock	199	-	-	-	66.4	66.9	13.0	15.2
4/21/2023	13	Canal Lock	198	-	-	-	65	65	7	10
4/21/2023	14	Columbia	188	-	-	-	67.1	67.8	10.5	15.5
4/22/2023	15	Canal Lock	199	-	-	-	66.6	66.7	9.3	17.1
4/23/2023	16	Canal Lock	200	-	-	-	67.6	68.0	11.5	15.3
4/23/2023	17	Canal Lock	188	-	-	-	68.5	68.9	12.9	15.2
4/23/2023	18	Columbia	209	-	-	-	68.2	68.2	8.7	13.9
4/24/2023	19	Canal Lock	200	-	-	-	66.4	66.4	12.3	16.6
4/24/2023	20	Canal Lock	142	-	-	-	65.8	65.8	9.7	20.0
4/25/2023	21	Canal Lock	169	-	-	-	65.8	66.0	8.7	11.8
4/26/2023	22	Canal Lock	213	-	-	-	64.2	64.2	10.3	13.5
4/26/2023	23	Canal Lock	204	-	-	-	64.8	64.9	13.0	20.0
4/27/2023	24	Canal Lock	200	-	-	-	64.8	65.1	10.2	16.3
4/27/2023	25	Columbia	161	-	-	-	64.8	65.1	9.8	16.1
4/28/2023	26	Canal Lock	204	-	-	1 A. Shad	64.6	64.8	7.2	16.3
4/28/2023	27	Canal Lock	201	-	-	-	64.4	64.6	9.3	10.7
4/29/2023	28	Canal Lock	74	-	-	-	64.2	64.4	8.5	19.4
4/30/2023	29	Canal Lock	213	-	-	-	62.6	62.8	9.4	14.7
4/30/2023	30	Columbia	212	-	-	-	62.2	62.2	9.3	12.5
5/1/2023	31	Canal Lock	63	-	-	-	61.3	61.5	15.1	19.6
5/7/2023	32	Canal Lock	139	1	-	-	58.3	58.8	12.0	13.0
5/9/2023	33	Canal Lock	199	2	-	-	61.5	61.9	8.2	12.2
5/9/2023	34	Columbia	112	2	1	-	N/A	N/A	N/A	N/A
5/10/2023	35	Canal Lock	156	-	-	-	64.2	64.8	12.5	15.8
5/11/2023	36	Canal Lock	178	-	-	-	63.7	64.2	9.9	11.5
5/12/2023	37	Canal Lock	158	-	-	-	62.8	63.5	10.6	12.9
5/12/2023	38	Columbia	201	-	-	-	64.8	65.1	9.0	13.3
5/13/2023	39	Canal Lock	185	-	-	-	67.5	67.6	9.8	11.5
5/13/2023	40	Canal Lock	200	-	-	-	65.8	66.2	10.3	19.4
5/14/2023	41	Canal Lock	210	-	-	-	66.9	67.6	17.8	20.0
5/15/2023	42	Canal Lock	187	1	1	-	68.0	68.5	10.3	19.1
5/16/2023	43	Columbia	198	-	-	-	68.7	69.1	11.2	14.7
5/16/2023	44	Canal Lock	204	1	32	-	70.9	71.2	7.6	8.8
5/16/2023	45	Columbia	97	-	3	-	68.7	69.3	12.1	12.8
5/17/2023	46	Canal Lock	144	-	38	-	71.6	71.8	12.4	16.5
5/17/2023	47	Canal Lock	133	-	2	-	70.9	70.9	12.7	14.4
5/18/2023	48	Canal Lock	200	-	-	-	70.2	70.3	10.8	13.4
5/18/2023	49	Canal Lock	192	-	-	-	70.0	70.0	8.6	12.3
5/18/2023	50	Canal Lock	148	-	1	-	69.8	69.8	10.5	14.8
5/19/2023	51	Canal Lock	116	-	4	-	69.4	69.6	10.3	14.3
5/20/2023	52	Canal Lock	170	-	24	-	69.8	69.8	7.6	8.9
5/21/2023	53	Canal Lock	157	-	-	-	72.0	72.3	9.1	14.3
5/22/2023	54	Canal Lock	199	-	4	1 A. Shad	71.2	71.6	10.6	15.2
5/22/2023	55	Canal Lock	125	-	3	-	70.7	71.1	9.5	15.3
5/23/2023	56	Canal Lock	89	-	131	-	71.1	71.2	9.6	14.8
5/24/2023	57	Canal Lock	148	-	103	-	71.2	71.6	8.7	9.8
5/25/2023	58	Columbia	95	-	9	-	72.7	73.0	6.0	11.8
5/27/2023	59	Columbia	45	-	6	-	73.2	73.4	12.5	14.1
5/29/2023	60	Canal Lock	67	-	6	-	73.2	73.6	10.2	12.0

Appendix F-WFL and EFL Transport and Mortalities

Date	Transport Number	Stocking Location	American Shad Stocked	Alewife Stocked	Blueback Herring Stocked	Transport Mortalities	Min. Temperature (°F)	Max. Temperature (°F)	Min. Dissolved Oxygen (mg/L)	Max. Dissolved Oxygen (mg/L)
5/30/2023	61	Columbia	18	-	-	-	73.4	73.6	10.9	14.8
5/31/2023	62	Columbia	23	-	2	-	74.5	74.7	10.9	13.3
6/5/2023	63	Columbia	21	-	-	-	78.6	78.6	10.0	10.3
TOTALS			9,412	16	370	10 A. Shad				
* 3 American Shad mortalities were observed but unable to be retrieved										

**APPENDIX G. CONOWINGO WEST AND EAST FISH LIFTS BIOLOGICAL
SAMPLING**

2023 WFL American Shad Sacrifice Sheet

2023 EFL American Shad Sacrifice Sheet

Number	Total Length (mm)	Weight (g)	Sex	Date	Number	Total Length (mm)	Weight (g)	Sex
1	513	1,262	Female	4/14/2023	1	509	1,120	Female
1	435	668	Male		2	505	1,070	Female
1	439	784	Male		3	493	1,112	Male
1	465	983	Male		4	509	1,198	Female
2	481	1,029	Female	4/15/2023	1	458	836	Male
3	419	732	Male		2	517	1,375	Female
1	437	729	Male		3	462	928	Male
2	460	841	Male		4	450	833	Male
3	496	1,253	Female		5	472	861	Male
1	495	894	Female		6	437	805	Male
2	463	1,010	Female		7	476	1,074	Female
3	559	1,720	Female	4/16/2023	1	466	816	Male
1	435	689	Male		2	411	606	Male
1	479	1,064	Male		3	511	1,348	Female
2	448	869	Female		4	406	603	Male
1	468	808	Female		5	437	686	Male
2	463	825	Male		6	516	1,380	Female
1	491	801	Male	4/19/2023	1	395	505	Male
2	400	578	Male	4/20/2023	1	422	608	Male
3	449	694	Male		2	442	622	Male
1	513	1,214	Female		3	494	1,152	Female
2	454	663	Male		4	508	1,069	Female
3	563	1,112	Female		5	435	627	Male
1	440	642	Male	4/21/2023	1	455	807	Male
2	433	682	Male		2	506	1,339	Male
3	464	750	Male		3	479	939	Female
4	525	1,458	Female	4/22/2023	1	444	741	Male
5	521	1,306	Female		2	454	706	Male
1	474	734	Male		3	510	1,156	Female
2	463	850	Female	4/23/2023	1	457	736	Female
3	455	781	Male		2	498	852	Female
4	446	722	Male		3	408	508	Male
1	455	815	Female		4	455	848	Female
2	437	590	Male		5	457	793	Male
1	457	785	Male	4/24/2023	1	435	667	Male
2	438	766	Male	4/25/2023	1	462	767	Male
3	416	552	Male		2	405	565	Male
4	479	986	Female		3	442	677	Male
5	416	658	Male	4/26/2023	1	466	844	Male
1	409	525	Male		2	444	679	Male
2	459	811	Male		3	505	1,026	Female
3	475	925	Male	4/27/2023	1	460	770	Male
4	415	615	Male		2	420	580	Male
5	449	702	Male	4/28/2023	1	470	822	Male
1	447	909	Female		2	473	1,036	Female
2	414	469	Male		3	468	823	Female
1	461	959	Female		4	460	774	Male
1	0:00	486	Male		5	452	728	Male
2	436	768	Male		6	480	873	Female
3	0:00	1,518	Female		7	492	1,208	Female
1	400	525	Male	4/30/2023	1	440	650	Male
1	0:00	618	Male		2	465	1,108	Female
2	402	516	Male		3	403	602	Male
3	0:00	1,142	Female		4	451	727	Male
4	440	689	Male		5	460	724	Female
1	0:00	657	Male		6	439	674	Male
2	437	609	Male		7	474	1,016	Female
1	0:00	706	Male		8	429	672	Male
2	412	616	Male		9	454	709	Male
1	0:00	1,152	Female		10	485	1,099	Female

Appendix G. Conowingo West and East Fish Lift Biological Sampling

Number	Total Length (mm)	Weight (g)	Sex	Date	Number	Total Length (mm)	Weight (g)	Sex
1	450	1,132	Female	5/8/2023	1	430	721	Male
2	0:00	992	Male	5/9/2023	1	433	737	Male
1	434	860	Female	5/9/2023	2	420	573	Male
2	0:00	596	Male	5/10/2023	1	515	1,126	Female
1	552	1,130	Female	5/11/2023	1	457	630	Male
1	0:00	1,003	Female		2	385	534	Male
2	468	1,029	Female		3	492	1,132	Female
3	0:00	1,257	Female	5/12/2023	1	444	740	Male
4	494	1,235	Female		2	493	906	Female
5	0:00	801	Female		3	450	632	Male
6	455	858	Female		4	448	698	Male
7	0:00	1,377	Female		5	469	1,010	Female
8	383	453	Male		6	416	589	Male
9	0:00	555	Male	5/13/2023	1	458	883	Male
10	455	773	Female		2	429	643	Male
11	0:00	963	Female		3	413	570	Male
1	444	770	Female		4	493	1,048	Female
1	0:00	939	Female		5	412	632	Male
2	479	585	Female		6	510	1,141	Female
3	0:00	1,248	Female		7	438	615	Male
1	506	1,430	Female	5/14/2023	1	517	1,223	Female
2	0:00	812	Male	5/15/2023	1	444	695	Male
1	482	881	Male		2	461	736	Male
1	0:00	1,040	Female		3	406	553	Male
1	493	1,205	Female		4	495	1,111	Female
1	0:00	840	Female		5	458	886	Female
1	437	790	Male	5/16/2023	1	541	1,599	Female
					2	343	356	Male
					3	464	921	Female
					4	497	1,148	Female
					5	491	975	Male
					6	496	1,223	Female
				5/17/2023	1	429	614	Male
					2	392	495	Male
					3	421	513	Male
					4	366	415	Male
					5	470	941	Female
				5/18/2023	1	445	698	Male
				5/19/2023	1	444	715	Male
				5/19/2023	2	503	1,304	Female
				5/20/2023	1	434	598	Male
				5/21/2023	1	420	671	Male
				5/22/2023	1	480	799	Male
					2	505	1,025	Female
					3	445	815	Female
					4	491	1,085	Male
				5/23/2023	1	470	871	Female
					2	461	773	Female
					3	475	810	Male
				5/24/2023	1	423	1,429	Female
					2	502	922	Female
				5/25/2023	1	472	976	Female
				6/4/2023	1	435	710	Female
				4/15/2023	1*	455	811	Male
				4/23/2023	1*	431	600	Male

*Floy Tagged (prior to 2023)

Appendix G. Conowingo West and East Fish Lift Biological Sampling

2023 WFL Herring Sacrifice Sheet						2023 EFL Herring Sacrifice Sheet					
Date	Number	Total Length (mm)	Weight (g)	Sex	Species	Date	Number	Total Length (mm)	Weight (g)	Sex	Species
						5/16/2023	1	267	165	Male	Blueback Herring
						5/16/2023	2	255	129	Male	Blueback Herring
						5/17/2023	1	235	97	Male	Blueback Herring
							2	250	117	Male	Blueback Herring
						5/19/2023	1	250	112	Female	Blueback Herring
						5/23/2023	1	260	127	Male	Blueback Herring
							2	257	122	Male	Blueback Herring
							3	254	111	Male	Blueback Herring
							4	239	96	Male	Blueback Herring
							5	241	104	Male	Blueback Herring
							6	262	130	Male	Blueback Herring
							7	259	137	Male	Blueback Herring
							8	259	119	Male	Blueback Herring
						5/24/2023	1	264	134	Male	Blueback Herring
							2	244	114	Male	Blueback Herring
							3	150	111	Male	Blueback Herring
							4	263	135	Male	Blueback Herring
							5	243	108	Male	Blueback Herring
						5/26/2023	1	266	132	Male	Blueback Herring

**APPENDIX H. CALIBRATION OF FLOWS, CONOWINGO WEST EEL COLLECTION
FACILITY, 2023**

Calibration of Flows (Gallons per Minute), Conowingo West Eel Collection Facility, 2023

	DATE									
	3-May	10-May	17-May	23-May	31-May	7-Jun	14-Jun	21-Jun	28-Jun	5-Jul
Collection Tank Fill	12.5	17.5	16	15.5	15	13	11.4	12.5	16	12.5
Collection Tank Drain	13.5	18.5	16	16.5	17.5	13.5	13.2	13	16.5	14.5
Holding Tank #1 Drain	9	16.5		17						
Holding Tank #2 Drain			15		20	16	13	14	19	
Holding Tank #3 Drain	17.5	37.5	30	30	27.5	40.5	26	33	34	37.5
Spray Bar	7	6.75	6.6	6.6	6.6	6.6	6.4	6.75	6.75	6.75
Scent line	0.6	0.5	0.3	0.8	0.5	0.45	0.45	0.25	0.3	1.2
Backside of Ramp	1.6	1.5	0.3	1.8	3	0.95	2.25	0.75	0.8	3.2
Top Attraction	5.4	5.25	6.3	4.8	3.3	5.65	4.15	6	5.95	3.55
Bottom of Ramp Attraction	40	72.5	61	63.5	65	70	52.2	60	69.5	52
Total Attraction*	46.0	78.25	67.6	69.1	69.1	76.1	56.8	66.25	75.75	56.75

	DATE									
	12-Jul	19-Jul	26-Jul	2-Aug	9-Aug	16-Aug	23-Aug	30-Aug	6-Sep	13-Sep
Collection Tank Fill	10	5.4	15.6	19	12.9	10.2	10	17.5	9.5	8.7
Collection Tank Drain	11	5.25	14.8	19	13.2	10.8	9.6	17	10	8.55
Holding Tank #1 Drain										
Holding Tank #2 Drain										
Holding Tank #3 Drain	48.75	45	33	38.5	49.5	51	64.5	52.5	54	51.75
Spray Bar	6.75	6.6	6.4	6.6	6.3	6.15	7.2	6.4	6.3	6.3
Scent line	1.2	1.1	1.4	1.45	1.35	1.1	1.2	1.25	1.2	1.2
Backside of Ramp	2.2	0.95	0.6	1.45	1.65	1.7	0.8	0.75	1.7	1.05
Top Attraction	4.55	5.65	5.8	5.15	4.65	4.45	6.4	5.65	4.6	5.25
Bottom of Ramp Attraction	59.75	50.25	47.8	57.5	62.7	61.8	74.1	69.5	64	60.3
Total Attraction	65.3	57.0	55.0	64.1	68.7	67.35	81.3	76.4	69.8	66.75

	DATE									
	20-Sep	27-Sep	4-Oct	11-Oct	18-Oct	25-Oct	1-Nov	7-Nov	14-Nov	22-Nov
Collection Tank Fill	14.5	12	14	15	14	15	16.2	12	16.6	16.2
Collection Tank Drain	13.5	12.5	13.4	14.5	15.5	15	15.6	12	16.2	16.2
Holding Tank #1 Drain										
Holding Tank #2 Drain	18	10.5	14	9	8	18	9.9	13.2	15	
Holding Tank #3 Drain	30.25	30	30	36	30	30	31.5	41.25	37.5	57
Spray Bar	6.45	6.45	7	6.6	6	6.15	6.45	6	6	5.1
Scent line	1.4	0.8	1.25	1.23	1	1.3	1.3	0.9	1.2	1.25
Backside of Ramp	0.4	1.3	0.65	0.73	2.5	1.3	0.7	0.9	0.9	1.25
Top Attraction	6.05	5.15	6.35	5.87	3.5	4.85	5.75	5.1	5.1	3.85
Bottom of Ramp Attraction	61.75	53	57.4	59.5	53.5	63	57	66.45	68.7	73.2
Total Attraction*	69.0	58.95	65.0	66.6	58.0	69.5	64.05	72.45	75.0	78.3

* Tank flows were reduced to get accurate flow measurement and to calibrate.

All Flow returned to normal operating condition after calibration was complete at approximately 70 gpm total flow.

Calibration of flows (gallons per minute) of the CWECF, 2023

Appendix H. Calibration of Flows, Conowingo West Eel Collection Facility, 2023 Water temperature (°F) from Conowingo West Eel Collection facility's Collection Tank

Day	May	June	July	August	September	October	November
1	-	72.32	76.28	81.86	76.46	65.84	57.56
2	56.66	73.04	77	80.6	76.28	65.84	56.84
3	53.42	75.2	77.36	81.14	75.92	66.38	56.48
4	51.98	74.3	78.44	80.96	75.38	67.1	56.12
5	52.34	76.28	80.24	80.78	76.82	67.46	56.3
6	53.6	76.46	80.42	81.14	77.9	67.64	55.76
7	55.94	75.74	80.6	80.78	78.26	66.02	54.14
8	57.92	75.38	82.22	80.6	78.08	68.72	54.32
9	58.82	77	82.4	80.78	79.88	67.28	53.42
10	59.18	73.94	82.4	80.96	78.8	67.64	53.78
11	60.44	74.66	82.94	80.06	80.06	66.92	53.24
12	60.62	75.02	82.4	79.34	81.32	67.46	53.06
13	59.36	75.38	82.94	79.7	79.52	67.28	52.7
14	64.58	75.38	82.76	79.7	79.88	65.66	52.88
15	65.48	76.1	82.76	80.24	77.18	64.58	52.16
16	67.1	76.28	83.12	80.78	76.1	62.6	52.7
17	66.92	75.56	82.94	80.96	75.2	61.52	52.7
18	68	76.1	83.48	78.8	74.48	60.44	53.42
19	67.46	75.74	83.84	79.34	73.76	60.26	53.06
20	67.64	75.02	84.02	77	72.68	59.54	52.52
21	64.4	74.84	83.3	75.56	71.96	59.54	52.52
22	68.9	74.3	83.66	75.2	71.78	58.64	52.7
23	69.08	74.3	83.48	75.02	70.7	57.92	51.8
24	68.9	74.66	82.76	74.48	69.8	56.84	50.72
25	69.62	74.66	82.4	74.48	69.26	57.2	49.46
26	71.06	75.02	82.94	74.12	68.18	57.2	46.22
27	70.88	74.66	82.76	75.56	67.46	57.2	46.04
28	69.98	77.18	82.76	75.74	67.28	57.02	
29	70.7	77.36	83.3	75.74	66.02	57.56	
30	70.7	76.46	83.3	76.46	65.3	59.72	
31	71.42		82.04	76.64		58.82	

Appendix H. Calibration of Flows, Conowingo West Eel Collection Facility, 2023

Dissolved Oxygen (mg/L) Reading from the Control Room (Station 643)

Day	May	June	July	August	September	October	November
1	9.58	9.36	7.71	7.59	8.51	9.77	10.16
2	10.08	9.01	7.66	7.72	8.43	9.7	10.26
3	10.7	8.59	7.71	7.81	8.23	9.54	10.42
4	11.07	9.24	7.75	7.69	8.14	9.73	10.34
5	11.04	8.17	7.82	7.61	7.57	9.41	10.21
6	10.72	8.15	7.49	7.55	9.62	9.32	10.28
7	10.28	8.13	7.35	7.32	7.9	7.75	10.64
8	10.05	7.22	7.22	7.41	8	7.82	10.3
9	9.55	7.64	7.22	7.45	7.68	7.97	10.25
10	9.17	7.49	7.38	7.06	7.2	9.05	10.2
11	9.46	7.42	7.45	8.27	7.73	8.3	10.77
12	9.57	7.02	7.85	8.39	7.87	8.15	10.5
13	9.61	7.73	7.64	8.45	8.08	9.95	10.2
14	9.81	6.95	7.78	8.01	7.77	10.19	10.62
15	9.93	7.12	7.97	7.43	8.25	10.04	10.5
16	9.9	7.38	7.75	7.89	8.73	10.39	10.92
17	9.18	7.63	7.28	8.97	8.48	10.53	10.6
18	8.4	7.71	7.33	8.34	8.7	10.91	10.3
19	8.3	8.45	7.18	8.14	8.72	10.88	10.48
20	8.01	8.22	7.45	8.81	8.78	10.8	10.5
21	7.87	7.92	6.57	8.53	8.91	10.75	10.4
22	9.88	8.07	6.85	8.74	8.78	10.82	10.61
23	7.67	7.79	7.96	8.49	8.62	11.21	10.8
24	9.2	7.31	7.22	8.7	8.11	10.23	12.6
25	9.26	7.38	7.4	8.34	8.76	10.14	11.49
26	9.75	7.2	8.13	8.4	9.1	9.87	11.86
27	9.18	7.33	7.88	8.26	9.14	9.59	11.65
28	8.99	8.41	8.18	7.78	8.9	9.52	
29	9.08	8.12	8.25	8.02	9.88	9.34	
30	8.79	7.51	8.14	8.06	9.89	10.23	
31	8.83		7.65	8.12	8.73	10.15	
After November 2, 2023, dissolved oxygen readings were taken at Shures Landing boat ramp. Dissolved Oxygen (mg/L) readings from Control Room from Station 643							

APPENDIX I. 2023 CONOWINGO WEST EEL COLLECTION FACILITY

Appendix I. 2023 Conowingo West Eel Collection Facility

Number of Juvenile American Eel Caught Daily, Conowingo West Eel Collection Facility, 2023

Date	Number of Eels	Date	Number of Eels	Date	Number of Eels	Date	Number of Eels	Date	Number of Eels
5/1/2023	0	6/13/2023	143	7/26/2023	906	9/7/2023	105	10/20/2023	2
5/2/2023	0	6/14/2023	150	7/27/2023	566	9/8/2023	281	10/21/2023	10
5/3/2023	11	6/15/2023	125	7/28/2023	653	9/9/2023	1203	10/22/2023	3
5/4/2023	11	6/16/2023	97	7/29/2023	630	9/10/2023	402	10/23/2023	3
5/5/2023	6	6/17/2023	43	7/30/2023	91	9/11/2023	385	10/24/2023	2
5/6/2023	5	6/18/2023	65	7/31/2023	233	9/12/2023	262	10/25/2023	0
5/7/2023	54	6/19/2023	251	8/1/2023	229	9/13/2023	306	10/26/2023	3
5/8/2023	111	6/20/2023	124	8/2/2023	123	9/14/2023	73	10/27/2023	4
5/9/2023	49	6/21/2023	73	8/3/2023	123	9/15/2023	2183	10/28/2023	10
5/10/2023	205	6/22/2023	152	8/4/2023	189	9/16/2023	2047	10/29/2023	24
5/11/2023	519	6/23/2023	207	8/5/2023	122	9/17/2023	1109	10/30/2023	20
5/12/2023	1371	6/24/2023	56	8/6/2023	72	9/18/2023	477	10/31/2023	7
5/13/2023	132	6/25/2023	200	8/7/2023	37	9/19/2023	303	11/1/2023	16
5/14/2023	5870	6/26/2023	159	8/8/2023	89	9/20/2023	118	11/2/2023	2
5/15/2023	5682	6/27/2023	162	8/9/2023	19	9/21/2023	61	11/3/2023	3
5/16/2023	5701	6/28/2023	20	8/10/2023	17	9/22/2023	16	11/4/2023	4
5/17/2023	2181	6/29/2023	1125	8/11/2023	21	9/23/2023	8	11/5/2023	4
5/18/2023	1966	6/30/2023	1915	8/12/2023	140	9/24/2023	2	11/6/2023	22
5/19/2023	2009	7/1/2023	918	8/13/2023	79	9/25/2023	10	11/7/2023	11
5/20/2023	1338	7/2/2023	454	8/14/2023	16	9/26/2023	29	11/8/2023	2
5/21/2023	1215	7/3/2023	430	8/15/2023	10	9/27/2023	24	11/9/2023	2
5/22/2023	1039	7/4/2023	229	8/16/2023	31	9/28/2023	93	11/10/2023	0
5/23/2023	1458	7/5/2023	664	8/17/2023	0	9/29/2023	197	11/11/2023	1
5/24/2023	807	7/6/2023	5461	8/18/2023	2	9/30/2023	51	11/12/2023	0
5/25/2023	492	7/7/2023	17326	8/19/2023	4	10/1/2023	132	11/13/2023	0
5/26/2023	694	7/8/2023	13280	8/20/2023	299	10/2/2023	397	11/14/2023	0
5/27/2023	605	7/9/2023	13635	8/21/2023	169	10/3/2023	614	11/15/2023	0
5/28/2023	707	7/10/2023	13916	8/22/2023	53	10/4/2023	425	11/16/2023	1
5/29/2023	628	7/11/2023	7054	8/23/2023	665	10/5/2023	888	11/17/2023	2
5/30/2023	632	7/12/2023	7854	8/24/2023	1180	10/6/2023	1155	11/18/2023	1
5/31/2023	313	7/13/2023	8970	8/25/2023	781	10/7/2023	458	11/19/2023	0
6/1/2023	275	7/14/2023	11858	8/26/2023	900	10/8/2023	519	11/20/2023	0
6/2/2023	294	7/15/2023	6279	8/27/2023	2571	10/9/2023	1346	11/21/2023	0
6/3/2023	270	7/16/2023	*2036	8/28/2023	1827	10/10/2023	1111	11/22/2023	0
6/4/2023	506	7/17/2023	3525	8/29/2023	1741	10/11/2023	146	11/23/2023	1
6/5/2023	698	7/18/2023	2581	8/30/2023	*2129	10/12/2023	742	11/24/2023	4
6/6/2023	773	7/19/2023	4517	8/31/2023	1451	10/13/2023	253	11/25/2023	0
6/7/2023	382	7/20/2023	5133	9/1/2023	1083	10/14/2023	1	11/26/2023	0
6/8/2023	519	7/21/2023	1774	9/2/2023	822	10/15/2023	21	11/27/2023	0
6/9/2023	396	7/22/2023	952	9/3/2023	254	10/16/2023	13		
6/10/2023	219	7/23/2023	961	9/4/2023	273	10/17/2023	70		
6/11/2023	170	7/24/2023	1101	9/5/2023	321	10/18/2023	10		
6/12/2023	151	7/25/2023	988	9/6/2023	470	10/19/2023	7	TOTAL	217,035

The peak periods are shown in boxes

Bolded numbers are peak days

Volumetric Counts in *italics*

* Quality control checks

Number of Juvenile American Eel placed in holding during the CWECF 2023 season

Day	May	June	July	August	September	October	November
1	-	275	-	-	-	132	16
2	360	114	-	-	-	-	-
3	40	525	-	-	-	614	3
4	-	620	-	-	-	425	4
5	36	765	-	-	-	-	4
6	55	-	*9,549	-	-	1155	22
7	459	461	-	-	-	458	11
8	161	545	-	-	-	519	2
9	-	-	-	-	-	-	-
10	514	241	-	-	-	1107	-
11	864	199	-	-	-	145	1
12	1,921	188	-	-	-	-	-
13	156	-	-	-	-	253	-
14	5,889	296	-	-	-	1	-
15	5,689	207	-	-	-	21	-
16	-	-	-	-	-	-	-
17	2,426	125	-	-	-	70	-
18	2,192	260	-	-	-	8	-
19	2,268	381	-	-	-	-	-
20	2,340	-	-	-	-	2	-
21	1,778	396	-	-	-	10	-
22	3,626	291	-	-	16	3	
23	-	-	-	-	8	-	
24	1,070	169	-	-	2	2	
25	1,721	391	-	-	-	-	
26	1,784	484	-	-	29	-	
27	731	-	-	-	24	4	
28	1,004	245	-	-	-	10	
29	711	-	-	-	197	24	
30	-	-	-	-	51	-	TOTAL
31	386		-	-		7	60,268

Number of eels held were combined from CWECF and OCEF

* Collection tank was checked multiple times the evening before to keep from overcrowding, eels placed in holding tank for a few hours until transport the next morning.

**APPENDIX J. AGENCY COMMENTS AND RESPONSIVENESS SUMMARY ON 2023
DRAFT FOMP ANNUAL REPORT**

2023 Draft FOMP Annual Report– Resource Agency Comment Responsiveness Summary

Comment	Response
PADEP, December 28, 2023	
No comment.	
Maryland (MDE working with MDNR), January 12, 2024	
No comment.	

From: [Eberts, Ron](#)
To: [Kendra Gorski](#); [Kirk Smith](#); [Danucalov, Andrea H:\(Constellation Power\)](#); [Bleistine, Ray](#); [Mike.Cox@ERM.com](#); [David Frazier](#); [Sheila Eyler](#); [Aaron Henning](#); [jesus_morales@fws.gov](#); [Martinek, Michael](#); [McCorkle, Richard](#); [Miller, Jeremy](#); [steve_minkinen@fws.gov](#); [bob.sadzinski@maryland.gov](#); [shawn.seaman@maryland.gov](#); [Smith, Fred P:\(Constellation Power\)](#); [lsteffy@srbc.net](#); [Williamson, Scott](#); [hnelson@maryland.gov](#); [tony.prochaska@maryland.gov](#); [brett.coakley@maryland.gov](#); [david.seaborn@maryland.gov](#); [don.pugh@outlook.com](#); [matthew.jargowsky@maryland.gov](#); [emily.zollweg-horan@dec.ny.gov](#); [Niewinski, Brian](#)
Cc: [Joseph Petre](#)
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Andrea,

PADEP has reviewed the 2023 Conowingo FOMP Annual Report DRAFT and have no comments.

Regards,

Ronald C. Eberts, Jr. | Environmental Protection Compliance Specialist

Department of Environmental Protection

Southcentral Regional Office

Waterways & Wetlands Program

909 Elmerton Avenue | Harrisburg, PA 17110

Phone: 717.705.4819 | Fax: 717.705.4760

THE SOUTHCENTRAL REGIONAL OFFICE AFTER HOURS REPORTING & 24 HOUR EMERGENCY
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From: Kendra Gorski <kgorski@gomezandsullivan.com>

Sent: Thursday, December 21, 2023 12:22 PM

To: [Kirk Smith](#) <ksmith@gomezandsullivan.com>; [Danucalov, Andrea H:\(Constellation Power\)](#) <u000ahd@constellation.com>; [Bleistine, Ray](#) <rbleistine@normandeau.com>; [Mike.Cox@ERM.com](#); [David Frazier](#) <dfrazier@gomezandsullivan.com>; [Eberts, Ron](#) <reberts@pa.gov>; [Sheila Eyler](#) <Sheila_Eyler@fws.gov>; [Aaron Henning](#) <ahenning@srbc.net>; [jesus_morales@fws.gov](#); [Martinek, Michael](#) <mmartinek@normandeau.com>; [McCorkle, Richard](#) <richard_mccorkle@fws.gov>; [Miller, Jeremy](#) <jeremmille@pa.gov>; [steve_minkinen@fws.gov](#); [bob.sadzinski@maryland.gov](#); [shawn.seaman@maryland.gov](#); [Smith, Fred P:\(Constellation Power\)](#) <fredp.smith@constellation.com>; [lsteffy@srbc.net](#); [Williamson, Scott](#) <scwilliams@pa.gov>;

hnelson@maryland.gov; tony.prochaska@maryland.gov; brett.coakley@maryland.gov;
david.seaborn@maryland.gov; don.pugh@outlook.com; matthew.jargowsky@maryland.gov;
emily.zollweg-horan@dec.ny.gov; Niewinski, Brian <bniewinski@pa.gov>

Cc: Joseph Petre <jpetre@gomezandsullivan.com>

Subject: [External] 2023 FOMP Annual Report -draft

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Please see the attached Constellation Conowingo Fishway Operations and Maintenance Plan Annual Report Draft for 2023. This report is business confidential.

 [2023_Conowingo_FOMP_Annual_Report-draft_agency_review.pdf](#)

Constellation is requesting that comments be provided to Andrea Danucalov by January 12, 2024.

Thank you,

Kendra

Kendra Gorski

Environmental Scientist

Gomez and Sullivan Engineers, DPC

1961 Wehrle Dr, Ste 12 | Williamsville, NY 14221

O: (716) 250-4960 | D: (716) 402-6811

kgorski@gomezandsullivan.com



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To: [Kendra Gorski](#)
Cc: [Kirk Smith](#); [Danucalov, Andrea H:\(Constellation Power\)](#); [Bleistine, Ray](#); [Mike.Cox@ERM.com](#); [David Frazier](#); [reberts@pa.gov](#); [sheila_eyler@fws.gov](#); [ahenning@srbc.net](#); [jesus_morales@fws.gov](#); [Martinek, Michael](#); [richard_mccorkle@fws.gov](#); [jeremmille@pa.gov](#); [steve_minkinen@fws.gov](#); [bob.sadzinski@maryland.gov](#); [shawn.seaman@maryland.gov](#); [Smith, Fred P:\(Constellation Power\)](#); [lsteffy@srbc.net](#); [scwilliams@pa.gov](#); [hnelson@maryland.gov](#); [tony.prochaska@maryland.gov](#); [brett.coakley@maryland.gov](#); [don.pugh@outlook.com](#); [matthew.jargowsky@maryland.gov](#); [emily.zollweg-horan@dec.ny.gov](#); [bniewinski@pa.gov](#); [Joseph Petre](#)
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Andrea,

Maryland (MDE working with MDNR) has reviewed the 2023 Conowingo FOMP Annual Report DRAFT and have no comments.

Thank you,

On Thu, Dec 21, 2023 at 12:22 PM Kendra Gorski <kgorski@gomezandsullivan.com> wrote:

Hello,

Please see the attached Constellation Conowingo Fishway Operations and Maintenance Plan Annual Report Draft for 2023. This report is business confidential.

 [2023_Conowingo_FOMP_Annual_Report-draft_agency_review.pdf](#)

Constellation is requesting that comments be provided to Andrea Danucalov by January 12, 2024.

Thank you,

Kendra

Kendra Gorski

Environmental Scientist

Gomez and Sullivan Engineers, DPC

1961 Wehrle Dr, Ste 12 | Williamsville, NY 14221

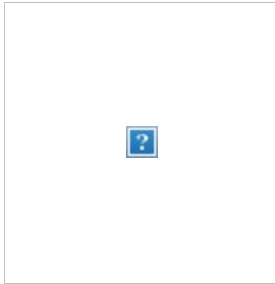
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David Seaborn, Ph.D.

Deputy Program Manager, Wetlands and
Waterways Protection Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230

david.seaborn@maryland.gov

410-537-4465 (O)

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