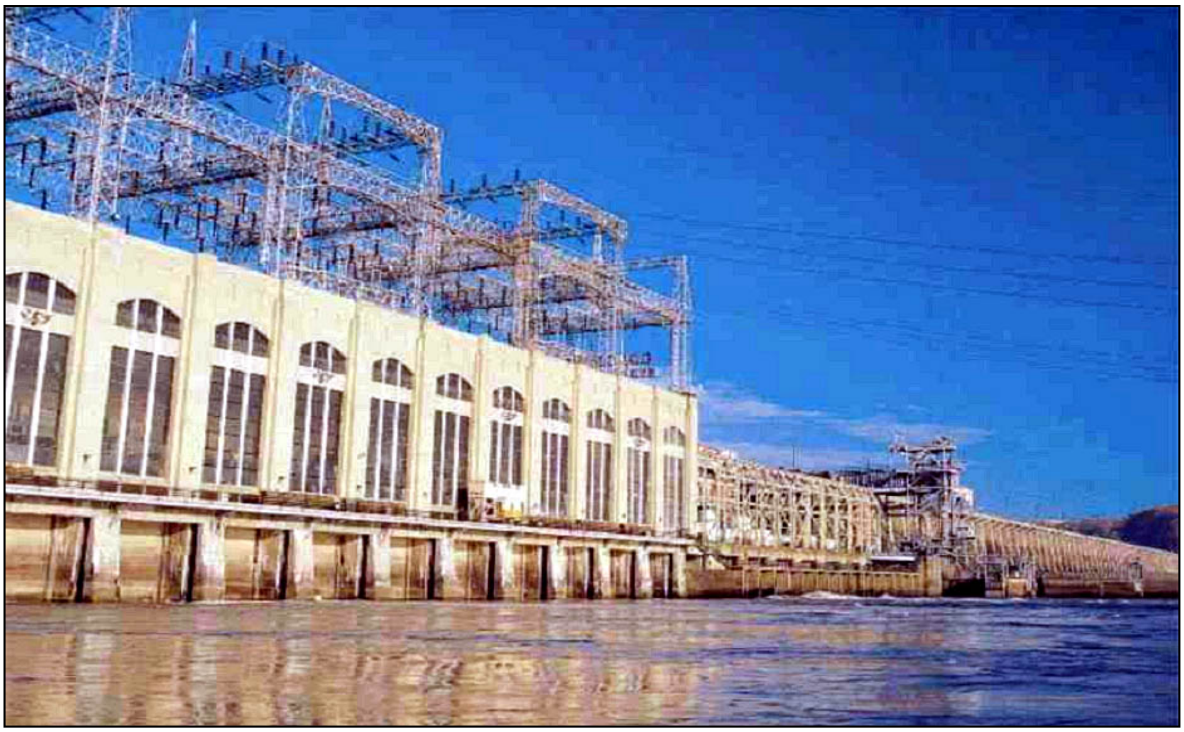
BEFORE THE FEDERAL ENERGY REGULATORY COMMISSION

APPLICATION FOR NEW LICENSE FOR MAJOR WATER POWER PROJECT-EXISTING DAM

CONOWINGO HYDROELECTRIC PROJECT
FERC PROJECT NUMBER 405



Exelon Generation

Volume 3 of 4

RECREATION MANAGEMENT PLAN
SHORELINE MANAGEMENT PLAN

SECURITY LEVEL: PUBLIC

August 2012

RECREATION PLAN

RSP 3.26

CONOWINGO HYDROELECTRIC PROJECT

FERC PROJECT NUMBER 405

Prepared for:

Prepared by:

TRC Companies, Inc.

Gomez and Sullivan Engineers, P.C.

August 2012

EXECUTIVE SUMMARY

The Conowingo Hydroelectric Project (Conowingo Project) Recreation Plan ensures the development of recreation resources at the Conowingo Project is consistent with area recreational needs. This Recreation Plan provides a comprehensive overview of public recreational use and needs for the Conowingo Project. Exelon Generation Company LLC (Exelon) manages the Conowingo Project shorelines and lands in compliance with the Federal Energy Regulatory Commission (FERC) license and serves the greater public interest by providing recreational access and facilities, protecting wildlife habitat, producing electricity, and preserving aesthetic resources.

Objectives of the Conowingo Project Recreation Plan are to:

- Inventory existing access and facilities.
- Estimate existing and potential recreational use of the Project.
- Assess the need for additional public recreational access, opportunities and facilities.
- Determine enhancements to existing facilities and any new facilities needed to meet recreational demand.
- Determine the cost associated with rehabilitation and development of the evaluated facilities and the mechanisms for implementing, constructing, operating, or maintaining any existing or proposed measures or facilities.
- Determine how the project can be integrated with existing or proposed regional recreation plans.
- Address public access, safety and recreation with respect to blocked and impeded access and fluctuating water levels.

In 2008, Exelon inventoried Project recreational facilities. This included facilities owned, constructed, and managed by Exelon, and facilities provided and managed by other entities on Project lands pursuant to existing leases and agreements with Exelon. The inventory was updated throughout the recreation study period. The infrastructure and condition of each site described in this report is as of November 2011.

In 2008-2009, Exelon undertook a study to determine recreation use occurring within the Project for the FERC Form 80 reporting requirement. While the Form 80 only requires a summary of use by general facility type and/or use (i.e., boat launch lanes, day use sites), Exelon conducted on-site data collection for one year at the various project recreational sites in order to have detailed use information for each recreational site and facility in preparation for the FERC relicensing of the Conowingo Project.

The Form 80 estimates the number of recreation days occurring on a Project-wide basis for a one year period. The Form 80 also provides data on facility capacity in broad terms by grouping similar recreational facilities (i.e., boat launch areas, marinas, parks, trails, picnic areas, etc.) for reporting purposes.

The most recent Form 80 for the Conowingo Project was completed in April 2009. Facility capacities ranged from 5% (canoe portage trail) to 40% (boat launches, marinas, parks, trails and picnic areas). No Project facility recreational use exceeded 40% of capacity.

Exelon also collected information on specific recreational user activities at each Project recreational facility in order to develop use estimates by activity for this recreation plan. Project recreation activity by site was estimated through 2050. Project-wide recreation demand, in terms of recreation days, is projected to increase by 34 percent from 375,152 in 2008 to 487,622 in 2050. Cold Cabin Boat Launch and Line Bridge Access capacities in 2050 are estimated to reach 140% and 133%, respectively, due to lack of formal parking or constrained parking availability. All other sites will still be underutilized.

Exelon proposes to provide new and enhanced recreational opportunities for the Conowingo Project. The need for the proposed improvements was developed by assessing the number, type and condition of the existing facilities, consultation with stakeholders and other interested parties, and conducting a recreational user preference survey during 2010-11. Exelon has developed concept plans, cost estimates, and a schedule for the completion of Project recreation enhancements. Specific Project improvements are provided in Table ES-1 and in Section 8.3 of this Plan.

Exelon will provide and maintain the existing and proposed Project recreation facilities for the term of the FERC license. Although Exelon is responsible for all construction, operation and maintenance of the Project recreation facilities, it expects to partner with agencies and vendors in providing, operating, and maintaining Project facilities.

Table ES-1- Proposed Recreation Enhancement Costs

Facility	Construction Cost (2014 dollars)	Annual O&M Cost (2014 dollars)
Lock 13 Fencing	$11,000	$500
Lock 13 Vegetation Removal	$19,000	
Total Lock 13	**$30,000**	**$500**
Lock 15 dock, parking, stabilization, restrooms	$60,000	$1,200
Total Lock 15	**$60,000**	**$1,200**
Muddy Creek Boat Launch enhancements	$72,000	$6,000
Total Muddy Creek	**$72,000**	**$6,000**
Cold Cabin boat ramp upgrade	$96,000	$500
Cold Cabin parking	$102,000	$500
Cold Cabin picnic area	$12,000	$1,500
Total Cold Cabin	**$210,000**	**$2,500**
Dorsey Park boat ramp upgrades	$265,000	$15,000
Dorsey Park restroom	$9,000	$3,000
Total Dorsey Park	**$274,000**	**$18,000**
Conowingo Creek stabilization	$41,000	$1,200
Conowingo Creek other	$15,000	$2,400
Total Conowingo Creek	**$56,000**	**$3,600**
Glen Cove Marina extra boat trailer parking	$154,000	$1,700
Glen Cove Marina Parking Improvements	$45,000	
Glen Cove Marina Wall Improvement	$21,000	
Total Glen Cove Marina	**$220,000**	**$1,700**
Funk’s Pond signage	$300	$500
Total Funk’s Pond	**$300**	**$500**
Conowingo Pool ADA	$127,000	$2,000

Facility	Construction Cost (2014 dollars)	Annual O&M Cost (2014 dollars)
Conowingo Wading Pool ADA	$46,000	$1,500
Total Conowingo Pool	**$173,000**	**$3,500**
Overlook pavilion	$142,000	$1,200
Overlook picnic area	$45,000	$1,200
Overlook fence and parking	$45,000	$600
Total Overlook	**$232,000**	**$3,000**
Fisherman's Park boat ramp and parking	$1,093,000	$2,400
Fisherman's Park widening	$101,000	$500
Total Fisherman's Park	**$1,194,000**	**$2,900**
Line Bridge Bank Stabilization	$9,000	$500
Total Line Bridge	**$9,000**	**$500**
Peach Bottom shore access	$20,000	$1,800
Total Peach Bottom Shore Access	**$20,000**	**$1,800**
TOTAL CONOWINGO	**$2,550,300**	**$45,700**

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

CFR – Code of Federal Regulations

CFS – cubic feet per second

EL – Elevation

FERC – Federal Energy Regulatory Commission

FPA – Federal Power Act

LSHG – Lower Susquehanna Heritage Greenway

MDNR – Maryland Department of Natural Resources

MW – Megawatt

NGVD – National Geodetic Vertical Datum

NOI – Notice of Intent

NPS – National Park Service

PAD – Pre-Application Document

PADCNR – Pennsylvania Department of Conservation and Natural Resources

PADEP – Pennsylvania Department of Environmental Protection

PBAPS – Peach Bottom Atomic Power Station

PFBC – Pennsylvania Fish and Boat Commission

PSP – Proposed Study Plan

RSP – Revised Study Plan

SOBA – States Organization for Boating Access

USDA – U. S. Department of Agriculture

USFWS – U.S. Fish & Wildlife Service

WMA – Wildlife Management Area

1.0 INTRODUCTION

FERC requires Exelon to develop a Recreation Plan that describes the use, design, and development of project recreational facilities and public access areas. To develop this recreation plan, Exelon conducted research, performed field investigations (including user counts and preference surveys), and consulted with resource agencies and interested members of the public to collect and review data, and address issues and concerns.

2.0 PURPOSE AND GOALS OF THE RECREATION PLAN

FERC is responsible for issuing licenses for the operation and maintenance of non-federal hydropower projects. Exelon, as the licensee for the Conowingo Project, is responsible for operating and maintaining the Project in accordance with license requirements. FERC regulations require the license application to address existing recreational land uses within the project boundary and adjacent lands and proposed recreation facilities. 18 C.F.R. 5.6(d)(3)(viii) and 5.18(b). A comprehensive recreation plan provides for long-term management of the Project recreational facilities and addresses the needs of a broad range of users.

Exelon manages the Conowingo Project to serve the public interest by generating renewable power while providing public recreational access, managing and controlling non-Project access and use of Project lands, and preserving important habitat within the Project boundary.

Objectives of the Conowingo Project Recreation Plan are to:

- Inventory existing access and facilities.
- Estimate existing and potential recreational use of the Project.
- Assess the need for additional public recreational access, opportunities and facilities.
- Determine enhancements to existing facilities and any new facilities needed to meet recreational demand.
- Determine the cost associated with rehabilitation and development of the evaluated facilities and mechanisms for implementing, constructing, operating, or maintaining any existing or proposed measures or facilities.
- Determine how the project can be integrated with existing or proposed regional recreation plans.
- Address public access, safety and recreation with respect to blocked and impeded access and fluctuating water levels.

This plan addresses the proposed Project boundary as shown on Figure 2.1.

Legend
Project Boundary

N

0 1,000 2,000 4,000 Feet

EXELON GENERATION COMPANY, LLC
RECREATION PLAN DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

Figure 2.1
Proposed Amended
Conowingo Project Boundary Plan

Path: X:\GISMaps\project_maps\study_plan\conowingo\Study_3.26\Proposed_Amended_Project_Boundary_Plan.mxd

Exelon.

N

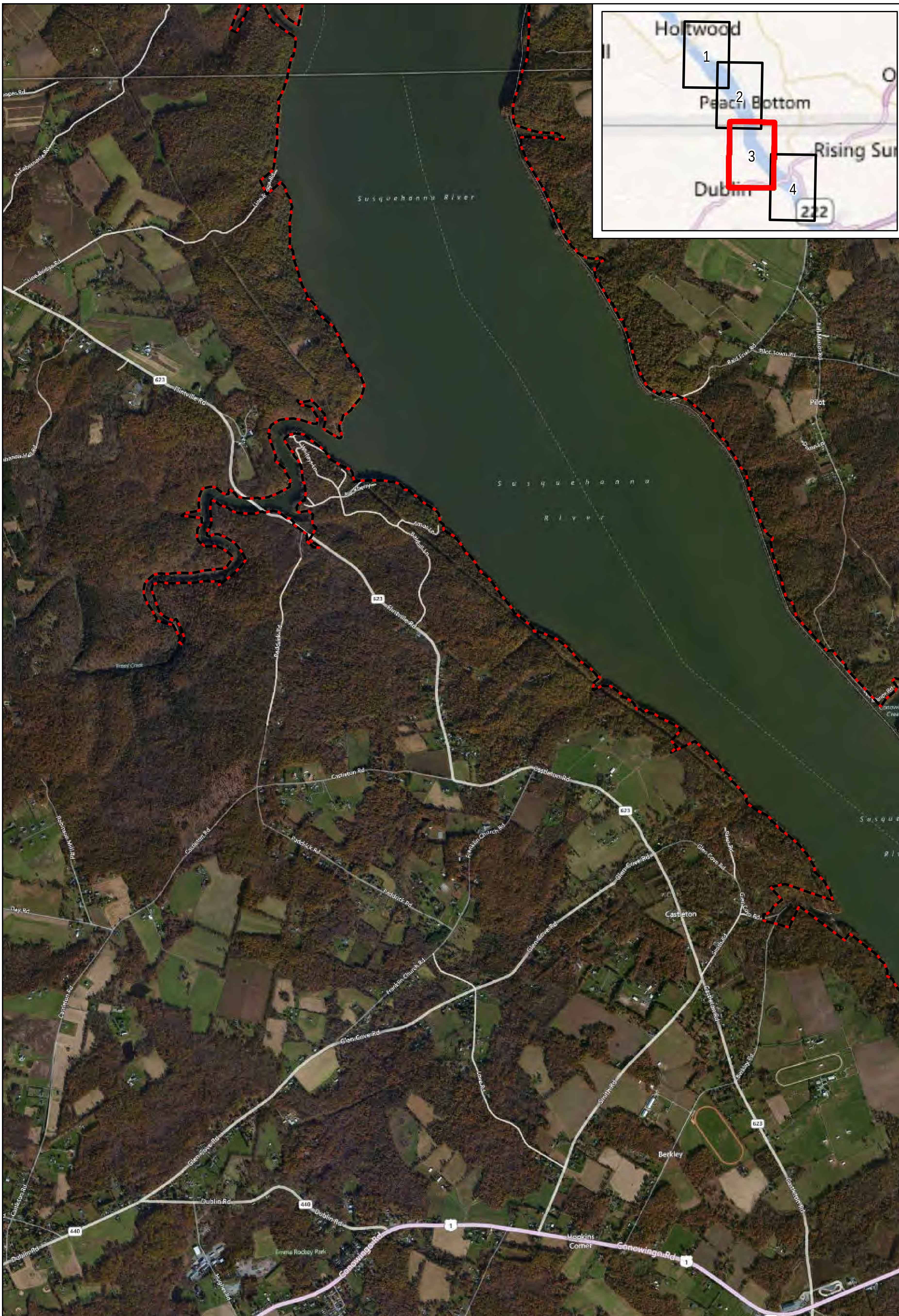
Legend
Project Boundary

EXELON GENERATION COMPANY, LLC
RECREATION PLAN DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

0 1,000 2,000 4,000 Feet

Figure 2.1
Proposed Amended
Conowingo Project Boundary Plan

Path: X:\GISMaps\project_maps\study_plan\conowingo\Study_3.26\Proposed_Amended_Project_Boundary_Plan.mxd



Legend
Project Boundary

N

0 1,000 2,000 4,000 Feet

EXELON GENERATION COMPANY, LLC
RECREATION PLAN DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

Figure 2.1
Proposed Amended
Conowingo Project Boundary Plan

Path: X:\GISMaps\project_maps\study_plan\conowingo\Study_3.26\Proposed_Amended_Project_Boundary_Plan.mxd

Legend

Project Boundary

N

0 1,000 2,000 4,000 Feet

EXELON GENERATION COMPANY, LLC

RECREATION PLAN DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

Figure 2.1
Proposed Amended
Conowingo Project Boundary Plan

Path: X:\GISMaps\project_maps\study_plan\conowingo\Study_3.26\Proposed_Amended_Project_Boundary_Plan.mxd

3.0 DESCRIPTION OF THE PROJECT

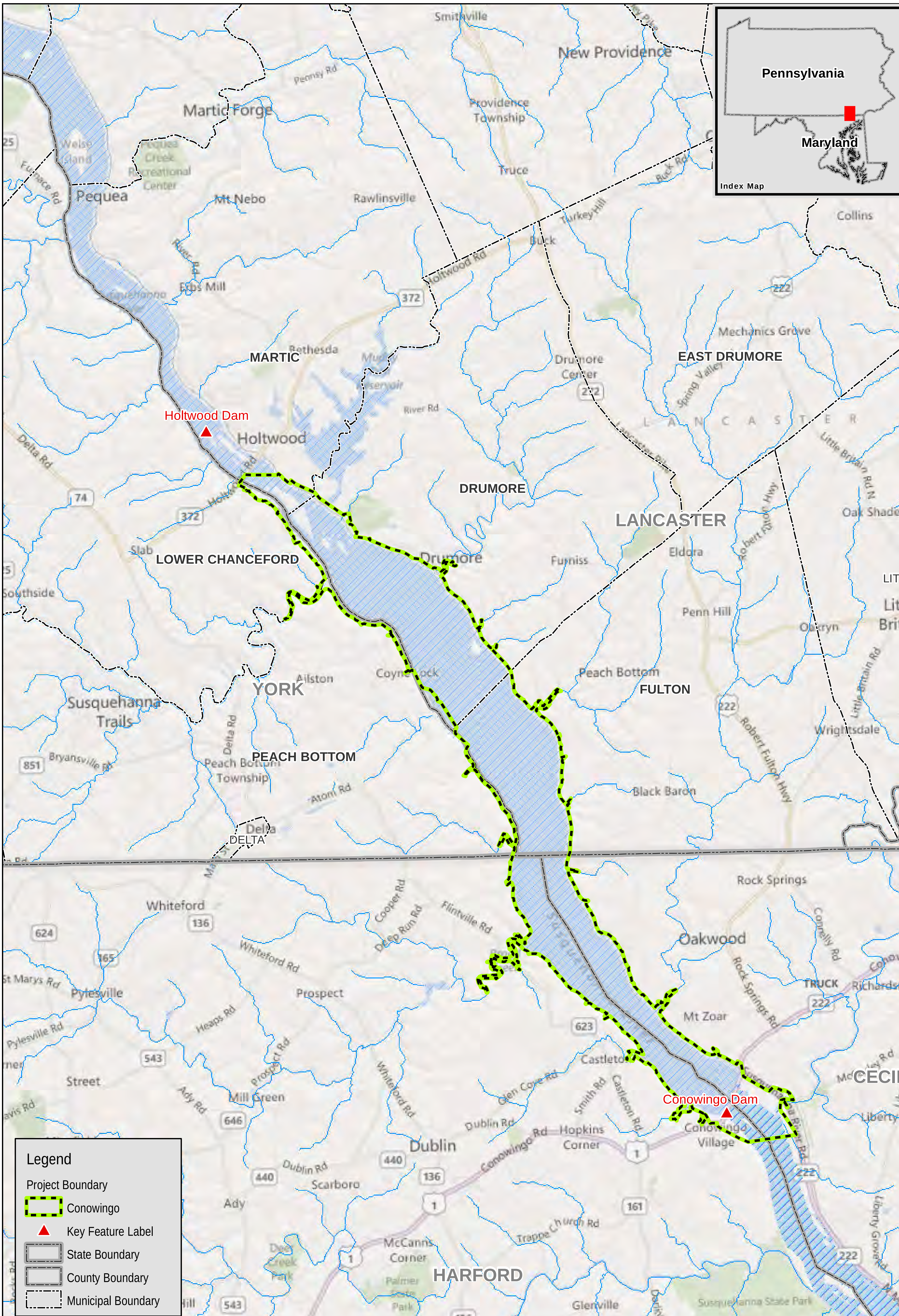
3.1 Project Location and Regional Setting

The Conowingo Project is located in a rural setting on the Susquehanna River in Pennsylvania (Lancaster and York counties) and Maryland (Cecil and Harford counties). Conowingo Dam and the lowermost 6 miles of the Project reservoir, Conowingo Pond, are located in Maryland and the upper 8 miles of the reservoir are located in Pennsylvania. The Project extends approximately 2.5 miles downstream of the dam along the east bank of the river and approximately 0.6 miles downstream along the west bank of the river (Figure 3.1).

Located at river mile 10, Conowingo Dam is the most downstream of the five hydroelectric projects located on the lower Susquehanna River. The upstream projects (York Haven, Safe Harbor, Holtwood, and Muddy Run) are located at river miles 56, 32, 24, and 22, respectively. Tidewater extends up the river to within approximately four miles of Conowingo Dam.

York and Lancaster counties have 434,972 and 519,445 residents, respectively, and population densities of 481 and 547 people per square mile, respectively. Cecil and Harford counties have 101,108 and 244,826 residents, respectively, and population densities of 290 and 556 people per square mile, respectively. The nearest metropolitan area within the Susquehanna River watershed is Lancaster, Pennsylvania, approximately 32 miles to the northeast, with a population of about 59,332 people. Major metropolitan areas within 60 miles of the Project include Baltimore, MD, Wilmington, DE, Lancaster, PA and Harrisburg, PA with populations of approximately 620,961, 72,826, 59,322 and 49,528 respectively (U.S. Census Bureau 2010).

While 75 percent of Lancaster County's population, 71 percent of York County's population, and 77 percent of the State of Pennsylvania's population are classified as living in urban areas, a full 100 percent of the residents of the five Pennsylvania townships (Martic, Drumore, Fulton, Lower Chanceford, Peach Bottom) adjacent to the Conowingo project are classified as living in rural areas. Fifty-two percent of the population of Cecil County resides in a rural area, much lower than neighboring Harford



EXELON GENERATION COMPANY, LLC

RECREATION PLAN DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

N

0 0.5 1 2 3 Miles

Exelon.

Figure 3.1
Project Location Map

Path: X:\GISMaps\project_maps\study_plan\conowingo\Study_3.26\Fig3_1_Project_Location_Map.mxd

County (78 percent) and the State of Maryland as a whole (86 percent). (city-data.com, 2009)

3.2 Existing Water Levels

The Conowingo Pond has a surface area of 8,850 acres at the normal high water elevation and varies in width from 0.5 to 1.3 miles. The Project includes 1,069 acres of land above the normal high water elevation and within the Project boundary.

The Conowingo Project license allows for the Conowingo Pond to normally fluctuate between elevation (El.) 100.5 feet and 109.5 feet (Conowingo Datum). The datum noted in the license is National Geodetic Vertical Datum (NGVD) 1929. The NGVD 1929 datum elevation is 0.7 feet higher than the Conowingo Datum. Therefore, the licensed permitted range of water level fluctuation in Conowingo Pond is El. 101.2 to 110.2 NGVD 1929. The Conowingo Pond is maintained at an elevation of 106.5 feet on weekends between Memorial Day and Labor Day to meet recreational needs.

The current flow regime below Conowingo Dam was formally established with the signing of a settlement agreement in 1989 between the Project owners and several federal and state resource agencies, and varies by time of year. The flow regime below Conowingo Dam is as follows:

March 1 – March 31: 3,500 cubic feet per second (cfs) or natural river flow[1], whichever is less

April 1 – April 30: 10,000 cfs or natural river flow, whichever is less

May 1 – May 31: 7,500 cfs or natural river flow, whichever is less

June 1 – September 14: 5,000 cfs or natural river flow, whichever is less

September 15 – November 30: 3,500 cfs or natural river flow, whichever is less

[1] As measured at the Susquehanna River at Marietta USGS gage (No. 0157600)

December 1 – February 28: 3,500 cfs intermittent (maximum six hours off followed by equal amount on)

3.3 Existing Shoreline and Land Use

The Conowingo Project has 9,919 acres of land within the Project boundary: 8,850 acres of flowed land and 1,069 acres above the normal high water elevation. These lands are located in Lancaster and York counties in Pennsylvania and Harford and Cecil counties in Maryland. The land surrounding the Project is largely composed of steep wooded slopes, agriculture fields, forested lands and some seasonal residences along the shore of the Project. Overall land use in the subbasin includes agricultural, forest and rural uses. Some of the most productive agricultural lands are located in the Lower Susquehanna subbasin.

There are approximately 46 miles of shoreline within the Project boundary: 43 miles associated with Conowingo Pond and three miles associated with the area downstream of Conowingo Dam. Lands within the Project boundary exhibit a variety of land uses, including, but not limited to: Project operations, public access, recreational use, and wildlife habitat (portions of which are subject to protection and conservation of rare, unique and special features and biota).

4.0 FERC REQUIREMENTS

FERC regulations generally require licensees to provide public access and recreational opportunities on Project lands consistent with area recreational needs. Exelon has developed and maintains several designated recreational sites and facilities within the Project boundary for public recreation including trails, day use sites, boat launches, a swimming pool, and shoreline fishing access. Exelon has also partnered with several state, county, municipal and non-profit agencies to provide recreational facilities on Project lands.

4.1 Recreational Development at Licensed Projects

Pursuant to 18 CFR, Chapter 1, Subchapter A, Part 2, Section 2.7, FERC expects the licensee to assume the following responsibilities:

1. To develop suitable public recreational facilities on project lands and waters and make provisions for adequate public access to such facilities and waters and to include consideration of the needs of persons with disabilities in the design and construction of such project facilities and access.

   Existing public recreational facilities and access to Project lands and waters are described in Section 5.1. Estimated current recreational use within the Project and projected recreational use are provided in Sections 6.3 and 7.0, respectively. Proposed enhancements to existing facilities and new facilities are described in Section 8.3.

2. To encourage and cooperate with appropriate local, state, and federal agencies and other interested entities in the determination of public recreation needs and to cooperate in the preparation of plans to meet these needs.

   Exelon developed study plans based on stakeholder input, conducted on-site recreational user surveys, and consulted with agencies and interested parties in developing this plan.

3. To encourage governmental agencies and private interests, such as operators of user-fee facilities, to assist in carrying out plans for recreation, including operation and adequate maintenance of recreational areas and facilities.

   Exelon partners with several state, county, and municipal agencies, non-profits, and commercial vendors to provide recreational opportunities and facilities within the Project boundary. Exelon proposes to continue with these arrangements.

4. To cooperate with local, state and federal government agencies in planning, providing, operating, and maintaining facilities for recreational use of public lands administered by those agencies adjacent to the project area.

   Susquehannock State Park and Conowingo Community Park are adjacent to the Project boundary. Exelon leases Conowingo Project lands for inclusion in the state park to Pennsylvania Department of Conservation and Natural Resources (PADCNR). Conowingo Community Park is located on non-project land leased by Exelon to Cecil County. Exelon proposes to continue with the lease agreement.

5. To ensure public access and recreational use of project lands and waters without regard to race, color, sex, religious creed or national origin.

   Portions of Project lands are not available to the public for safety and security reasons; however, other Project lands and facilities are open to the public regardless of race, color, sex, religious creed or national origin. Exelon will provide and maintain FERC Part 8 signs at each Project recreational facility and access points noting this requirement.

6. To inform the public of the opportunities for recreation at licensed projects, as well as rules governing accessibility and use of recreational facilities.

   Exelon provides directional signage along area public roads to the Project recreation facilities.

4.2 FERC License Application Requirements

Pursuant to 18 CFR 5.6(d)(3)(viii) and 5.18(b), the license application must discuss existing and proposed recreational facilities and opportunities at the project. This Recreation Plan provides the following detailed analysis:

1. A description of existing recreational facilities at the project (see Section 5.1).

2. An estimate of existing and potential recreational use of the project area in daytime visits (see Sections 6.3 and 7.0).

3. A description of measures or facilities recommended by agencies consulted for the purpose of creating, preserving, or enhancing recreational opportunities at the project and in its vicinity (see Section 8.1).

4. A statement of the existing measures and facilities to be continued or maintained and new measures or facilities proposed for the purpose of creating, preserving, or enhancing recreational opportunities at the project and in its vicinity, and for the purpose of ensuring the safety of the public in its use of project lands and waters,

including an explanation of why any measure or facilities recommended by an agency was rejected (see Section 8.5).

5. Identification of the entities responsible for implementing, constructing, operating, or maintaining any existing or proposed measures or facilities (see Section 9.0).

6. A schedule showing the intervals following issuance of a license at which implementation of the measure or construction of facilities would be commenced and completed (see Section 8.4).

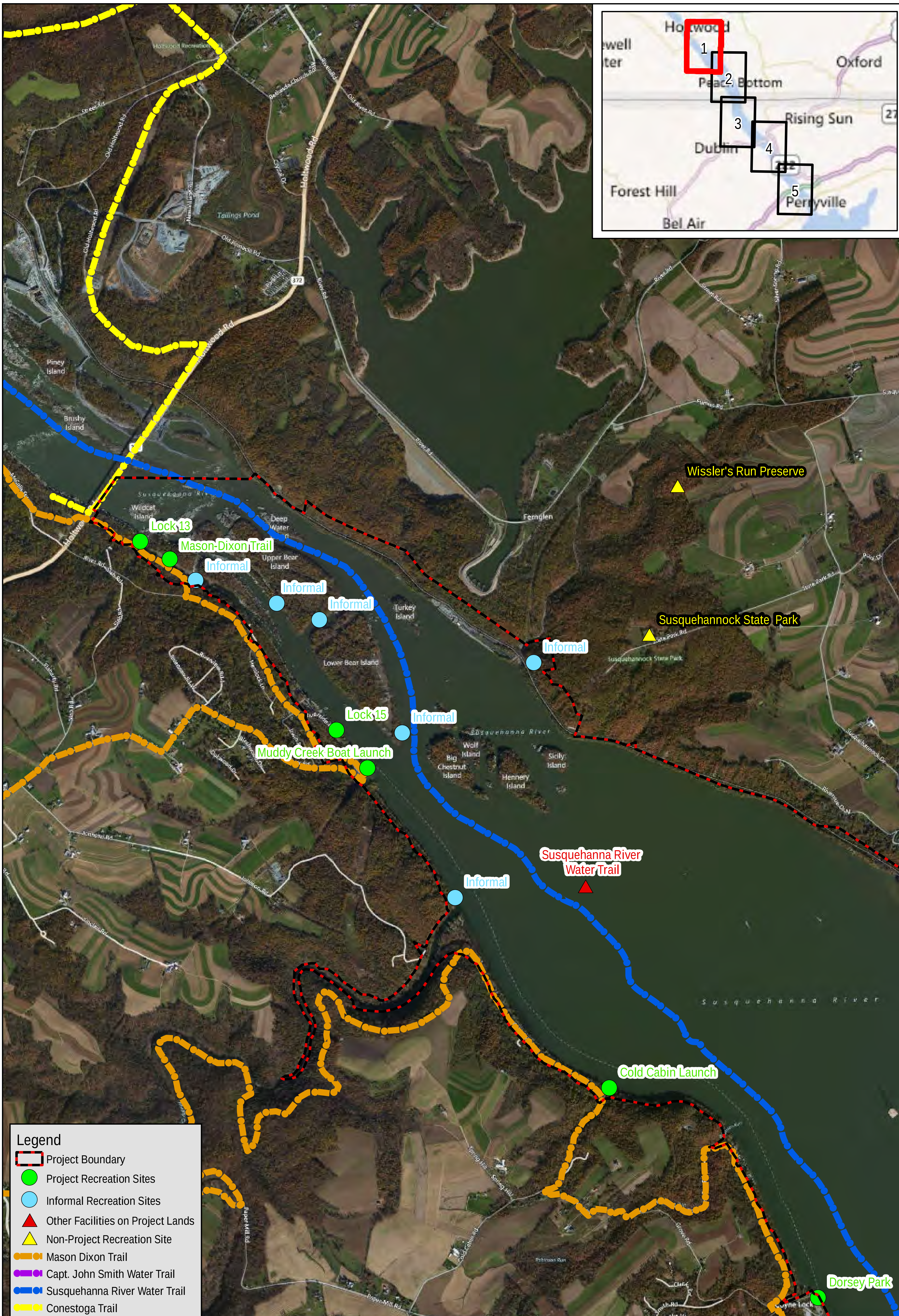
7. An estimate of the costs of construction, operation, and maintenance of any proposed facilities (see Section 8.4).

5.0 EXISTING PUBLIC RECREATION AND ACCESS

To accommodate uses of the Project and Exelon property by the general public, Exelon operates and maintains several recreational sites open to the public, including trails, day use sites, boat launch facilities, a swimming pool and shoreline fishing opportunities.

Exelon has also partnered with several federal, state, and local agencies for the development and/or management of additional recreational facilities on Project lands. These facilities allow visitors to the Conowingo Project area the opportunity to participate in a variety of recreation activities. Several informal recreation sites also exist within the Project boundary. Use of these sites is primarily by local residents.

The following sections provide a description of each formal public recreational facility and access site that is currently available within the Project boundary. These sites are shown on Figure 5.1.



Exelon

N

EXELON GENERATION COMPANY, LLC

SHORELINE MANAGEMENT PLAN DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

0 1,000 2,000 4,000 Feet

Figure 5.1
Existing Project and Other Area
Recreation Facilities/Sites
Sheet 1 of 5

Path: X:\GISMaps\project_maps\study_plan\conowingo\Study_3.26\Fig5_1_Existing_Rec_Facilities.mxd

Exelon.

N

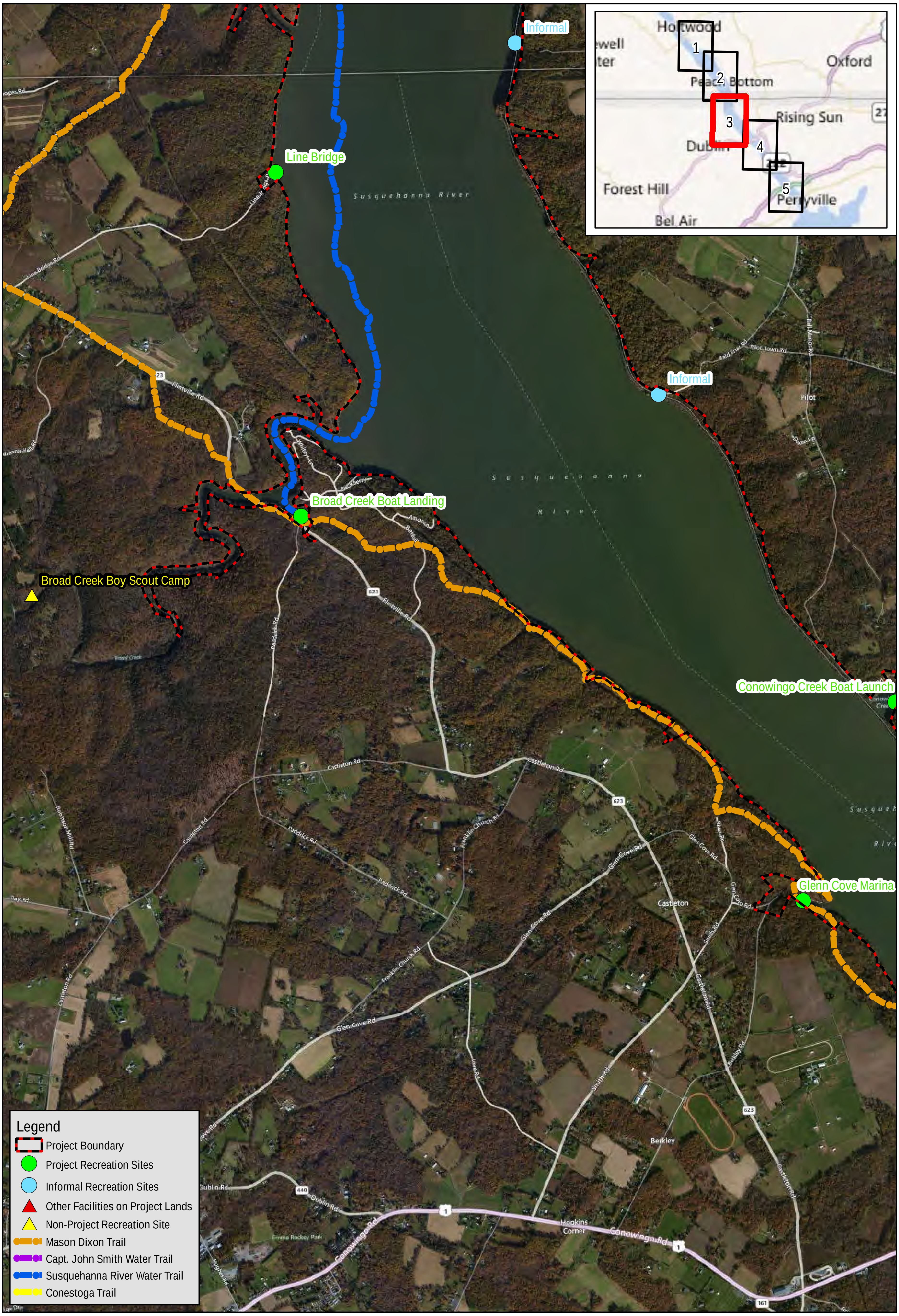
EXELON GENERATION COMPANY, LLC

SHORELINE MANAGEMENT PLAN DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

0 1,000 2,000 4,000 Feet

Figure 5.1
Existing Project and Other Area Recreation Facilities/Sites
Sheet 2 of 5

Path: X:\GISMaps\project_maps\study_plan\conowingo\Study_3.26\Fig5_1_Existing_Rec_Facilities.mxd



EXELON GENERATION COMPANY, LLC

SHORELINE MANAGEMENT PLAN DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

0 1,000 2,000 4,000 Feet

Figure 5.1
Existing Project and Other Area Recreation Facilities/Sites
Sheet 3 of 5

Exelon

N

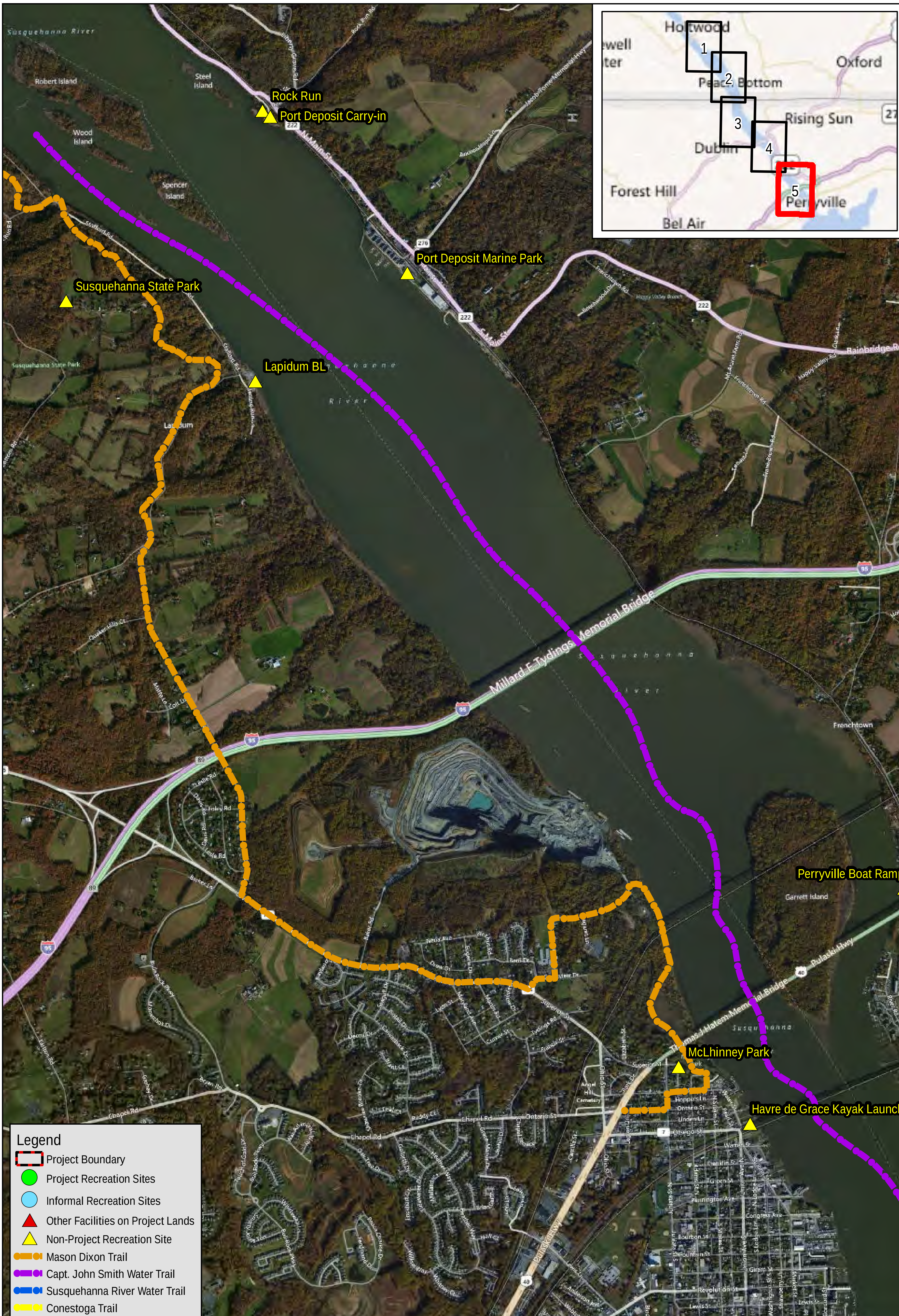
EXELON GENERATION COMPANY, LLC

SHORELINE MANAGEMENT PLAN DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

0 1,000 2,000 4,000 Feet

Figure 5.1
Existing Project and Other Area
Recreation Facilities/Sites
Sheet 4 of 5

Path: X:\GISMaps\project_maps\study_plan\conowingo\Study_3.26\Fig5_1_Existing_Rec_Facilities.mxd



Exelon.

N

EXELON GENERATION COMPANY, LLC

SHORELINE MANAGEMENT PLAN DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

0 1,000 2,000 4,000 Feet

Figure 5.1
Existing Project and Other Area Recreation Facilities/Sites
Sheet 5 of 5

Path: X:\GISMaps\project_maps\study_plan\conowingo\Study_3.26\Fig5_1_Existing_Rec_Facilities.mxd

5.1 Conowingo Pond Project Recreation Facilities

5.1.1 Lock 13 – York County, Pennsylvania

The facility is located at the site of the Susquehanna and Tidewater Canal Lock 13. The facility is maintained in a primitive state with no public amenities or interpretive improvements. Lock 13 is owned and managed by Exelon, but is accessed from the PPL Holtwood LLC Lock 12 parking lot (Holtwood Project, FERC No. 1881) via the Mason-Dixon Trail. Recreation opportunities at Lock 13 include the Mason-Dixon trail and shoreline fishing. The remains of the historical lock structure are shown in Figure 5.1.1-1.

Figure 5.1.1-1: Lock 13

5.1.2 Lock 15 - York County, Pennsylvania

Lock 15 is owned and operated by Exelon as a day use and interpretive area. The site has a 36 space gravel parking lot and portable restrooms, and offers picnicking and shoreline fishing opportunities. There are interpretive signs on-site that describe the Susquehanna and Tidewater Canal system, how the lock worked, and the history of the site. A pathway connects the picnic area with the Muddy Creek Boat Launch immediately downstream. The Mason-Dixon Trail runs through the site and connects Lock 15 with Lock 13 to the north and Muddy Creek Boat Launch to the south. This site is open to the public from dawn to dusk from March to November. Figure 5.1.2-1 shows Lock 15.

Figure 5.1.2-1: Lock 15

5.1.3 Muddy Creek Boat Launch – York County, Pennsylvania

Muddy Creek Boat Launch is owned by Exelon. Pennsylvania Fish and Boat Commission (PFBC) developed the site and currently leases and operates the site. The facility provides shoreline fishing access, a 20 foot wide hard surface ramp, courtesy docks, and portable toilets. The site is serviced by a paved parking lot (44 boat trailer spaces and 26 vehicle spaces) and used by both power boaters and car top boaters. A pathway (Mason-Dixon Trail) connects the site to the Lock 15 interpretive area. Figure 5.1.3-1 shows the boat launch and docks.

Figure 5.1.3-1: Muddy Creek Boat Launch

5.1.4 Cold Cabin – York County, Pennsylvania

Cold Cabin Boat Launch is owned by Exelon and managed by Peach Bottom Township, which developed the recreation facilities. Amenities include a 12' wide hard surface boat launch, informal parking for approximately 5 vehicles, and a small picnic area. The Mason-Dixon Trail extends past this site. The site is open from dawn to dusk. Figure 5.1.4-1 shows the boat launch.

Figure 5.1.4-1: Cold Cabin Boat Launch

5.1.5 Dorsey Park Boat Launch – York County, Pennsylvania

The Dorsey Park Boat Launch is located just upstream of the Peach Bottom Atomic Power Station (PBAPS). Though the majority of the site is located outside of the Project boundary, the boat ramps extend into and provide access to Project waters. The site, which is owned and operated by Exelon, includes boat launching, shoreline fishing, and picnicking opportunities with several tables and grills. Amenities include two 32’ wide boat ramps, courtesy docks, a paved parking lot (25 boat trailer spaces and 30 vehicle spaces), portable toilets, picnic tables, and grills. This site is closed at dusk. Figure 5.1.5-1 shows the northern most boat ramp and dock.

Figure 5.1.5-1: Boat Ramp and Dock

5.1.6 Peach Bottom Marina – Lancaster County, Pennsylvania

Peach Bottom Marina is owned by Exelon and operated by a commercial contractor. The marina offers boat launching, shoreline fishing, and picnicking opportunities. The facility amenities include a 25' wide boat hard surface ramp, a paved parking area (17 boat trailer spaces and 33 vehicle spaces), boater courtesy docks, tie-up rental space, boat storage, repair shop, portable toilet, fueling facilities, and picnic tables. There is a launch fee charged to use the ramp. The marina is located on Peters Creek, a tributary on the east side of Conowingo Pond. The Norfolk Southern rail line extends along the entire east shore of the pond and access to/from the marina requires boating under the train trestle spanning Peters Creek. Figure 5.1.6-1 shows the docks, launch and repair and storage building.

Figure 5.1.6-1: Peach Bottom Marina

5.1.7 Line Bridge Access – Harford County, Maryland

The Line Bridge Access site is owned by Exelon and managed and maintained by Harford County under an agreement with Exelon. The property provides shoreline access, a three car parking area, and an unimproved carry-in boat access area. Figure 5.1.7-1 shows unimproved carry-in boat access.

Figure 5.1.7-1: Line Bridge Access

5.1.8 Broad Creek Public Landing – Harford County, Maryland

The Broad Creek Public Landing is owned by Exelon and managed and maintained by Harford County under agreement with Exelon. The facility provides a hard surface boat launch, small dock, shoreline fishing opportunities, and limited (4 vehicle) on-site parking. A 33 space boat trailer off-site parking lot has been provided by Exelon on Paddrick Road due to the steep terrain and limited parking available at the boat launch site. The Mason-Dixon Trail extends through this site. The site is open from dawn to dusk. Figure 5.1.8-1 shows the boat launch, dock and shoreline area.

Harford County proposes to redevelop this site and relocate and construct a new ramp and dock and replace the retaining wall. The redevelopment of this site may occur in 2012.

Figure 5.1.8-1: Broad Creek Public Landing

5.1.9 Conowingo Creek Boat Launch – Cecil County, Maryland

The Conowingo Creek Boat Launch is owned and operated by Exelon. The facility offers an 80 foot wide hard surface boat ramp, two parking areas (one for 9 boat trailers and one for 10 vehicles), a small picnic area and shoreline fishing opportunities. The site is open one hour before dawn until one hour after dusk. The facility is located on Conowingo Creek, a tributary on the east side of Conowingo Pond. The Norfolk Southern rail line extends along the entire east shore of the pond and access to/from the ramp requires passing under the train trestle spanning Conowingo Creek. Figure 5.1.9-1 shows the boat launch and associated parking.

Figure 5.1.9-1: Conowingo Creek Boat Launch

5.1.10 Glen Cove Marina – Harford County, Maryland

The Glen Cove Marina is owned by Exelon and operated by a commercial contractor. Recreation opportunities available at the facility include boat launching and picnicking. Facility amenities include a hard surface boat ramp, boat slips, portable toilets, fueling facilities, picnic tables, and parking for 16 boat trailers and 20 vehicles. There is a launch fee charged to use the ramp. The operator also provides repair services and a small on-site store. This facility also serves as the take-out for the Conowingo Dam canoe portage, and the Mason-Dixon Trail runs through the site. Figure 5.1.10-1 shows the slips and boat launch and Figure 5.1.10-2 shows the parking lot for the marina. Docks to the boat slips were replaced in 2011 and other recent improvements include new bathroom facilities, upgraded picnic sites and a new fuel containment facility.

Figure 5.1.10-1: Glen Cove Marina Launch and Slips

Figure 5.1.10-2: Glen Cove Marina Parking Lot

5.1.11 Funk's Pond – Cecil County, Maryland

Funk's Pond is a small inlet separated from Conowingo Pond by the Norfolk Southern rail line. The "pond" is within the Project boundary and accessed from a 24 vehicle parking lot and trail on adjacent non-Project land. The site is owned and operated by Exelon. The site provides a non-motorized trail (0.45 miles trail), picnicking and shoreline fishing opportunities. Figure 5.1.11-1 shows trail to Funk's Pond. Improvements to the parking area and picnic site were completed in 2011.

Figure 5.1.11-1: Funk's Pond Trail

5.1.12 Conowingo Swimming Pool and Visitors Center – Harford County, Maryland

The Conowingo Swimming Pool complex and Visitors Center are located just upstream of Conowingo Dam on Route 1. The Conowingo Swimming Pool complex is owned by Exelon and operated by a commercial contractor. This facility includes a swimming pool, wading pool, playground area, picnic area, concession stand, and changing/restrooms. The pool is open 11:00 a.m. to 7:00 p.m. from May to September and users are charged an entrance fee. Figure 5.1.12-1 shows the pool concession stand and changing rooms.

The Visitors Center contains informational displays and brochures, restrooms, conference rooms, and office space for the Lower Susquehanna Heritage Greenway (LSHG). The center is owned, operated and staffed by Exelon. A small picnic area is also provided. A 213 paved parking lot is shared by these two facilities. The Mason-Dixon Trail extends through the site. Figure 5.1.12-2 shows the common parking lot and Figure 5.1.12-3 shows the Visitors Center. The Visitors Center was renovated in 2010.

Figure 5.1.12-1: Conowingo Pool

Figure 5.1.12-2: Pool and Visitor Center Parking Area

Figure 5.1.12-3: Visitors Center

5.2 Downstream Project Recreation Facilities

5.2.1 Fisherman's Park – Harford County, Maryland

Fisherman's Park is located on the western shore of the Susquehanna River immediately downstream of the Conowingo Dam and powerhouse. Fisherman's Park is owned and operated by Exelon and is a popular fishing and bird watching area. Amenities at the park include shoreline and platform fishing, a carry-in boat launch (Shure's Landing), observation areas, portable toilets, picnic areas, and scenic views. This area also serves as a trailhead for the Lower Susquehana Heritage Greenway (LSHG) Trail to Deer Creek and a wildflower viewing area. There is a 124 space paved vehicle parking lot, a 14 space paved boat trailer parking lot and a 12 vehicle gravel parking lot associated with this site. A new ADA accessible fishing platform and overlook has been completed, picnic areas have been improved, the trailhead parking area for LSHG was resurfaced, and the picnic pavilion has been renovated.

The Mason-Dixon Trail passes through the lower part of the parking lot. The park is open one hour before sunrise to one hour after sunset. Figure 5.2.1-1 shows the new fishing platform. Figure 5.2.1-2 shows the carry-in boat launch at Shure's Landing.

Figure 5.2.1-1: Fishing Platform

Figure 5.2.1-2: Carry-in Boat Launch (Shure's Landing)

5.2.2 Octoraro Creek Access Trail – Cecil County, Maryland

The Octoraro Creek Access site is located on the southern shore of Octoraro Creek. The area includes a 12 car gravel parking lot, public safety signage, a public information kiosk, and shoreline access trail along Octoraro Creek to its confluence with the Susquehanna River. The trail has recently been resurfaced. The area offers shoreline fishing opportunities for both Octoraro Creek and the eastern shore of the Susquehanna River. Exelon owns and manages the site.

Figure 5.2.2-1 shows the trailhead near the parking lot. This site is adjacent to the Conowingo Community Park, a non-Project facility on Exelon property leased to and maintained by Cecil County.

Figure 5.2.2-1: Octoraro Creek Trailhead

5.3 Other Formal Recreational Facilities in the Project Vicinity

In the Lower Susquehanna River region, numerous other public recreational sites/facilities and opportunities are provided and managed by various entities. Some of these sites are located adjacent to the Project boundary, and most provide the opportunity to access to Project lands and waters from upstream or downstream of the Project.

5.3.1 Holtwood Hydroelectric Project (FERC No. 1881) Facilities

PPL Corporation provides several facilities and opportunities associated with the Holtwood Project immediately upstream from Conowingo Pond. They include campgrounds, boat launches, picnic areas, interpretive sites, trails, sports fields, overlooks, natural areas, wildflower preserve.

5.3.2 Muddy Run Pumped Storage Project (FERC No. 2355) Facilities

Exelon provides a variety of formal recreational facilities and access sites associated with the Muddy Run Project. These facilities and sites are described in detail in the Muddy Run Project Recreation Plan. Muddy Run facilities in proximity to the Conowingo Project include Wissler Park, Muddy Run Wildlife Management Area, and Muddy Run Park.

5.3.3 Mason-Dixon Trail – York County, Pennsylvania

The 193 mile long Mason Dixon Trail connects the Appalachian Trail in Cumberland County, Pa. with the Brandywine Trail at Chadds Ford, Pa. The trail in the Project area roughly parallels the west shore of the Susquehanna River between the Holtwood Project to the north and Havre de Grace in the south.

While most of the trail is outside the Conowingo Project boundary, portions of it are located on the Licensee’s Project (approximately 3.5 miles) and non-project (approximately 14.25 miles) lands. The trail passes through several of the Project recreation sites (Locks 13 and 15, Muddy Creek, Cold Cabin, Broad Creek, Glen Cove, Swimming Pool/Visitors Center, and Fisherman’s Park). There is one informal campsite associated with the trail near Hopkins Cove. The trail is maintained and managed by Mason-Dixon Trail System, Inc. under a license agreement with the Exelon.

5.3.4 Susquehanna River Water Trail

The Lower Section of the Susquehanna River Water Trail extends from Harrisburg, PA, to the Broad Creek Public Landing just below the PA/MD state line (approximately 53 miles) and is part of the Chesapeake Bay Gateways and Watertrails Network, and is also a designated National Recreation Trail.

5.3.5 Susquehannock State Park – Lancaster County, Pennsylvania

The park is located on the east shore of Conowingo Pond adjacent to both the Muddy Run Project and the Conowingo Project. The park is owned and managed by PADCNR and contains approximately 224 acres. An additional 4 acres of Conowingo Project land are leased to the PADCNR by the Exelon. Improvements and facilities at the park include picnic areas, pavilions, playground, ball fields, walking and equestrian trails, an organized group tent site, and overlook areas with a view of the Conowingo impoundment and Muddy Run powerhouse. The Landis House, a historic building from 1850, is also located within the park.

5.3.6 Ferncliff Wildflower and Wildlife Preserve – Lancaster County, Pennsylvania

Ferncliff Wildflower and Wildlife Preserve is a designated National Park Service (NPS) National Natural Landmark. The preserve is a scenic wooded ravine that is a favorite spot for bald eagles that nest nearby. There is a hiking trail (0.62 miles) located on the 65-acre site.

5.3.7 Broad Creek Memorial Boy Scout Camp – Harford County, Maryland

The Broad Creek Memorial Scout Reservation has 1,688-acres that is owned and maintained by the Boy Scout of America, Baltimore Area Council. In addition to the facilities specifically for the Boy Scouts (camp buildings, swimming pool, boating facilities, etc.) there is over 26 miles of hiking trails on Scout and Exelon property, some of which are accessible to the public.

5.3.8 Conowingo Community Park

The Conowingo Community Park is a 32-acre park adjacent to the Octoraro Creek Access. This site offers a multi-purpose field, parking lot and portable restrooms. The site is owned by Exelon and leased to Cecil County. Cecil County plans to expand the facilities at the site to include additional athletic fields and game courts.

5.3.9 Conestoga Trail

Maintained by the Lancaster Hiking Club, this 61 mile trail extends through Lancaster County to Lock 12 in York County just north of the Norman Wood Bridge (Route 372) where it joins the Mason-Dixon Trail System. The trail intersects the north side of Route 372 near the Muddy Run Project Wildlife Management Area (WMA).

5.3.10 Wissler Run Nature Preserve

Owned and managed by the Lancaster County Conservancy, the preserve is an 18 acre nature preserve encompassing a ravine that abuts Susquehannock State Park and the Muddy Run Project. This property provides habitat for a variety of flora and fauna and hiking opportunities.

5.3.11 Susquehanna State Park – Harford County, Maryland

Susquehanna State Park is a 2,600 acre park located on the western shore of the Susquehanna River below the Conowingo Dam. The park offers a variety of recreation opportunities including: fishing, camping, picnicking, boating, hunting, mountain biking, and horseback riding. The campground has a total of 69 sites, which include sites for trailers and cabins. The park has picnic tables, grills, shelters, restrooms, Rock Run Historic Area, Steppingstone Museum, and trails (hiking, biking and horseback riding).

5.3.12 Rock Run

Rock Run is a former commercial marina site on the east shore of the river approximately 4.4 miles downstream of Conowingo Dam owned by Exelon and previously leased to a commercial vendor. The site also had seven leased cottages and several camper trailer sites along the shore line. The lease was terminated and all buildings and camper units removed and the site graded, seeded and stabilized. Two small hard surface ramps and a small dock associated with the marina remain in place, and the site is open for public use and access, though boat access is limited to small trailered and hand carry watercraft.

5.3.13 Port Deposit Carry-in

This unimproved carry-in site is approximately 4.8 miles downstream of Conowingo Dam on the north end of town. Access is off North Main Street via a small side street crossing under the Norfolk Southern rail corridor to an unimproved shoreline access point on the river.

5.3.14 Port Deposit Marine Park

Located approximately 5.7 miles below Conowingo Dam, this town facility extends approximately 1,200 feet along the shoreline. Site amenities include a 20' wide hard surface boat ramp, docks, and a paved parking area for 13 vehicles. In addition, there are three additional hard surface boat ramps and several concrete bulkheads in various conditions and picnic tables along the shoreline. Informal parking occurs in other areas at this site. The site is available to town residents at no charge; others must obtain a permit to park and launch. The park is closed at dark.

5.3.15 City of Havre de Grace Kayak Launch

Located approximately 8.6 miles downstream of Conowingo Dam, this facility is a joint project with the City and MDNR. The site is upstream and adjacent to the CSX Transportation bridge over the Susquehanna River. The facility includes a paved parking lot for 15 vehicles, a hard surface ramp, two docks, picnic tables, and a porta potty. The site is posted for kayak launching only and a launch fee is charged. The site is open from 6:00 a.m. to 10 p.m. The site is adjacent to the Jean Roberts Memorial Park, a small open green space with river frontage.

5.3.16 City of Havre de Grace City Yacht Basin

The City Yacht Basin is located on the Chesapeake Bay just beyond the mouth of the Susquehanna River approximately 10.2 miles downstream of Conowingo Dam. The facility includes a paved parking lot for 214 vehicles, boat slips, and a hard surface ramp.

A launch fee is assessed at this site. The facility is open from 6:00 a.m. to 10:00 p.m. The City Yacht Basin abuts the Millard Tydings Memorial Park, which provides a playground, picnic area, and gazebo.

5.3.17 Town of Perryville Boat Ramp

This site is located approximately 8.5 downstream of Conowingo Dam and just upstream of the Route 40 bridge crossing in Perryville. The site includes a hard surface boat ramp, dock and paved parking lot for 23 vehicles. The ramp is open from 4:00 a.m. to 11:00 p.m., and a launch fee is charged to use the ramp.

5.3.18 Perryville Community Park

Perryville Community Park is located on Chesapeake Bay near the mouth of the Susquehanna River. The park is situated on 44 acres and provides a variety of recreation facilities, including a carry-in launch area. A paved 17 space parking area is located near the carry-in. The park is open from 7:30 a.m. to sunset. The carry-in is approximately 12 miles downstream of Conowingo Dam.

5.3.19 Captain John Smith Chesapeake National Historic Water Trail

As the first national water trail, the Captain John Smith Chesapeake National Historic Trail follows the historic routes of Smith's travels based on his map and journals. It encompasses Smith's two main voyages on the Chesapeake Bay in 1608 and also his excursions on the York, James, and other rivers between 1607 and 1609. The trail includes approximately 3,000 miles in parts of present-day Virginia, Maryland, Delaware, and the District of Columbia.

5.3.20 Lower Susquehanna Heritage Greenway Trail – Harford County, Maryland

An improved section of the LSHG trail extends from Fisherman's Park/Shures Landing along the bank of the Susquehanna River approximately two miles to Stafford Road at Deer Creek. The Mason Dixon Trail is collocated with the LSHG along this segment of the trail. The trail forks near Deer Creek and a more primitive trail continues downstream for approximately one mile to the confluence of Deer Creek and the Susquehanna River. Improvements along the trail include benches, tables, interpretive displays, and a boardwalk. The site is owned by Exelon and the managed by the MDNR under a lease agreement with Exelon.

5.3.21 Deer Creek Access – Harford County, Maryland

This site is located approximately four miles downstream of Conowingo Dam and provides shoreline access for fishing and carry-in boating, and a trailhead for the lower portion of the LSHG. Parking is provided on either side of the Stafford Road with two gravel parking areas that can accommodate approximately 24 vehicles. The property is owned by Exelon and leased to the MDNR, which manages it as part of the Susquehanna State Park.

5.3.22 Lapidum Boat Launch – Harford County, Maryland

Located approximately 5 miles downstream of Conowingo Dam, this launch site consists of two hard surface boat ramps, a pier, a paved parking area (35 boat trailer spaces and 25 vehicle spaces), interpretive/informational displays and a restroom facility. The inside launch lane is open for carry-in boats and the outside lane is for trailered boat launching. A launch fee is charged for use of the facility. The property is owned by Exelon and the facilities are provided and managed by MDNR as part of the Susquehanna State Park under a lease with Exelon. The facility was renovated in 2010 with expanded parking and a new ADA accessible gangway and pier and expanded parking.

5.3.23 McLhinney Park – Harford County, Maryland

The park, which is owned by Exelon and leased to and managed by the City of Havre de Grace, is located approximately nine miles downstream of Conowingo Dam. The park includes a playground, picnic area, restrooms, green space and non-motorized trails. Parking is available in two locations on city streets adjacent to the park. The Mason-Dixon Trail extends through the park. The park is open from 6:00 a.m. to 10:00 p.m.

5.4 Informal Recreation Sites

Informal recreation sites and access points exist within and adjacent to the Project boundary. Most informal sites are unimproved footpaths extending from public roads, though a few are water accessible only. These sites are used to access the headpond for fishing, camping, swimming, and boat launching. The locations of these sites are also shown on Figure 5.1.

5.5 Recreational Boating Access to Project Waters

Water levels above Conowingo Dam fluctuate due to several variables including natural river flow, operational status of upstream generating stations, and the operational status of the turbines at Conowingo Dam. When river flows and input from other sources exceed the operational capacity (86,000 cfs) of the Conowingo Project turbines, flood gates at Conowingo Dam are used to regulate pool elevation. The licensed permitted range of water level fluctuation in Conowingo Pond is EL. 101.2 to 110.2 NGVD. . To accommodate recreational boating activity during the summer boating season, Conowingo Pond is maintained at an elevation of 107.2 feet NGVD on weekends between Memorial Day and Labor Day.

As part of the recreation study plan, Exelon gathered information on the functionality of existing formal boat launch facilities on Conowingo Pond and conducted a tributary access study to determine the effects of pond levels on recreational boating.

5.5.1 Existing Boat Launch Facilities

Several Project recreation facilities provide formal trailered boat launch access to Conowingo Pond. These includes: Muddy Creek Boat Launch, Cold Cabin Boat Launch, Dorsey Park, Peach Bottom Marina, Broad Creek Public Landing, Conowingo Creek Boat Launch, and Glen Cove Marina, all which are described in more detail in Section 5.5 above. Information on the lengths and the elevation of the bottom of the ramps was collected from various sources and is summarized in Table 5.6.1-1.

Table 5.6.1-1 Boat Ramp Dimensions and Toe of Ramp Water Depths

Site	Length of Ramp	End of Ramp Elevation	Estimated Water Depth End of Ramp at 107.2 EL
Muddy Creek	42’	91’(1)	unknown
Cold Cabin	70’+	105.5	1.7’
Dorsey Park (2 ramps)	35’	104	3.2’
Peach Bottom(2)	10’	104.2	3.0’
Broad Creek(3)	50’	103.5	3.7’
Conowingo Creek	unknown	105.2	2.0’
Glen Cove	46’	103.7	3.5’

(1)Based on an assumed elevation of 100’ at top of ramp and a mean water elevation of 98.32 (November 2008, per PFBC plans)

(2) Ramp length provided by operator. Ramp length is below water line.

(3) Harford County proposes to rebuild Broad Creek in 2012. Dimensions are based on new design.

The States Organization for Boating Access (SOBA) developed a “Design Handbook for Recreational Boating & Fishing Facilities” (2006, second edition) and recommend a minimum water depth of 3 feet at the end of boat ramps (1989 first edition recommended 2.5 to 3 feet of depth).

The two ramps at Dorsey Park, Peach Bottom Marina ramp, Glen Cove Marina ramp, and the proposed redesigned ramp at Broad Creek exceed the SOBA 2006 recommendation (3’) for toe of ramp water depths. The Cold Cabin (1.7’) and Conowingo Creek (2.0’) ramps are shallower than the lower (2.5 to 3’) 1989 guideline.

5.5.2 Effect of Pond Elevation on Recreational Boating

Exelon conducted a study to assess tributary access in Conowingo Pond in 2010 to identify potential blockages associated with Project operations to fish and recreational boating to Pond tributaries under various water levels. The full report, “*Study to Assess Tributary Access in Conowingo Pond, RSP 3.13, January 2012*” is summarized here where it pertains to recreational boating access.

Assessments were conducted at full pond (EL 109.2) and at EL. 107.2, the minimum weekend recreational pool level from Memorial Day weekend to Labor Day weekend. Eighteen tributaries (9 backwater and 9 shoreline) were surveyed. An additional opportunistic survey was conducted on September 18, 2010 at selected tributaries when Conowingo Pond was between 105.8 and 106.0. A backwater tributary is characterized by a broad mouth at their confluence with Conowingo Pond, while shoreline tributaries are narrower and end abruptly at their confluence with the pond. The tributaries are listed in Table 5.6.2-1.

Table 5.6.2-1 Conowingo Pond Tributaries included in Tributary Access Study

Tributary	Tributary Type	Location
Wissler Run	Shoreline	River left, Lancaster County, PA.
Muddy Creek	Backwater	River right, York County, PA.
Fishing Creek	Shoreline	River left, Lancaster County, PA.
Robinson Run	Shoreline	River right, York County, PA.
Benton Hollow	Shoreline	River left, Lancaster County, PA.
Un-named trib. No. 1	Shoreline	River left, Lancaster County, PA.
Peter Creek	Backwater	River left, Lancaster County, PA.
Burkins Run	Shoreline	River right, York County, PA.
Haines Branch	Shoreline	River left, Lancaster County, PA.
Michaels Run	Backwater	River right, York County, PA.
Un-named trib. No. 2	Shoreline	River left, Cecil County, MD.
Broad Creek	Backwater	River right, Harford County, MD.
Un-named trib No. 3	Shoreline	River left, Cecil County, MD.
Conowingo Creek	Backwater	River left, Cecil County, MD.
Glen Cove	Backwater	River right, Harford County, MD.
Funks Pond	Backwater	River left, Cecil County, MD.
Hopkins Cove	Backwater	River right, Harford County, MD.
Policemans Cove	Backwater	River right, Harford County, MD.

The generally small size of the shoreline tributaries offer limited or no recreational access to boaters. The former marina site on Fishing Creek is functional at full pond, but at 107.2 NVGD water depth at the end of the ramp is 1.0’ and extensive shoals with depths of 1.5 to 2.0’ make accessing the mouth of the creek from the pond difficult for powerboats.

Of the backwater tributaries, five provide recreational value; four due to the presence of public boat launch facilities (Peters Creek/Peach Bottom Marina, Conowingo Creek, Glen Cove and Broad Creek). The fifth tributary, Muddy Creek, provides recreational value due to its size.

Pond elevations do influence boat access at three of the four tributary boat launches. At EL 109.2, boats with an air draft greater than 5.2 and 4.9 cannot navigate under the arches of the railroad trestles at Peters Creek and Conowingo Creek, respectively. Conversely, while the weekend recreational pool level (107.2) increases the air draft under these trestles by an additional two feet, water depths at the toe of the boat ramps decrease accordingly. At 107.2, ramp toe water depths at the Peters Creek, Conowingo Creek and the existing Broad Creek ramp are 3.0., 2.0, and 1.5 feet, respectively. Glen Cove Marina was the only tributary boat launch with sufficient water (2.3 feet) at pond elevation 105.8 to 106.0; however, two non-tributary launches, Dorsey Park and Muddy Creek, are still functional at these levels. (Updated Study Report, Study to Assess Tributary Access in Conowingo Pond, RSP 3.13, January 2012)

6.0 ESTIMATE OF PROJECT RECREATIONAL USE

6.1 FERC Form 80

Exelon is required to file a FERC Form 80 every six years. The FERC Form 80 collects information from licensees on the use and development of recreational facilities. FERC staff utilizes Form 80 data when analyzing the adequacy of existing project recreational facilities.

The Form 80 estimates the number of recreation days, defined as "*each visit by a person to a development for recreational purposes during any portion of a 24 hour period*" occurring on a Project-wide basis for a one year period. The Form 80 also provides data on facility capacity in broad terms by grouping similar recreational facilities (i.e., boat launch areas, marinas, parks, trails, picnic areas, etc.) for reporting purposes.

The most recent Form 80 for the Project was completed and filed with FERC in April 2009. Based on data collected in 2008-09, total annual Project recreational use was 375,152 recreation days (pre-amended Project boundary use estimate). All recreational use associated with the Conowingo Project is day-time use. Facility capacities ranged from less than 5% (canoe portage trail) to 40% (boat launch areas and lanes, marinas, playground areas, visitor center, and interpretive displays).

6.2 Methodology for Refining Estimated Project Recreational Use by Site

As the Form 80 estimating and reporting requirement does not require site specific data collection, Exelon conducted an enhanced data collection process in 2008-09 in order to collect site specific use, activities and capacity data for this license application. Data collection objectives included characterizing types and levels of recreational use within the Project boundary and evaluating the potential need for additional access or facilities at the Project. The study used a variety of methods to develop recreation use estimates that appropriately characterized annual, peak, and seasonal usage at the Project. The data collected included: spot counts, calibration counts, traffic counter data, and facility operator-supplied data. Data collection for the Conowingo Project covered the period from March 15, 2008 through March 14, 2009, and included: Lock 13, Lock 15, Muddy Creek Boat Launch, Cold Cabin Boat Launch, Dorsey Park, Peach Bottom Marina, Line

Bridge Access, Broad Creek Public Landing, Conowingo Creek Boat Launch, Glen Cove Marina, Funk's Pond, Conowingo Swimming Pool, Fisherman's Park, Lower Susquehanna Heritage Greenway, Octoraro Creek Access, Deer Creek Access, Lapidum Boat Launch, and McLhinney Park.

6.2.1 Spot Counts

Spot counts were conducted at Lock 13, Lock 15, Muddy Creek Boat Launch, Cold Cabin Boat Launch, Dorsey Park, Line Bridge, Broad Creek Public Landing, Conowingo Creek Boat Ramp, Funk's Pond, Fisherman's Park, Lower Susquehanna Heritage Greenway, Octoraro Creek Access, Deer Creek Access, and McLhinney Park during six randomly selected days a month for the study period (four weekdays and two weekend days each month[2]). Spot counts were conducted at different times of the selected days throughout the study period to capture site activity that may vary depending on time of day. A spot count consisted of field staff arriving at a recreation site and recording the number of vehicles, boats/boat trailers, and people at the site. If people were observed on site, the activities in which they were participating in, or assumed participation based on observation (i.e., if they had fishing poles it was assumed they would be fishing, etc.), was also recorded. Upon completing a spot count at a site, field staff moved to the next site on their schedule (spot counts are short duration stays on-site).

6.2.2 Calibration Counts

Calibration counts were conducted at Lock 13, Lock 15, Muddy Creek Boat Launch, Cold Cabin Boat Launch, Dorsey Park, Line Bridge, Broad Creek Public Landing, Conowingo Creek Boat Ramp, Funk's Pond, Fisherman's Park, Lower Susquehanna Heritage Greenway, Octoraro Creek Access, Deer Creek Access, and McLhinney Park during six randomly selected days a month for the study period (four weekdays and two weekend days each month[3]). Calibration counts were conducted at different times of the selected days throughout the study period to capture site activity that may vary depending

[2] A spot or calibration count was conducted at least one day during any three-day holiday weekend.

[3] A spot or calibration count was conducted at least one day during any three-day holiday weekend.

on time of day. During a calibration count, field staff was on-site for two hours. Upon arrival, staff noted the number of people and vehicles at the site, and during the two hours on site recorded the time of arrival/departure of additional vehicles, if the vehicle was towing a trailer, the number of people per vehicle, and the recreational activity(ies) each person in each party (vehicle) participated in at the site.

Calibration count data was used to calculate the average number of people per vehicle, which was applied to vehicle counts collected with traffic counters and during spot counts to arrive at recreation use estimates at the facilities.

6.2.3 Traffic Counters

Traffic (tube-type) counters were installed at on the entrance roads at Muddy Creek Boat Launch, Dorsey Park, and Fisherman's Park. The average number of people per vehicle entering the sites was estimated using calibration count data and applied to the total site vehicle count in developing the use estimates for the sites.

6.2.4 Data Supplied by Facility Operator

Data for Glen Cove Marina, Peach Bottom Marina, Conowingo Swimming Pool, Deer Creek Access, and Lapidum Boat Launch area was provided to Exelon by the operators of each site. The Susquehanna State Park staff provided information regarding the number of boats launched at Lapidum Boat Launch, as well as the estimated number of users for the Deer Creek Access and the approximately 2.7 miles of shoreline between Deer Creek and Lapidum Boat Launch. The Glen Cove Marina operator provided the number of boat launches, the number of users participating in private tournaments and the number of users associated with groups that passed through the marina. The operator of Peach Bottom Marina provided the number of boat launches that occurred during the normal operating season. The Conowingo Swimming Pool vendor supplied the daily use figures for the pool for the season.

6.3 Recreational Use of Conowingo Project Facilities

The enhanced Form 80 study used a variety of methods to develop recreation use estimates beyond that necessary for Form 80 reporting requirements in order to have data available for licensing purposes. The data was collected through the use of: spot counts, calibrations, traffic (tube) counter data, and records maintained by facility vendors and operators. Data was analyzed and is reported herein on a seasonal and annual basis. The following dates were used for compiling seasonal results:

Spring – March 15 to May 26, 2008

Summer – May 27 to August 29, 2008

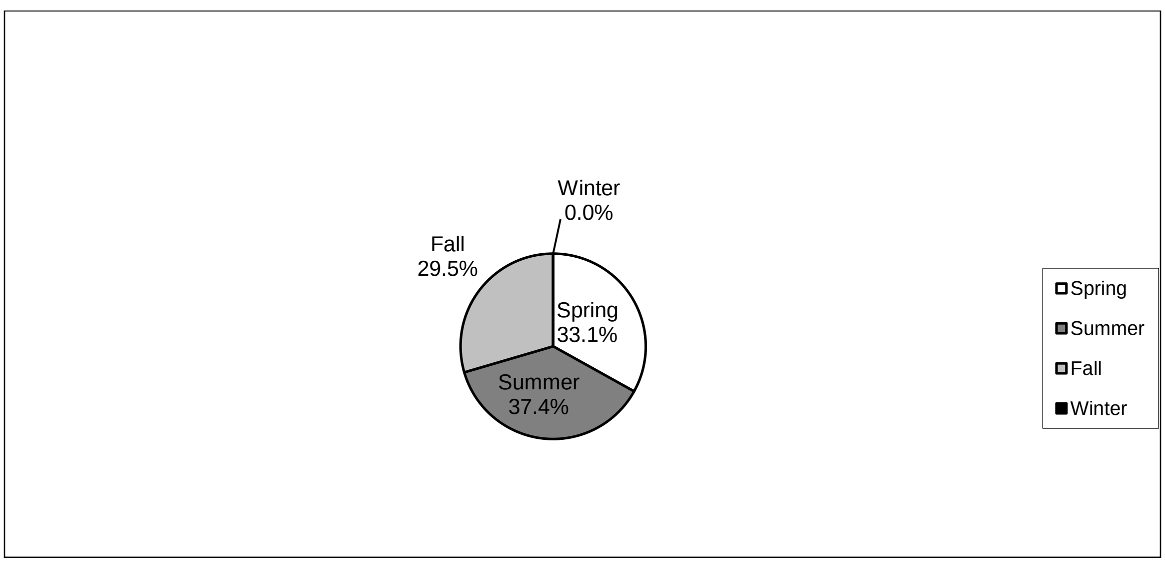
Fall – August 30 to November 30, 2008

Winter – December 1, 2008 to March 14, 2009

6.3.1 Lock 13 Day Use

From March 15, 2008 through March 14, 2009, Lock 13 was utilized during an estimated 782 recreation days. Recreation usage was at its highest in the summer, with approximately 37 percent of all recreation days. Roughly one-third of all visitors to Lock 13 came in the spring. Fall recreation usage was estimated to be 30 percent of total use in 2008. There is no winter use at Lock 13 as the site is gated and closed during the winter months. Figure 6.3.1-1 illustrates the estimated distribution of recreation usage by season in 2008.

Figure 6.3.1-1: Recreation Usage by Season, Conowingo Project: Lock 13, 2008-2009



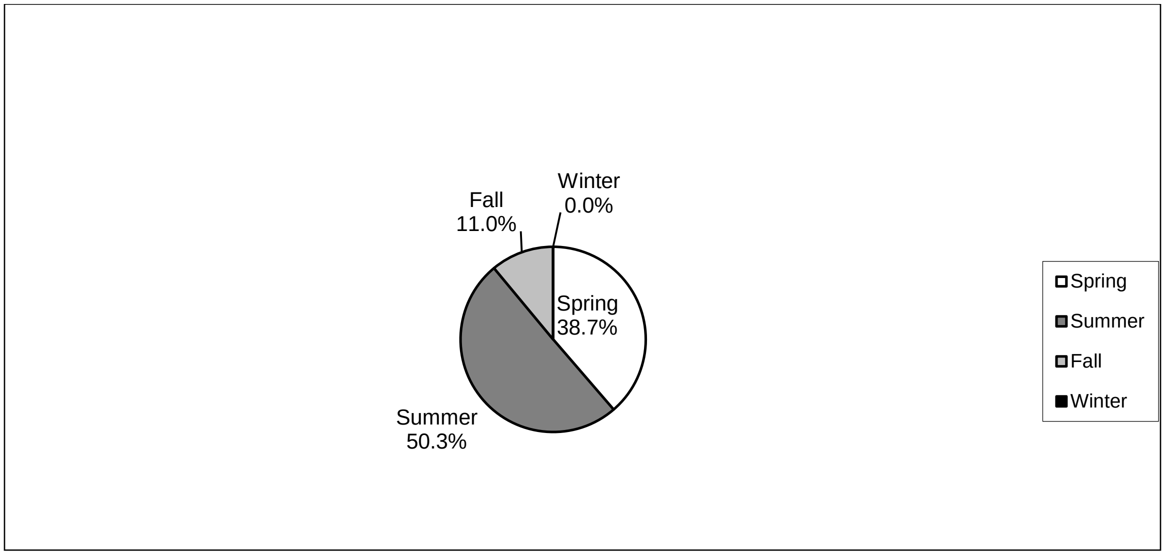
The FERC Form 80 requires estimates of the Peak Use Weekend. This is defined as the long weekend when recreation use is at its peak for the season. This is typically, the Fourth of July weekend, depending on the weather and the day of the week on which July 4th falls. It is estimated that a total of 34 daytime recreation days were spent at the site during the peak use weekend in 2008.

In considering recreational demand, it is also important to consider the level of activity on a typical day at the facilities and sitess, as the varying lengths of the season can obscure the site's recreational pressures. At Lock 13, very little use overall was observed. In 58 spot counts, not a single person was observed at the facility. Recreational activity was only noted at the park at 4 out of 37 calibration events. Annually, it was estimated that approximately 2 people visited Lock 13 per day in 2008.

6.3.2 Lock 15 Day Use

In 2008, Lock 15 was utilized during an estimated 13,066 recreation days. Recreation usage peaked in the summer, with approximately half of all recreation days (6,572 days) occurring then. Spring recreation usage was estimated to be 5,054 days (39 percent of total use) in 2008. In the fall an estimated 1,441 (11 percent of total use) days were spent at Lock 15. The site is gated and closed during the winter months. Figure 6.3.2-1 illustrates the estimated distribution of recreation usage by season in 2008.

Figure 6.3.2-1: Recreation Usage by Season, Conowingo Project: Lock 15, 2008-2009



An estimated total of 424 recreation days were spent at Lock 15 over the peak weekend in 2008. At Lock 15, average daily usage varied from a low of 15 persons per day in the fall to a high of 71 daily visitors in the summer. Average daily use in the spring was 69 visitors per day. Over the course of 2008 season at Lock 15, the average number of visitors per day was 50.

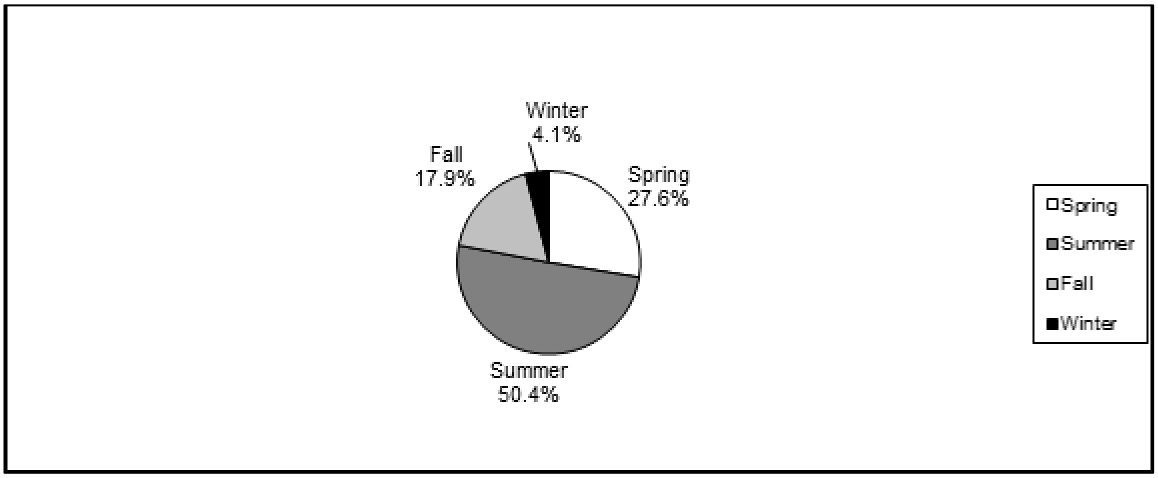
At Lock 15, surveyors also recorded the level of use observed on the headpond. Boaters on the headpond, excluding canoeists and kayakers, are presumed to have launched their boats from other recreation sites or private docks. Based on the use observed, an additional 4,462 annual recreation days were spent boating on the headpond in the vicinity of Lock 15. Use was heaviest in the summer, with 59 percent of use, with 28 recreationists per day. Peak weekend boating near Lock 15 was estimated to be 180 recreation days.

6.3.3 Muddy Creek Boat Launch

An estimated 38,742 recreation days were spent at the Muddy Creek Boat Launch during the 2008-2009 recreation season. Recreation usage was at its highest in the summer, with approximately half of all recreation days (19,521 days) occurring during that period. Spring recreation usage was estimated to be 10,704 days (28 percent of total use) in 2008.

Usage at the boat launch was lower in the fall, with 6,936 days (18 percent of total use). An estimated 1,581 recreation days (4 percent of total use) were spent at the Muddy Creek Boat Launch during the winter. Figure 6.3.3-1 illustrates the estimated distribution of recreation usage by season in 2008-2009.

Figure 6.3.3-1: Recreation Usage by Season, Conowingo Project: Muddy Creek Boat Launch, 2008-2009



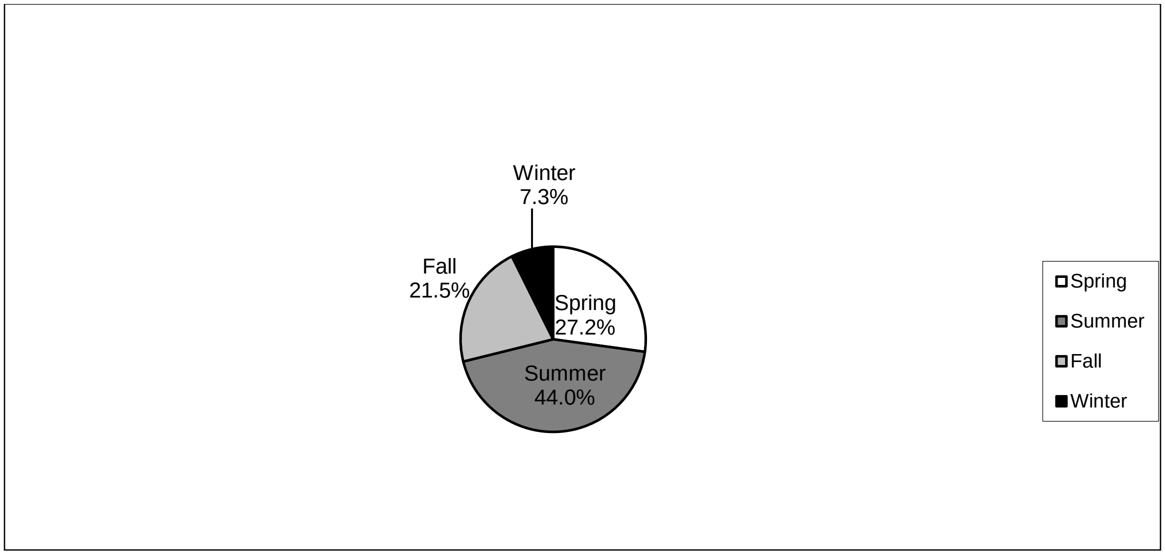
It is estimated that a total of 3,071 recreation days were spent at the Muddy Creek Boat Launch during the Peak Use Weekend in 2008. Average daily usage was greatest in the summer, with 205 visitors per day. The winter saw the lowest average daily use (15 recreationists per day) of the study period. Average daily use in the spring was 147 visits per day, with fall considerably lower at 75 visits per day. Over the course of the study period, the Muddy Creek Boat Launch averaged 106 visitors per day.

6.3.4 Cold Cabin Boat Launch

Over the course of the 2008-2009 recreation season, an estimated 11,968 recreation days were spent at the Cold Cabin Boat Launch from March 15, 2008 through March 14, 2009. Recreation usage was at its highest in the summer, with approximately 44 percent of all recreation days (5,263 days) occurring during that period. Spring recreation usage was estimated to be 3,251 days (27 percent of total use) in 2008. Usage at the boat launch was lower in the fall, with 2,575 days (22 percent of total use). An estimated 879 recreation days (approximately 7 percent of total use) were spent at the Cold Cabin Boat

Launch during the winter. Figure 6.3.4-1 illustrates the estimated distribution of recreation usage by season in 2008-2009.

Figure 6.3.4-1: Recreation Usage by Season, Conowingo Project: Cold Cabin Boat Launch, 2008-2009

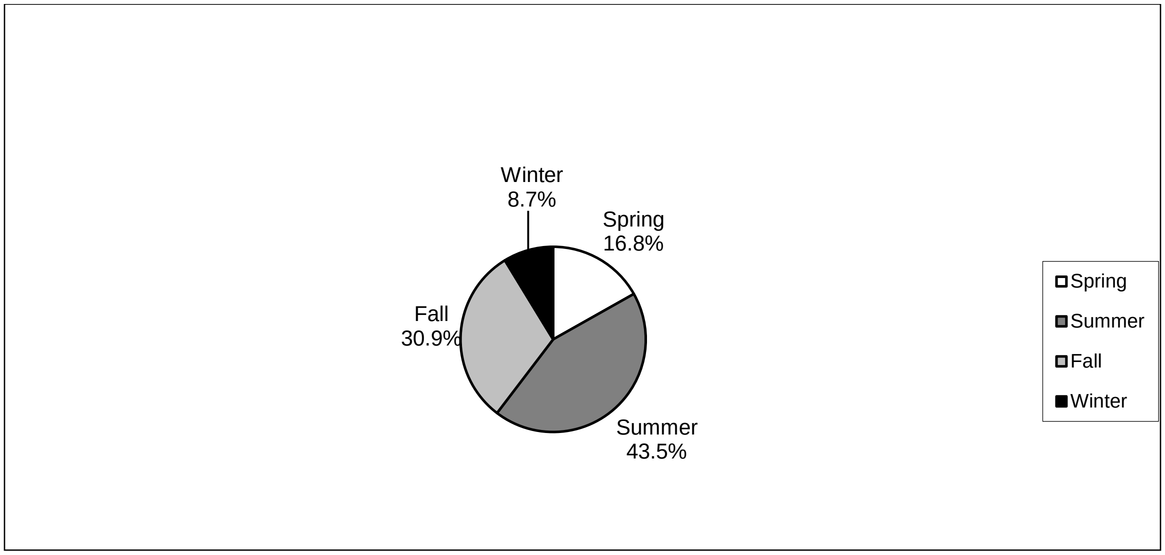


It is estimated that a total of 597 recreation days were spent at the Cold Cabin Boat Launch during the Peak Use Weekend in 2008. Average daily usage was greatest in the summer, with 55 visitors per day. The winter saw the lowest average daily use (8 recreationists per day) of the study period. Average daily use in the spring was 45 visits per day, with fall considerably lower at 28 visits per day. Over the course of the study period, the Cold Cabin Boat Launch averaged 33 visitors per day.

6.3.5 Dorsey Park Boat Launch

During the 2008-2009 recreation season, an estimated 16,706 recreation days were spent at the Dorsey Park Boat Launch. Recreation usage was greatest in the summer, with approximately 44 percent of all recreation days (7,272 days) occurring during that period. Spring recreation usage was estimated to be 2,812 days (17 percent of total use) in 2008. Usage at the boat launch was higher in the fall, with 5,165 days (31 percent of total use). An estimated 1,457 recreation days (approximately 9 percent of total use) were spent at the Dorsey Park Boat Launch during the winter. Figure 6.3.5-1 illustrates the estimated distribution of recreation usage by season in 2008-2009.

Figure 6.3.5-1: Recreation Usage by Season, Conowingo Project: Dorsey Park Boat Launch, 2008-2009



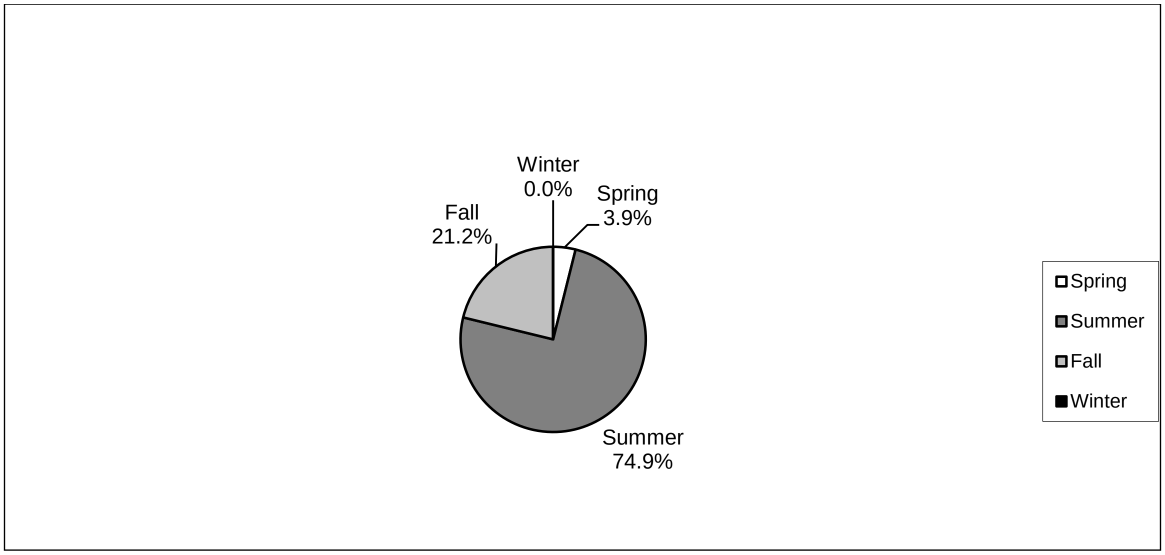
Note: Figures do not sum to 100 percent because of rounding.

It is estimated that a total of 453 recreation days were spent at the Dorsey Park Boat Launch during the Peak Use Weekend in 2008. Average daily usage was greatest in the summer, with 77 visitors per day. The winter saw the lowest average daily use (14 recreationists per day) of the study period. Average daily use in the spring was 39 visits per day, with fall higher at 56 visits per day. Over the course of the study period, the Dorsey Park Boat Launch averaged 46 visitors per day.

6.3.6 Peach Bottom Marina

Peach Bottom Marina was open from May through October in 2008. Over the course of the 2008 recreation season, an estimated 538 recreation days were spent at the Peach Bottom Marina, based on boat launch data from the marina operator. Recreation usage was at its highest in the summer, with approximately 75 percent of all recreation days (403 days) occurring during that period. Spring (May) recreation usage was estimated to be 21 days (4 percent of total use) in 2008. Usage at the boat launch was higher in the fall (September and October), with 114 days (21 percent of total use). Figure 6.3.6-1 illustrates the estimated distribution of recreation usage by season in 2008.

Figure 6.3.6-1: Recreation Usage by Season, Conowingo Project: Peach Bottom Marina, 2008-2009

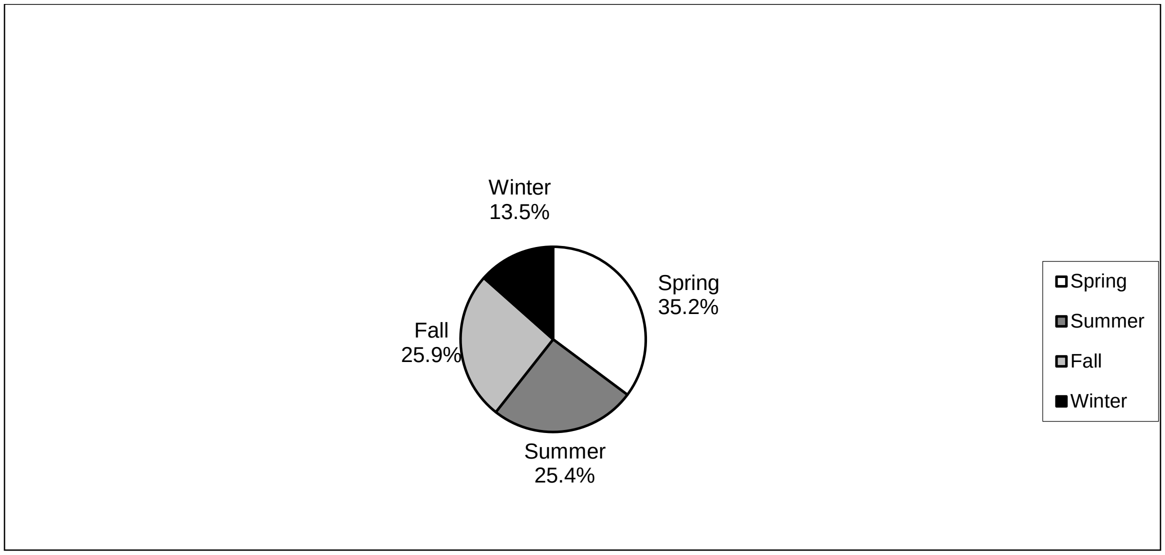


It is estimated that a total of 33 recreation days were spent at the Peach Bottom Marina during the Peak Use Weekend in 2008. Average daily usage was an estimated 5 visitors per day summer. During the period in 2008 when the facility was open, the Peach Bottom Marina averaged 3 visitors per day, based on an average of 1.7 boat launches per day.

6.3.7 Line Bridge Access

Over the course of the 2008-2009 recreation season, an estimated 5,789 recreation days were spent at the Line Bridge Access site. Recreation usage was at its highest in the spring, with approximately 35 percent of all recreation days (2,038) occurring during that period. Fall recreation usage was estimated to be 1,501 days (26 percent of total use) in 2008. Usage at the site was slightly lower in the summer, with 1,472 days (25 percent of total use). An estimated 779 recreation days (approximately 13 percent of total use) were spent at the Line Bridge Access site during the winter. Figure 6.3.7-1 illustrates the estimated distribution of recreation usage by season in 2008-2009.

Figure 6.3.7-1: Recreation Usage by Season, Conowingo Project: Line Bridge Access, 2008-2009



It is estimated that a total of 55 recreation days were spent at the Line Bridge Access site during the Peak Use Weekend in 2008. Average daily usage was greatest in the spring, with 28 visitors per day. The winter saw the lowest average daily use (7 recreationists per day) of the study period. Average daily use in the summer and fall was 16 visits per day. Over the course of the study period, the Line Bridge Access site averaged 16 visitors per day.

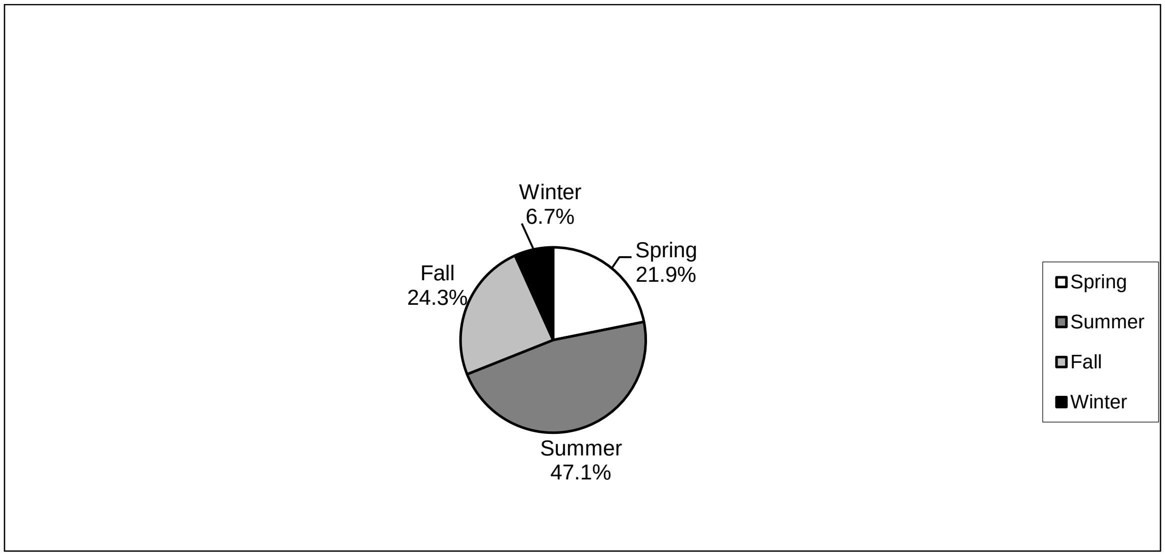
At the Line Bridge Access site, surveyors also recorded the level of use observed on the headpond. Boaters on the headpond, excluding canoeists and kayakers, are presumed to have launched their boats from other recreation sites or private docks. Based on the use observed, an additional 2,749 annual recreation days were spent boating on the headpond in the vicinity of Line Bridge Access. Use was heaviest in the summer, with 57 percent of use, with 16 recreationists per day. Peak weekend boating near the site was estimated to be 80 recreation days.

6.3.8 Broad Creek Public Landing

During the 2008-2009 recreation season, an estimated 10,138 recreation days were spent at Broad Creek Public Landing. Recreation usage was at its highest in the summer, with approximately 47 percent of all recreation days (4,778 days) occurring during that period.

Spring recreation usage was estimated to be 2,216 days (22 percent of total use) in 2008. Usage at the boat launch was lower in the fall, with 2,461 days (24 percent of total use). An estimated 684 recreation days (approximately 7 percent of total use) were spent at Broad Creek Public Landing during the winter. Figure 6.3.8-1 illustrates the estimated distribution of recreation usage by season in 2008-2009.

Figure 6.3.8-1: Recreation Usage by Season, Conowingo Project: Broad Creek Public Landing, 2008-2009



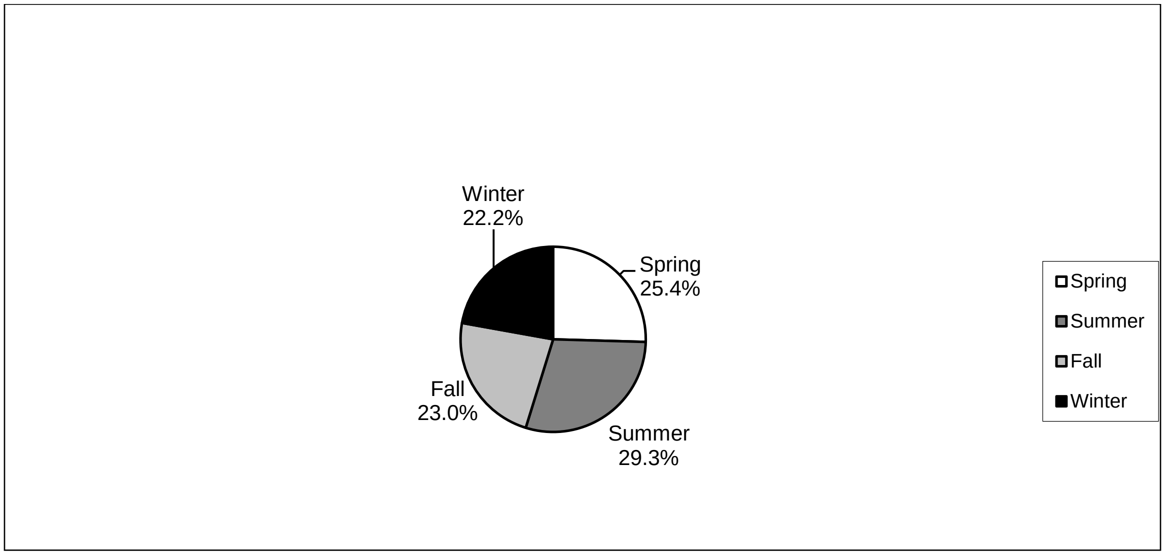
It is estimated that a total of 433 recreation days were spent at Broad Creek Public Landing during the Peak Use Weekend in 2008. Average daily usage was greatest in the summer, with 50 visitors per day. The winter saw the lowest average daily use (7 recreationists per day) of the study period. Average daily use in the spring was 30 visits per day, with fall slightly lower at 26 visits per day. Over the course of the study period, Broad Creek Public Landing averaged 28 visitors per day.

6.3.9 Conowingo Creek Boat Launch

In the 2008-2009 recreation season, Conowingo Creek Boat Launch was utilized during an estimated 10,594 recreation days. Usage occurred fairly steadily throughout the course of the year. Recreation usage peaked in the summer, with approximately 29 percent of all recreation days (3,108 days) occurring then. Spring recreation usage was estimated to be 2,696 days (25 percent of total use) in 2008. In the fall an estimated

2,441 (23 percent of total use) days were spent at the boat launch. Wintertime use was the lowest, at 22 percent (2,349 recreation days). Figure 6.3.9-1 illustrates the estimated distribution of recreation usage by season in 2008-2009.

Figure 6.3.9-1: Recreation Usage by Season, Conowingo Project: Conowingo Creek Boat Launch, 2008-2009



An estimated total of 72 recreation days were spent at the Conowingo Creek Boat Launch over the peak weekend in 2008. At the boat launch, average daily usage varied from a low of 23 persons per day in the winter to a high of 37 daily visitors in the spring. Average daily use in the summer was 33 visitors per day, with that figure dropping to 26 visitors per day in the fall. Throughout the 2008-2009 recreation season, an average of 29 recreationists spent time at the boat launch.

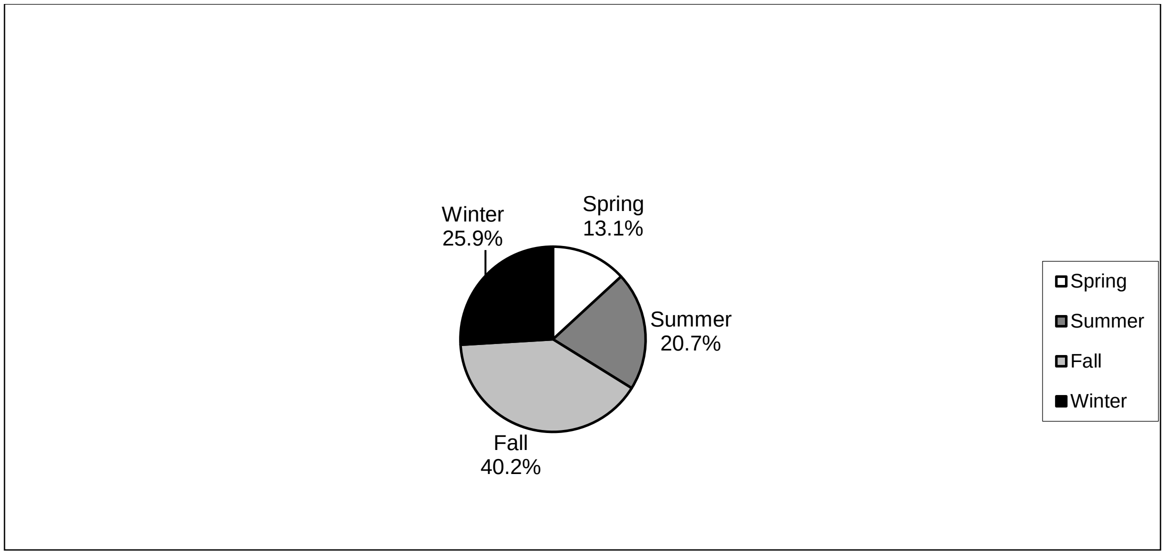
6.3.10 Glen Cove Marina

During the 2008 recreation season, an estimated 707 recreation days were spent at the Glen Cove Marina, based on annual data obtained from the marina operator. This figure includes approximately 300 participants in eight private fishing tournaments. Seasonal data were not provided by the marina operator. It is estimated that a total of 38 recreation days were spent at the Glen Cove Marina during the Peak Use Weekend in 2008.

6.3.11 Funk's Pond

Over the course of the 2008-2009 recreation season, an estimated 4,380 recreation days were spent at Funk's Pond. Unlike most sites within the Conowingo Project, recreation usage was at its highest in the fall, with approximately 40 percent of all recreation days (1,762 days) occurring during that period. Winter recreation usage was estimated to be 1,137 days (26 percent of total use) in 2008. Usage was lower in the summer, with 906 days (21 percent of total use). An estimated 576 recreation days (approximately 13 percent of total use) were spent at Funk's Pond during the winter. Figure 6.3.11-1 illustrates the estimated distribution of recreation usage by season in 2008-2009.

Figure 6.3.11-1: Recreation Usage by Season, Conowingo Project: Funk's Pond, 2008-2009

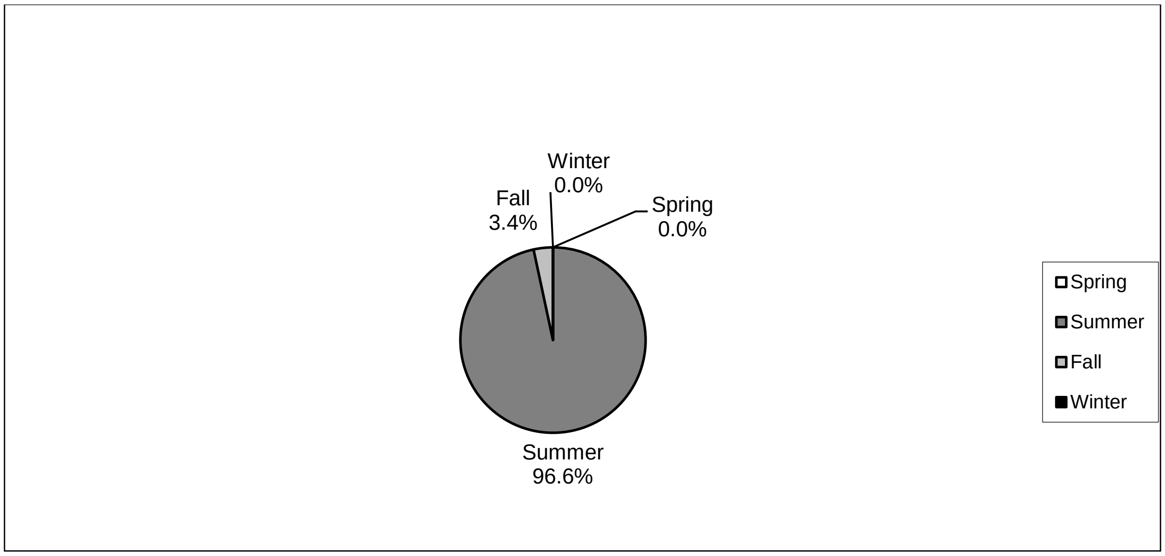


It is estimated that a total of 108 recreation days were spent at Funk's Pond during the Peak Use Weekend in 2008. Average daily usage was greatest in the fall, with 19 visitors per day. The spring saw the lowest average daily use (8 recreationists per day) of the study period. Average daily use in the winter was 11 visits per day, with summer slightly lower at approximately 10 visits per day. Over the course of the study period, Funk's Pond averaged 12 visitors per day.

6.3.12 Conowingo Swimming Pool

In 2008, Conowingo Swimming Pool was open on weekends beginning June 1 and then daily from June 14 through August 24. The pool opened again to serve recreationists over the long Labor Day weekend (August 30 through September 1). During this period, an estimated 8,471 recreation days were spent at the pool. Ninety-seven percent of the recreation usage was in the summer. The only period outside of summer that the pool was open was Labor Day weekend. Usage during this period of early fall accounted for 3 percent of the total visits made in 2008. Figure 6.3.12-1 illustrates the estimated distribution of recreation usage by season in 2008.

Figure 6.3.12-1: Recreation Usage by Season, Conowingo Project: Conowingo Swimming Pool, 2008-2009



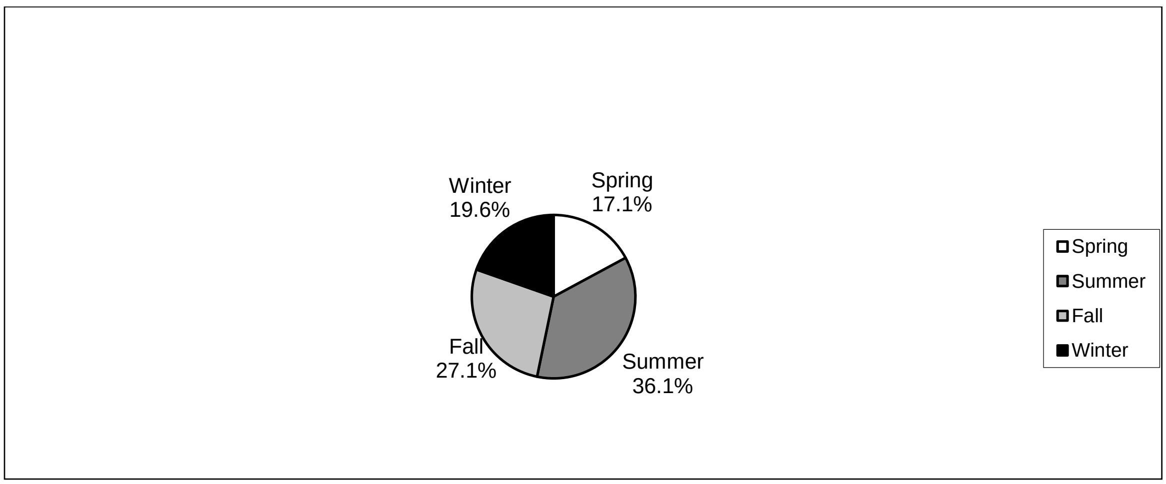
It is estimated that a total of 419 recreation days were spent at the Conowingo Swimming Pool during the Peak Use Weekend in 2008[4]. Average daily usage in the summer was 109 visitors per day. Average daily use over the Labor Day weekend at the beginning of fall was 95 persons per day.

[4] Because of inclement weather, the Fourth of July weekend was not considered to be the Peak Use Weekend at the pool.

6.3.13 Fisherman's Park

In 2008, Fisherman's Park was utilized during an estimated 141,580 recreation days. Recreation usage peaked in the summer, with approximately 36 percent of all recreation days (51,155 days) occurring then. Fall recreation usage was estimated to be 38,413 days (27 percent of total use) in 2008. In the winter 27,772 (20 percent of total use) days were spent at the park. Springtime use was the lowest, at 17 percent (24,240 recreation days). Figure 6.3.13-1 illustrates the estimated distribution of recreation usage by season in 2008.

Figure 6.3.13-1: Recreation Usage by Season, Conowingo Project: Fisherman's Park, 2008-2009



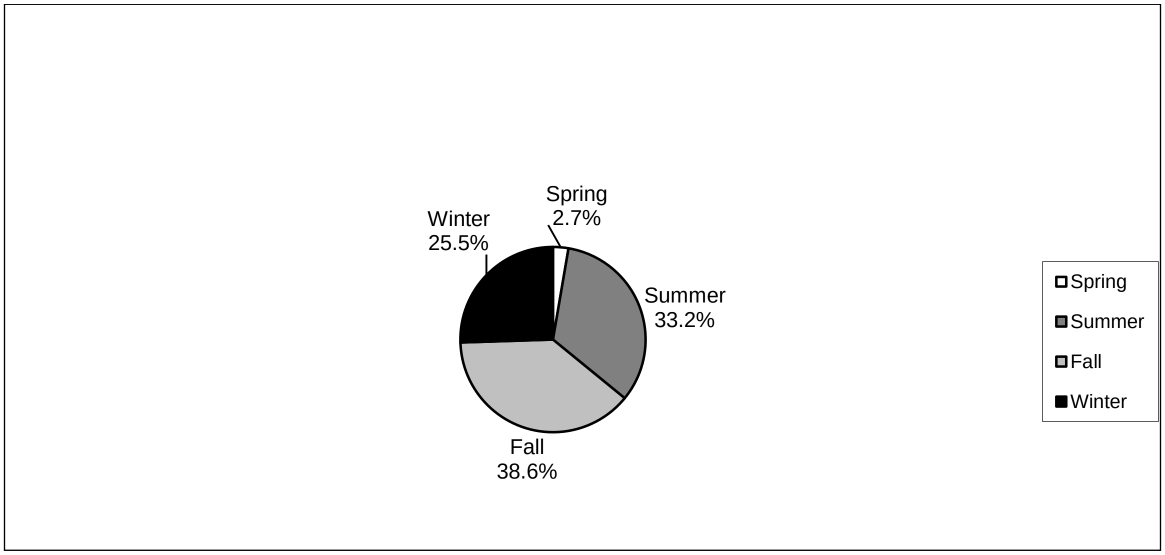
Note: Figures do not sum to 100 percent because of rounding.

An estimated total of 2,124 recreation days were spent at Fisherman's Park over the peak weekend in 2008. At the park, average daily usage varied from a low of 267 persons per day in the winter to a high of 538 daily visitors in the summer. Average daily use in the fall was 413 visitors per day. An average of 332 recreationists per day spent time at the park in the spring. Throughout the 2008-2009 recreation season, an average of 388 persons visited the park per day.

6.3.14 Octoraro Creek Access

Over the course of the 2008-2009 recreation season, an estimated 7,485 recreation days were spent at Octoraro Creek Access. Recreation usage was at its highest in the fall, with approximately 39 percent of all recreation days (2,889 days) occurring during that period. Summer recreation usage was estimated to be 2,486 days (33 percent of total use) in 2008. Usage was lower in the winter, with 1,909 days (26 percent of total use). Only 3 percent (201 days) of the total recreation days spent at Octoraro Creek Access occurred during the spring. Figure 6.3.14-1 illustrates the estimated distribution of recreation usage by season in 2008-2009.

Figure 6.3.14-1: Recreation Usage by Season, Conowingo Project: Octoraro Creek Access, 2008-2009



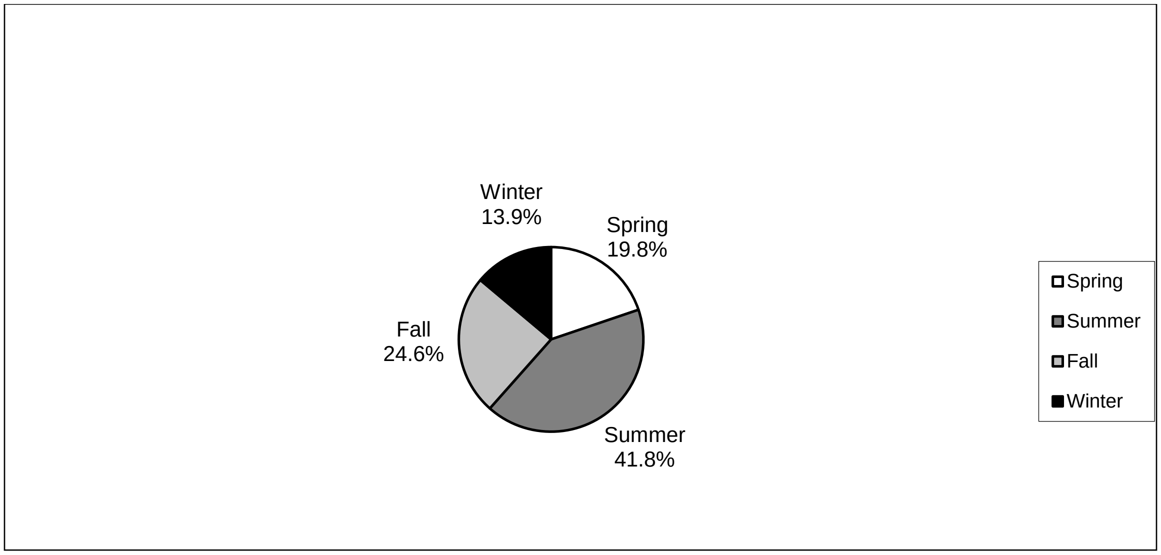
It is estimated that a total of 225 recreation days were spent at the Octoraro Creek Access site during the Peak Use Weekend in 2008. Average daily usage was greatest in the fall, with 31 visitors per day. The spring saw the lowest average daily use (3 recreationists per day) of the study period. Average daily use in the summer was 26 visits per day, with winter somewhat lower at 18 visits per day. Over the course of the study period, Octoraro Creek Access averaged roughly 21 visitors per day.

6.3.15 Summary of Conowingo Project Recreational Use

During the 2008-2009 study period at the Conowingo Project, there were an estimated 278,158 recreational day trips made to the current Project sites. A detailed breakdown of the trips is provided in Table 6.3.15-1. Approximately 42 percent of the trips (a total of

116,136 trips) were made in the summer. Fall trips totaled 68,305 or 25 percent of the total annual trips). Spring trips reached 55,073 (20 percent of total annual trips). Usage was lowest in the winter, with 38,643 trips (14 percent). Figure 6.3.15-1 below illustrates the estimated distribution of recreation usage by season in 2008-2009.

Figure 6.3.15-1: Recreation Usage by Season, Conowingo Project, 2008-2009



Recreation usage was the highest at Fisherman's Park, with 51 percent of the study area's activity taking place there. Almost 2 out of every 3 recreation days spent in the project were at Fisherman's Park or Muddy Creek Boat Launch (14 percent).

Table 6.3.15-1 Recreation Usage by Season, Conowingo Project Summary, 2008-2009

Site	Spring	Summer	Fall	Winter	Yearly	Share of Total Project Use
Broad Creek	2,216	4,778	2,461	684	10,138	3.6%
Cold Cabin	3,251	5,263	2,575	879	11,968	4.3%
Conowingo Creek	2,696	3,108	2,441	2,349	10,594	3.8%
Conowingo Pool	0	8,186	285	0	8,471	3.0%
Dorsey Park	2,812	7,272	5,165	1,457	16,706	6.0%
Fisherman's Park	24,240	51,155	38,413	27,772	141,580	50.9%
Funks Pond	576	906	1,762	1,137	4,381	1.6%
Glen Cove Marina (a)	28	530	150	0	707	0.3%
Line Bridge (b)	2,038	3,048	2,577	876	8,539	3.1%
Lock 13	259	293	231	0	782	0.3%
Lock 15 (b)	6,033	9,189	2,307	0	17,528	6.3%
Muddy Creek Boat Launch	10,704	19,521	6,936	1,581	38,742	13.9%
Octoraro Creek	201	2,486	2,889	1,909	7,485	2.7%
Peach Bottom Marina	21	402	114	0	537	0.2%
Total	55,073	116,136	68,305	38,643	278,158	
Percentage	20%	42%	25%	14%	100%	
Average Daily Use	754	1,222	734	372	762	

(a) Seasonal data were not maintained by the marina operator. The distribution shown here is based on the recorded seasonal use pattern observed at the Peach Bottom Marina.
(b) Includes boating use on the headpond near the recreation site.

Project-wide average daily use was greatest in the summer at 1,222 visitors per day. Lower levels of use were experienced in the spring (754 visitors per day) and the fall (734 visitors per day). Usage was lowest in the winter, with an average of 372 visitors per day. Project-wide, annual average daily use was 762 visitors.

No formal overnight camping facilities are available within the Conowingo Project, though camping is offered at the nearby Holtwood Project, Muddy Run Project, Susquehannock State Park, and Susquehanna State Park.

6.4 Recreational Activities at Project Facilities

According to Pennsylvania Outdoors, The Keystone for Healthy Living 2009-2013 Statewide Comprehensive Outdoor Recreation Plan , a statewide resident survey reported walking as the most popular outdoor recreation activity, followed by picnicking, visiting historic sites, driving for pleasure, swimming and viewing wildlife. For the Southeast Pennsylvania Region, which includes the Conowingo Project, residents indicated they were most likely to participate in visiting historic sites and night sky viewing. Residents in this region also expressed a desire for more overnight recreation facilities (campgrounds, rental cabins, nature lodges) and for more and improved bicycle lanes. Maryland's "*Land Preservation, Parks & Recreation Plan 2009, Volume II"* recommends promoting hunting, enhancing a statewide land and water trail system, expanding fishing and boating opportunities, and expansion of primitive or unimproved camping. The recreation study recently completed for the Conowingo Project provides specific detail on the recreational activities occurring at the Project facilities, with the level of detail varying according to the methods of data collection. A discussion on recreational activities within the Project boundary follows.

6.4.1 Lock 13 Day Use

Shoreline fishing, walking and running, and sightseeing were the activities observed at Lock 13. Running and walking represented 38 percent of the annual estimated use at the site. These activities were observed in the spring and summer only. Shoreline fishing (33 percent) was also popular, with usage also observed in the spring and summer only. Sightseeing (30 percent of annual use) was noted only during the fall recreation season. No other activities were recorded at the site. Table 6.4.1-1 below shows the participation rates for various recreational activities at the Lock 13.

Table 6.4.1-1 Recreational Days by Site, Lock 13, 2008-2009

Activity	Spring	%	Summer	%	Fall	%	Yearly	%
Boating	0	0%	0	0%	0	0%	0	0%
Shoreline Fishing	121	47%	137	47%	0	0%	257	33%
Picnicking	0	0%	0	0%	0	0%	0	0%
Running/ Walking	138	53%	156	53%	0	0%	294	38%
Swimming	0	0%	0	0%	0	0%	0	0%
Hunting	0	0%	0	0%	0	0%	0	0%
Horseback Riding	0	0%	0	0%	0	0%	0	0%
Biking	0	0%	0	0%	0	0%	0	0%
Sightseeing	0	0%	0	0%	231	100%	231	30%
Birding	0	0%	0	0%	0	0%	0	0%
Other	0	0%	0	0%	0	0%	0	0%
Total	259		293		231		782	
Note: There is no wintertime recreation use at Lock 13.								

6.4.2 Lock 15 Day Use

At Lock 15, sightseeing was the most popular activity (31 percent). Walking or running (25 percent) was also enjoyed frequently at the site, as was canoeing or kayaking (22 percent). Picnicking (9 percent), shoreline fishing (5 percent), swimming (2 percent), hunting (1 percent), and birding (1 percent) were also observed by field staff at Lock 15. Boating activity on the headpond was also observed from Lock 15. Table 6.4.2-1 below summarizes by season the various activities enjoyed by recreationists visiting Lock 15.

Table 6.4.2-1 Recreational Days by Site, Lock 15, 2008-2009

Activity	Spring	%	Summer	%	Fall	%	Yearly	%
Boating—canoe or kayak (a)	1,469	29%	1,173	18%	239	17%	2,881	22%
Shoreline Fishing	319	6%	157	2%	224	16%	700	5%
Picnicking	545	11%	616	9%	0	0%	1,161	9%
Running/ Walking	1,008	20%	1,749	27%	531	37%	3,289	25%
Swimming	0	0%	226	3%	0	0%	226	2%
Hunting	58	1%	66	1%	0	0%	124	1%
Horseback Riding	0	0%	0	0%	0	0%	0	0%
Biking	0	0%	0	0%	0	0%	0	0%
Sightseeing	1,405	28%	2,258	34%	447	31%	4,110	31%
Birding	93	2%	0	0%	0	0%	93	1%
Other	156	3%	327	5%	0	0%	482	4%
Total, Site-based Recreationists	5,054		6,572		1,441		13,066	
Boating—on headpond (b)	979		2,617		866		4,462	
Total, Observed at/from Site	**6,033**		**9,189**		**2,307**		**17,528**	

Note: There is no wintertime recreation use at Lock 15.

(a) Recreationists engaged in canoeing or kayaking are presumed to have launched from Lock 15.

(b) Recreationists engaged in boating on the headpond have launched from elsewhere within the Project, but were observed from Lock 15.

6.4.3 Muddy Creek Boat Launch

As would be expected, boating was the most popular activity (64 percent) at the Muddy Creek Boat Launch during the 2008-2009 recreation season. In the summer, boating was overwhelmingly the activity of choice, with a participation rate of 83 percent. In the spring, however, activity was more varied: boating (32 percent), hunting (25 percent), shoreline fishing (18 percent), walking/running (18 percent), and sightseeing (5 percent). Over the course of the year, shoreline fishing and hunting were enjoyed by similar proportions, 12 and 11 percent, respectively, of visitors to Muddy Creek Boat Launch. Less than one-tenth of the recreationists participated in running/walking, or sightseeing while at the site. Table 6.4.3-1 below summarizes the recreational activity by season at the Muddy Creek Boat Launch.

Table 6.4.3-1 Recreational Days by Season, Muddy Creek Boat Launch, 2008-2009

Activity	Spring	%	Summer	%	Fall	%	Winter	%	Yearly	%
Boating	3,458	32%	16,289	83%	4,338	63%	844	53%	24,929	64%
Shoreline Fishing	1,951	18%	1,330	7%	1,109	16%	182	12%	4,572	12%
Picnicking	37	<1%	0	0%	0	0%	0	0%	37	<1%
Running/ Walking	1,968	18%	166	1%	83	1%	44	3%	2,260	6%
Swimming	0	0%	0	0%	0	0%	0	0%	0	0%
Hunting	2,713	25%	1,368	7%	0	0%	0	0%	4,081	11%
Horseback Riding	0	0%	0	0%	0	0%	0	0%	0	0%
Biking	0	0%	0	0%	32	<1%	0	0%	32	<1%
Sightseeing	541	5%	0	0%	689	10%	439	28%	1,669	4%
Birding	0	0%	0	0%	0	0%	0	0%	0	0%
Other	37	<1%	368	2%	686	10%	72	5%	1,162	3%
Total	10,704		19,521		6,936		1,581		38,742	
Note: Figures may not total to 100 percent because of rounding.										

6.4.4 Cold Cabin Boat Launch

Boating was the most popular activity (44 percent) at the Cold Cabin Boat Launch during the 2008-2009 recreation season as a whole, as well as during the summer and fall seasons. During the summer, two-thirds of site visitors participated in boating. In the winter and spring, however, sightseeing was most popular, with 49 percent and 75 percent, respectively, of recreationists participating in that activity. Over the course of the year, sightseeing was enjoyed by 28 percent of the visitors, with running and/or walking enjoyed by 11 percent. Less than one-tenth of the recreationists participated in swimming (2 percent), shoreline fishing (1 percent), picnicking (1 percent), and biking (less than one percent) while at the site. An additional 13 percent of annual visitors engaged in "other activities", such as collecting driftwood or owner's checking on their cabins. Table 6.4.4-1 below provides a summary of recreation activities by season.

Table 6.4.4-1 Recreational Days by Season, Cold Cabin Boat Launch, 2008-2009

Activity	Spring	%	Summer	%	Fall	%	Winter	%	Yearly	%
Boating	566	17%	3,482	66%	1,196	46%	16	2%	5,260	44%
Shoreline Fishing	0	0%	150	3%	16	1%	0	0%	166	1%
Picnicking	116	4%	0	0%	0	0%	0	0%	116	1%
Running/ Walking	516	16%	226	4%	433	17%	88	10%	1,263	11%
Swimming	0	0%	258	5%	0	0%	0	0%	258	2%
Hunting	0	0%	0	0%	0	0%	0	0%	0	0%
Horseback Riding	0	0%	0	0%	0	0%	0	0%	0	0%
Biking	0	0%	0	0%	17	1%	0	0%	17	<1%
Sightseeing	1,600	49%	402	8%	651	25%	664	75%	3,316	28%
Birding	0	0%	0	0%	0	0%	0	0%	0	0%
Other	453	14%	744	14%	264	10%	111	13%	1,572	13%
Total	3,251		5,263		2,575		879		11,968	

Note: Figures may not total to 100 percent because of rounding.

6.4.5 Dorsey Park Boat Launch

Boating, as anticipated, was the most popular activity (42 percent) at the Dorsey Park Boat Launch during the 2008-2009 recreation season. Sightseeing was also popular at the site, with 31 percent of visitors to the boat launch taking part in that activity. "Other activities", such as lunch breaks in a vehicle, often occurred at the site. Recreationists also participated in shoreline fishing (4 percent) and running or walking (4 percent) while at Dorsey Park Boat Launch. Less than one percent of recreationists were observed picnicking, biking, swimming, birding or hunting while at the site. A summary of the recreation use by season at the Dorsey Park Boat Launch is presented in Table 6.4.5-1 below.

Table 6.4.5-1 Recreational Days by Season, Dorsey Park Boat Launch, 2008-2009

Activity	Spring	%	Summer	%	Fall	%	Winter	%	Yearly	%
Boating	965	34%	3,384	47%	2,086	40%	537	37%	6,972	42%
Shoreline Fishing	176	6%	368	5%	104	2%	0	0%	648	4%
Picnicking	0	0%	39	1%	95	2%	0	0%	134	1%
Running/ Walking	0	0%	422	6%	121	2%	109	7%	652	4%
Swimming	0	0%	39	1%	0	0%	0	0%	39	<1%
Hunting	0	0%	0	0%	0	0%	24	2%	24	<1%
Horseback Riding	0	0%	0	0%	0	0%	0	0%	0	0%
Biking	0	0%	13	<1%	17	<1%	0	0%	30	<1%
Sightseeing	956	34%	2,229	31%	1,364	26%	570	39%	5,120	31%
Birding	0	0%	0	0%	17	<1%	0	0%	17	<1%
Other	715	25%	777	11%	1,359	26%	217	15%	3,068	18%
Total	2,812		7,272		5,165		1,457		16,706	

6.4.6 Peach Bottom Marina

Boating is the primary activity at Peach Bottom Marina, as the site is operated as a commercial marina. The general public is allowed to launch at this site for a minimal fee. According to records maintained by the marina, 307 boats were launched from the site in 2008. Roughly three-quarters of the launches took place during the summer months (June through August). Just 4 percent of the launches occurred in May, the only spring month during which the marina was operating. The balance of the launches (21 percent) took place in the fall months of September and October. The marina was closed from November through April.

6.4.7 Line Bridge Access

During the 2008-2009 recreation season as a whole, walking/running was the most popular activity (27 percent) at the Line Bridge Access site. However, during the summer, more than one-third of the visitors participated in boating. In the winter sightseeing was most popular, with 72 percent of recreationists participating in that activity. Over the course of the year, sightseeing was enjoyed by 23 percent of the visitors, as was running and/or walking. Less than one-tenth of the recreationists participated in shoreline fishing (9 percent), picnicking (3 percent), hunting (less than 1 percent), and swimming (less than one percent) while at the site. An additional 24 percent of annual visitors engaged in "other activities", the majority of which were noted in the spring. Table 6.4.7-1 below summarizes the recreational activity by season at Line Bridge Access.

Table 6.4.7-1 Recreational Days by Season, Line Bridge Access, 2008-2009

Activity	Spring	%	Summer	%	Fall	%	Winter	%	Yearly	%
Boating—canoe or kayak	138	7%	503	34 %	84	6%	0	0%	725	13%
Shoreline Fishing	345	17 %	153	10 %	0	0%	0	0%	498	9%
Picnicking	0	0%	0	0%	168	11%	0	0%	168	3%
Running/ Walking	691	34 %	283	19 %	458	30%	146	19 %	1,577	27%
Swimming	0	0%	0	0%	14	1%	0	0%	14	<1%
Hunting	0	0%	0	0%	0	0%	73	9%	73	1%
Horseback Riding	0	0%	0	0%	0	0%	0	0%	0	0%
Biking	0	0%	0	0%	0	0%	0	0%	0	0%
Sightseeing	173	8%	163	11 %	433	29%	560	72 %	1,328	23%
Birding	0	0%	0	0%	0	0%	0	0%	0	0%
Other	691	34 %	371	25 %	345	23%	0	0%	1,406	24%
Total, Site-based Recreationists	2,038		1,472		1,501		779		5,790	
Boating—on headpond (b)	0		1,576		1,076		97		2,749	
Total, Observed at/from Site	2,038		3,048		2,577		876		8,539	

Note: Figures may not total to 100 percent because of rounding.
(a) Recreationists engaged in canoeing or kayaking are presumed to have launched from Lock 15.
(b) Recreationists engaged in boating on the headpond have launched from elsewhere within the project, but were observed from Lock 15.

6.4.8 Broad Creek Public Landing

Boating was the most popular activity (56 percent) at the Broad Creek Public Landing during the 2008-2009 recreation season as a whole, as well as during the spring, summer, and fall seasons. Boating use peaked in the summer, with 63 percent of visitors to site engaged in that activity. Sightseeing was the most popular activity during the winter months, with 39 percent participation during that time. Over the course of the year, shoreline fishing and sightseeing were popular with 15 percent each of the total recreation days spent at the location. Walking or running (8 percent), "other activities" (6 percent), and biking (less than 1 percent) were also observed. A summary of the recreation use by season at the Broad Creek Public Landing is presented in Table 6.4.8-1 below.

Table 6.4.8-1 Recreational Days by Season, Broad Creek Public Landing, 2008-2009

Activity	Spring	%	Summer	%	Fall	%	Winter	%	Yearly	%
Boating	1,279	58%	2,995	63%	1,210	49%	208	30%	5,692	56%
Shoreline Fishing	352	16%	1,060	22%	31	1%	87	13%	1,529	15%
Picnicking	0	0%	0	0%	0	0%	0	0%	0	0%
Running/ Walking	469	21%	153	3%	187	8%	21	3%	829	8%
Swimming	0	0%	0	0%	0	0%	0	0%	0	0%
Hunting	0	0%	0	0%	0	0%	0	0%	0	0%
Horseback Riding	0	0%	0	0%	0	0%	0	0%	0	0%
Biking	0	0%	12	<1%	0	0%	0	0%	12	<1%
Sightseeing	117	5%	466	10%	636	26%	266	39%	1,485	15%
Birding	0	0%	0	0%	0	0%	0	0%	0	0%
Other	0	0%	91	2%	397	16%	103	15%	592	6%
Total	2,216		4,778		2,461		684		10,138	

6.4.9 Conowingo Creek Boat Launch

Sightseeing was the most popular activity (46 percent) at the Conowingo Creek Boat Launch during the 2008-2009 recreation season as a whole, as well as during the fall, winter, and spring seasons. In the winter, the participation rate for sightseeing rose to 91 percent. During the summer, boating was most frequently the activity of choice, with a participation rate of 58 percent. Over the course of the year, one-quarter of the visitors to the Conowingo Creek Boat Launch participated in boating, while 15 percent enjoyed shoreline fishing. Less than one-tenth of the recreationists participated in running, walking, swimming, horseback riding, birding, or "other" activities while at the site. Table 6.4.9-1 below summarizes the recreational activity by season at the Conowingo Creek Boat Launch.

Table 6.4.9-1 Recreational Days by Season, Conowingo Creek Boat Launch, 2008-2009

Activity	Spring	%	Summer	%	Fall	%	Winter	%	Yearly	%
Boating	483	18%	1,815	58%	289	12%	59	3%	2,646	25%
Shoreline Fishing	870	32%	348	11%	314	13%	59	3%	1,591	15%
Picnicking	0	0%	0	0%	33	1%	0	0%	33	<1%
Running/ Walking	196	7%	149	5%	272	11%	52	2%	669	6%
Swimming	0	0%	66	2%	0	0%	0	0%	66	1%
Hunting	0	0%	0	0%	0	0%	0	0%	0	0%
Horseback Riding	0	0%	0	0%	16	1%	30	1%	46	<1%
Biking	0	0%	0	0%	0	0%	0	0%	0	0%
Sightseeing	1,148	43%	687	22%	869	36%	2,149	91%	4,853	46%
Birding	0	0%	41	1%	0	0%	0	0%	41	<1%
Other	0	0%	0	0%	648	27%	0	0%	648	6%
Total	2,696		3,108		2,441		2,349		10,594	
Note: Figures may not total to 100 percent because of rounding.										

6.4.9.1 Glen Cove Marina

Boating is the primary activity at Glen Cove Marina. According to records maintained by the marina, activity for 2008 included 204 boat launches, eight fishing tournaments (300 participants), and six group activities (50 participants). Seasonal data were not provided by the marina operator.

6.4.9.2 Funk's Pond

"Other activities" were recorded most frequently (36 percent) during spot counts and calibrations at Funk's Pond. These activities typically included talking on cell phones, smoke breaks, and stopping to eat lunch. Of identified activities, sightseeing was the most popular (28 percent). This was also the most frequently observed activity during the winter (52 percent). In the summer, shoreline fishing was the most popular activity

(46 percent). Throughout the year, shoreline fishing and walking and running were enjoyed by similar proportions, 15 percent, of the visitors to Funk's Pond. Less than one-tenth of the recreationists participated in hunting and picnicking while at the site. Table 6.4.9.2-1 below summarizes the recreational activity by season at Funk's Pond.

Table 6.4.9.2-1 Recreational Days by Season, Funk's Pond, 2008-2009

Activity	Spring	%	Summer	%	Fall	%	Winter	%	Yearly	%
Boating	0	0%	0	0%	0	0%	0	0%	0	0%
Shoreline Fishing	0	0%	414	46%	30	2%	196	17%	640	15%
Picnicking	0	0%	28	3%	0	0%	0	0%	28	1%
Running/ Walking	0	0%	216	24%	461	26%	0	0%	677	15%
Swimming	0	0%	0	0%	0	0%	0	0%	0	0%
Hunting	0	0%	0	0%	247	14%	0	0%	247	6%
Horseback Riding	0	0%	0	0%	0	0%	0	0%	0	0%
Biking	0	0%	0	0%	0	0%	0	0%	0	0%
Sightseeing	276	48%	220	24%	147	8%	587	52%	1,229	28%
Birding	0	0%	0	0%	0	0%	0	0%	0	0%
Other	300	52%	28	3%	876	50%	354	31%	1,559	36%
Total	576		906		1,762		1,137		4,381	
Note: Figures may not total to 100 percent because of rounding.										

6.4.9.3 Conowingo Swimming Pool

The Conowingo Swimming Pool facility includes, in addition to the swimming and wading pools, a playground and picnic area. Data for 2008, however, were only collected for the swimming pool by the facility operator. In 2008, an estimated 8,471 recreational days were spent at the pool.

6.4.9.4 Fisherman's Park

Sightseeing (41 percent) and shoreline fishing (34 percent) were the activities observed most frequently at Fisherman's Park. In the summer, shoreline fishing led in popularity, with more than half of the recreationists participating in that activity. Shoreline fishing was enjoyed frequently in the spring and fall, by 36 percent and 33 percent, respectively, of visitors. Birding peaked in popularity in the winter, with a 39 percent participation rate. Less than one-tenth of the visitors were observed running or walking (4 percent), biking (2 percent), boating (1 percent), or enjoying "other activities" (3 percent). Table 6.4.9.4-1 below shows the participation rates for various recreational activities at the park.

Table 6.4.9.4-1 Recreational Days by Season, Fisherman's Park, 2008-2009

Activity	Spring	%	Summer	%	Fall	%	Winter	%	Yearly	%
Boating	134	1%	813	2%	325	1%	76	<1%	1,347	1%
Shoreline Fishing	8,724	36%	26,227	51%	12,486	33%	1,131	4%	48,568	34%
Picnicking	0	0%	0	0%	0	0%	0	0%	0	0%
Running/ Walking	544	2%	1,341	3%	2,110	5%	1,992	7%	5,987	4%
Swimming	0	0%	0	0%	22	<1%	0	0%	22	<1%
Hunting	0	0%	0	0%	0	0%	51	<1%	51	<1%
Horseback Riding	0	0%	0	0%	0	0%	0	0%	0	0%
Biking	99	<1%	2,101	4%	950	2%	132	<1%	3,282	2%
Sightseeing	13,758	57%	16,486	32%	13,816	36%	13,514	49%	57,574	41%
Birding	0	0%	3,240	6%	7,017	18%	10,877	39%	21,134	15%
Other	981	4%	948	2%	1,686	4%	0	0%	3,615	3%
Total	24,240		51,155		38,413		27,772		141,580	
Note: Figures may not total to 100 percent because of rounding.										

6.4.9.5 Octoraro Creek Access

The recreational activities at the Octoraro Creek Access site during the 2008-2009 recreation season were diverse. Most popular were running and walking (27 percent) and shoreline fishing (26 percent). Shoreline fishing was most frequently enjoyed in the spring (70 percent) and summer (63 percent). Running and walking peaked in popularity in the winter, with 67 percent of the visitors participating in the activity. Sightseeing (13 percent of annual use), birding (12 percent), and "other activities" (10 percent) were also noted at the site. Hunting accounted for 14 percent of the visitors to Octoraro Creek Access in the fall, with a total of 6 percent annually. Limited canoeing and kayaking took place during the summer (6 percent) and fall (8 percent). Table 6.4.9.5-1 below shows the participation rates for various recreational activities at the access site.

Table 6.4.9.5-1 Recreational Days by Season, Octoraro Creek Access, 2008-2009

Activity	Spring	%	Summer	%	Fall	%	Winter	%	Yearly	%
Boating—canoe or kayak	0	0%	140	6%	235	8%	0	0%	375	5%
Shoreline Fishing	141	70%	1,564	63%	205	7%	38	2%	1,948	26%
Picnicking	0	0%	0	0%	29	1%	0	0%	29	<1%
Running/ Walking	22	11%	262	11%	470	16%	1,271	67%	2,025	27%
Swimming	0	0%	0	0%	0	0%	0	0%	0	0%
Hunting	0	0%	0	0%	414	14%	38	2%	451	6%
Horseback Riding	0	0%	0	0%	29	1%	0	0%	29	<1%
Biking	5	2%	24	1%	14	1%	0	0%	43	1%
Sightseeing	22	11%	231	9%	286	10%	421	22%	959	13%
Birding	0	0%	165	7%	696	24%	0	0%	861	12%
Other	12	6%	100	4%	510	18%	141	7%	764	10%
Total	201		2,486		2,889		1,909		7,485	
Note: Figures may not total to 100 percent because of rounding.										

6.4.9.6 Summary of Conowingo Project Recreation Activities

Project-wide, the top three recreation activities observed during the 2008-2009 study were sightseeing (29 percent of total use), shoreline fishing (22 percent), and boating (21 percent). Together, these three activities accounted for more than 7 out of every 10 visitors to the Conowingo Project during the study period. Birding (8 percent), running/walking (7 percent), "other activities" (5 percent), swimming (3 percent), hunting (2 percent), biking (1 percent), and picnicking (1 percent) were also observed at the Project. Table 6.4.9.6-1 summarizes the annual number of recreation days per activity spent each at each site. The project-wide participation rates are additionally provided.

Table 6.4.9.6-1 Recreation Activity in Terms of Recreation Days by Location, Project Summary, 2008-2009

	Boating	Shoreline Fishing	Picnic	Walking/ Running	Swimming	Hunting
Broad Creek	5,692	1,529	0	829	0	0
Cold Cabin	5,260	166	116	1,263	258	0
Conowingo Creek	2,646	1,591	33	669	66	0
Conowingo Pool	0	0	0	0	8,471	0
Dorsey Park	6,972	648	134	652	39	24
Fisherman's Park	1,347	48,568	0	5,987	22	51
Funks Pond	0	640	28	677	0	247
Glen Cove Marina	707	0	0	0	0	0
Line Bridge (b)	3,466	356	168	1,277	14	73
Lock 13	0	257	0	294	0	0
Lock 15 (b)	7,343	700	1,161	3,289	226	124
Muddy Creek Boat Launch	24,929	4,572	37	2,260	0	4,081
Octoraro Creek	375 (a)	1,948	29	2,025	0	451
Peach Bottom Marina	537	0	0	0	0	0
Total	59,283	61,118	1,706	19,521	9,096	5,052
Participation Rate	21%	22%	1%	7%	3%	2%

(a) Includes canoeing and kayaking only.
(b) Includes boating on the headpond in the vicinity of the recreation site.

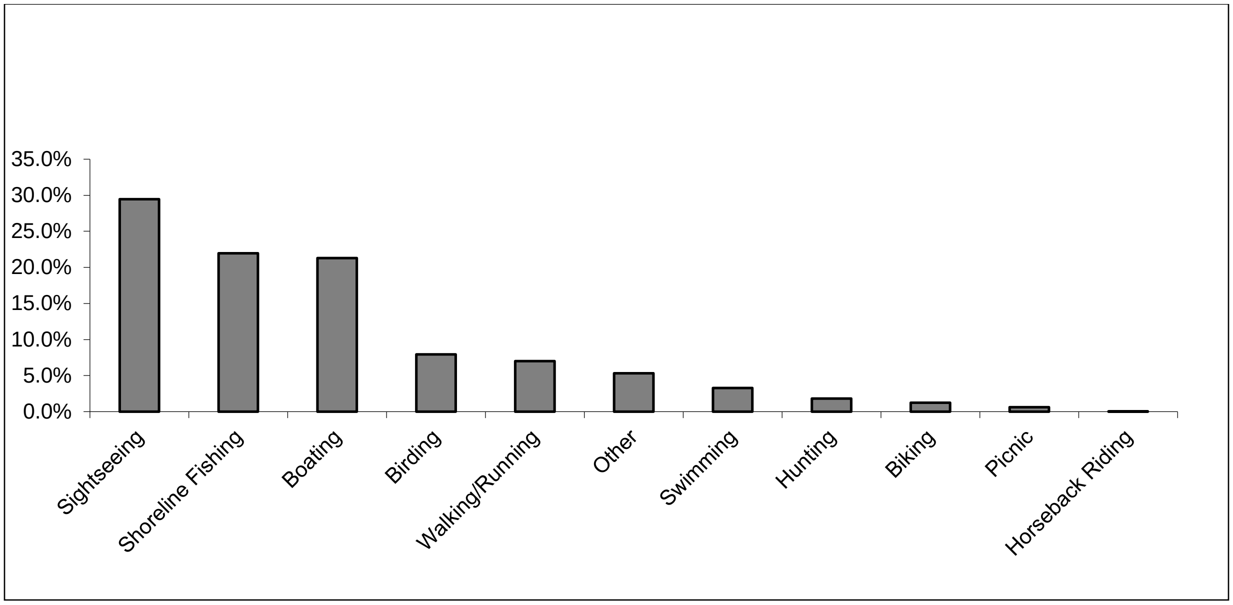
Table 6.4.9.6-1 (Continued)

	Horseback Riding	Biking	Sight-seeing	Birding	Other	Total
Broad Creek	0	12	1,485	0	592	10,138
Cold Cabin	0	17	3,316	0	1,572	11,968
Conowingo Creek	46	0	4,853	41	648	10,594
Conowingo Pool	0	0	0	0	0	8,471
Dorsey Park	0	30	5,120	17	3,068	16,706
Fisherman's Park	0	3,282	57,574	21,134	3,615	141,580
Funks Pond	0	0	1,229	0	1,559	4,381
Glen Cove Marina	0	0	0	0	0	707
Line Bridge (b)	0	0	1,249	0	1,936	8,539
Lock 13	0	0	231	0	0	782
Lock 15 (b)	0	0	4,110	93	482	17,528
Muddy Creek Boat Launch	0	32	1,669	0	1,162	38,742
Octoraro Creek	29	43	959	861	764	7,485
Peach Bottom Marina	0	0	0	0	0	537
Total	75	3,416	81,876	22,147	14,869	278,158
Participation Rate	0%	1%	29%	8%	5%	

(b) Includes boating on the headpond in the vicinity of the recreation site.

Figure 6.4-1 below illustrates the participation rates for the activities at the Conowingo Project.

Figure 6.4-1: Participation Rates for Recreation Activities, Project Summary Conowingo Project, 2008-2009



6.5 Facility Capacity of Project Recreation Facilities

The FERC Form 80 requires estimates of facility capacity for all available recreational resources. This figure, expressed as a percentage, is calculated by comparing the average total amount of weekend use during the summer recreation season with the total combined capacity of these resources to handle such use. The sections that follow present the capacities for public recreation facilities within the Conowingo Project boundary.

6.5.1 Lock 13 Day Use

The percent capacity use was calculated for the average weekend day use at Lock 13 during the summer recreation season. Table 6.5.1-1 below presents the facility capacity at the parking area at the site, along with the recreational activity supported. As shown below, the parking lot was only at 5 percent capacity during the summer on an average weekend. The peak use recorded was 3 spaces (14 percent).

Table 6.5.1-1 Parking Lot Capacity and Use, Lock 13, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Lock 13	Access area	22	1	5%

6.5.2 Lock 15 Day Use

At Lock 15 the parking lot was only at 3 percent capacity during the summer on an average weekend. The peak use recorded was 5 spaces (14 percent). Table 6.5.2-1 below presents the facility capacity at the parking area at the site, and the corresponding recreational activities supported.

Table 6.5.2-1 Parking Lot Capacity and Use, Lock 15, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Lock 15	Park, trail, picnic area, interpretative display	36	1	3%

6.5.3 Muddy Creek Boat Launch

The percent capacity use was calculated for average weekend day use at Muddy Creek Boat Launch during the summer recreation season. As shown below, the parking lot was at 45 percent capacity during the summer on an average weekend. The peak use recorded was 55 spaces (80 percent). The parking area's facility capacity and the recreational activities supported are shown in Table 6.5.3-1.

Table 6.5.3-1 Parking Lot Capacity and Use, Muddy Creek Boat Launch, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Muddy Creek Boat Launch	Boat launch, 2 boat launch lanes, 1 interpretative display	69	31	45%

6.5.4 Cold Cabin Boat Launch

The Cold Cabin Boat Launch's parking lot was at full capacity during the summer on an average weekend. The peak use recorded was 6 spaces (20 percent over capacity) on a single weekend[5]. Table 6.5.4-1 below presents the facility capacity at the parking area at the site and the associated recreational activities.

Table 6.5.4-1 Parking Lot Capacity and Use, Cold Cabin Boat Launch, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Cold Cabin Boat Launch	Boat launch, 1 boat launch lane, 1 park	5	5	100%

[5] FERC notes in its Form 80 instructions that on peak use weekends "recreation use may exceed the capacity to handle such use." While the weekend on which maximum use was observed was not technically a Peak Use Weekend (i.e., the Fourth of July) within the Conowingo Project, it was the peak use for the facility. Over the Fourth of July weekend, the peak use observed was 3 spaces.

6.5.5 Dorsey Park Boat Launch

The parking lot at the Dorsey Park Boat Launch was only at 11 percent capacity during the summer on an average weekend. The peak use recorded was 34 spaces (60 percent). Table 6.5.5-1 below presents the parking area's facility capacity, along with the recreational activities supported.

Table 6.5.5-1 Parking Lot Capacity and Use, Dorsey Park Boat Launch, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Dorsey Park Boat Launch	2 boat launches, 2 boat launch lanes, 1 park, 1 picnic area, 1 interpretative display	57	6	11%

6.5.6 Peach Bottom Marina

For the Peach Bottom Marina, the percent capacity use was calculated for average weekend day use during the summer recreation season. As shown below, the parking lot was only at an estimated 15 percent capacity during the summer on an average weekend, based on boat launch data provided by the Marina operator[6]. The marina's facility capacity for parking and its associated recreational activities are presented below in Table 6.5.6-1.

Table 6.5.6-1 Parking Lot Capacity and Use, Peach Bottom Marina, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Peach Bottom Marina	1 boat launch, 1 boat lane, 1 marina	48	7	15%

[6] Maximum use data was not provided by the Marina operator.

6.5.7 Line Bridge Access

The three-space parking lot at Line Bridge Access was at full capacity during the summer on an average weekend. The peak use recorded was 7 spaces (233 percent)[7]. The parking lot at Line Bridge Access was observed to be over capacity at two of the 16 summer spot checks and three of the 19 fall spot checks. However, excess capacity was noted at all spring and winter spot checks. Table 6.5.7-1 below presents the parking area's facility capacity and the recreational activities supported.

Table 6.5.7-1 Parking Lot Capacity and Use, Line Bridge Access, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Line Bridge Access	Access area	3	3	100%

6.5.8 Broad Creek Public Landing

The percent capacity use was calculated for average weekend day use at Broad Creek Public Landing during the summer recreation season. As shown below, the parking lot was only at 12 percent capacity during the summer on an average weekend. The peak use recorded was 12 spaces (29 percent). Table 6.5.8-1 below presents the facility capacity at the parking area at the site and the recreational activities supported.

Table 6.5.8-1 Parking Lot Capacity and Use, Broad Creek Public Landing, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Broad Creek Public Landing	1 boat launch, 1 boat launch lane, 1 picnic area,	41	4	12%

[7] Observed during one weekend in the fall.

6.5.9 Conowingo Creek Boat Launch

As shown below, the parking lot at the Conowingo Boat Launch was only at 16 percent capacity during the summer on an average weekend. The peak use recorded was 9 spaces (47 percent). Table 6.5.9-1 below presents the facility capacity at the parking area at the site, along with the recreational activities supported.

Table 6.5.9-1 Parking Lot Capacity and Use, Conowingo Creek Boat Launch, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Conowingo Creek Boat Launch	1 boat launch, 4 boat launch lanes	19	3	16%

6.5.10 Glen Cove Marina

For the Glen Cove Marina, the parking lot was at an estimated 47 percent capacity during the summer on an average weekend, based on private fishing tournament data provided by the Marina operator[8]. The facility capacity at the marina's parking area and the recreational activities supported are shown in Table 6.5.10-1.

Table 6.5.10-1 Parking Lot Capacity and Use, Glen Cove Marina, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Glen Cove Marina	1 boat launch, 1 boat lane, 1 marina	47	22	47%

6.5.11 Funk's Pond

At Funk's Pond, the parking lot was only at 8 percent capacity during the summer on an average weekend. The peak use recorded was 7 spaces (29 percent). Table 6.5.11-1 below presents the facility capacity at the parking area at the site and the recreational activities supported.

[8] Maximum use data was not provided by the Marina operator.

Table 6.5-11 Parking Lot Capacity and Use, Funk's Pond, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Funk's Pond	Access area, 1 trail, 1 picnic area	24	2	8%

6.5.12 Conowingo Swimming Pool

At the Conowingo Swimming Pool, the parking lot was only at 38 percent capacity during the summer on an average weekend, based on the data received from the swimming pool operator[9]. Table 6.5.12-1 below presents the facility capacity at the parking area at the site and the recreational activities supported.

Table 6.5.12-1 Parking Lot Capacity and Use, Conowingo Swimming Pool, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Conowingo Swimming Pool	1 park, 1 playground, 1 picnic area, 1 visitors' center, 1 interpretative display, 1 "other" facility (swimming and wading pools)	213	80	38%

6.5.13 Fisherman's Park

The percent capacity use was calculated for average weekend day use at Fisherman's Park during the summer recreation season. As shown below, the parking lot was only at 27 percent capacity during the summer on an average weekend. The peak use recorded was 72 spaces (58 percent). The facility capacity at the parking area at the site and the associated recreational activities are presented in Table 6.5.13-1.

[9] The average weekend use presented here provides the upper range of use, as all daily visitors to the facility are assumed to be there at the same time. In actuality, as visitors come and go throughout the day, the number of parking spaces used will fluctuate. Maximum use data was not provided by the swimming pool operator.

Table 6.5.13-1 Parking Lot Capacity and Use, Fisherman's Park, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Conowingo Fisherman's Park	1 boat launch, 1 boat launch lane, tailwater fishing, 1 picnic area, wildlife area, 1 interpretative display,	124	34	27%

6.5.14 Octoraro Creek Access

As shown below, the parking lot for the Octoraro Creek Access site was at 17 percent capacity during the summer on an average weekend. The peak use recorded was 15 spaces (125 percent). The peak use occurred on a weekend in November. At this time, 14 of the vehicles present belonged to those associated with a birding group that was visiting the site. During the other spot checks throughout the year, the maximum number of parking spaces utilized at a given time was five (42 percent of available capacity). Table 6.5.14-1 below presents the facility capacity at the parking area at the site, along with the recreational activities supported.

Table 6.5.14-1 Parking Lot Capacity and Use, Octoraro Creek Access, 2008-2009

Recreation Facility	Recreational Activities Supported	Total Available Spaces	Average Spaces Used, Summer Weekend	Percent Use
Octoraro Creek Access	Access site, trail, 1 interpretative display	12	2	17%

6.6 Summary of Facility Capacity at the Conowingo Project

The usage data from the above areas were combined by recreational resource to develop facility capacity for each of the resource types available at within the boundary of the Conowingo Project. Project-wide facility use and capacity summary are presented in Table 6.6-1, shown below.

Table 6.6-1 Facility Use and Capacity, Summary, 2008-2009

Recreation Resource Type	Total Available Spaces (a)	Average Spaces Used, Summer Weekend	Facility Capacity, rounded
Access Areas	61	8	20%
Boat Launch Areas	410	112	30%
Boat Launch Lanes	410	112	30%
Marinas	95	29	40%
Tailwater Fishing Facilities	124	34	30%
Parks	311	92	30%
Playground Areas	213	80	40%
Trails	72	5	10%
Picnic Areas	547	154	30%
Wildlife Area	124	34	30%
Visitor Centers	213	80	40%
Interpretive Displays	511	154	40%
Other	337	114	40%

(a) As shown in the tables above, parking lots typically provide access for multiple recreation activities. Therefore, the capacity associated with a given lot may appear multiple times on this table.

7.0 Projected Recreation Demands

7.1 Projection of Project Recreation Days

To evaluate the ability of the facilities at the Conowingo Project to meet future recreation demands, projections were made through the year 2050 of growth in recreation days by activity at each location. The projections are based on growth coefficients developed as part of *Projections of Outdoor Recreation Participation to 2050*, published by the U. S. Department of Agriculture (USDA) Forest Service, uses a combination of population, income, age, gender, and ethnicity to develop projected regional growth rates for various recreational activities. Table 7.1-1 below presents the activity-specific growth rates.

Table 7.1-1 Recreation Projection Index, through 2050 (a) Northeast Region

Recreation Resource Type	2000	2008 (b)	2010	2050	Growth Factor, 2008 to 2050
Boating—general	1.00	1.02	1.03	1.20	1.17
Canoe/kayak	1.00	1.11	1.14	1.78	1.60
Biking	1.01	1.08	1.09	1.55	1.44
Shoreline Fishing	1.00	1.04	1.05	1.29	1.24
Picnic	1.00	1.06	1.07	1.23	1.17
Walking-Running	1.04	1.12	1.14	1.52	1.36
Camping	1.00	1.0	1.09	1.32	1.32
Hunting	0.98	1.00	1.01	1.12	1.12
Horseback Riding	1.03	1.12	1.14	2.03	1.82
Sight-seeing	1.04	1.22	1.27	1.80	1.48
Birding	1.04	1.18	1.22	1.76	1.49

(a) Source: Bowker, J. M., Donald B. K. English, H. Ken Cordell. *Projections of Outdoor Recreation Participation to 2050*, published by the USDA Forest Service, Athens, GA.
(b) Interpolated from the projected change between 2000 and 2010.

As shown above, the activities that are anticipated to have the greatest increases in demand are horseback riding (82 percent growth), canoeing or kayaking (60 percent), birding (49 percent growth), sightseeing (48 percent), and biking (44 percent). The lowest growth rates are projected for general boating (17 percent), picnicking (17 percent), and hunting (12 percent).

These growth coefficients were used to project recreation activity by site through 2050. Recreational use from Section 6.4 serves as the baseline 2008 numbers from which the projections were made. Table 7.1-2 below presents the projected number of recreation days for the year 2050 by activity for each site in the Conowingo Project.

Table 7.1-2 Recreation Activity in Terms of Recreation Days by Location, Summary, 2050 (a)

	Boating	Shoreline Fishing	Picnic	Walking/ Running	Swimming	Hunting	Horse-back Riding	Biking	Sight-seeing	Birding	Other	Total	Growth from 2008
Broad Creek	6,670	1,897	0	1,125	0	0	0	18	2,190	0	790	12,691	25%
Cold Cabin	6,165	206	135	1,716	340	0	0	24	4,892	0	2,100	15,576	30%
Conowingo Creek	3,101	1,974	38	908	87	0	84	0	7,159	62	865	14,279	35%
Conowingo Pool	0	0	0	0	4,966	0	0	0	0	0	0	4,966	32%
Dorsey Park	8,171	804	156	886	51	27	0	44	7,553	26	4,099	21,817	31%
Fisherman's Park	1,579	60,254	0	8,130	29	57	0	4,738	84,928	31,477	4,830	196,022	38%
Funks Pond	0	794	33	919	0	276	0	0	1,814	0	2,083	5,918	35%
Glen Cove Marina	829	0	0	0	0	0	0	0	0	0	0	829	17%
Line Bridge	4,384 (c)	618	196	2,142	18	81	0	0	1,959	0	1,879	11,277	32%
Lock 13	0	319	0	399	0	0	0	0	341	0	0	1,059	35%
Lock 15	9,847 (c)	868	1,353	4,466	298	139	0	0	6,063	139	644	23,817	36%
Muddy Creek Boat Launch	29,216	5,672	43	3,069	0	4,552	0	46	2,463	0	1,552	46,614	20%
Octoraro Creek	601 (b)	2,417	34	2,750	0	504	53	62	1,415	1,283	1,020	10,138	35%
Peach Bottom Marina	629	0	0	0	0	0	0	0	0	0	0	629	17%
Total	71,193	75,824	1,987	26,510	11,985	5,636	136	4,932	120,776	32,986	19,882	371,841	34%
Participation Rate	19%	20%	1%	7%	3%	2%	0%	1%	32%	9%	5%		

(a) Based on the growth factors shown in Table 7.1-1 and the 2008 recreation activity presented in Table 6.5.19-1.

(b) Includes canoeing and kayaking only.

(c) Includes boating on the headpond in the vicinity of the recreation site, as well as canoeing and kayaking.

As shown in the table above, the participation rates will change over time as the level of growth (or decline) varies from activity to activity. By 2050, sightseeing is anticipated to occupy a larger share of visitor days. Both shoreline fishing and boating are expected to decline, with shoreline fishing decreasing from 22 percent to 20 percent and boating from 21 percent to 19 percent over the next four decades. The percentage of visitors to the Project engaging in running or walking is expected to remain steady at 7 percent.

As shown in the last column of the above table, these differences in demands for activities will result in varying growth rates for the recreation sites. Glen Cove Marina, Muddy Creek Boat Launch, and Peach Bottom Marina, which are all closely tied to boating, are expected to experience the slowest growth, with an anticipated 17 percent increase from 2008 to 2050 in total recreation days spent at the sites. Fisherman's Park (38 percent growth) is forecasted to have the largest increase in visitors within the Project area. Project-wide, recreation demand, in terms of recreation days, is projected to increase by more than one-third from 278,158 in 2008 to 371,841 in 2050.

7.2 Projection of Facility Capacity

The-site specific growth rates presented above are the basis for projecting 2050 parking lot demand figures, in terms of average summer weekend use. Table 7.2-1 presents the level of parking lot use projected for 2050 at each site within the Conowingo Project.

Table 7.2-1 Potential Average Weekend Summer Parking Lot Use by Location, Summary, 2050

	Available Spaces	2008 Average Summer Use	Projected 2050 Average Summer Use (a)	Projected Percentage of Use 2050 (a)
Broad Creek	41	4	5	12%
Cold Cabin	5	5	7	140%
Conowingo Creek	19	3	4	21%
Conowingo Pool	213	80	105	49%
Dorsey Park	57	6	8	14%
Fisherman's Park	124	34	47	38%
Funks Pond	24	2	3	13%
Glen Cove Marina	47	22	26	55%
Line Bridge	3	3	4	133%
Lock 13	22	1	1	5%
Lock 15	36	1	1	3%
Muddy Creek Boat Launch	69	31	37	54%
Octoraro Creek	12	2	3	25%
Peach Bottom Marina	48	7	8	17%
Total	720	201	259	36%

(a) Based on growth rates presented in last column of 7.1-1.

As shown in the table above, it is projected that the majority of the recreation sites at the Conowingo Project will be under-capacity on the average summer weekend in 2050. Two-thirds of the sites are anticipated to be less than half-filled on those weekend days. Only two sites are expected to exceed capacity at that point in the future: Cold Cabin and Line Bridge. At each of these, the number of additional parking spaces needed to fully accommodate the projected growth in average summer weekend use over the next four decades is very small: Cold Cabin may require 2 additional spaces and Line Bridge 1 additional space.

The usage data from the above areas were combined by recreational resource to develop facility capacity for each of the resource types available at the Conowingo Project. This summary is provided in Table 7.2-2 below.

Table 7.2-2 Potential Facility Use and Capacity, Summary, 2050

Recreation Resource Type	Total Available Spaces (a)	2008 Average Spaces Used, Summer Weekend	2050 Average Spaces Used, Summer Weekend	Facility Capacity, rounded
Access Areas	61	8	11	20%
Boat Launch Areas	410	112	142	40%
Boat Launch Lanes	410	112	142	40%
Marinas	95	29	34	40%
Tailwater Fishing Facilities	124	34	47	40%
Parks	311	92	121	40%
Play-ground Areas	213	80	105	50%
Trails	72	5	7	10%
Picnic Areas	547	154	202	40%
Wildlife Area	124	34	47	40%
Visitor Centers	213	80	105	50%
Interpretive Displays	511	154	201	50%
Other	337	114	152	50%

(a) As shown in the tables presented in Section 6, parking lots typically provide access for multiple recreation activities. Therefore, the capacity associated with a given lot may appear multiple times on this table.

For each recreation resource type, the growth presented in the table above includes increases in parking lot demands from all types of recreation. For example, the parking lot at Fisherman's Park that serves the boat launch area also provides space for those sightseeing. While boating is expected to increase somewhat slowly (17 percent) over the next four decades, sightseeing is anticipated to grow much more quickly (48 percent). Therefore, the growth in sightseeing will place additional demands on the parking lot that is used by those launching boats.

By 2050, it is projected that for each type of recreation resource at the Conowingo Project, parking facility use will average 50 percent or less on weekend summer days. That is, while individual lots may be more heavily used, in terms of percentages, ample parking will be available for recreationists to enjoy any of the recreation resource types the Project offers. With so many of the projects sites underutilized, it would be expected that as demand pressures rose at the more heavily utilized (in terms of percentages) areas, recreationists would shift to facilities with more capacity. However, Exelon will continue to collect Form 80 data over the term of the license and should that data, or evidence of need for additional recreation capacity otherwise become apparent, an appropriate license amendment application will be filed.

8.0 Recommendations and Proposed Enhancements

8.1 Agency Recommendations

Exelon has received comments and recommendations from agencies and other interested parties on recreation measures and facilities throughout the license application process for the Conowingo Project. The following summarizes the consultation process and comments received. Complete copies of all letters, meeting minutes, and e-mails are included in Appendix 1, including comments pertaining to recreation that were received during the Shoreline Management Plan consultation process.

8.2 User Preference Surveys

To get an understanding of recreationists' demand for improved and/or additional facilities, a focused survey instrument was developed to measure user satisfaction and additional demand at the sites. Exelon conducted user preference surveys from April 2010 to May 2011 at Lock 13, Lock 15, Muddy Creek Boat Launch, Cold Cabin Boat Launch, Dorsey Park, Line Bridge, Broad Creek Public Landing, Conowingo Creek Boat Ramp, Funk's Pond, Fisherman's Park, Lower Susquehanna Heritage Greenway, Octoraro Creek Access, Deer Creek Access, Lapidum Boat Launch, and McLhinney Park.[10]

The user perception survey protocol and field schedule was designed to maximize response rates. During the Form 80 data collection, no or low use was observed at some sites during a particular season or seasons. The results of the 2008-09 FERC Form 80 data collection were used to identify times when recreationists used Project facilities. This identified, by site, when (weekday vs. weekend day) recreationists used each facility on a seasonal basis, and allowed Exelon to develop a user preference survey field schedule for when users were apt to be on site in order to maximize survey response rates. The frequency user preference surveys were conducted at Project recreation facilities based on a site's share of use during 2008-09. If a site's seasonal share of use

[10] The Lower Susquehanna Heritage Greenway, Deer Creek, Lapidum, and McLhinney sites were included in the survey and the results presented herein, but have subsequently removed from the Project boundary.

was less than 10 percent, surveys were not conducted at that site for that particular season. For sites where seasonal share of use was 10 percent or greater, share of use between weekday and weekend day for 2008-09 was calculated to determine site user preference survey frequency.

Survey days were randomly selected using a random number generator. Surveys were conducted at different times of the selected days throughout the study period to capture site activity that may vary depending on time of day. For Muddy Run Park, survey cards were distributed to park users from the gatehouse at the park entrance. Survey form return boxes were conveniently located throughout the park. For the remaining sites, field staff was on-site for 2.5 to 3.5 hours on each survey day to administer the survey to willing participants.

Visitors were asked to assign ratings from one (poor) to five (excellent) for parking, maintenance, fishing, and overall quality of the facility. Respondents were specifically asked to explain any poor ratings they may have provided. An opportunity was given to specify desired improvements at the site, as well as any project-wide changes. All additional comments the recreationists wanted to make also were accepted and recorded.

These ratings were tabulated by season to provide an average assessment of the qualities of the recreation sites, as viewed by the recreationists. The distribution of ratings was also analyzed. Finally, comments were reviewed to identify areas of concern the visitors may have. A user preference survey form is included in Appendix 2.

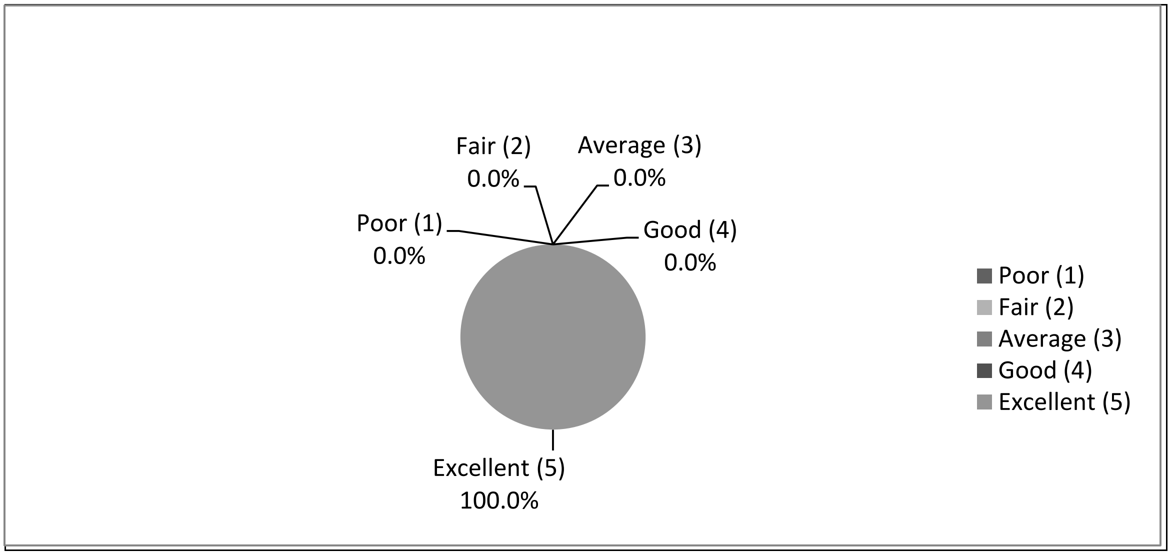
8.2.1 User Preference Survey Results

8.2.1.1 Project Recreation Facilities

Lock 13

At Lock 13, a typically low-use recreation site, walking was the only activity noted by interview during the 2010-2011 survey period. All of the recreationists who completed the questionnaire rated the overall facilities at the site as excellent (a *five*), as shown in Figure 8.1 below. The individual aspects of parking, maintenance, and fishing received all excellent ratings as well. Only one request was made by recreationists surveyed at Lock 13: clean up the broken glass.

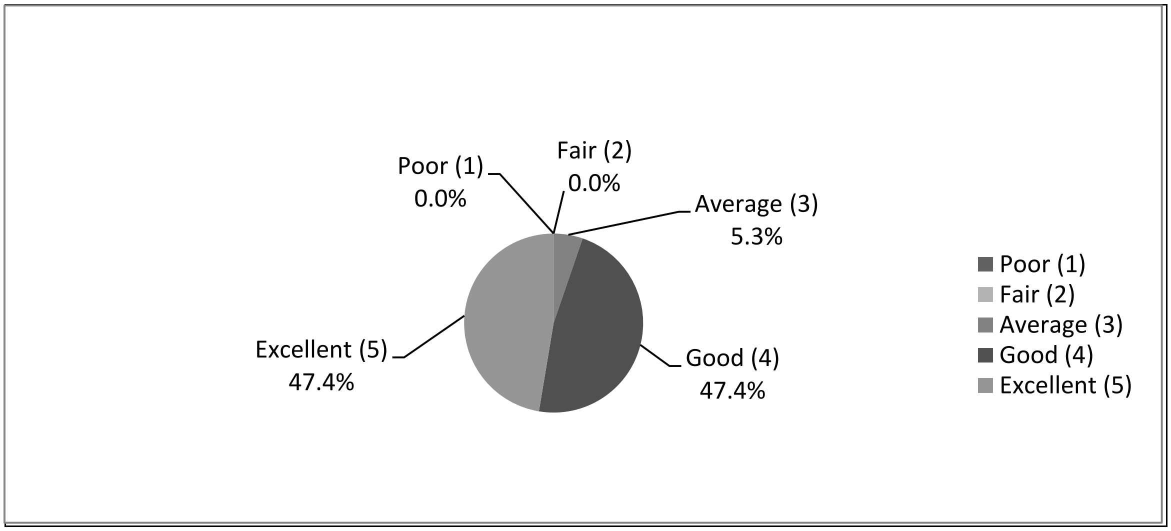
Figure 8.1: Recreation User Facility Perception, Conowingo Project: Lock 13, 2010-2011



Lock 15

During the 2010-2011 survey period, kayaking was noted most frequently as the primary activity recreationists enjoyed at Lock 15. Walking was also popular at the site. Ninety-five percent of those surveyed rated the overall facilities at Lock 15 as good (a *four*) or excellent (a *five*), with opinion divided equally between the two ratings. None of the respondents rated the overall facilities as fair (a *two*) or poor (a *one*). The average rating for the site as a whole was 4.4. Figure 8.2 below presents the distribution of ratings given to Lock 15 by recreationists visiting the site.

Figure 8.2: Recreation User Facility Perception, Conowingo Project: Lock 15, 2010-2011



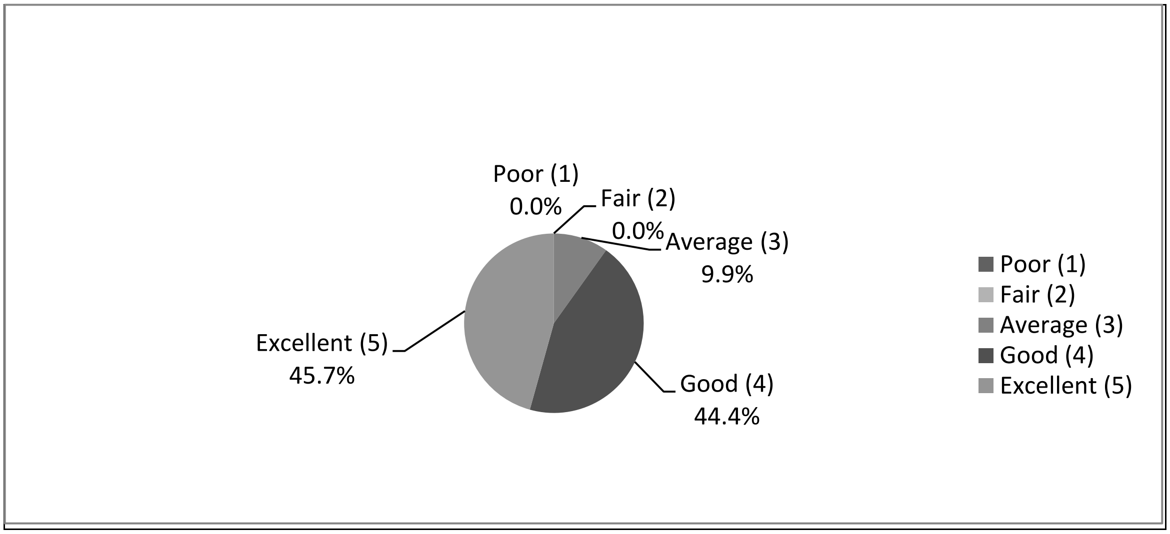
Note: Figures do not sum to 100 percent because of rounding.

Fishing received the lowest average rating of 4.3, with the ratings being somewhat lower in the spring (4.2) than in the summer (4.5). Maintenance and parking received similar scores from recreationists, averaging 4.4 across the recreational period surveyed. Roughly 90 percent of interviewed visitors considered the various aspects of Lock 15 to be good (4) or excellent (5). None of those surveyed assigned the ratings of fair (2) or poor (1). Few comments were received requesting improvements at Lock 15, which boasts overall high levels of satisfaction. One comment each was received related to expanded fishing access, a dedicated ramp for kayaks, minor trash issues, and the need for trash cans.

Muddy Creek Boat Launch

During the 2010-2011 survey period, boating/fishing was noted by surveyors as the primary activity recreationists enjoyed at the Muddy Creek Boat Launch. Kayaking was also quite popular. Ninety percent of those surveyed rated the overall facilities at the boat launch as good (a *four*) or excellent (a *five*). None of the respondents rated the overall facilities as fair (a *two*) or poor (a *one*). The average rating for the site as a whole was 4.5. The spring recreationists rated the site the highest (4.5), with the summer visitors rating Muddy Creek Boat Launch at 4.2. Figure 8.3 summarizes the distribution of user ratings at the site.

Figure 8.3: Recreation User Facility Perception, Conowingo Project: Muddy Creek Boat Launch, 2010-2011



Maintenance and fishing both had average ratings of 4.2. Parking was perceived as the strongest aspect of the site, with a 4.4 average rating. Each of these three areas was considered to be excellent (5) or good (4) by more than 80 percent of those interviewed. A few visitors rated parking, maintenance, and/or fishing at the Muddy Creek Boat launch as either fair (2) or poor (1).

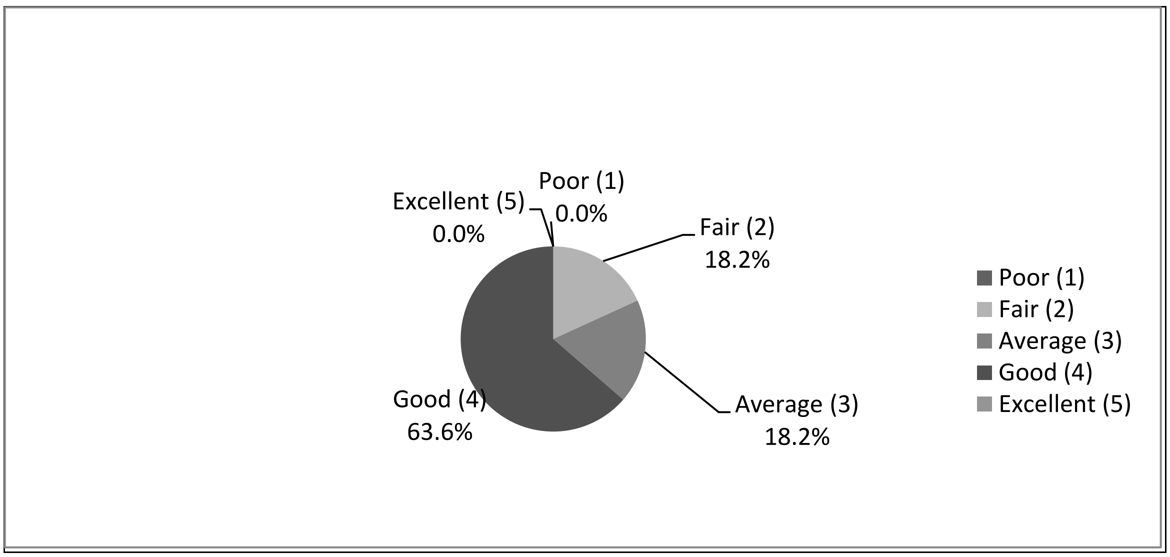
Improvement of the boat ramp was the most frequently mentioned concern of the recreationists, representing 23 percent of the comments received. Specific concerns were that the ramp was too steep and too narrow. Portable toilet cleanliness and the desire for permanent restroom facilities were the topics of 17 percent of the comments. Other areas for improvements included parking improvements, trash cans, and a dedicated kayak and canoe ramp, representing 6 percent of each of the comments.

Cold Cabin Boat Launch

A wide variety of recreational activities was noted by surveyors at the Cold Cabin Boat Launch. These activities included fishing, jet skiing, swimming, canoeing, kayaking and running.

Nearly two thirds of those surveyed rated the overall facilities at the Cold Cabin Boat Launch as good (a *four*). None of the respondents rated the overall facilities as excellent (a *five*) or poor (a *one*). The average rating for the site as a whole was 3.5. The spring recreationists rated the site the highest (3.7), with the summer visitors rating boat launch at 3.3. The distribution of ratings given to the Cold Cabin Boat Launch overall is presented in Figure 8.4.

Figure 8.4: Recreation User Facility Perception, Conowingo Project: Cold Cabin Boat Launch, 2010-2011



Maintenance received the lowest average rating of 3.1, with the scores being the lowest in the summer (2.3) and highest in the fall (3.4). Parking averaged 3.2 across the recreational period surveyed. The ratings for parking were lowest in the fall (2.8) and highest in the summer (3.7), when the facility is at its busiest. Fishing received an average rating of 3.4 for the spring and fall, with 4.0 in the spring and a 3.25 in the fall.

None of the summer respondents were engaged in fishing and all declined to rate that particular area.

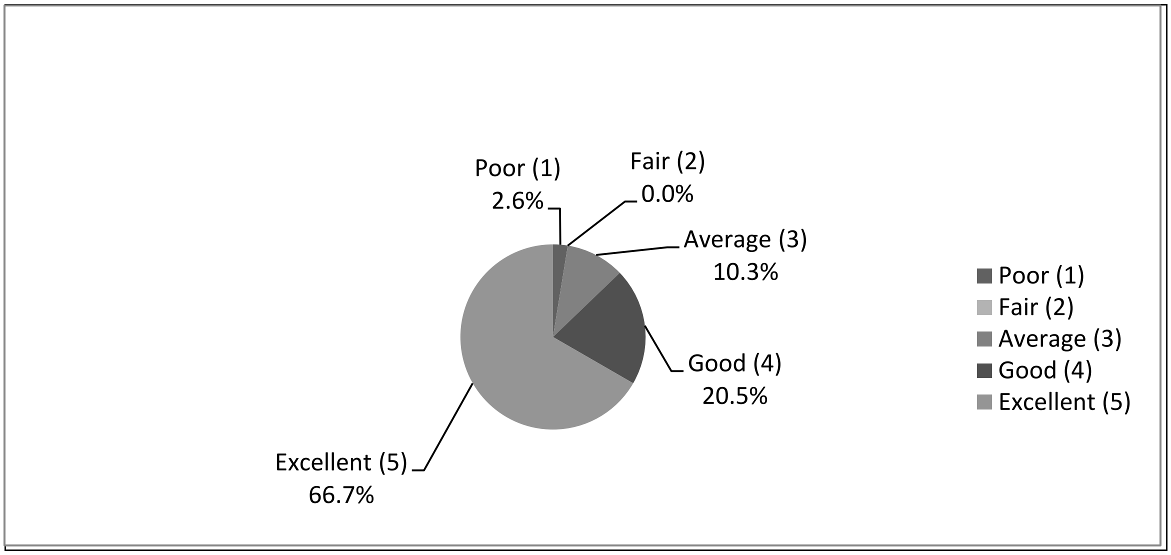
Maintenance was rated as poor (1) by one respondent, a summertime visitor. That recreationist noted specifically that the grass was in need of cutting. Maintenance and fishing were rated once each as fair (2). Parking and the overall facilities were scored as fair (2) twice each over the course of the survey period. All other responses were that facilities at Cold Creek Public Launch were considered average, good, or excellent.

The installation of restroom facilities or the return of the portable toilets was the most frequently mentioned improvement desired by the recreationists, representing 27 percent of the comments received. One-fifth of the comments received were related to parking concerns: additional parking needed, safety issues, and grading/paving. Other areas for improvements included ramp maintenance/drainage at ramps (13 percent), installation of a dock (13 percent), and a later closing time. Requests for improved ground maintenance (7 percent) and installation of trash cans (7 percent) were also received.

Dorsey Park Boat Launch

At Dorsey Park Boat Launch, fishing was the primary activity observed during the 2010-2011 survey period. The majority of the visitors to the site reported being very pleased with the facilities. Of the recreationists surveyed there, two-thirds rated the overall site as excellent (a *five*), with an additional 20 percent considering the location to be good (a *four*). The average rating for the site as a whole was 4.5. The spring recreationists rated the site the highest (5), with the summer visitors rating the location at 4.2. The distribution of ratings given to the Dorsey Park Boat Launch as a whole ("overall") is presented in Figure 8.5.

Figure 8.5: Recreation User Facility Perception, Conowingo Project: Dorsey Park Boat Launch, 2010-2011



Note: Figures do not sum to 100 percent because of rounding.

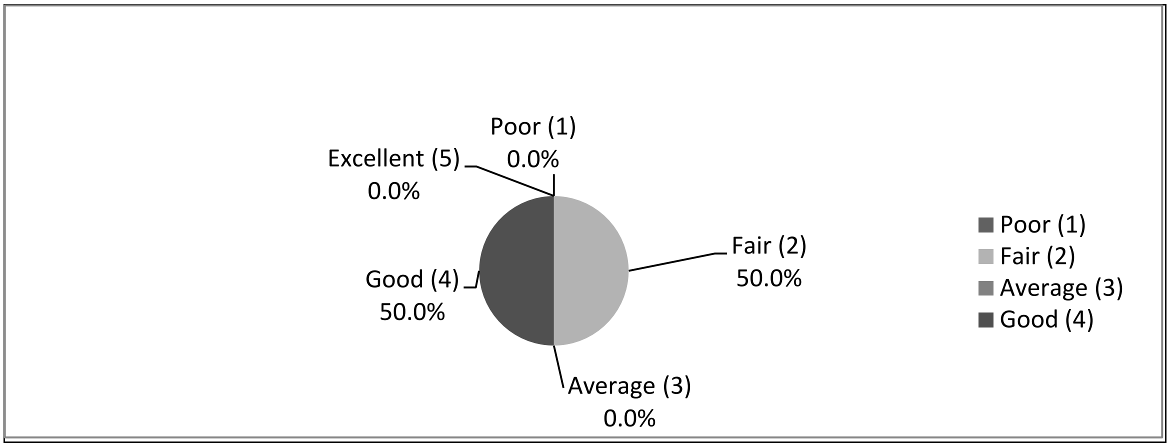
Maintenance at the Dorsey Park Boat Launch was rated the highest of the areas addressed, with a 4.5 average score. The ratings ranged from 4.1 in the summer, the location's busiest time, to 5.0 in the fall. Parking received an average rating of 4.3, with the fall visitors again providing the highest marks. Fishing was considered the weakest of the topics surveyed, with an average rating of 4.1. The quality of the fishing at the site garnered the highest rating in the fall (4.8) and lowest in the summer (3.8). For all of the areas surveyed, the recreational users of the Dorsey Park Boat Launch viewed the area as good (4) or excellent (5) in roughly three quarters or more of the responses. Fishing was rated as poor (1) by a single visitor, who provided no comments.

Twenty-nine percent of the comments received dealt with the steepness of the boat ramp at Dorsey Park, with an additional 8 percent noting a desire for ramp improvements in general. A request to extend the hours composed 18 percent of the comments received from visitors to the location. Other areas for improvements included parking (13 percent) and dock improvements (8 percent).

Line Bridge Access

Of the recreationists surveyed at Line Bridge Access, all rated the overall facilities at the site as either good (a *four*) or fair (a *two*). None of the respondents rated the overall facilities as excellent (a *five*), average (a *three*), or poor (a *one*). The distribution of ratings given to Line Bridge Access as a whole is shown in Figure 8.6 below.

Figure 8.6: Recreation User Facility Perception, Conowingo Project: Line Bridge Access, 2010-2011

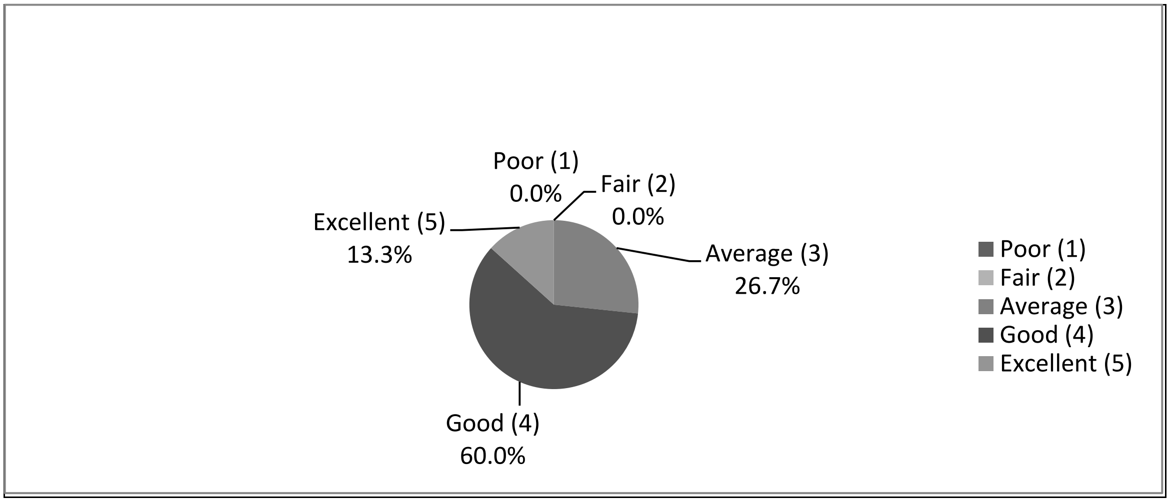


Fishing received the strongest average rating of 4.0, with parking and maintenance at 2.5 and 2.0 respectively. The low ratings are reflected in the comments received about the site. Two thirds of the comments from the Line Bridge Access site, which is maintained by Harford County, requested that trash and debris be removed, particularly at the carry-in launch. Two requests were made by recreationists surveyed at Line Bridge Access to improve security.

Broad Creek Public Landing

During the 2010-2011 survey period, fishing was noted as the primary activity recreationists enjoyed at the Broad Creek Public Landing. Kayaking was also observed in the spring. Seventy-three percent of those surveyed rated the overall facilities at the Broad Creek Public Landing as good (a *four*) or excellent (a *five*). None of the respondents rated the overall facilities as fair (a *two*) or poor (a *one*). The average rating for the site as a whole was 3.9. The summer recreationists rated the site the highest (4.2), with the fall visitors rating Broad Creek Public Landing at 3.6. Figure 8.7 presents the distribution of ratings given to Line Bridge Access overall.

Figure 8.7: Recreation User Facility Perception, Conowingo Project: Broad Creek Public Landing, 2010-2011



Parking received the lowest average rating of 3.5, with the ratings being the lowest in the spring (3.1) and highest in the fall (4.0). Maintenance and fishing received similar scores from recreationists, averaging 3.6 across the recreational period surveyed. As with parking, the ratings were lowest in the spring (3.3 and 3.4 respectively) and highest in the fall (4.0 each).

Maintenance was rated as poor (1) by one respondent, a spring visitor. Parking and fishing were rated once each as fair (2). All other responses were that facilities at Broad Creek Public Landing were considered average, good, or excellent.

Improvement of the boat ramp was the most frequently mentioned concern of the recreationists, representing 29 percent of the comments received. Other areas for improvements included higher water levels (14 percent), as mentioned by those fishing in the spring and summer, and parking (14 percent), with both the location and "tight spaces" being issues. Those kayaking mentioned improvements to water access (10 percent of all comments). Additional amenities were requested by a few of the respondents: restrooms (10 percent), picnic tables or benches (5 percent), and trash cans

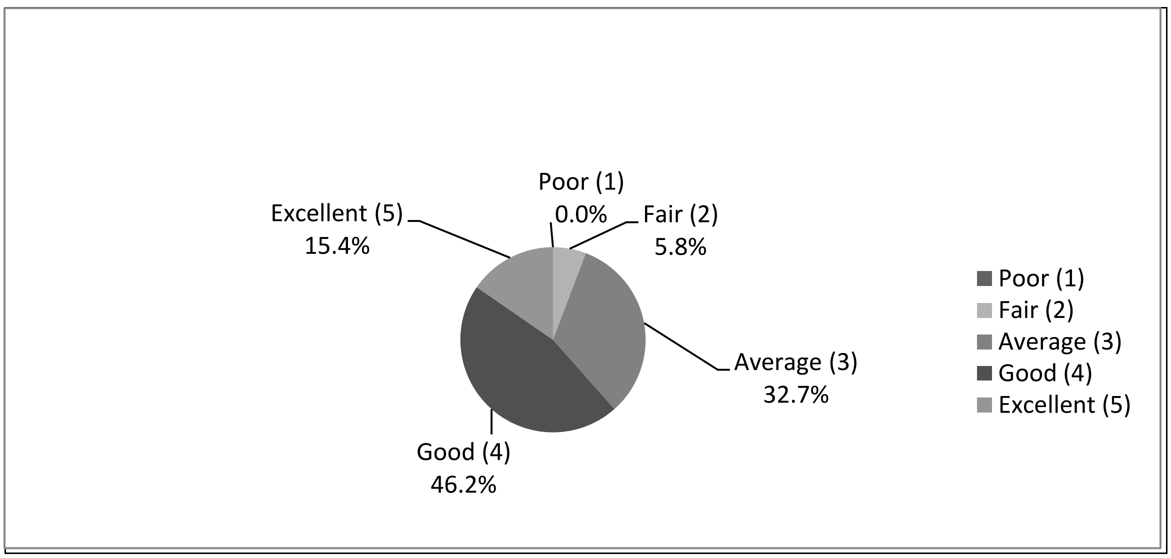
(5 percent). Comments related to repairs to the bulkhead (10 percent) and the docks (5 percent) were also received.

Conowingo Creek Boat Launch

At the Conowingo Creek Boat Launch, fishing was the predominant activity observed during the 2010-2011 survey period. Fishing was at its height in the spring, with 81 percent of visitors seen engaging in the activity. Canoeing, kayaking, and bird watching were also popular.

Sixty-two percent of those surveyed rated the overall facilities at the Conowingo Creek Boat Launch as good (a *four*) or excellent (a *five*). None of the respondents rated the overall facilities as poor (a *one*). The average rating for the site as a whole was 3.7. The fall recreationists, of whom there were relatively few, rated the site the highest (4.7), with the summer visitors, who represented the majority of the survey respondents, rating the location at 3.5. Figure 8.8 illustrates the distribution of ratings given to the Conowingo Creek Boat Launch as a whole overall.

Figure 8.8: Recreation User Facility Perception, Conowingo Project: Conowingo Creek Boat Launch, 2010-2011



Note: Figures do not sum to 100 percent because of rounding.

Fishing received the strongest average rating of 3.8, with the scores being the highest in the spring (4.0) and lowest in the fall (3.0). Parking averaged 3.8 across the recreational period surveyed. The ratings for parking ranged from (3.7) in the summer, when this site experience the most visitors, to 4.3 in the fall. Maintenance received an average rating of 3.3, with the biggest seasonal variation in scores, from a low of 2.8 in the summer to a high of 4.3 in the fall.

For parking, fishing, and overall facilities, the recreational users of Conowingo Creek Boat Launch viewed the area as good (4) or excellent (5) in well over half of the responses. Maintenance received those ratings from 46 percent of the visitors. For all areas, roughly one third of the visitors felt the recreation site was average (3). Maintenance was rated as poor (1) or fair (2) by 20 percent of the visitors, many of whom commented on trash and debris. Parking, fishing, and overall facilities were rated as fair (2) by no more than three respondents.

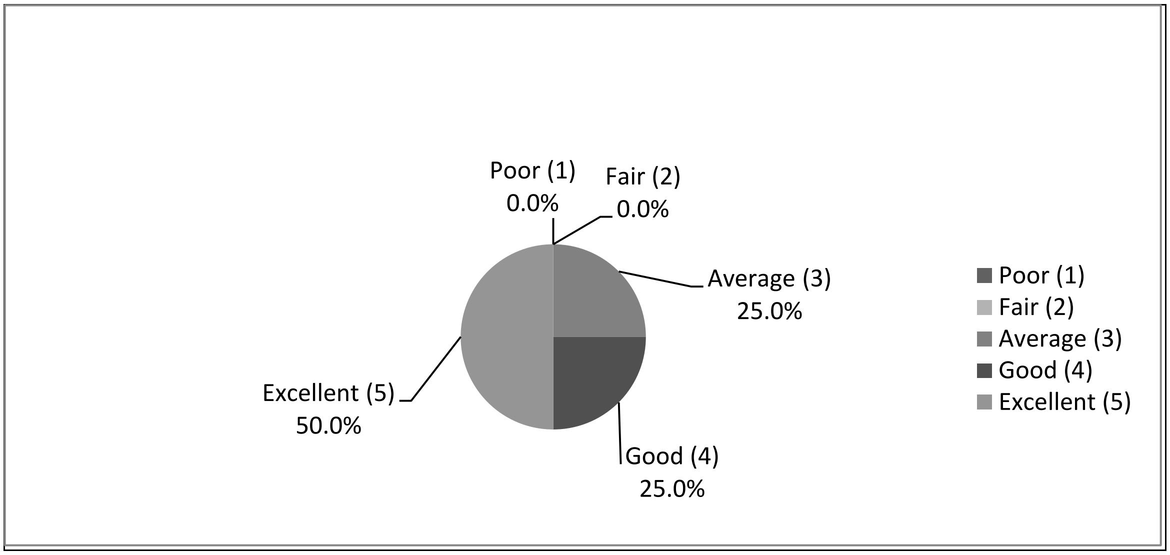
One fourth of the comments received were related to the installation of restrooms or portable toilets. Debris in the water and on the boat ramp was mentioned in 22 percent of the responses. Roughly one tenth of the comments concerned trash at the site and general cleanliness. Other areas for improvements included security/after-hours activity (9 percent), trash cans (8 percent), parking improvements (8 percent), and shallow water concerns/dredging needed (6 percent).

Recreationists who visited in the spring of 2011 rated the facilities much higher than those who had visited in the prior spring. All of those visitors rated each of the four aspects of the Conowingo Creek Boat Launch as good (4) or excellent (5). Forty-six percent of the survey respondents in the spring of 2011 mentioned that they liked the improvements that had been made at the site.

Funk's Pond

Fishing and walking were the only activities observed at Funk's Pond during the 2010-2011 survey period. Of the recreationists surveyed at the quiet park, three-fourths rated the overall facilities at the site as good (a *four*) or excellent (a *five*). None of the respondents rated the overall facilities as fair (a *two*) or poor (a *one*). The distribution of ratings given to Funk's Pond as a whole (overall) is shown in Figure 8.9 below.

Figure 8.9: Recreation User Facility Perception, Conowingo Project: Funk's Pond, 2010-2011



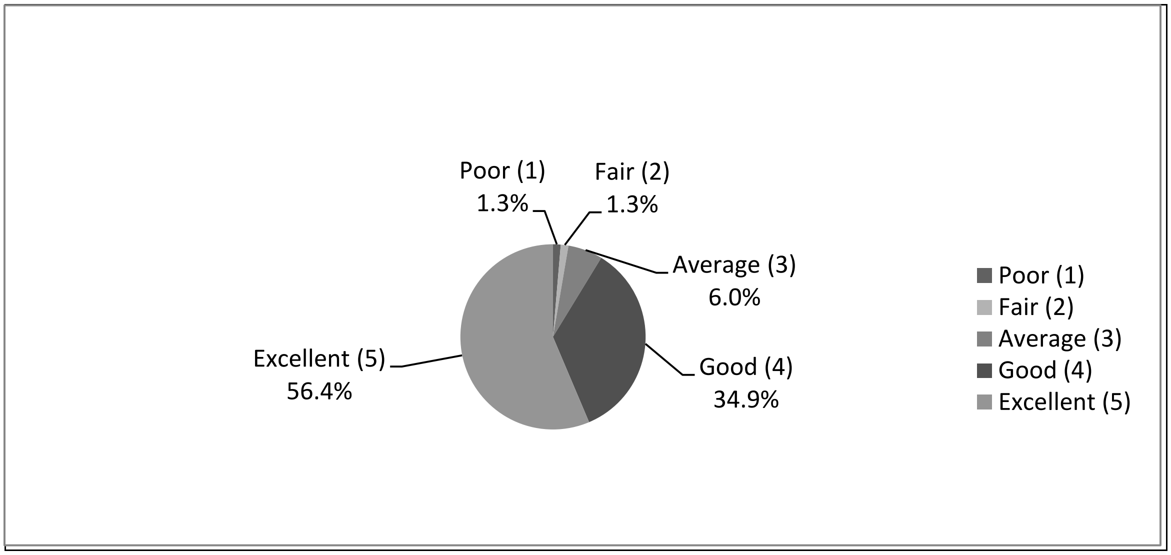
Parking received the strongest average rating of 4.8, with maintenance and fishing at 4.5 and 4.3 respectively. All of the recreationists surveyed viewed parking and maintenance as good (4) or excellent (5). None of the respondents assigned ratings of fair (2) or poor (1) to any of the aspects of Funk's Pond.

Two items were noted by recreationists surveyed at Funk's Pond: the need for installation/replacement of trash cans and the addition of historical markers. The visitors commented that they "like all improvements" and that the site "looks good for the improvements."

Fisherman's Park

Bird watching and fishing were the activities most frequently observed at Fisherman's Park during the 2010-2011 survey period. Other activities noted by the interviewers included walking, biking, and kayaking. Nine out of ten recreationists enjoying the facilities there rated the overall site as good (a *four*) or excellent (a *five*). The average rating for the site as a whole was 4.4, with the ratings being consistent throughout the survey period. Figure 8.10 illustrates the distribution of ratings given to Fisherman's Park overall.

Figure 8.10: Recreation User Facility Perception, Conowingo Project: Fisherman's Park, 2010-2011



Note: Figures do not sum to 100 percent because of rounding.

Maintenance and parking each earned an average rating of 4.4. Fishing averaged 4.2 across the recreational period surveyed. As with the *overall* rating, there were little variations from season to season in the user perceptions of maintenance, parking, and fishing at Fisherman's Park. For parking, maintenance, and overall facilities, the recreational users of the site viewed the area as good (4) or excellent (5) in roughly 90 percent of the responses. Fishing received those ratings from 80 percent of the visitors.

A wide variety of comments was received at Fisherman's Park, with no one item garnering more than 14 percent of the response. Highest on the list of concerns was the desire to have the catwalk reopened. Roughly one tenth of the comments dealt with either expanding the trails or trail maintenance. Bicyclists expressed the desire for more finely-compacted gravel trail surface to minimize tire ruptures. Several recreationists requested improvements to the parking lot, such as additional trailer spaces and handicapped spaces. Many of those engaged in fall bird watching commented on the need for tree trimming. Other areas for improvements included the need for trash cans and trash cleanup (10 percent combined), benches and picnic tables (8 percent), more water/gates open (5 percent), signage improvements (5 percent), improved/expanded restroom facilities (5 percent), and accurate and available water release information (3 percent).

Octoraro Creek Access

Walking was noted most frequently by surveyors as the primary activity recreationists enjoyed at Octoraro Creek Access during the 2010-2011 survey period. The walkers often include dogs in their parties. Fishing and bird watching were also popular. Ninety-eight percent of those surveyed rated the overall facilities at Octoraro Creek Access as good (a *four*) or excellent (a *five*). None of the respondents rated the overall facilities as fair (a *two*) or poor (a *one*). The average rating for the site as a whole was 4.8. The rating was highest in the fall, with all 18 percent of the survey respondents labeling the site as excellent overall. Figure 8.11 below presents the distribution of ratings given to the area by recreationists visiting the site.

Figure 8.11: Recreation User Facility Perception, Conowingo Project: Octoraro Creek Access, 2010-2011

Note: Figures do not sum to 100 percent because of rounding.

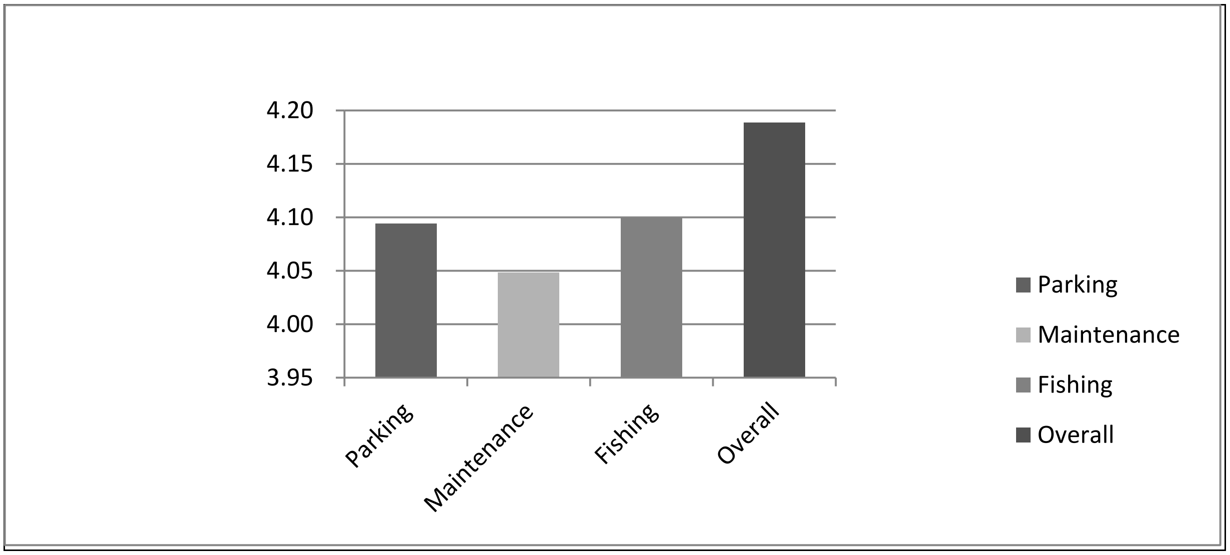
Fishing received the lowest average rating of 4.7, with the ratings being lowest in the summer (4.2) and highest in the fall (5.0). Parking was rated the highest at 4.9, with fall, typically the busiest season at the site, garnering a 4.94 rating. Maintenance received an average rating of 4.8. More than 90 percent of interviewed visitors considered the various aspects of the Octoraro Creek Access to be good (4) or excellent (5). None of those surveyed assigned the ratings of fair (2) or poor (1).

The most frequent request received from recreationists at the Octoraro Creek Access was for trash cans (26 percent). Sixteen percent of the comments were to expand the trails. Additional inputs addressed paved parking, trash cleanup, and picnic tables (11 percent each).

8.2.2 Summary of Conowingo Project Recreation User Perceptions

The Conowingo Project as a whole received positive ratings from its recreational visitors during the 2010-2011 study period. The average of the overall ratings across the project was roughly 4.2, on a scale of one (poor) to five (excellent). Project-wide fishing was rated 4.1, with parking slightly lower. Maintenance also topped the 4.0 (good) mark. Figure 8.16 and Table 8.3 below illustrate the project-wide ratings received in various categories.

Figure 8.16: Recreation User Facility Perception, Conowingo Project, 2010-2011



Although it has low overall usage, Lock 13 received the highest marks from its visitors, with scores of 5 (excellent) in all areas. Octoraro Creek Access also garnered high ratings, ranging from 4.7 for fishing to 4.9 for parking. Line Bridge Access, which typically has about 2 percent of the project's annual visitation, was the lowest rated of the project sites, at 3.0 overall, which would be considered to be an "average" recreation site. Fisherman's Park, which hosts more than one third of the project's recreationists, had a strong overall rating of 4.4.

Table 8.3 Recreational User Perceptions, Conowingo Project Summary, 2010-2011

Site	Parking	Maintenance	Fishing	Overall
Broad Creek	3.5	3.6	3.6	3.9
Cold Cabin	3.2	3.1	3.4	3.5
Conowingo Creek	3.8	3.3	3.8	3.7
Deer Creek Access	4.0	4.0	4.1	4.1
Dorsey Park	4.3	4.5	4.1	4.5
Fisherman's Park	4.4	4.4	4.2	4.4
Funks Pond	4.8	4.5	4.3	4.3
Heritage Trail	3.4	3.9	3.9	4.0
Lapidum Boat Launch	4.6	4.5	4.0	4.5
Line Bridge	2.5	2.0	4.0	3.0
Lock 13	5.0	5.0	5.0	5.0
Lock 15	4.4	4.4	4.3	4.4
McLhinney Park	4.4	4.5	3.9	4.4
Muddy Creek Boat Launch	4.4	4.2	4.2	4.4
Octoraro Creek Access	4.9	4.8	4.7	4.8
Average Rating	4.1	4.0	4.1	4.2

Notes: Ratings are based on the following: 5 is excellent, 4 is good, 3 is average, 2 is fair, and 1 is poor. The project-wide average is an average of all the sites' ratings, rather than a weighted average of all responses received.

In addition to site-specific comments, surveyors also collected comments about the project as a whole. Communication and information was one area that recreationists would like to see improved. One request was that the communications be improved between Exelon and the homeowners. Another related common remark was the need to more reliably communicate about the water release schedule. Recreationists would also like to have maps available that show the access to other project facilities. A variety of other comments was received, including the desire for more security patrols, additional environmental education, the opening of all roads and bridges, more open gates/higher water, and cleanup and restorative projects. As shown in the ratings and comments provided at the individual sites, recreationists are generally pleased with the recreational facilities provided at the Conowingo Project.

8.3 Proposed Recreation Enhancements

The proposed recreation enhancements for the Project are based on data and information collected during the Form 80 process, relicensing studies, the condition of the facilities, stakeholder consultation meetings and correspondence, and the user preference surveys. The proposed enhancements will provide improved access, increase site capacities, and/or provide new opportunities for the recreating public at the Conowingo Project. Concept design drawings for the proposed recreation enhancements are included in Appendix 3. Initial cost opinions for these enhancements are included in Appendix 4.

Exelon proposes to provide, operate and maintain the existing Project recreation opportunities and facilities and improve several facilities/sites currently serving the Project[11]. Exelon is committed to working with the Mason-Dixon Trail organization to improve the trail system on Exelon owned lands, and will continue to contract with vendors and partner with interested entities for the management of certain opportunities and facilities; where partnerships cannot be developed, Exelon will manage and maintain the facilities.

8.3.1 Lock 13 Enhancements

Enhancements at Lock 13 include installation of a trailhead directional sign at the Lock 12 parking area and clearing the vegetation from within the lock to provide an unobstructed view of the structure. Enhancements also include the installation of light fencing along each side of the lock structure itself to protect visitors.

---

[11] Proposed dredging improvements associated with the existing Peach Bottom Marina and other recreation facilities subject to sedimentation issues within the Project boundary are outlined in this license application as a measure in Exelon's Sediment Management Plan. This Plan is provided in Exhibit E, Appendix C of this license application.

8.3.2 Lock 15 Enhancements

Access at Lock 15 will be improved by designating two ADA parking spaces in the existing parking area and installing a dock on the shoreline near the picnic area to allow boaters to access the site. A concrete pad for the restroom will be constructed. The open shoreline area near the parking area will be stabilized to prevent further erosion.

8.3.3 Muddy Creek Boat Launch Enhancements

Two boat trailer spaces and one vehicle space will be designated for ADA parking in the existing parking lot. Areas adjacent to the southwest corner and southerly side of the parking area will be stabilized to improve drainage and redirect flow away from the parking area and the river. A sign providing information on the Conowingo Dam canoe portage and the location of the portage take-out will be erected on site.

8.3.4 Cold Cabin Enhancements

Access to the site will be improved by designating a one-way directional traffic pattern through the site and constructing parking for 11 vehicles (five boat trailer and six vehicle spaces), including two ADA spaces. The existing boat ramp will be reinforced to prevent undermining of the ramp and a boat dock will be installed. A sign providing information on the Conowingo Dam canoe portage and the location of the portage take-out will be erected. Two ADA picnic tables will be provided to replace the existing tables. A concrete pad for two portable restrooms (1 ADA, 1 standard), will be constructed.

8.3.5 Dorsey Park Enhancements

Both boat ramps at Dorsey Park will be rebuilt. One ADA boat trailer space and one ADA vehicle space will be designated in the existing lot. A concrete pad for three portable restrooms (1 ADA, 2 standard), will be constructed. A sign providing information on the Conowingo Dam canoe portage and the location of the portage take-out will be erected.

8.3.6 Conowingo Creek Boat Launch Enhancements

One ADA parking space will be designated in the existing parking area. A roadside ditch along Mt. Zoar Road will be stabilized and a stone line drainage ditch will be constructed along the south side of the parking lot to redirect runoff from the parking lot and boat ramp area. A sign will be erected providing information on the Conowingo Dam canoe portage and the location of the portage take-out.

8.3.7 Glen Cove Marina Enhancements

The existing gravel lot between Glen Cove Rd. and Berkley Rd. will be expanded and provide 13 additional rig spaces. The existing bulkhead wall at the Marina will be repaired.

8.3.8 Funks Pond Enhancements

One ADA parking space will be designated in the existing parking area.

8.3.9 Conowingo Swimming Pool Enhancements

An ADA compliant access ramp will be installed at the swimming pool and an ADA compliant access ramp will be installed at the wading pool.

8.3.10 Conowingo Dam Overlook Enhancements

This facility will be reopened. Three ADA vehicle spaces will be designated in the existing parking lot. The existing pavilion will be demolished and replaced with a new 24' by 24' wood pavilion. Pavement will be removed from the easterly corner of the existing paved parking area, loamed and seeded, and three ADA pathways and picnic tables will be installed. Two portable restrooms will be provided in close proximity to the new picnic area. Security fencing will be installed around the site to restrict access to Conowingo Dam while allowing unobstructed views from the pavilion and picnic area.

8.3.11 Fisherman's Park/Shures Landing Enhancements

The access road leading to the facility will be widened three to five feet in order to construct 12-foot wide lanes. A retaining wall will be constructed along the easterly 250 feet of existing parking along the access road due to widening. Five additional ADA parking spaces will be designated in the existing parking lot. The access road leading to Shures Landing will be widened four feet along the eastbound lane for 320 feet. An additional 13 space parking area will be constructed near the Lower Susquehanna Heritage Greenway trailhead at the southerly end of Fisherman's Park. The existing access at Shures Landing will be closed. The existing hard surface boat launch and asphalt access will be demolished. Stone fill will be placed next to the existing wall down to existing grade along the shore. A new 20-foot wide hard surface carry-in boat launch with a floating dock and breakwater will be constructed at Shure's Landing to replace the existing launch area.

8.3.12 Peach Bottom Access Development

A small (approximately four vehicle) road-side parking area will be constructed near the existing informal boat launch area south of Peters Creek. A sign will be erected providing information on the Conowingo Dam canoe portage and the location of the portage take-out.

8.3.13 Line Bridge Access Area

Shoreline erosion control and stabilization work will be performed at this unimproved carry-in boat access area.

8.4 Costs and Scheduling

Table 8.2 provides a summary of estimated enhancement costs for completion of recreation enhancements at the Project. Facility costs are current probable construction costs for each project with a 10% contractor mobilization cost, a 25% contingency cost, and a 20% administration cost (permitting, engineering, project management) to arrive at a Opinion of Probable Construction Cost (OPCC) in 2011 dollars. The 2011 OPCC's are escalated at 4% per annum to arrive at an OPCC in 2014 (assumes FERC license will be issued in 2014) dollars.

Table 8.2 Enhancement Costs

Facility	Construction Cost (2014 dollars)	Annual O&M Cost (2014 dollars)
Lock 13 Fencing	$11,000	$500
Lock 13 Vegetation Removal	$19,000	
Total Lock 13	**$30,000**	**$500**
Lock 15 dock, parking, stabilization, restrooms	$60,000	$1,200
Total Lock 15	**$60,000**	**$1,200**
Muddy Creek Boat Launch enhancements	$72,000	$6,000
Total Muddy Creek	**$72,000**	**$6,000**
Cold Cabin boat ramp upgrade	$96,000	$500
Cold Cabin parking	$102,000	$500
Cold Cabin picnic area	$12,000	$1,500
Total Cold Cabin	**$210,000**	**$2,500**
Dorsey Park boat ramp upgrades	$265,000	$15,000
Dorsey Park restroom	$9,000	$3,000
Total Dorsey Park	**$274,000**	**$18,000**
Conowingo Creek stabilization	$41,000	$1,200
Conowingo Creek other	$15,000	$2,400
Total Conowingo Creek	**$56,000**	**$3,600**
Glen Cove Marina extra boat trailer parking	$154,000	$1,700
Glen Cove Marina Parking Improvements	$45,000	
Glen Cove Marina Wall Improvement	$21,000	
Total Glen Cove Marina	**$220,000**	**$1,700**
Funk's Pond signage	$300	$500
Total Funk's Pond	**$300**	**$500**
Conowingo Pool ADA	$127,000	$2,000

Facility	Construction Cost (2014 dollars)	Annual O&M Cost (2014 dollars)
Conowingo Wading Pool ADA	$46,000	$1,500
Total Conowingo Pool	**$173,000**	**$3,500**
Overlook pavilion	$142,000	$1,200
Overlook picnic area	$45,000	$1,200
Overlook fence and parking	$45,000	$600
Total Overlook	**$232,000**	**$3,000**
Fisherman's Park boat ramp and parking	$1,093,000	$2,400
Fisherman's Park widening	$101,000	$500
Total Fisherman's Park	**$1,194,000**	**$2,900**
Line Bridge Bank Stabilization	$9,000	$500
Total Line Bridge	**$9,000**	**$500**
Peach Bottom shore access	$20,000	$1,800
Total Peach Bottom Shore Access	**$20,000**	**$1,800**
TOTAL CONOWINGO	**$2,550,300**	**$45,700**

8.4.1 Agency Recommendations not Proposed

NPS requested Exelon determine ownership of land along Muddy Creek but outside the Project boundary, and if the land is owned by Exelon, that Exelon construct a road side parking area for trail users and boaters. Exelon is in discussions with the other party claiming ownership of this property and attempting to settle the dispute and clear title to the property; however, the land in question is non-Project land and has no bearing in the FERC licensing process.

Several agencies stated the Conowingo Dam catwalk should be re-opened for angler access. For safety, security, and operational reasons, the Catwalk will remain closed.

USFWS requested the construction of primitive water access campgounds to accommodate overnight use. Exelon does not believe there is sufficient demand to implement this recommendation.

9.0 RECREATION MANAGEMENT

Exelon will provide and maintain the existing and proposed Project recreation facilities as described in this plan for the term of the FERC license. Project facilities will be maintained and will be open to all members of the public during reasonable times of the day and/or seasons. However, Exelon will determine guidelines of allowable uses and activities for each site and have the authority to restrict inappropriate activities at any time. Exelon, at its discretion, may also restrict use and access to or close a site, or any portion thereof, on a short-term basis for maintenance/construction activities, unsafe conditions, emergencies, and operational reasons.

Safety of members of the recreating public at the Conowingo Project is a primary concern to Exelon. To ensure the safety of visitors to and users of the Project, Exelon has instituted, and will continue to provide, several programs and measures to meet this objective.

- Water release safety devices – signs warning of water releases from the powerhouse are maintained at areas accessible to the public. In addition, a siren and warning lights are used to notify visitors immediately downstream of the powerhouse of impending water releases.

- Upstream boat buoys and warning signs – a line of warning buoys 400 yards upstream of Conowingo Dam are maintained by Exelon. In addition, lighted billboard-sized signs warning boaters of the presence of the dam are located on either shore upstream of the boat buoys.

- Flow information – Exelon provides a toll-free telephone number (1-888-457-4076) for scheduled water releases from Conowingo Dam.

- Canoe portage shuttle – Exelon provides a shuttle service from Glen Cove Marina (take-out) to either Shures Landing or the Lapidum Boat Launch (put-ins) with prior notice from paddlers needing to portage Conowingo Dam.

- Muddy Creek Boat Launch – Exelon provides and maintains boat channel markers at the Muddy Creek Boat Ramp.

- Security fencing/warning signs – Security fencing and warning signs are in place in areas deemed a security risk or unsafe to members of the public.

- Water levels - Exelon maintains Conowingo Pond levels to provide safe boating opportunities during the boating season.

- Facility maintenance – Exelon maintains the Project recreation facilities to ensure the facilities and improvements are functional for their intended purposes, that proper cleanliness and sanitary conditions are maintained, and that the the facilities are safe for public use and enjoyment.

As the Licensee, Exelon assumes responsibility for all operations and maintenance of the Project recreation facilities. If opportunities exist, Exelon will partner with agencies and interested parties in providing, operating, and maintaining Project facilities. Presently, several facilities are managed and operated by state and local agencies and contracted vendors. Other sites are maintained and operated solely by Exelon. Exelon will continue to cooperate and partner with interested entities and contract with vendors for the development, operation and maintenance of the various Project recreational site and facilities, including any new facilities that may be developed over the term of the FERC license. Exelon will ensure that existing and future Project facilities that are managed and operated by third parties are done so in accordance with FERC rules and regulations and any license articles.

Recreational use and capacity will be assessed and reported to FERC through the Form 80 process every six years as required. The Form 80 will provide a means to review Project recreational use trends over the term of the FERC license and a comparison with the recreational use projections in Section 7.0, and whether there may be a need for additional specific recreation facilities during the license period. The next FERC Form 80 will collect data for 2015-2015 and be filed with FERC in the spring of 2015.

10.0 REFERENCES

Code of Federal Regulations, Title 8, Conservation of Power and Water Resources, Parts 1 to 399, Revised as of April, 1, 2011.

U.S. Census Bureau 2010. URL: http://quickfacts.census.gov/qfd/states/42000.html

city-data.com. URL: http://www.city-data.com/

The States Organization for Boating Access, Design Handbook for Recreational Boating & Fishing Facilities, 2006, second edition

The States Organization for Boating Access, Handbook for the Location, Design, Construction, Operation, and Maintenance of Boating Facilities, 1989, second edition

Study to Assess Tributary Access in Conowingo Pond, RSP 3.13, January 2012, Normandeau Associates, Inc. and Gomez & Sullivan Engineers, P.C.

Pennsylvania Outdoors: The Keystone for Healthy Living, 2009-2013 Statewide Comprehensive Outdoor Recreation Plan, PADCNR.

Maryland Land Preservation, Parks & Recreation Plan 2009, Maryland Department of Planning

Projections of Outdoor Recreation Participation to 2050, published by the U. S. Department of Agriculture (USDA) Forestry Service, Bowker, J. M., Donald B. K. English, H. Ken Cordell.

APPENDIX 1: CONSULTATION RECORD

A. Karen Hill, Esq.
Vice President
Federal Regulatory Affairs

Telephone 202.347.7500
Fax 202.347.7501
www.exeloncorp.com

Exelon Corporation
101 Constitution Avenue, NW
Suite 400 East
Washington, DC 20001

Via Electronic Filing

March 28, 2011

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Re: Conowingo Hydroelectric Project, FERC Project No. 405
Muddy Run Pumped Storage Project, FERC Project No. 2355
Filing of the Initial Study Report Meeting Notes Summary

Dear Secretary Bose:

In accordance with Title 18 Code of Federal Regulations (18 C.F.R.), Section 5.15 (c)(3) of the regulations of the Federal Energy Regulatory Commission (Commission or FERC), Exelon Corporation, on behalf of its wholly-owned subsidiary, Exelon Generation Company, LLC (Exelon), encloses for filing the Initial Study Report Meeting Notes Summary for the relicensing of the Conowingo Hydroelectric Project (Conowingo Project), FERC Project No. 405, and the Muddy Run Pumped Storage Project, FERC Project No. 2355.

Exelon is filing this document with the Commission electronically. To access the document on the Commission's website (http://www.ferc.gov), go to the "eLibrary" link, and enter the docket number, P-405 or P-2355. Exelon is also making the document available for download at its corporate website. To access the document here, navigate to http://www.exeloncorp.com/powerplants/conowingo/relicensing/Pages/overview.aspx.

In addition to this electronic filing with the Commission, paper copies of the document are also available upon request to Colleen Hicks (610-765-6791). Finally, Exelon is making available to the public the document at the Visitor's Center at Muddy Run Recreation Park in Holtwood, Pennsylvania, and the Darlington Public Library in Darlington, Maryland, during regular business hours.

Exelon appreciates the work and involvement of Commission Staff, resource agencies, local governments, and members of the public in the development and work completed to date. If you have any questions regarding the above, please do not hesitate to contact Colleen Hicks. Thank you for your assistance in this matter.

Respectfully submitted,

Colleen E Hicks

Colleen E. Hicks
Manager Regulatory and Licensing, Hydro
Exelon Power
300 Exelon Way
Kennett Square, PA 19348
Tel: (610) 765-6791
Email: Colleen.hicks@exeloncorp.com

A. Karen Hill
Vice President Federal Regulatory Affairs
Exelon Corporation
101 Constitution Ave.
Suite 400E
Washington, DC 20001
Tel: (202) 347-8092
Email: Karen.Hill@exeloncorp.com

CC: Distribution List-Attachment D

Conowingo and Muddy Run Project FERC Relicensing
Initial Study Report Meeting
Meeting Notes Summary
March 9-11, 2011
Darlington Volunteer Fire Department
2600 Castleton Road, Darlington, MD

List of Attendees: See Attachment A

Introductions, Meeting Purpose, and Process Timeline

Colleen Hicks (Exelon) opened the meeting and welcomed everyone. Parties introduced themselves and gave their affiliation. Tom Sullivan (Gomez and Sullivan) described the meeting structure and reviewed the meeting agenda. Each study was scheduled to have approximately 20 minutes for presentation followed by questions and discussion. Tom Sullivan also provided an overview of the next steps in the ILP process (See Attachment B-Meeting Presentation).

Larry Miller (USFWS) raised concern that the stakeholders have incomplete studies with which to make judgments regarding requests for the Year Two study season. Shawn Seaman (MDNR), Mike Hendricks (PFBC) and Andy Shiels (PFBC) stated that there is not enough time from a process perspective to properly design the Year Two spring studies. The stakeholders felt that they will not have enough time to file comments, discuss results, and participate in designing Year Two studies. Mike Helfrich (Riverkeeper) stated that the delay with some study reports places the stakeholders at a disadvantage by holding up the entire process. In light of these concerns there was a specific request made to push the license application filing date to a point farther out in time. Tom Sullivan indicated that the Federal Power Act precludes pushing back the license application filing date. Tom Sullivan also indicated that Exelon is prepared to perform necessary Year Two studies and that Exelon has met all required regulatory obligations by filing complete reports where they are available and report summaries in lieu of complete reports where necessary. Emily Carter (FERC) also commented that the stakeholders will have the ability to comment throughout the licensing process, and if FERC determines that the stakeholders have legitimate concerns about the conducted studies that are not addressed, Exelon could be required to complete additional studies in 2012 or later to fill-in information gaps.

Tom Sullivan (Gomez and Sullivan) went over criteria for proposing a new study, including the 7 criteria for new studies. Andy Shiels (PFBC) asked if there was a study report matrix outlining the studies with expected and actual completion dates, and indicated it would be helpful for Exelon/FERC to provide this information and maintain it as “living document” (See Attachment C-Study Report Schedule).

Wednesday March 9, 2011

Session 1: Fish and Aquatics

Conowingo 3.10 – Maryland Darter Surveys (Tim Brush – Phone)

Tim Brush (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Andy Shiels (PFBC) asked what was the last sampling event included in the report summary. Tim Brush responded that it was the January 14, 2011 sampling event. Additional sampling had been conducted in February 2011, but could not be included in the study report submission. Geoff Smith (PFBC) asked which additional four species were caught in the February sampling event. Tim responded that they were flathead catfish, goldfish, walleye, and creek chubsucker.

Conowingo 3.22 – Shortnose and Atlantic Sturgeon Life History Studies (Steve Leach – Phone)

Steve Leach (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Andy Shiels asked that a comparison (physical conditions, attraction flow etc.) be made of Conowingo East Fish Lift with other facilities that successfully pass sturgeon species, specifically those facilities at Holyoke Dam. Andy noted that Holyoke has passed some sturgeon (> 100 fish over 30 years) while Conowingo has not. Steve Leach described the mechanical differences at the fish lift facilities and the differences in the river characteristics (i.e., river width). Steve mentioned that attraction flows are different at the lifts. Availability of sturgeon in the river was also mentioned as the reason for the Conowingo East Fish Lift not passing sturgeon. Andy Shiels asked if the East Fish Lift at Conowingo is sufficient to pass sturgeon should they become available in the Susquehanna River. Don Pugh (American Rivers) indicated that the East Fish Lift is a surface entrance and that is a major difference compared to the spillway lift at Holyoke Dam, which is several feet deep. However, the East Fish Lift may be comparable with the tailrace lift at Holyoke Dam. It was decided that Exelon would provide a conclusion on whether the East Fish Lift is capable of passing sturgeon species- **Action Item**.

Mike Helfrich suggested that an effort be made to ask river guides, anglers, bait shop owners, etc. to see if they had any information about sturgeon presence. He indicated that may be a useful method of gathering data on presence/absence of sturgeon in the river.

Conowingo 3.16 – Instream Flow Habitat Assessment below Conowingo Dam (Kirk Smith)

Kirk Smith (Gomez and Sullivan) presented the study objectives, work completed, findings, and schedule for this study. Geoff Smith asked what the source of the macroinvertebrate data was to develop the EPT curves, and why they were included in the assessment. Tom Sullivan indicated that the curves were developed in consultation with the resource agencies, and that these species were being assessed, at the resource agencies request, because of a relative lack of abundance in the study reach. Bill Richkus (Versar) suggested combining study summary tables 3 and 4 in the study report.

Conowingo 3.19 – Freshwater Mussel Characterization Study (Bill Ettinger)

Bill Ettinger (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Matt Ashton (MDNR) indicated that he had major disagreements on the conclusions drawn from the study results, and how flow peaking may be impacting mussel diversity. Matt also had concerns about how the sampling methodology was established, and thought the sampling areas were not representative of the entire river. Matt stated that many areas were not sampled, especially on the west side of the river. There was a concern from some stakeholders that a few large mussels found in the study are the ones that have found refuge in areas more protected from peaking operations, and that they do not indicate a healthy population.

Don Pugh also expressed disagreement with the study conclusion that Conowingo operations have no impact on mussel abundance and composition. He noted that the Catch Per Unit Effort (CPUE) increased in the lower portions of the study reach, away from the influence of the Conowingo Project.

Don Pugh requested that the report tables and appendices be made available in electronic form. Bill agreed to make the data available to all interested parties on March 14, 2011-**Action Item**.

Andy Shiels asked why eastern elliptio is rare above Conowingo Dam but dominant below the dam. Bill said others have hypothesized that this difference may be due to the presence of American eel, while Matt Ashton suggested that there may be water quality influences as well.

It was agreed that a conference call would be scheduled to discuss MDNR comments on the study methodology and results. The call was scheduled for Friday, March 25, 2011 from 9 am-Noon-**Action Item**. Interested stakeholder participants were Matt Ashton, Don Pugh, Geoff Smith, Shawn Seaman, Mike Helfrich, Steve Minkkinen, and Andy Bernick.

Session 2: Fish Passage

Conowingo 3.2 – Downstream Fish Passage Effectiveness Study (Jennifer Griffin – Phone)

Jennifer Griffin (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Don Pugh asked if the proposed blade strike model would consider if the turbine blade was blunt or sharp, and what was the turbine configuration at Conowingo. Jennifer stated that she would research the turbine design at Conowingo and address this issue in the report-**Action Item**. Bill Richkus ask whether the entrainment analysis would consider the impact of turbine aeration. Jennifer responded that the literature database to be used in the entrainment analysis did not indicate whether turbines were aerated or not, but that she would investigate the issue further and address it within the study report to the extent possible-**Action Item**. Don Pugh asked whether the turbine/runner configuration (i.e., wicket gates, guide vanes) would be factored into the entrainment analysis. Jennifer said that this will be addressed in the study report. Andy Shiels asked which projects would be used as a comparison to Conowingo. Jen Griffin responded that she has not narrowed the list at this time, but this component will be described in the study report.

Conowingo 3.5 – Upstream Fish Passage Effectiveness Study (Eric White)

Eric White (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Shawn Seaman contended that there was a deviation from the study plan in that the tailrace area was to be defined as the area from the powerhouse to the downstream end of Rowland Island. Eric stated that extending the definition to the downstream end of Rowland Island would add one fish to "the number of fish available" in the tailrace in the report.

Mike Hendricks stated that the composite telemetry animation showing all of the tagged fish ends on April 29, and that a composite animation of all fish through the end of the study period would be helpful. Doug Royer (Normandeau) mentioned that the file sizes were very large, and to alleviate this problem, he would create 10-day animations over the study period and provide this information to stakeholders-**Action Item**.

Larry Miller indicated that he would like to know more about what happened to the fish that dropped downstream from the study tailrace after tagging and release. Eric indicated that only mobile tracking was available for the area downstream of Spencer Island.

John Mudre (FERC) asked how fish that passed back downstream after being lifted were counted. Eric White responded they were only counted once for the study purposes.

Don Pugh indicated that it would be helpful to have the electronic data of all tagged fish, including detection times at each station. Eric indicated that this would be provided-**Action Item**.

Shawn Seaman noted that most fish appear to be favoring the west side of the river near Rowland Island, and appeared to be attracted to the small turbine units (Francis). He also indicated the results seemed to show that when flows ramped up to generation the fish left the area immediately downstream of the turbines. Bob Sadzinski (MDNR) also noted that only one tagged fish was captured in the West Fish Lift, even though several tagged fish were in that area.

Mike Hendricks recommended investigating the crowder gate operations, and stated that perhaps lifts should also be increased in frequency to as often as every 15 minutes, as part of the Year Two shad telemetry study design. Ray Bleistine (Normandeau) stated that it is only possible to lift every 20-30 minutes; and that the current protocol is to lift a minimum of every hour. In terms of Year Two study design, Don Pugh suggested adding to the radio telemetry monitoring array, rather than re-positioning, and several stakeholders suggested discontinuing the transport of tagged fish from the tailrace down to the Lapidum boat launch for release.

It was noted that the last fixed telemetry monitoring station was in the trough of the East Fish Lift, and there was some manual tracking in Conowingo Pond up to the Norman Wood Bridge. A clarification was also made with regard to the fate of tagged fish that passed into Conowingo Pond. Six of these radio tagged fish passed Safe Harbor Dam and 2 fish passed York Haven Dam. Larry Miller also deployed additional fixed telemetry monitoring stations in the upper portions of the river. He agreed to make this data available the group-**Action Item**.

Tom Sullivan indicated that a work plan for the Year Two shad telemetry study would be circulated to stakeholders by Friday, March 18, 2011-**Action Item**. He indicated that Exelon would like to work with the agencies to refine this study at a meeting on April 7, 2011 if they would be willing to participate.

Conowingo 3.6 – Conowingo East Fish Lift Attraction Flows (Ray Bleistine)

Ray Bleistine (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Andy Shiels asked if there was a correlation between overall river flow and fish passage efficiency at the East Fish Lift. Ray indicated that lower flows generally had better fish passage, possibly due to a larger percentage of fish finding the fish lift entrance.

Mike Hendricks asked how passage efficiency was affected by operations, specifically lift frequency. Mike suggested that a lift be done every time a project operations change is made. Ray Bleistine indicated that this is already done.

Bill Richkus stated that the statistical analysis of turbine operation and fish catch data were not analyzed the way the study plan stated, as the study plan called for correlated matrices. Ray responded that the t-test and Pearson correlation did not show any multi-variable correlations. Larry Miller and Don Pugh suggested that there were better statistical methodologies available, and Larry Miller indicated he would get back to Ray with statistical analysis recommendations, after he consulted with the USFWS statistician-**Action Item**. Larry specifically mentioned looking at percentage of shad passed during each specific day, to give a better normalization on the day-to-day passage number variability.

Bill Richkus requested that Table 4.2-2 from the report present data for the 2001-2009 period as well-**Action Item**. Don Pugh asked where the attraction flow velocity probe was positioned. Ray stated that the probe was put in the middle of the gate, approximately 15 inches below the surface, and that the gate opening was variable.

Don Pugh and Shawn Seaman stated that the telemetry animations do not support the conclusion that operations do not have an effect on fish passage efficiency, since the animations show indirect routes taken to get to the East Fish Lift. Ray stated that his statistical analysis does not attribute a specific turbine operation to good or bad passage.

Don Pugh noted that 43% of fish were making forays to tailrace area during the night, when the East Fish Lift was not operating. Mike Hendricks mentioned that in the Year Two shad telemetry study design, Exelon should examine the effects of running the attraction flow starting at dawn. Ray Bleistine explained that starting the attraction flow early could cause gizzard shad to congregate and clog the lift entrance.

Conowingo 3.7 – Fish Passage Impediments Study (Brian Hanson – Phone)

Brian Hanson (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Don Pugh asked why there are many fish that appear to be traveling upriver, only to fall back right before they reach the tailrace. Don said this holds true even for fish that do eventually enter the tailrace and pass Conowingo Dam. Brian stated that while there are some high velocity areas at the full generation flow, the high velocity area is relatively small, and fish can maneuver around those areas. Brian postulated that the multiple forays made by some fish were simply a result of individual fish behavior.

Mike Hendricks suggested looking at the tailrace shad telemetry study (Conowingo 3.5) to see if velocity is an issue, particularly plots of telemetry spot readings in the tailrace versus generation to get an idea of any relationship between generation and fallback-**Action Item**.

Conowingo 3.9 – Biological and Engineering Studies of the East and West Fish Lifts (Tom Hoffman)

Tom Hoffman (Gomez and Sullivan) presented the study objectives, work completed, findings, and schedule for this study. Larry Miller wanted to ensure that the study report would explain the rationale behind the conclusion that providing volitional passage at the West Fish Lift was not feasible. Tom Hoffman stated that the report would do so. Don Pugh asked if an increase in bucket size and/or attraction flow would be investigated as methods to improve hopper entry. Tom indicated these would be explored in the study report.

Conowingo 3.3 – Biological and Engineering Studies of American Eel (Terry Euston)

Terry Euston (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Terry Euston mentioned that the sampling dates from the Year One study season began 17 days late, and that the goal is to begin sampling around Mid-May as part of the Year Two study.

Don Pugh stated that a wider range of eels may be caught by increasing attraction flows through the ramp, or possibly setting up two ramps with differing substrates. Terry stated that it is possible that attraction flow issues could be worked out for the 2011 study season. Larry Miller noted that nighttime spotlighting has been effective. Larry Miller also mentioned that the USFWS sampling on the west side of the river was much more effective, and was wondering why there may be such a discrepancy. Terry mentioned flow attraction differences, substrate differences, and the late start to the study sampling relative to the USFWS sampling may be possible explanations.

Tom Sullivan indicated that a work plan for the Year Two elver sampling study would be circulated to stakeholders by Friday, March 18, 2011-**Action Item**.

Muddy Run 3.3 – Entrainment and Impingement Study (Jen Griffin – Phone)

Jennifer Griffin (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Andy Shiels asked why expected survival at Muddy Run is higher than similar projects. Jen Griffin responded that the runner speed and trash rack spacing is different than other projects and are better suited for fish survival. Jen Griffin also stated that habitat is generally not good near the intakes as well. Sheila Eyler (USFWS) asked if migratory fish entrained are counted twice as they would have to pass the turbines twice to go back and forth to Muddy Run and back down to Conowingo Pond. Tom Sullivan stated that for some of the fish the survival probability should be calculated twice (American eel, but not American shad) as they are not necessarily taken out of the population. Don Pugh stated that any entrained migratory fish should be considered extirpated from the system.

Larry Miller suggested that the pressure differential experienced by fish moving through the water conveyance system at Muddy Run may be problematic for fish survival, and this warranted further investigation by Exelon-**Action Item**. Don Pugh asked for a description of any structures (i.e., gates, valves) in the water conveyance system at Muddy Run-**Action Item**.

Andy Shiels suggested that the generation/pumping diurnal schedule may have an impact on some species more than others, and suggested investigating this relationship further-**Action Item**.

Don Pugh indicated that egg and larvae entrainment had historically been reported as high, but the current report suggests entrainment is more modest. Don asked that the report explain the reasons for these differences.

Muddy Run 3.3 –Adult American Eel Telemetry Study (Terry Euston)

Terry Euston (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Larry Miller asked if Exelon could confirm that the acoustic frequencies from the Year One study were input to the ACT (Atlantic Coastal Tag) database, and whether Exelon requested to be notified of any detections-**Action Item**.

Mike Hendricks asked that appropriate steps be taken to make sure the acoustic receivers for the Year Two study can be operated without any interference related to Project noise. Steve Leach stated that noise is high near the Project draft tubes, but this should not interfere with the study. Don Pugh mentioned that he would like to see the receivers in the canal as close to the Muddy Run intake towers as possible, and that they should be tested prior to the study to ensure that project noise does not interfere with them.

Bob Sadzinski asked how often and how many total nights were sampled in Deer and Octoraro Creeks, and mentioned MDNR typically nets for 8 or 9 consecutive weeks. Bob mentioned that the number of eels that did not migrate may be due to a maturity difference between the in-basin and out of basin eels. Terry said that a maturity difference is possible, but that all of the indicators (coloring, eyes) suggested that the in-basin eels were silver, just like the out-of-basin eels. Terry stated that Exelon's expectation is to use out-of-basin eels for the Year Two study.

Muddy Run 3.5 – Nearfield Effects of the Muddy Run Project on Migratory Fishes (Doug Royer)

Eric White (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Sheila Eyler (USFWS) asked why the pit tag reader is impractical at Muddy Run. Steve Leach indicated because the antenna read range is small; an array of nearly 100 antennas would be needed to provide full coverage around the intake/tailrace areas.

Andy Shiels asked how the cruise speeds were estimated for historic telemetry studies and the 2010 telemetry study. It was agreed that this item will be addressed in the study report to the extent possible-**Action Item**. For entrainment percentages discussed in the study report, Andy Shiels requested that the numerator and denominator be given. Andy also asked what the velocities were at certain locations in the water column; since the depth-averaged velocity may not be the best metric to show when there are potentially complex velocity eddies around the Muddy Run tailrace. Terry Euston indicated that the raw data would be reviewed to determine if velocities over the vertical water column could be included in the study report, rather than a depth averaged velocity-**Action Item**.

Thursday March 10, 2011

Conowingo 3.13 – Study to Assess Tributary Access in Conowingo Pond (Enn Kotkas)

Enn Kotkas (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Bob Sadzinski asked for clarification of the extra survey and Enn stated that it was because of the low pond level due to a LIDAR survey that occurred in mid-September. Bob Sadzinski also asked if boat size was taken into account when assessing tributary access. Bob Sadzinski indicated that the launches with obstructions (bridges) should have signs indicating low overhangs. Andy Shiels requested frequency tables of Conowingo Pond waters levels in lieu of the frequency graphs currently included in the study report-**Action Item**.

Conowingo 3.8 – Downstream Flow Ramping and Fish Stranding Study (Terry Euston)

Terry Euston (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Mike Hendricks requested that arrows showing when the stranding surveys occurred be added to the water level figures within the study report-**Action Item**.

Don Pugh asked if the individual stranding data could be extrapolated over a season, and if one minimum flow yielded less bird predation than another. Tom Sullivan indicated that the study was meant to characterize individual events, and that the data was not meant to be extrapolated. Don Pugh also asked if an estimate of dewatered areas could be provided for different flow pairs. Terry stated that there was not existing aerial photography/mapping under the various minimum flow conditions to make an accurate assessment of dewatered area.

Don Pugh also asked if there was any assessment of connectivity between the stranded areas completed, and whether any relationships with connectivity and predation or flow could be developed. Terry stated that only a qualitative assessment of connectivity could be completed based on data collected as part of this study.

Conowingo 3.18 – Characterization of Downstream Aquatic Communities (John Pierce – Phone)

John Pierce (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Andy Shiels requested a fish length frequency distribution be completed for the 2010 West Fish Lift data (i.e., fish length-weight data) to supplement the current study report.-**Action Item**.

Bob Sadzinski and Andy Shiels expressed concern that collecting fish from different times of year may throw off the weight vs. length relationship. Terry indicated that this is possible, but there is no way to separate the cumulative dataset out by individual season. Bob Sadzinksi suggested that the length/weight relationship regression relationships for yellow perch seem to have changed from the 1980s to present.

Conowingo 3.21 – Impact of Plant Operations on Migratory Fish Reproduction (Steve Leach, Brian Hanson – Phone)

Brian Hanson and Steve Leach (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Mike Hendricks asked when the Year Two study plan would be ready for the ichthyoplankton sampling. Terry Euston stated that the ichthyoplankton study plan would be circulated to stakeholders on March 18, 2011-**Action Item**. Mike also indicated that there was a need for more field observational information on American shad spawning locations in the river below Conowingo Dam. Steve Leach indicated that the Year Two ichthyoplankton sampling would help address this issue, along with the results of the Instream Flow Study (Conowingo 3.16).

Conowingo 3.24 – Zebra Mussel Monitoring Study (Steve Adams)

Steve Adams (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. It was asked if Exelon is doing any treatment for zebra mussels. Kim Long (Exelon) indicated that Exelon is considering treatment, but that there is no current plan in place.

Muddy Run 3.4 –Impacts of Muddy Run Project on Conowingo Pond Fishes (Terry Euston)

Terry Euston (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Andy Shiels asked if black crappie was present and if the population was healthy. Terry Euston indicated they are present, but have always been lower in abundance than white crappie. Andy Shiels asked why relative weight was used in this study report, while condition factor was used for fish lift data evaluated as part of Conowingo 3.18. Terry Euston indicated that MDNR has used relative weight recently and this study tried to mimic their methods for easy comparison. Aaron Henning (SRBC) asked if the data showed any logperch within Conowingo Pond. Terry stated that this species had been caught in all gear types.

Muddy Run 3.6 – Interactions with the PBAPS Thermal Plume (Terry Euston)

Terry Euston (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Larry Miller asked for clarification as to the withdrawal capacity and cooling water temperature differential at the Peach Bottom Station. Terry replied that the Peach Bottom withdrawal capacity is approximately 3,450 cfs, while the design cooling water temperature differential is approximately 22°F.

Session 3: Water Quality

Conowingo 3.1 – Water Quality in Conowingo Pool and below Dam (Ray Bleistine, Steve Adams)

Steve Adams and Ray Bleistine (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. John Mudre (FERC) asked if the boils of the larger units had lower DO readings. Ray indicated that some of the boil readings were rather low, but this was primarily during low-flow summertime periods, just after turbine start-up. He then mentioned that during low-flow periods the larger units are rarely used. Larry Miller followed up with a request that the run times of the turbine units in July and August of 2010 be analyzed versus previous years to see if the collected data was a representative sample-**Action Item**. Bob Sadzinski suggested that a GIS map be considered for Conowingo Pond DO levels, to show the areas of higher and lower DO.

Muddy Run 3.1 – Water Quality Study (Ray Bleistine, Steve Adams)

Steve Adams and Ray Bleistine (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Mike Helfrich requested information related to the dead storage volume versus the active storage volume for the Muddy Run Power Reservoir-**Action Item**[1]. Tom Sullivan indicated that Exelon anticipated completing a Year Two study related to Water Quality at Muddy Run.

Conowingo 3.14 – Debris Management (Marjie Zeff)

Marjie Zeff (URS) presented the study objectives, work completed, findings, and schedule for this study. Shawn Seaman (MDNR) asked how the estimates of the amount of debris that sank, was removed, and passed were derived. Tom Sullivan (Gomez and Sullivan) responded that the source of these estimates will be provided-**Action Item**. Andy Shiels (PFBC) stated that the report should depict where debris along Conowingo Dam is collected and removed-**Action Item**.

Conowingo 3.15 – Sediment Introduction and Transport (Marjie Zeff)

Marjie Zeff (URS) presented the study objectives, work completed, findings, and schedule for this study. In response to a question from Larry Miller (USFWS), Marjie Zeff (URS) indicated that historic maps would be included in the final report. Woohee Choi (FERC) mentioned that wind influences can impact sediment movement when water depths are 20 feet or less. Mike Helfrich (Riverkeeper) requested that the study report include the peak flows associated with Hurricane Hazel (1954) and Tropical Storms Connie and Diane (1955), as well as the storm events examined in the HEC-6 modeling analysis-**Action Item**. Mike also contended that the Hazel, Connie, and Diane storms did not cause significant flood events (greater than ~400,000 cfs) to result in scour within Conowingo Pond.

[1] The water storage between elevations 520 feet and 470 feet is available for generation purposes at the Muddy Run Power Reservoir. The volume of water between these elevations constitutes approximately 60% of the total storage in the Power Reservoir.

There was a discussion on the objectives and data sources for the USGS HEC-6 model. Mike Helfrich expressed concern that the modeling completed does not address any future storms, and that the bathymetry used in the model may be outdated. Marjie Zeff responded that the goal of the HEC-6 modeling was to take a more detailed look at historic storm events to better understand the local movement and distribution of sediment during those events.

Session 4: Water Use

Muddy Run 3.2 –Hydrologic Study of Muddy Run Water Withdrawal and Return Characteristics (Kirk Smith)

Kirk Smith (Gomez and Sullivan) presented the study objectives, work completed, findings, and schedule for this study. Woohee Choi (FERC) asked why the Muddy Run withdrawal and discharges were greater during a 30-day low flow period than the 30-day high flow period. Kirk Smith responded that the low-flow and high-flow periods were referring to the Susquehanna River flow, and that river flow does not necessarily have any correlation with Muddy Run operations. Kirk stated that Muddy Run operations are typically driven by power demand, which likely explains the difference.

Larry Miller requested that if more bathymetry and/or velocity data is collected this year that the shad staging area near Sicily Island be included in the survey-**Action Item**. It was suggested that a note be included on the bathymetry map indicating normal pool elevation. Drew Dehoff (SRBC) requested that an hourly maximum withdrawal and discharge be included for each period in the final report for all analyzed periods-**Action Item**.

With regard to the bathymetric mapping of the Muddy Run tailrace, Jim Spontak (PFBC) requested that the normal water surface elevation be included on the map, and Andy Shiels (PFBC) requested that the location of the Muddy Run draft tubes be included on the map-**Action Item**.

Conowingo 3.11 – Hydrologic Study of the Lower Susquehanna River (Gary Lemay)

Gary Lemay (Gomez and Sullivan) presented the study objectives, work completed, findings, and schedule for this study. Don Pugh (American Rivers) asked when the Conowingo USGS gage had most recently been verified. Gary Lemay responded that he believes it was last year, but that it was at minimum flow, which does not apply well to flows at 40,000 cfs, where the inconsistencies were being noticed[2]. Only four flow verification measurements have taken place since 1980, two of which were below 4,000 cfs, and two of which were above 200,000 cfs.

Conowingo 3.20 – Salinity and Salt Wedge Encroachment (Gary Lemay)

[2] A review of the USGS gage data reveals that the last verification was in the fall of 2009, at 3,910 cfs http://waterdata.usgs.gov/nwis/measurements/?site_no=01578310&agency_cd=USGS

Gary Lemay (Gomez and Sullivan) presented the study objectives, work completed, findings, and schedule for this study. Don Pugh (American Rivers) asked if salinity tolerances for young-of-year had been provided. Gary Lemay indicated that no analysis had examined those thresholds. Bob Sadzinski stated that he could provide data comparing yellow perch young-of-year and egg collections to salinity levels. Follow-up conversations with Bob Sadzinski and Paul Piavis (MDNR) yielded information relating to eggs, larval, and young-of-year yellow perch. Observational data showed that eggs could tolerate salinities up to 8 ppt. Larvae tolerated salinities up to 12-13 ppt. Young-of-year have been collected in salinities as high as 13 ppt. Paul Piavis also stated that the preferred salinity levels for these life stages would likely be closer to 2 ppt. This is well above the maximum salinity level recorded at any of the salinity stations, where the maximum salinity recorded was 0.46 ppt at the MDNR station.

Conowingo 3.29 – Effect of Project Operations on Downstream Flooding (Gary Lemay)

Gary Lemay (Gomez and Sullivan) presented the study objectives, work completed, findings, and schedule for this study. Woohee Choi (FERC) requested that the HEC-RAS model cross-sections be provided-**Action Item**. Woohee Choi (FERC) also requested information related to Conowingo's Flood Operations Plan-**Action Item**.

Friday, March 11, 2011

Session 5: Recreation, Shoreline Management, Cultural Resources

Muddy Run 3.11 – Recreational Inventory and Needs Assessment (Bud Newell)

Bud Newell (TRC) presented the study objectives, work completed, findings, and schedule for this study. Mike Hendricks (PFBC) noted that a few specific recreation areas had parking shortages, such as the mouth of Deer Creek during the hickory shad run. Bob Sadzinski and Kevin Mendik (National Park Service) asked if Exelon had a web page showing recreation facilities, and what methods of outreach were being employed by Exelon. Shawn Seaman (MDNR) expressed concern that perhaps the incorrect groups were being targeted in the recreation user survey, and that Exelon should reach out to those who may be interested in using the facilities but for whatever reason are not. Andy Shiels stated that where the users originate is important, and Bob Sadzinski recommended collecting a zip code from those being surveyed to get at this answer. Terry Euston mentioned that the zip code of all anglers interviewed as part of the creel survey was recorded. Tom Sullivan requested input for the stakeholder list, and some local residents provided suggestions.

Conowingo 3.26 – Recreational Inventory and Needs Assessment (Bud Newell)

Bud Newell (TRC) presented the study objectives, work completed, findings, and schedule for this study. Lee Haille expressed concern with the 400-yard boating access restriction above and below Conowingo Dam. Lee stated that a float line will not stop a security threat, and it restricts what would otherwise be good fishing areas. Doug Clark also expressed concern with the time limits for the Conowingo Fishermans Park, as he and others he knows like to go nighttime float fishing, but they cannot access the boat ramp after certain hours.

A discussion was held relative to the closing of the Rock Run boat ramp, and whether it should be addressed in the study report since it is outside the project boundary. Bud Newell (TRC) stated that boat ramp would be included in the regional discussion of available facilities, but would not receive the same level of treatment as facilities within the project boundary. Several stakeholders reiterated that parking at Deer Creek is not adequate for certain times of the year.

Muddy Run 3.12 – Shoreline Management and Conowingo 3.27 – Shoreline Management (Bud Newell)

Bud Newell (TRC) presented the study objectives, work completed, findings, and schedule for these studies. In response to a question from Larry Miller (USFWS), Bud confirmed that Year One study results (i.e., wetland, significant habitats) would be considered in the shoreline management planning process.

Muddy Run 3.10 – Creel Survey of Muddy Run Recreation Lake (Mike Martinek)

Mike Martinek (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. Mike Hendricks (PFBC) asked if parking availability was investigated at all of the creel survey locations. Mike Martinek (Normandeau) indicated that it was not. Andy Shiels (PFBC) stated that it would be helpful if the study report could identify pulses of angling activity related to PFBC stocking activities-**Action Item.**

Conowingo 3.25 – Creel Survey of Conowingo Pond and the Susquehanna River (Mike Martinek)

Mike Martinek (Normandeau) presented the study objectives, work completed, findings, and schedule for this study. It was suggested that the final report include seasonal use, as well as a weekday/weekend breakdown of results-**Action Item**. It was also requested that the length-frequency distribution based on the creel survey results be included in the final report-**Action Item**. Shawn Seaman requested that the aerial photos from the surveys be included in the final report-**Action Item**. Andy Shiels suggested the black bass catch data be partitioned by season (i.e., catch and release)-**Action Item**. Bob Sadzinski (MDNR) asked for the raw data to be included with the report, as well as length-frequency distributions. Tom Sullivan indicated that this information will be included in the study report-**Action Item**. Mike Helfrich suggested that creel survey data from for the fisherman’s wharf and Conowingo tailrace be partitioned to examine the impacts of the catwalk closing.

Conowingo 3.32 – Re-evaluate the Closing of the Catwalk (Tom Sullivan)

Tom Sullivan (Gomez and Sullivan) presented the study objectives, work completed, findings, and schedule for this study. Shawn Seaman stated that the study summary included no comparison of fishing access at other projects (Safe Harbor) relative to Conowingo. Kevin Mendik (National Park Service) said that even though a security consultant made a determination that there was a threat posed by re-opening the catwalk, Exelon could still choose to do otherwise.

Several stakeholders suggested that Exelon did not investigate the feasibility of re-opening the catwalk, since no steps were identified showing what would have to be done in order for the catwalk to be reopened, such as completing a cost estimate for increased security presence to monitor the catwalk. It was also suggested that fisherman safety (i.e., accidents on the catwalk) be documented, as well as a risk assessment analysis to anglers on the catwalk.

Muddy Run 3.14 – Cultural Resource Review and Assessment (Kirk Smith)

Kirk Smith (Gomez and Sullivan) presented the study objectives, work completed, findings, and schedule for this study. In response to a question from Emily Carter (FERC), Kirk stated that Exelon hopes to file the Historic Properties Management Plans as part of the project license applications.

Conowingo 3.28 – Cultural Resource Review and Assessment (Kirk Smith)

Kirk Smith (Gomez and Sullivan) presented the study objectives, work completed, findings, and schedule for this study. There were no questions or comments.

Muddy Run 3.13 – Visual and Noise Assessment (Kirk Smith)

Kirk Smith (Gomez and Sullivan) presented the study objectives, work completed, findings, and schedule for this study. Mike Helfrich requested that the field notes be provided so that specific noise sources could be determined at each assessment site-**Action Item**.

Session 6: Terrestrial and Wetland Resources

Muddy Run 3.9 – Bog Turtle and Rough Green Snake Habitat Study (Deb Poppel)

Deb Poppel (URS) presented the study objectives, work completed, findings, and schedule for this study. Andy Shiels (PFBC) asked why no other herptiles were noted on any of the bog turtle Phase I surveys. Deb Poppel responded that the time expended to determine whether the wetland was potential bog turtle habitat was limited to the amount of time necessary for the habitat evaluation, and additional time was not spent searching for herpetofauna. Because the wetland areas investigated were very small, the time needed to make an accurate habitat determination was not substantial, and therefore it is not unusual that no animals were observed. However, Deb will review her field notes to confirm that no herpetofauna were observed during the field collection of information for the overall project area landscape habitat descriptions.-**Action Item**.

Conowingo 3.12 Water Level Management (Mike Rondinelli)

Mike Rondinelli (URS) presented the study objectives, work completed, findings, and schedule for this study. Doug Clark (Coastal Conservation Association) requested that the study include a description of critical water levels associated with the management of Conowingo Pond (e.g., the minimum pond level that requires a shutdown of the Peach Bottom Atomic Power Station).

Doug also noted recreational boat access issues at several launches can become apparent at low Conowingo Pond levels.

Conowingo 3.17 – Downstream EAV/SAV Study (Mike Rondinelli)

Mike Rondinelli (URS) presented the study objectives, work completed, findings, and schedule for this study. In response to a question from Larry Miller, Bryan Strawn (URS) stated that the vegetative communities below Conowingo Dam were generally similar to those seen in other reaches of the Susquehanna. In response to a question from Larry Miller, Mike Rondinelli indicated that the growth of EAV appears to be limited by the availability of substrate.

Muddy Run 3.7 – Transmission Line Avian Interaction Study (Deb Poppel)

Deb Poppel (URS) presented the study objectives, work completed, findings, and schedule for this study. No major comments or questions.

Muddy Run 3.8 and Conowingo 3.23 – Critical Habitat use Areas for Bald Eagle (Deb Poppel)

Deb Poppel (URS) presented the study objectives, work completed, findings, and schedule for this study. In response to a question from Doug Clark, Deb stated that assessment of the eagle nest in the Holtwood tailrace was not included as part of these studies, as its management is PPL's responsibility.

Muddy Run 3.15 and Conowingo 3.30 – Osprey Nesting Survey (Deb Poppel)

Deb Poppel (URS) presented the study objectives, work completed, findings, and schedule for this study. It was agreed that the coordinates of the identified osprey nests should be provided to the Pennsylvania Game Commission and the MDNR Wildlife and Heritage Service. Deb indicated that a work plan for the Year Two Osprey nesting study would be circulated to stakeholders by Friday, March 18, 2011-**Action Item**.

Conowingo 3.31 – Black-Crowned Night Heron Nesting Survey (Deb Poppel)

Deb Poppel (URS) presented the study objectives, work completed, findings, and schedule for this study. Deb indicated that a work plan for the Year Two black-crowned night heron nesting study would be circulated to stakeholders by Friday, March 18, 2011-**Action Item**.

Tom Sullivan stated that Exelon would like to convene a conference call on March 28th, 2011 from 1:00 pm to 3:00 pm, and a follow-up meeting on April 7th, 2011 from 11:00 am to 4:00 pm at the Conowingo Visitors Center to discuss the following Year Two study plans, which require spring field work commencing in April 2011.

1. Conowingo 3.3-Biological and Engineering Studies of American Eel at the Conowingo Project (i.e., American eel sampling below the Conowingo Dam spillway)

2. Conowingo 3.5- Upstream Fish Passage Effectiveness Study (i.e., American shad radio telemetry study)
3. Conowingo 3.21- Impact of Plant Operations on Migratory Fish Reproduction (i.e., Ichthyoplankton sampling below Conowingo Dam)
4. Conowingo 3.30- Osprey Nesting Survey
5. Conowingo 3.31- Black-crowned Night Heron Nesting Survey
6. Muddy Run 3.15- Osprey Nesting Survey

Several resource agencies stated that they would have to give further consideration to Exelon's proposed meeting schedule before making a determination on whether to participate.

Exelon Proposed Year Two Studies

Year Two Studies for the Conowingo Project

RSP No.	Study	Description
3.2	Downstream Fish Passage Effectiveness Study	Balloon tagging field entrainment study of adult and juvenile American shad.
3.3	Biological and Engineering Studies of American Eel at the Conowingo Project	American eel sampling below the Conowingo Dam spillway.
3.4	American Shad Passage Study	Development of shad population model in consultation with stakeholders.
3.5	Upstream Fish Passage Effectiveness Study	American shad radio telemetry study below Conowingo Dam.
3.10	Maryland Darter Surveys	Second year of survey program
3.21	Impact of Plant Operations on Migratory Fish Reproduction	Ichthyoplankton sampling below Conowingo Dam.
3.22	Shortnose and Atlantic Sturgeon Life History Studies	Second year of placement of acoustic receiver array below Conowingo Dam.
3.23	Study to Identify Habitat Use Areas for Bald Eagle	Winter roost surveys.
3.26	Recreational Inventory and Needs Assessment	Recreation plan development.
3.27	Shoreline Management	Shoreline management plan development.
3.28	Archaeological and Historic Cultural Resource Review and Assessment	Phase IB Archeology Survey and Phase II Historic Structures Evaluation
3.30	Osprey Nesting Survey	Second year of nesting surveys.
3.31	Black-crowned Night Heron Nesting Survey	Second year of nesting surveys.

Year Two Studies for the Muddy Run Project

RSP No.	Study	Description
3.1	Water Quality Study	Second year of water quality sampling in the MR Power Reservoir and Tailrace
3.3	Adult American Eel Telemetry Study Juvenile American shad Telemetry Study	Radio telemetry studies near the MR Tailrace.
3.5	Nearfield Effects of the Muddy Run Project on Migratory Fishes	Water velocity measurements in the MR Intake Canal and Tailrace.
3.8	Study to Identify Critical Habitat Use Areas for Bald Eagle	Winter roost surveys.
3.9	Rough Green Snake Habitat Study	Rough green snake presence/absence surveys.
3.11	Recreational Inventory and Needs Assessment	Recreation plan development.
3.12	Shoreline Management	Shoreline management plan development.
3.14	Archaeological and Historic Cultural Resource Review and Assessment	Phase IB Archeology Survey and Phase II Historic Structures Evaluation.
3.15	Osprey Nesting Survey	Second year of nesting surveys.

Attachment A-List of Attendees

Name	Affiliation	Email
Don Pugh	American Rivers	don.pugh@yahoo.com
Doug Clark	Coastal Conservation Association	dublinlaundry1@aol.com
Kimberly Long	Exelon	kimberly.long@exeloncorp.com
Colleen Hicks	Exelon	colleen.hicks@exeloncorp.com
Al Ryan	Exelon	halfred.ryan@exeloncorp.com
Tim Wirth	Exelon	timothy.wirth@exeloncorp.com
Monir Chowdhury	FERC	monir.chowdhury@ferc.gov
John Mudre	FERC	john.mudre@ferc.gov
Woohee Choi	FERC	woohee.choi@ferc.gov
Andy Bernick	FERC	andrew.bernick@ferc.gov
Emily Carter	FERC	emily.carter@ferc.gov
Tom Sullivan	Gomez and Sullivan	tsullivan@gomezandsullivan.com
Gary Lemay	Gomez and Sullivan	glemay@gomezandsullivan.com
Kirk Smith	Gomez and Sullivan	ksmith@gomezandsullivan.com
Tom Hoffman	Gomez and Sullivan	thoffman@gomezandsullivan.co m
Jan Nethen	Local Citizen	NA
Norman Stinchcomb	Local Citizen	Bonniestinchcomb@hotmail.com
Ronald Steelman	Local Citizen	rockdfish@aol.com
Jere Hess	Local Citizen	NA
Guy Alsentzer	Lower Susquehanna Riverkeeper	guy@lowsusriverkeeper
Mike Helfrich	Lower Susquehanna Riverkeeper	lowsusriver@hotmail.com
Shawn Seaman	Maryland Department of Natural Resources	sseaman@mdnr.state.md.us
Matthew Ashton	Maryland Department of Natural Resources	mashton@dnr.state.md.us
Bob Sadzinski	Maryland Department of Natural Resources	bsadzinski@dnr.state.md.us
Lee Haile	Maryland Saltwater Sportsfishermans Association-Perry Hall Chapter	NA
Julie Crocker	National Oceanic and Atmospheric Administration	julie.crocker@noaa.gov
Terry Euston	Normandeau Associates	teuston@normandeau.com
Ray Bleistine	Normandeau Associates	rbleistine@normandeau.com
Doug Royer	Normandeau Associates	droyer@normandeau.com
Tim Brush	Normandeau Associates	tbrush@normandeau.com
Eric White	Normandeau Associates	ewhite@normandeau.com
Enn Kotkas	Normandeau Associates	ekotkas@normandeau.com
Steven Adams	Normandeau Associates	sadams@normandeau.com
Steve Leach	Normandeau Associates	sleach@normandeau.com
Brian Hanson	Normandeau Associates	bhanson@normandeau.com
Jennifer Griffin	Normandeau Associates	jGriffin@normandeau.com
John Pierce	Normandeau Associates	Jpierce@normandeau.com

Name	Affiliation	Email
Bill Ettinger	Normandeau Associates	wettinger@normandeau.com
Jim Spontak	Pennsylvania Department of Environmental Protection	jspontak@state.pa.us
Andy Shiels	Pennsylvania Fish and Boat Commission	ashiels@state.pa.us
Mike Hendricks	Pennsylvania Fish and Boat Commission	mihendrick@state.pa.us
Geoff Smith	Pennsylvania Fish and Boat Commission	geofsmith@state.pa.us
Wayne Melnick	Pennsylvania Fish and Boat Commission	Wmelnick@state.pa.us
Olivia Braun	Pennsylvania Game Commission	obraun@state.pa.us
Jim Richenderfer	Susquehanna River Basin Commission	jrichenderfer@srbc.net
Andrew Dehoff	Susquehanna River Basin Commission	adehoff@srbc.net
Aaron Henning	Susquehanna River Basin Commission	ahenning@srbc.net
Tara Moberg	The Nature Conservancy	tmoberg@tnc.org
Bud Newell	TRC Solutions, Inc	anewell@trcsolutions.com
Bill Campbell	TRC Solutions, Inc	wbcampbell@trcsolutions.com
Debby Nizer	U.S. Army Corps of Engineers	debby.nizer@usace.army.mil
Larry Miller	U.S. Fish and Wildlife Service	larry_m_miller@fws.gov
Sheila Eyler	U.S. Fish and Wildlife Service	Sheila_eyler@fws.gov
Ian Park	U.S. Fish and Wildlife Service	Ian_Park@fws.gov
Steve Minkkinen	U.S. Fish and Wildlife Service	steve_minkkinen@fws.gov
Kevin Mendik	U.S. National Park Service	kevin_mendik@nps.gov
Marjorie Zeff	URS	marjorie_zeff@urscorp.com
Deborah Poppel	URS	deborah.poppel@urscorp.com
Mike Rondinelli	URS	michael_rondinelli@urscorp.com
Bryan Strawn	URS	Bryan_strawn@urscorp.com
Andrew Tittler	USDOI-Solicitors Office	andrew.tittler@sol.doi.gov
John Clements	Van Ness Feldman	jhc@vnf.com
Jay Ryan	Van Ness Feldman	jrt@vnf.com
Steve Schreiner	Versar for MDNR	sschreiner@versar.com
Bill Richkus	Versar for MDNR	brichkus@versar.com

Attachment B-Meeting Presentation

Conowingo Hydroelectric Project (FERC No. 405)
Muddy Run Pumped Storage Project (FERC No. 2355)

Initial Study Report Meeting
March 9-11, 2011

Purpose of the Initial Study Report Meeting [18 CFR 5.15(C)(2)]

- Within 15 days following the filing of the Initial Study Report (February 22, 2011), the Applicant shall hold a meeting with licensing participants and Commission staff to discuss the study results and the potential applicant's and/or other participant's proposals, if any, to modify the study plan in light of the progress of the study plan and the data collected.

Meeting Objectives

- Discuss the results of the relicensing studies to date
- Discuss any upcoming study activities
- Discuss any proposed study modifications and/or proposals based on the results and data provided at the meeting

Criteria for Modification of Approved Study [18 CFR 5.15(d)]

- Any proposal to modify an ongoing study must be accompanied by a showing of good cause why the proposal should be approved, and must include, as appropriate to the facts of the case, a demonstration that:
  - Approved studies were not conducted as provided for in the approved study plan; or
  - The study was conducted under anomalous environmental conditions or that environmental conditions have changed in a material way.

Criteria for New Study [18 CFR 5.15(e)]

- Any proposal for new information gathering or studies must be accompanied by a showing of good cause why the proposal should be approved, and must include, as appropriate to the facts of the case, a statement explaining:
  - Any material changes in the law or regulations applicable to the information request;
  - Why the goals and objectives of any approved study could not be met with the approved study methodology;
  - Why the request was not made earlier;
  - Significant changes in the project proposal or that significant new information material to the study objectives has become available; and
  - Why the new study request satisfies the seven (7) study criteria.

Seven Study Criteria [18 CFR 5.9(b)]

- Identify goals and objectives of the study proposal
- Identify relevant management plans
- Relevant public interest (if not a resource agency)
- Describe existing information and the need for additional information
- Explain any nexus between project operations and effects to studied resource and how the results would inform the development of license requirements
- Explain how any proposed study methodology is consistent with generally accepted scientific practice
- Describe level of effort and cost and why any alternatives would not be sufficient to meet stated information needs.

Relicensing Process Dates

- Initial Study Report Meeting (All Stakeholders and Exelon)
  - March 9-11, 2011
- Initial Study Report Meeting Summary Filed (Exelon)
  - March 28, 2011
- Study Disputes/Requests to Modify Study Plan Due, *if no one files a disagreement, the amendment to the study plan is deemed approved* (All Stakeholders)
  - April 27, 2011
- Responses to Disputes/Study Requests Due (All Stakeholders)
  - May 27, 2011
- Last date for the Director to resolve disagreements and amend the approved study plan (FERC)
  - June 27, 2011

Fish and Aquatics

Conowingo 3.10-Maryland Darter Surveys

- Study Objective
  - Determine if Maryland darter are present in the Susquehanna River below Conowingo Dam and/or the lower riffles of Deer and Octoraro creeks.
- Work Completed
  - Deer Creek – October and November, 2010
    - Six sampling sites to date (5 electrofisher/seine combination; 1 snorkeled)
    - Included the so-called Stafford Bridge riffle – the only location within the study area that Maryland darter has ever been found
    - Ice prevented sampling from December through present
  - Octoraro Creek – October and November, 2010
    - Three sampling sites to date (electrofisher/seine combination)
    - Ice prevented sampling from December through present
  - Susquehanna River – January and February, 2011
    - Used electrified benthic trawl
    - 33 sites sampled over four day period in January
    - 12 sites sampled on 20 February (NOTE: study report was submitted prior to this sampling event)
- Findings
  - No Maryland darters have been collected or observed
  - Five of six darter species known to occur in the study area have been collected = sampling program is effective for darters
  - Through January, 43 species representing 11 families have been collected
  - Number of species per water body to date: Deer C. – 40; Octoraro C. – 37; Susquehanna R. – 12 through January (+4 additional species collected in February after the progress report was submitted)
- Work Remaining & Schedule
  - Deer Creek – tentatively scheduled for March (electrofisher/seine); spring, summer, early fall (electrofisher/seine & snorkeling)
  - Octoraro Creek – tentatively scheduled for March (electrofisher/seine); spring, summer, early fall (electrofisher/seine & snorkeling)
  - Susquehanna River – tentatively scheduled for March (elec. benthic trawl); spring, summer, early fall (elec. benthic trawl & snorkeling)

Conowingo 3.22-Shortnose and Atlantic Sturgeon Life History Studies

- Study Objective
  - Review shortnose and Atlantic sturgeon status, occurrence in the Susquehanna River, and habitat requirements.
  - Compare Conowingo east fish lift and any East Coast passage facilities where successful upstream passage has been documented.
  - Assess habitat availability below Conowingo Dam.
  - Assess sturgeon stranding below Conowingo Dam.
  - Monitor the lower Susquehanna River for use by sturgeons.
- Work Completed
  - Literature review of sturgeon status, occurrence, and habitat requirements with emphasis on Susquehanna River and regional information.
  - Comparison of the Conowingo east fish lift with two facilities documented to pass / collect both shortnose and Atlantic sturgeons.
  - Monitored the lower Susquehanna River for acoustic transmitter tagged sturgeons from March 24 – November 8 +.
  - Potential stranding sites examined after peak generation periods in 12 events from April 29 – November 17, 2010 (Study 3. 8-Downstream Flow Ramping and Stranding Study).
  - An analysis of project operational impacts on shortnose sturgeon habitat below Conowingo Dam is being conducted in a separate study (Study 3.16-Instream Flow Habitat Assessment Below Conowingo Dam).
- Findings
  - Contemporary records of shortnose sturgeon are limited and there is no contemporary record of Atlantic sturgeon in the river;
  - Suitable habitat appears to exist in the lower river and upper Chesapeake Bay, but water quality could be limiting.
  - No acoustic transmitter tagged fish (from Delaware River or lower Chesapeake Bay) were detected using the Susquehanna River during 2010.
  - No evidence of stranding below Conowingo Dam.
- Work Remaining
  - Informal Consultation with NOAA to determine what, if any additional studies are required for 2011.
- Schedule
  - Study Report has been completed
  - Informal consultation will follow Initial Study Report Meeting.

Conowingo 3.16-Instream Flow Habitat Assessment below Conowingo Dam

- Study Objective
  - Determine the relationship between flow and aquatic habitat conditions in the Susquehanna River below Conowingo Dam
- Work Completed
  - Development and calibration of hydraulic model
  - Selection of Habitat Suitability Indices (HSI) for target species/life stages
  - Development of habitat models for all target species/life stages
- Findings
  - Habitat (WUA) versus flow relationships for target species/life stages
- Work Remaining
  - Habitat analysis for mussel species using hydraulic model output parameters
  - Habitat persistence analysis for immobile target species/life stages (e.g., spawning , fry, macroinvertebrates) at combinations of the current minimum flows and full generation flow
  - Habitat time series analysis for all target species/life stages for alternative flow regime scenarios (i.e. existing conditions).
- Schedule
  - Completion of Study Report in April 2011

Conowingo 3.19-Freshwater Mussel Characterization Study below Conowingo Dam

- Study Objectives
  - Characterize the freshwater mussel community in 4.5 miles of the Susquehanna River below Conowingo Dam
  - Determine if plant operations at Conowingo Dam affect the mussel community in this river reach
- Work Completed
  - Search for published and unpublished locality records
  - Semi-quantitative mussel survey
  - Quantitative mussel survey
  - Habitat parameter measurements
- Findings
  - Contacts with nine museums identified two species collected in the study reach in the 1960s and two other species collected several miles downstream in the 1950s. The Maryland Department of Natural Resources, Monitoring and Non-Tidal Assessment reported six species collected in the survey reach in 2008-2010.
  - A total of 4,265 live mussels of five species were observed in a total of 87.4 search hours of semi-quantitative survey at 72 stations. The majority (96.5%) were eastern elliptio, a species widely observed in Maryland. Two other species were identified from dead/empty shells. None of the seven species appear on the official State Threatened and Endangered Species List and none are Federally-listed.
  - The highest numbers of mussels ($\geq$ 100 mussels per search hour) were observed in the lower part of the study reach, mostly near Robert, McGibney, Spencer, and Sterrett islands. Fewer than 5 mussels per search hour were observed at 16 stations, mostly in the upstream end of the study reach, but here and there in the middle and lower end of the study reach as well.
  - Quantitative sampling (0.25 m^2 quadrats following a systematic sampling design) at five stations resulted in total mussel density estimates ranging from 2.13 to 4.27 mussels/m^2, with the highest densities observed near McGibney Island. The majority (94.8%) of the live mussels collected were eastern elliptio, with small numbers of two other species also observed.
  - Small numbers of juvenile eastern elliptio (shell length < 50 mm) were observed in the semi-quantitative and quantitative surveys, suggesting that the species is reproducing in the study reach. The presence of large individuals (> 135 mm shell length) suggests that fluctuating river conditions do not exceed ecological requirements for eastern elliptio. Overall, any effects of Conowingo Project operation on the downstream mussel community are not discernable and likely not ecologically significant.
- Work Remaining
  - None
- Schedule
  - Study Report has been completed

Fish Passage

Conowingo 3.2-Downstream Fish Passage Effectiveness Study

- Study Objective
  - Provide estimates of entrainment and impingement potential and survival for the three turbine types at the Conowingo Project for target fish species using existing data, and describe downstream fish passage measures already in place.
  - The target fish species are American eel, American shad, bluegill, channel catfish, gizzard shad, largemouth bass, smallmouth bass, and walleye.
- Work Completed
  - Project description relative to impingement, entrainment and survival of target species.
  - Life history and habitat requirements of target species.
  - Assessment of the potential for target species/life stages to be impinged on Project trash racks.
  - Calculation of survival probabilities for target species/life stages passed through three turbine types at the Project using models developed by Franke et al. (1997).
- Findings
  - Impingement unlikely unless fish are stressed. Trash rack spacing (5.375 inches) sufficient to pass all but very large (30 inch) channel catfish.
  - Turbine survival probability is a function of size more than species. Initial calculations predict survival for small fish (<8 inches) to range between about 94-99% for the Kaplan and Francis turbines. For fish up to 30 inches which could include large juvenile or adult American eel, adult American shad, adult channel catfish and adult walleye, survival potential ranges from about 76-91% with higher survival potential through the Kaplan turbines.
- Work Remaining
  - Review of target species in Conowingo Pond.
  - Assessment of entrainment potential based on comparison to other projects.
  - Assessment of survival potential based on comparison to other projects.
- Schedule
  - Completion of Study Report in March 2011.

Conowingo 3.5 Upstream Fish Passage Effectiveness Study

- Study Objective
  - Estimate the upstream fish passage effectiveness of migratory adult American shad at Conowingo EFL
  - Identify factors that may influence EFL effectiveness on a daily or seasonal basis
- Work Completed
  - 151 adult American shad were radio-tagged and released downstream of Conowingo Dam
  - 102 shad were angled, tagged and released directly into Conowingo tailrace
  - 49 shad were trapped, tagged, and transported 5 miles downstream to Lapidum, Maryland
  - 75 shad were tagged, and released in April for the early-mid shad run segment
  - 76 shad were tagged and released in May for the mid-late shad run segment

- Findings
  - Under existing station and EFL operational conditions, 58.9% (89 of 151) of all radio-tagged were detected in the tailrace, making them accessible to the EFL, while the remaining 41.1% (62 of 151) did not re-enter the tailrace
  - **Fishway Attraction Effectiveness**: of the 89 radio- tagged shad, 73.0% (65 of 89) entered into the EFL
  - **Upstream Fish Passage Efficiency**: of the 89 radio-tagged shad detected in the tailrace, 44.9% (40 of 89) completed passage through the EFL
  - **Upstream Fish Passage Effectiveness:** of the 89 radio-tagged shad detected in the tailrace, 43.8% (39 of 89) completed passage through the EFL and remained upstream for 48 or more hours after passage

- Work Remaining
  - Collect all American shad by means of angling and release immediately upon tagging to reduce transport stress
  - Analyze EFL structures and hydraulics to increase shad retention inside the structure and to improve passage from the Entrance Channels to the Hopper
  - Compare unit preference in relationship to **fishway attraction effectiveness** for 2010 and 2011 shad run seasons
- Schedule
  - Study Report has been completed
  - 2011: Begin adult American shad tag and release in April

Conowingo 3.6 Attraction Flow Study

- Study Objective
  - Review/analyze applicable historical data (2001-2009)
  - Analyze 2010 turbine generation, water temperature, attraction flow velocity data, and hourly fish passage data
  - Analyze radio-telemetered shad passage as it relates to EFL and Conowingo station operations

- Work Completed
  - Analysis of Historical Data (2001-2009)
  - Analysis of Station and EFL operations, attraction flow velocity data and hourly fish passage data
  - Analysis of radio-telemetered shad passage relating to EFL and Conowingo station operations

- Findings
  - No strong correlation between station generation, attraction flow velocity, and fish passage
  - 89 radio tagged shad monitored in tailrace
  - 65 of 89 shad detected in EFL (73% attraction effectiveness)
  - 40 of the 65 RT shad successfully passed upstream
  - Remaining 25 RT shad made forays into the EFL but did not pass upstream
  - Overall passage efficiency of radio-tagged shad was 44.9% (40 of 89 fish)

- Work Remaining
  - None
- Schedule
  - Study Report has been completed

Conowingo 3.7- Fish Passage Impediments Study for the Susquehanna River below Conowingo Dam

- Study Objective
  - Determine if project operations adversely impact upstream migrations of American shad, river herrings (blueback herring and alewife), and Hickory shad
  - Utilize the River2D model (see Conowingo Study 3.16-Instream Flow Habitat Assessment below Conowingo Dam) to ascertain if areas in the tailrace and other portions of the river below Conowingo Dam could present adverse velocity barriers under typical dam operating regimes
- Work Completed
  - Performance of American shad radio telemetry study below Conowingo Dam
  - Development and calibration of hydraulic model
  - Development of velocity models for three Conowingo Dam discharges
- Findings
  - No indication that migratory behavior or movement of radio tagged shad was adversely influenced by operations of Conowingo Dam (discharges between 8,618 and 82,085 cfs) in the 5-mile river reach between the dam tailrace and the Lapidum boat launch area
  - River 2D modeling for three Conowingo Dam discharges indicated that for only the highest (86,000 cfs) discharge, some areas near the dam tailrace and Rowland Island exhibited velocities exceeding burst speed for American shad and river herrings
  - Despite some high velocity areas modeled, there is no evidence to suggest that high velocities impeded migration, based on telemetry data of American shad
- Work Remaining
  - None
- Schedule
  - Study Report has been completed

Conowingo 3.9-Biological and Engineering Studies of the East and West Fish Lifts

- Study Objectives
  - Determine how and to what extent the West Fish Lift and spawning tanks can be expanded to enhance biomonitoring and egg collection to promote American shad restoration
  - Ensure that excess fish taken in the West Fish Lift can be moved upstream so as to contribute to natural spawning stock upstream
  - Conduct an engineering analysis of the remaining life cycle and maximum fish passage capacity of the existing East Fish Lift and West Fish Lift
  - Determine the costs and logistics of upgrading or replacing the existing fish passage facilities
  - Assess the logistics and cost of utilizing the West Fish Lift as an interim measure to increase fish passage at the project via trap and truck
  - Assess the need for, impact of, and logistics and costs of adding the second hopper to the East Fish Lift
  - Investigate modification or replacement of the existing West Fish Lift and a protocol for upstream transport of American shad and river herring collected in the West Fish Lift, but not needed for biomonitoring and/or egg collection programs
  - Investigate other upstream fish passage measures or facilities interim or permanent

- Work Completed
  - Cost alternatives and preliminary layouts for East Fish Lift modifications
  - Cost alternatives and preliminary layouts for West Fish Lift modifications
  - Cost estimates and preliminary layouts for trap-and-transport program

- Findings
  - Replacement of the West Fish Lift with a full-capacity lift is not feasible due to location of the powerhouse
  - Initial cost estimates vary considerably with modification or full replacement alternatives

- Work Remaining
  - Investigate expanded spawning and biomonitoring capabilities
  - Finalize cost estimates and layouts upstream passage alternatives
  - Analyze biological implications of upstream passage alternatives

- Schedule
  - Completion of Study Report in April 2011

Conowingo 3.3-Biological and Engineering Studies of American eel

- Study Objective
  - Describe the spatial distribution and size characteristics of American eels in the Conowingo Dam tailrace and spillway
- Work Completed
  - Sampling for eels in the Conowingo tailrace by USFWS (31 May-2 August)
  - Sampling for eels below the spillway by Exelon (16 June-30 September)
  - Elvers and yellow eels from the spillway area were aged
- Findings
  - Spillway sampling collected 258 eels; 167 elvers and 91 yellow eels
  - Most elvers were caught on the east side of spillway; most yellow eels on the west side
  - Elvers were 92-154 mm; yellow eels were 301-640 mm
  - Relationships to rainfall and lunar phase were weak due to low catch
  - Most elvers Age I & II; most yellow eels Age VII, VIII, IX
  - USFWS caught 24,000 elvers and 28 yellow eels of similar size
- Work Remaining
  - Investigate biological and engineering feasibility of upstream and downstream passage options
- Schedule
  - The study in the spillway will be repeated in 2011
  - Completion of biological and engineering feasibility study report in April 2011

Muddy Run 3.3-Fish Entrainment and Impingement Assessment

- Objective
  - Describe physical characteristics of the intake structures and describe the likely effects of Project-induced entrainment and impingement on target fish resources using Project characteristics and existing fishery information.
  - Target species are: American eel, American shad, bluegill, channel catfish, rock bass, smallmouth bass, walleye and white crappie.
- Work Completed
  - Report written.
- Findings
  - Overall potential for impact to fishes due to entrainment and turbine passage is low-moderate. Standing crop of fish species in MR Reservoir comparable to other lakes and reservoirs. No changes in abundance and distribution of fishes in Conowingo Pond attributable to MR Project.
  - Impingement unlikely unless fish are stressed. Trash rack spacing (5.375 and 5.5 inch) sufficient to pass all but very large (30 inch) channel catfish.
  - Entrainment potential relatively low for juvenile and adult stages of resident target species other than channel catfish, due to swim speeds in excess of intake flow velocity or habitat preferences that generally keep them away from intake structures. Channel catfish more susceptible due to benthic habitat preference and occurrence near intake structures. Life stages most susceptible to entrainment are egg and larvae. Entrainment potential higher during pump-back than generation.
  - Turbine survival probability is a function of size more than species. Survival potential of small (≤4 inches) fishes passing the Project, the life stage more likely to be entrained, is high (≥95%). Survival probability for large adult resident species (30 inch channel catfish and walleye) ranged from moderate (85-90%) to low-moderate (80-85%).
  - Juvenile (yellow) American eel have a small home range, unless home range near intake, entrainment potential is low. Survival potential is moderate (85-90%) to low-moderate (80-85%). Adult (silver) American eel entrainment potential is low-moderate; migrate in upper water column away from intake, but follow flow cues. Survival probability moderate (85-90%) to low (≤80%).
  - Juvenile American shad entrainment expected to be low-moderate due to swim speeds lower than flow velocity at the intake; survival probability is high (95-100%). Adult American shad entrainment is expected to be low, and survival potential moderate (85-90%) to low (≤80%) due to their potential to grow up to 30 inches.
- Work Remaining
  - Adult American eel telemetry study (Fall 2011)
  - Juvenile American shad telemetry study (Fall 2011)
- Schedule
  - Report has been submitted.
  - Adult American eel telemetry study report in January 2012
  - Juvenile American shad telemetry study report in January 2012

Muddy Run 3.3-Study to Monitor Movement of Telemetered American Eel Downstream of Conowingo Dam

- Study Objective
  - Original-evaluate the vulnerability of emigrating silver eels to entrainment by Muddy Run Station
  - Alternate-Compare migratory behaviors of in-basin silver eels with active migrant out-of-basin eels

- Work Completed
  - Sampling for active migrant in-basin eels by fyke nets; proved to be ineffective
  - Obtained adequate samples of in-basin silver eels by electrofishing and emigrating out-of-basin eels at commercial weir
  - Implanted 49 silver eels with acoustic transmitters; 25 out-of-basin; 24 in-basin
  - Eels released in four batches between 27 October and 4 November

- Findings
  - All 25 out-of-basin eels moved four miles downstream to tidal water by 28 November
  - Two of 24 in-basin eels moved to tidal water by 28 November
  - All 27 eels that reached tidal water had left by 2 December
  - Non-tidal reach below Conowingo Dam is a noisy acoustic environment

- Work Remaining
  - Plan for 2011 Study near Muddy Run Project

- Schedule
  - Study Report for 2010 completed.
  - Conduct 2011 study near Muddy Run Project when silver eels become available

Muddy Run 3.5-Near Field Effects of the Muddy Run Project on Migratory Fishes

- Study Objectives
  - Delineate the effects of the Muddy Run operations on upstream and downstream migration of migratory fishes, principally American shad in Conowingo Pond, particularly in the vicinity of the Muddy Run Project
  - Identify temporal and spatial availability of migration zones of passage.
  - Address the potential effects, if any, of pumping and generating operations at Muddy Run on emigration of juvenile and post-spawned American shad, and juvenile and adult American eel (*Anguilla rostrata*)
  - Evaluate the feasibility of installing passive integrated transponder (PIT) tag monitoring equipment at Muddy Run to assess potential entrainment
  - Respond to comments provided by the PA Fish and Boat Commission relative to the 2008 adult American shad radio telemetry study conducted in Conowingo Pond.

- Work Completed
  - The delineation of temporal exposure of upstream migrating adult American shad to Muddy Run operations was performed by examining the passage counts at the Conowingo EFL and Holtwood Fish Lift.
  - Six (6) historical radio telemetry investigations conducted in Conowingo Pond, were reviewed to extract information for assessing the potential effects of Muddy Run on upstream migrating American shad.
  - For juveniles, the emigration period was determined from lift net sampling at Holtwood
  - Data on water velocity and direction in the vicinity of Muddy Run were collected with Acoustic Doppler Current Profiler (ADCP) equipment during station operating conditions (pumping and generating).

- Findings
  - The upstream migration of American shad, as indexed by passage counts, begins in early to mid April (water temperature > 50° F) and extends into early June.
  - The initial run of American shad is comprised primarily of pre-spawned "green" fish with males arriving early and in higher proportion than females; females arrive in greater numbers later in the season. As the season progresses, coincident with increasing water temperatures and typically declining natural river flows, the proportion of ripe, partially spent, and spent (post-spawned) fish increases.

Muddy Run 3.5-Near Field Effects of the Muddy Run Project on Migratory Fishes (cont.)

- Findings Continued
  - Ninety percent of the shad run is completed by late May, generally at water temperatures ≤ 70°F. Low water temperature (< 50° F) and high natural river flow (≥ 150,000 cfs) may delay the onset of passage at Conowingo.
  - Higher water temperatures and low river flows may initiate early passage.
  - American shad passage may also be disrupted or terminated by high river flows during the season.
  - The migration of adult and juvenile American shad through Conowingo Pond occurs in two distinct seasons (spring and fall) with different hydrology for each season.
  - Most adult American shad migrate past Conowingo and Holtwood Dams at river flows < 50,000 cfs
  - A large percentage of American shad successfully passed upstream of Muddy Run at the prevailing hydrological and station operating conditions.
  - In 2008, operations of Muddy Run , as indexed by a joint function of Muddy Run generation or pumping, did not appear to affect the upstream migration of American shad.
  - Some 48.8% of shad migrated past Muddy Run during generation (mostly daytime) and 51.2% during pumping (mostly during evening/night) or shutdowns; the latter conditions were coincident with full discharge from the upstream Holtwood station.
  - Prevailing natural river flows seemed to affect upstream passage to a greater extent. Most shad (86.6%) migrated upstream at river flows < 50,000 cfs.
  - Average travel times of most pre-spawned fish past Muddy Run were short and similar.
  - Most radio-tagged American shad that migrated past Muddy Run had a tendency to congregate near Deepwater Island, Norman Wood Bridge, or selected areas nearer the Holtwood Project.
  - There was little evidence of American shad congregating in the vicinity of Muddy Run ; most successfully migrated past Muddy Run and congregated upstream of the Project
  - The estimated cruising speeds of 0.03 to 0.4 mph compare well with that of prespawned radio-tagged American shad primarily released into more of a “riverine habitat” type.

Muddy Run 3.5-Near Field Effects of the Muddy Run Project on Migratory Fishes (cont.)

- Findings Continued
  - ADCP surveys showed much higher flow velocities during generating operations at Muddy Run.
  - Minimum observed depth-averaged velocities were 0.07 ft/s (0.02 m/s)
  - Average observed depth-averaged velocities were 1.97 ft/s (0.60 m/s)
  - Maximum observed velocities were located proximal to the Muddy Run discharge, during generating conditions, and reached depth-averaged velocities of 5.1 ft/s (1.55 m/s).
  - The highest velocities occurred in a portion of the tailrace just downstream of Muddy Run .
  - Pumping conditions greatly reduced the flow velocities downstream of Muddy Run .
  - Estimated entrainment rates at Muddy Run were considered low (5.1% in 2001 and 3.6% in 2008).
  - The majority of entrainment occurred late in the migration season and all but three of 384 shad were located upstream at Holtwood prior to being entrained.
  - Installation and operation of a PIT tag reader system at the Muddy Run pump intakes is technically feasible, but the potential for missed tag reads and number of antennas and readers required render it impractical.
- Work Remaining
  - Completion of Study Report
  - Revision of 2008 Telemetry Report
- Schedule
  - Completion of Study Report in April 2011

Fish and Aquatics (cont.)

Conowingo 3.13- Study to Assess Tributary Access in Conowingo Pond

- Study Objective
  - Identify potential blockages associated with Project operations to fish and recreational boating access into Conowingo Pond tributaries at the reservoir confluence under several commonly encountered water levels.
  - If access to fish is denied at certain water levels due to Project operations, identify those fish species most affected, when it occurs, and at what water levels.
  - Develop potential mitigation options to enhance fish or recreational access if problems are encountered.
- Work Completed
  - Preliminary field investigations of the Conowingo Pond tributaries were conducted on 14 and 15 June 2010 to identify the 18 tributaries that were included in the more detailed surveys.
  - Two tributary access surveys, one at 109.2 National Geodetic Vertical datum (NGVD) and the other at 107.2 NGVD, were completed between 30 June, 2010 and 30 July, 2010.
  - An additional opportunistic survey was conducted on 18 September, 2010 at selected tributaries when Conowingo Pond elevation was lowered to below 106.2 NGVD.
  - Annual duration curves of Pond elevation were generated for all elevation data available from January 2004 through September 2010. Annual duration curves were also generated for peak recreational periods (weekends only from Memorial Day weekend through Labor Day weekend.
- Findings
  - No evidence was found that fish access into Conowingo Pond tributaries was affected by obstacles that might be exposed at lowered Pond levels, at least not within the Pond levels experienced during the current study (109.2 to 105.8 (NGVD).
  - All four boat launches located inside Conowingo Pond tributaries are accessible to recreational power boats at Full Pond (109.2 NGVD) and minimum recreational Pond (107.2 NGVD) but only Glen Cove boat launch remained usable when Pond elevation was lowered to 105.9 (NGVD).
  - During the peak recreation period in Conowingo Pond the license required minimum recreation pool level of 107.2 NGVD was maintained from 2004 through September 2010. During non peak periods, Pond elevations ranged from a low of 104.1 to a high of 110.1 NGVD between January 2004 and September 2010.
- Work Remaining
  - None
- Schedule
  - Study Report has been completed

Conowingo 3.8-Downstream Flow Ramping and Stranding Study

- Study Objectives
  - Evaluate locations below Conowingo Dam where stranding potential exists; document fish numbers, species affected, and their condition
  - Describe project operations during the survey periods and effects on water levels
  - Relate stranding to characteristics of impacted populations

- Work Completed
  - Conducted 12 stranding studies, 4 each in spring, summer and fall
  - Documented the numbers and locations of various species affected and physical condition
  - Described changes in water levels associated with each survey
  - Related study findings to plant operations for each study

- Findings
  - Spring stranding surveys documented 5,030 fish of at least 14 taxa; 82% were alive
  - Summer stranding studies documented 10,308 fish of at least 13 taxa plus blue crab; 99% were alive
  - Fall stranding studies documented 1,779 fish of at least 12 taxa; 96% were alive
  - Resident fish species formed 90% or more of stranded fish each season
  - Anadromous fish species were found mainly in spring
  - Most dead fish were gizzard shad
  - Most adult fish stranded in the west spillway area nearest the tailrace; east side was mostly juveniles
  - Principal consequences of stranding include desiccation (spring) and predation by birds (fall)

- Work Remaining
  - None

- Schedule
  - Study Report has been completed

Conowingo 3.18-Characterization of Downstream Aquatic Communities

- Study Objectives
  - Conduct a literature-based study to provide a characterization of the current aquatic community below Conowingo Dam
  - Describe the benthic macroinvertebrate communities below Conowingo Dam collected by various common collection gears including rock basket, drift sampler, a Surber sampler, and a T-Sampler
  - Characterize resident fish abundance, size structure, condition, and reproductive success below Conowingo Dam from existing data that includes fish lift catches and results from other common fisheries gear types such as electrofishing, gill nets, and ichthyoplankton nets
- Work Completed
  - Data from 1972 to 2010 was analyzed to provide a characterization of the fisheries and macroinvertebrate communities in the aquatic ecosystem below Conowingo Dam to the area just below Spencer Island.
- Findings
  - Quantitative benthic studies in the non-tidal area of the Lower Susquehanna River below Conowingo Dam from 1980 through 1991 characterized the invertebrate community as moderately rich, moderately dense and generally comprised of facultative or tolerant warm-water genera primarily consisting of:

    Corbicula (clam) **Dugesia (flat worm)** **Goniobasis (gastropod, snail)** **Manayunkia (fan worm)** **Oligochaeta (Nais, segmented worm)** **Cheumatopsyche (caddisflies)** **Hydroptila (micro-caddisfly)** **Gammarus (scuds and sideswimmers, arthropods)** **Chironomidae (Cricotopus, Dicrotendipes, and Polypedilum, midges)**

  - EFL, WFL fish catches coupled with electrofishing, gill nets, and ichthyoplankton nets and the 2010 fish stranding study found a core assemblage of inhabitants and migrants consisting of:

gizzard shad	**white perch**	**common carp**	**quillback**	**comely shiner**	**channel catfish**	**walleye**
smallmouth bass	**largemouth bass**	**American shad**	**alewife**	**sea lamprey**	**striped bass**	**blueback herring**

  - Changes to the relative abundance of species within the fish assemblage were evident over the period studied; most notably with regards to clupeids. Gizzard shad became the increasingly dominant species over time, American shad generally increased proportionally, and blueback herring decreased proportionally over the study period.
  - Despite gains in the 1990's and early 2000's American shad collected at the fish lifts has declined since 2001.
  - Condition factor and length weight relationships of representative common fish species downstream of Conowingo Dam are comparable to those from other normal, natural populations and are indicative of relatively favorable conditions and habitats in the lower Susquehanna.
- Work Remaining
  - None
- Schedule
  - Study Report has been completed

Conowingo 3.21- Impact of Plant Operation on Migratory Fish Reproduction

- Study Objective
  - Determine if project operations adversely impact the reproduction of target anadromous fishes: American shad (*Alosa sapidissima*), hickory shad (*A. mediocris*), river herring (blueback herring, *A. aestivalis*, and alewife, *A. pseudoharengus*), striped bass (*Morone saxatilis*), and white perch (*M. americana*) in Conowingo Pond and the Susquehanna River below Conowingo Dam

- Work Completed
  - Review of existing information on 1) spawning habitat requirements for these species, 2) relevant survey data for early life stages for these species and, 3) data regarding characterization of hydraulic conditions below Conowingo Dam

- Findings
  - Based on 1980's ichthyoplankton monitoring, shad telemetry monitoring, and observations, the American shad spawning habitat in the lower Susquehanna River (between Robert, Wood, and Spencer Islands and between Port Deposit and Lapidum) should not be adversely impacted by routine Conowingo Project operations
  - The hickory shad population, based in Deer Creek, is robust and the largest in Maryland and it is evident that suitable habitat is available and being successfully used for spawning in the Susquehanna River and Deer Creek tributary – operations of the Project has not adversely impacted this species
  - River herring early life stages were collected in the lower river in the early survey indicating that suitable spawning habitat was available and utilized and that young were transported downstream
  - River herring populations in the northeast have been in decline for years, and population declines in the Susquehanna River are likely attributable to sources unrelated to Conowingo Project operations
  - There is no evidence that striped bass utilize the Susquehanna River for spawning, thus Conowingo Project operations do not affect this species spawning success
  - White perch spawning habitat was determined to be the upper tidal reach of the Susquehanna River and Conowingo Project operations are considered to impact success spawning minimally
  - Little suitable spawning habitat likely exists in the Conowingo Pond for anadromous fishes based on studies commissioned by the PFBC

- Work Remaining
  - Ichthyoplankton survey in 2011

- Schedule
  - Study report complete
  - Ichthyoplankton surveys results in January 2012

Conowingo 3.24-Dreissenid Mussel Monitoring Study

- Study Objective
  - Determine the presence and abundance of Dreissenid mussels, particularly zebra mussels (*Dreissena polymorpha*) within the Project boundary;
  - Identify potential mitigation measures to minimize the impact of Dreissenid mussels to Project structures.

- Work Completed
  - Three replicate samples were collected at each sampling event for microscopic analysis in the laboratory.
  - All pad samplers and veliger net samples were examined microscopically (30-40X) for Dreissenid mussels. Laboratory examinations were completed on live (unpreserved) samples, usually within 48 hours after collection, using the cross polarization technique.
  - Sampling for detection of settled juvenile mussels was accomplished using three PVC plates, one PVC tube with netting material inside and one scouring pad collector secured at the West Fish Lift in tailrace and in Conowingo Pond (six tube samplers). Natural substrate inspections were conducted at Shure's Landing Area (west shoreline 0.5 mi downstream of Conowingo Dam) for settled juveniles and adults.

- Findings
  - No Dreissenid mussel veligers or settled juveniles were found in any of the collected net or substrate samples collected during the 2010 monitoring period at Conowingo Dam.
  - Sampling frequency increased to weekly at Conowingo Dam in July after Dreissenid mussel veligers were observed in collected samples from the Peach Bottom Atomic Power Station intake area, located approximately six miles upstream of Conowingo Dam.
  - The Asiatic clam (*Corbicula fluminea*), another biofouling organism, was routinely observed in samples taken at Conowingo Dam in June through November 2010.
  - River temperatures during the monitoring period ranged from 9.0°C to 30.0°C (48.2°F to 86.0°F) in the Susquehanna River at Conowingo Dam.

- Work Remaining
  - None

- Schedule
  - Study report has been completed

Muddy Run 3.4-Impacts of Muddy Run Project on Conowingo Pond Fishes

Exelon

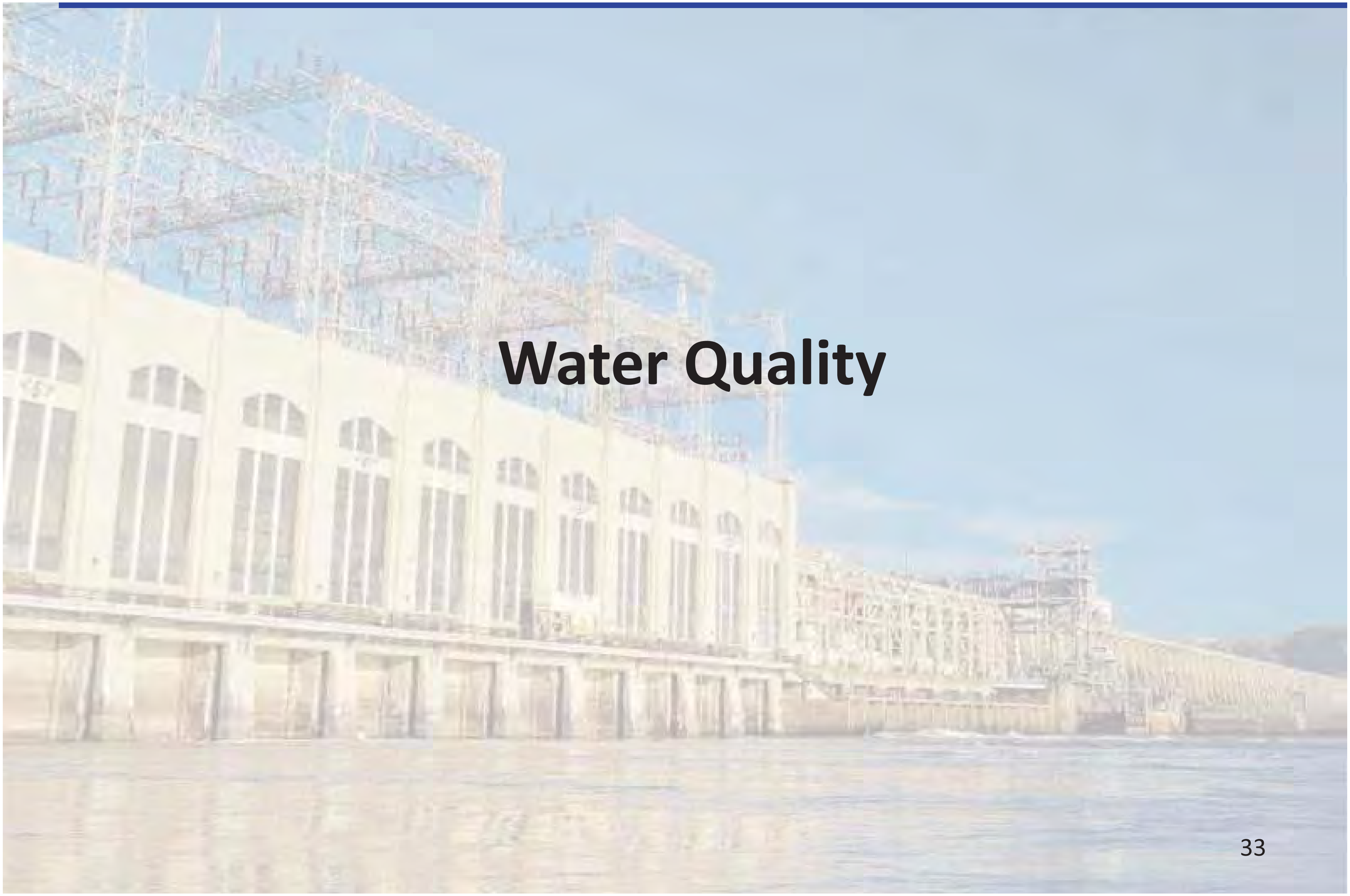
- Study Objectives
  - Review historical fisheries data in Conowingo Pond; compare trends in composition and abundance
  - Review biological data to describe fish length, weight, and condition
  - Update report with 2010 fisheries data collected for PBAPS as available
- Work Completed
  - Summarized species composition and abundance, indexed by catch per unit effort (CPUE), for historical data
  - Summarized historical biological data and fish condition for five target species; white crappie, channel catfish, smallmouth bass, largemouth bass, walleye
  - Analyzed CPUE, size structure, and fish condition (Wr) in 2010 for target species
- Findings
  - Changes in species composition largely reflect additions: gizzard shad, mimic shiner, banded darter, flathead catfish, occasional anadromous fishes since volitional passage
  - CPUE for species tracked by each gear type fluctuates annually but without trend; exception is white crappie
  - Growth and condition unchanged after Muddy Run became operational until effects of gizzard shad as forage were documented
  - 2010 CPUE within historic range for tracked fishes, except for white crappie
  - 2010 fish condition: relative weight (Wr) for target species good (97; 99) to excellent (104; 109)
- Work Remaining
  - Complete analyses of historic data
- Schedule
  - Completion of Study Report in April 2011

Muddy Run 3.6- Interactive Effects of Muddy Run and PBAPS Thermal Plume on Migratory Fishes

- Study Objective
  - Analyze the spatial and temporal migratory fish presence in Conowingo Pond to the timing, duration, and probability of coincidence of shifts in characteristics of PBAPS thermal plume attributable to Muddy Project operations
  - Identify the temporal availability of migration corridors (zones of passage) for migratory fishes.
- Work Completed
  - Established hydrological conditions (river flow of approximately 10,000 cfs) from hydraulic-thermal model at which PBAPS thermal plume shifts upstream
  - Developed joint probability occurrence of hydrological conditions (river flow and water temperature) for thermal plume shifts
  - Used empirical thermal profiles to get an idea of upstream shift in thermal plume
  - Established run timing and species/lift stage periodicity occurrence
  - Summarized findings of 8 radio telemetry studies on adult American shad in Conowingo Pond
  - Literature review of American shad responses to thermal plume
- Findings
  - Joint probability occurrence of American shad migration timing and upstream thermal plume shift is essentially nil
  - American shad migrated upstream without impedance
  - Post-spawned shad migrated freely downstream through Conowingo Pond
  - Emigrating juvenile shad have the entire pond available for passage
  - Joint probability occurrence of hydrological conditions conducive for thermal plume upstream shift and emigration time is essentially nil
  - Because of overlap in migration time findings for American shad also apply to river herring
  - American eel population in Conowingo Pond is negligible; little passage through Conowingo East Fish Lift
  - When eels are present in Conowingo Pond, they would encounter the same hydrological conditions as American shad and river herring
- Work Remaining
  - Present results of new thermal model, when available
- Schedule
  - Study Report is complete

Exelon

Water Quality



Conowingo 3.1-Seasonal and Diurnal Water Quality in Conowingo Pond and below Conowingo Dam

- Study Objective
  - Document water quality within Conowingo Pond under a variety of conditions
  - Confirm the dissolved oxygen (DO) of turbine discharges under all operational configurations is accurately monitored to ensure state DO water quality standards are being met downstream of the project
- Work Completed
  - Weekly monitoring of DO, water temperature, surface pH, and turbidity at five historically (1996-1999) established transects in Conowingo Pond and three newly established transects for this study below Conowingo Dam occurred between April and October 2010
  - Fecal coliform samples were also collected once per month at the midpoint station of each transect
  - Discharge boils of operating turbines were sampled hourly (0600 hr to 1800 hr) on FERC preselected dates (N = 20) in July and August.
- Findings
  - Thermal stratification, (a decrease in water temperature of 1°C per 1 m increase in depth or 0.55 °F decrease per 1 ft increase in depth) was not observed in Conowingo Pond in 2010. However, summer DO stratification (top to bottom differences in DO) did occur in the lower half of Conowingo Pond in 2010.
  - Comparison of water temperature data collected upstream and downstream of Conowingo Dam in 2010 confirmed that the operation of the project has almost no effect on the temperature of the water being released downstream.
  - The water temperature recorded at downstream Station 643 was virtually identical to that of turbine discharge "boils".
  - Aeration capabilities on the smaller Francis generating units (Units 1-7), increase the DO concentration of the water being released from the Project and allow the project discharge to meet state DO standards (5.0 mg/L).
  - Average DO conditions within all the turbine boils were always at or above standards, and were usually similar to the DO conditions measured at Station 643.
  - Station 643 consistently measured DO concentrations 1-2 mg/L lower than the DO measured at Transect 8. This difference seems most likely due to natural aeration in the river, as waters move downstream from Station 643.
- Work Remaining
  - None
- Schedule
  - Completion of Study Report in March 2011

Muddy Run 3.1-Water Quality of Muddy Run Project

- Study Objective
  - Characterize water quality within the power reservoir and within the project discharge under prevailing conditions
  - Include project generation flows, pumping operations, incoming river flows, meteorological conditions, and seasons
- Work Completed
  - Systematic collection (April-October, 2010) of water quality data (DO, temperature, pH, conductivity, turbidity, and chlorophyll *a*) in the power reservoir
  - Continuous monitoring of DO, temperature, pH, and conductivity at intake cylinder gate and tailrace to assess project effects on water quality
  - Compared historical river flows (1952-2009) and water temperature (1956-2009) with 2010 data
  - Compared historical patterns of DO, temperature, pH, conductivity, and chlorophyll *a* in power reservoir with the 2010 data
  - Assessed effects of project operations on tailrace DO, temperature, pH, and conductivity
  - Assessed project effects on water quality of upper Conowingo Pond
- Findings
  - River flows were lower in April through September and water temperatures higher in 2010 compared to historical period (1952-2009)
  - No thermal stratification in the Power Reservoir
  - Strength, duration, and timing of DO stratification varied with locations in the Power Reservoir, none seen at location at the head of intake canal (frequent exchange of water transfer)
  - Substandard DO occurred in both the tailrace and canal at pumping, generating, and idle modes
  - Substandard DO in the Susquehanna River at Muddy Run may be due to low DO in the Power Reservoir or be the result of low DO water discharge from the Holtwood Project or some combination of the two.
- Work remaining
  - None
- Schedule
  - Completion of Study Report in April 2011

Conowingo 3.14 Debris Management Study

- Study Objective
  - Review current debris management practices at the Conowingo Project including debris sources and hydrologic conditions
  - Evaluate the need for implementation of additional measures to reduce impacts to Pond and downstream users
- Work Completed
  - Collection of historic data on debris collection at Conowingo Dam and similar facilities upstream
  - Identification of current practices to manage debris
- Findings
  - Debris is an issue throughout the Susquehanna River Basin especially during high river flows
  - Current operations at the Conowingo Dam safely remove debris collected at the intake structure
  - A majority of the debris collected by Conowingo is natural material
- Work Remaining
  - None
- Schedule
  - Study Report has been completed

Conowingo 3.15 Sediment Introduction and Transport

- Study Objective
  - Provide data that will be useful in the future development of an overall sediment management strategy for the Susquehanna River and Chesapeake Bay
- Work Completed
  - Review and compilation of existing information on processes influencing sediment transport past the Conowingo Dam to the upper Chesapeake Bay and the impacts of these processes
    - Previous studies of project area were reviewed with respect to sedimentary context; sediment accumulation rates; reservoir storage volume; reservoir sediment-storage capacity; sediment quality; sediment transport modeling.
    - Other studies relevant to project area were reviewed with respect to sedimentary processes downstream of dams; storm events and sediment pulses; sediment record of Agnes in upper Chesapeake Bay; sea level rise and sediment supply in upper Chesapeake Bay.
    - Sediment management methods and existing programs were reviewed with respect to methods of sediment management in reservoirs; sediment management options at Conowingo Pond; Chesapeake Bay TMDL; the current Army Corps Sediment Task Force sediment transport modeling proposal.
  - HEC-6 simulation of deposition and scour through LSR reservoirs during 4 major storm events with peak discharges greater than 400,000 cfs
  - Bottom scour analysis with USGS regression model for Conowingo Pond
  - River 2D model output of bottom shear stress values below Conowingo Dam under different simulated release scenarios
- Findings
  - Historical and geological data suggest the river prior to dam construction had enough energy to sustain a mobile bedload with little sediment deposition until river mouth was reached.
  - Updated computations (2009) of sediment accumulation in Conowingo Pond since construction of the dam suggest average annual sediment accumulation rates have declined. Climate (number, duration, timing and magnitude of storm events) and implementation of sediment-erosion and runoff-control BMPs in the watershed are important factors influencing this trend.
  - In the absence of major scour events, reducing the quantity of sediment delivered to the pond by 20% will extend the estimated time to reaching sediment-storage capacity by 5 to 10 years.
  - Reported sediment trapping efficiencies of Conowingo Pond vary widely (17% to 70%) depending on computation methodology (volumetric changes in bathymetry; radionuclides in sediments; reservoir geometry and inflow rates).

Conowingo 3.15 Sediment Introduction and Transport (cont)

- Patchy distribution of coarse sediment downstream of Conowingo Dam is not solely due to trapping of coarse sediment behind the dam, but is a consequence of many inter-related factors: flow strength and timing of regulated water releases and storm discharges; sediment load from upstream passing the dam; tributary sediment supply downstream of the dam; and sediment-transport capacities of water releases and storm flows.
- The slower recovery after Tropical Strom Agnes (1972) of SAV population on Susquehanna Flats from pulses of sediment in comparison to Hurricane Hazel (1954) and Tropical Storms Connie and Diane (1955) has been attributed to the overprint of declining water quality rather than to an inability to recover from the sediment pulse.
- For wetlands in upper Chesapeake Bay to keep from drowning under predicted rises in sea level, the sediment supplied by the Susquehanna River during storm events will be important for them to maintain an intertidal position by vertical accretion.
- Preliminary results of HEC-6 simulations
  - Very fine sand and finer particles pass through the three reservoir system during major storm events.
  - Gravel load that appears at model cross section nearest Conowingo Dam (immediately upstream) and passes the dam may be due to turbulence created by flood gates
  - Lake Aldred passes a greater proportion of the sediment that enters it than Lake Clarke or Conowingo Pond. Channel shape may be factor.
  - HEC-6 simulations support the record of suspended sediment grain sizes transported past Conowingo Dam and deposited in upper Chesapeake Bay during major storms – i.e., silts and clays with minor amounts of sand are transported past the dam and deposited in the upper Bay.
  - HEC-6 appears to under estimate scour quantities compared to the regression model. Reasons for this are being explored.

- Work Remaining
  - Analysis of HEC-6 and scour model output data for storm event transport
  - Analysis of shear stress data for downstream impacts
  - Integration of model analyses and existing data/literature to characterize sediment introduction transport
  - Development of sediment and nutrient management options
- Schedule
  - Completion of Study Report in April 2011

Water Use

Muddy Run 3.2-Hydrologic Study of Muddy Run Water Withdrawal and Return Characteristics

- Study Objectives
  - Describe historic flow management in the lower Susquehanna River
  - Examine the water withdrawal and return characteristics of the Muddy Run Project
  - Describe the operations of the Muddy Run Project
  - Develop bathymetric mapping of the Middy Run Project reservoir and tailrace
  - Examine the impacts of alternative flow management regimes in the lower Susquehanna River on Muddy Run Project generation.

- Work Completed
  - Flow statistics computed with hourly operational data from 2008 to 2010
    - Average and maximum daily withdrawals and discharges for select periods
    - Maximum, average, median, and minimum headwater and tailwater elevations for select periods
    - Total amount of consumed and generated energy for select periods
  - Bathymetric mapping of the Muddy Run power reservoir, recreation lake, and tailrace

- Findings
  - Operational characteristics described
  - Muddy Run stage-storage curve developed

- Work Remaining
  - Alternative flow management regimes (operations modeling)

- Schedule
  - Completion of Study Report in April 2011

Conowingo 3.11-Hydrologic Study of the Lower Susquehanna River

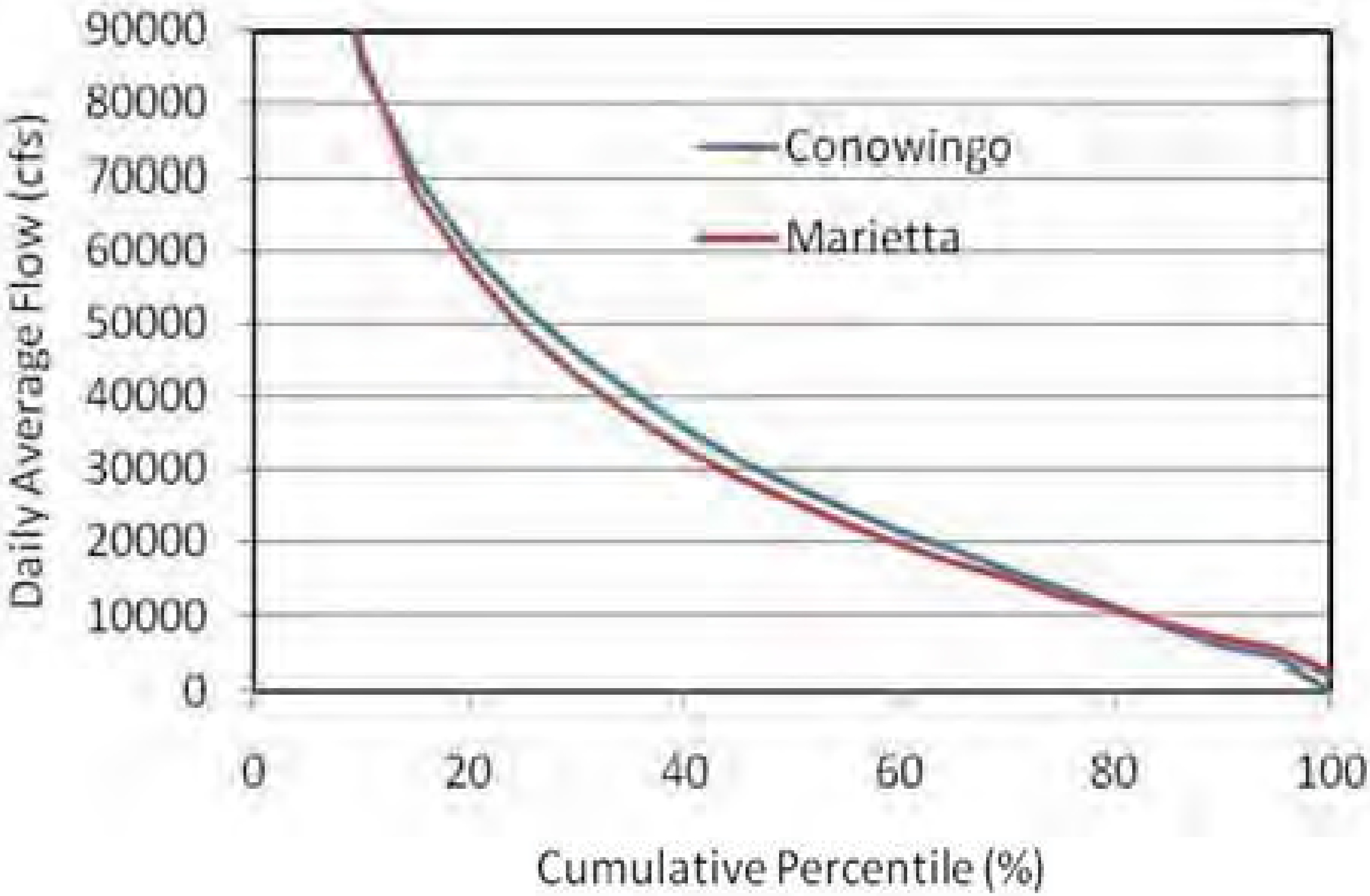
- Study Objectives
  - Describe the history of flow management practices in the lower Susquehanna River basin
  - Perform a statistical analysis to describe the lower Susquehanna River flow regime
  - Evaluate changes in Conowingo Project operations since
    - Minimum flow requirements were established (1989)
    - Energy deregulation laws came into effect (1998)
  - Confirm the accuracy of the Conowingo USGS gage
  - Develop a bathymetric map of the tailwater area below Conowingo Dam
  - Conduct operations modeling production runs to evaluate various operating scenarios to understand how operation changes may impact water use in the lower Susquehanna River

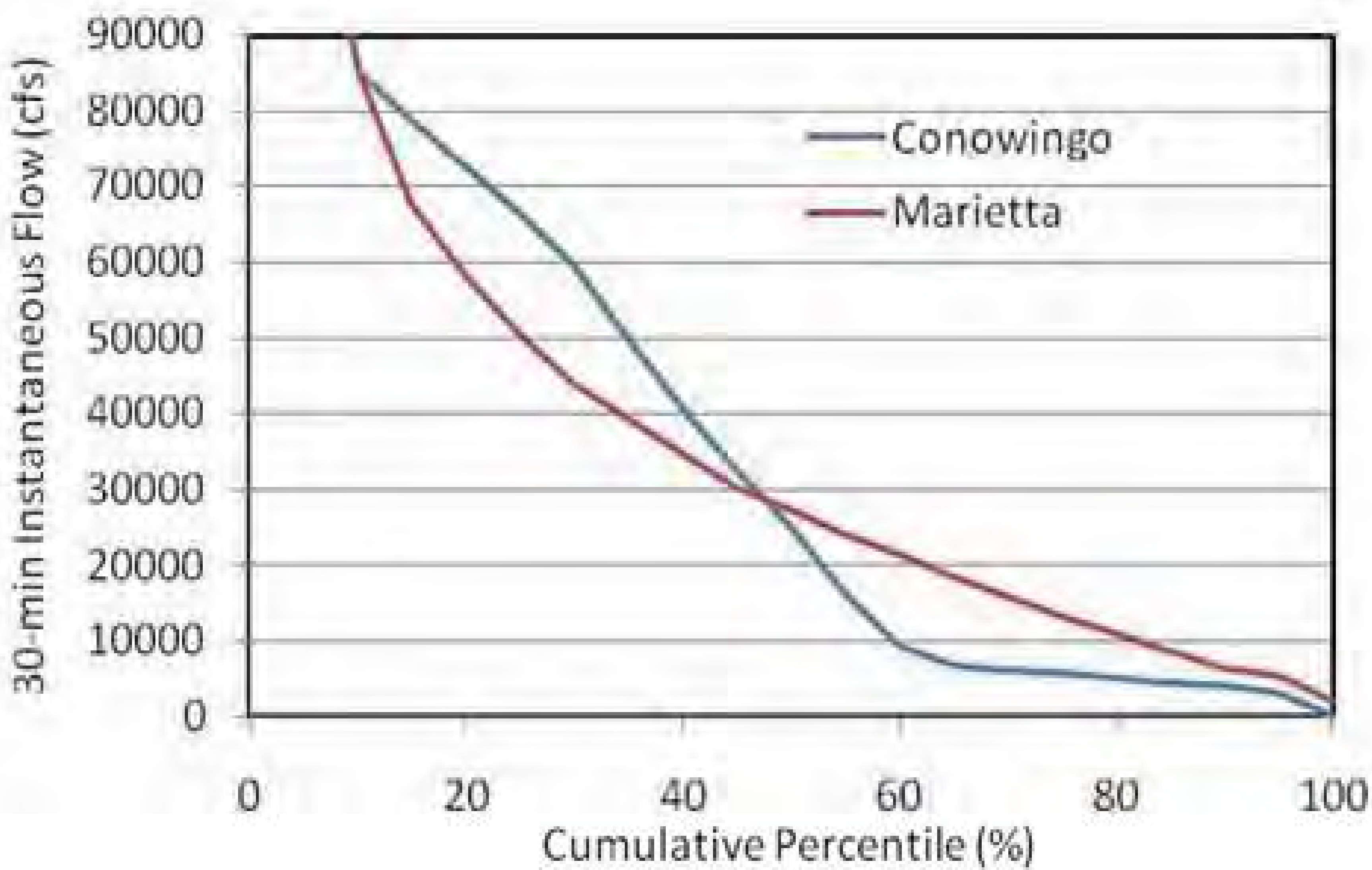
- Work Completed
  - Flow management practices in the lower Susquehanna River basin have been described
  - Statistical analyses of the Marietta and Conowingo USGS gages, to describe the river's flow regime
  - Statistical analyses comparing pre-minimum flow and pre-deregulation and recent flow data
  - USGS Conowingo gage assessment
  - Bathymetric map of the tailwater area below Conowingo Dam

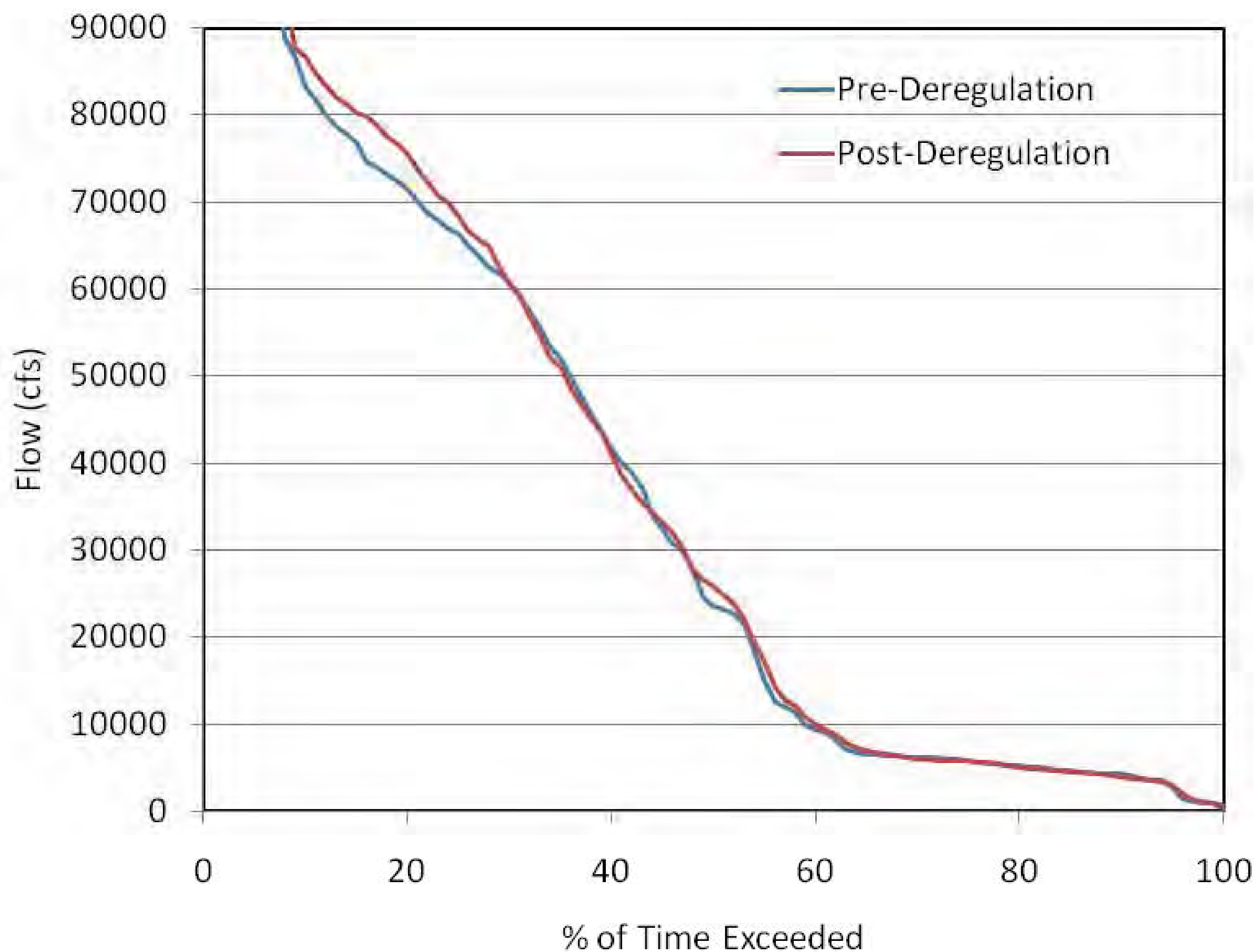
- Findings
  - Over long time steps (i.e. daily and weekly) Conowingo flows generally mirror Marietta flows
  - Sub-daily (e.g. hourly) flows downstream of Conowingo are influenced more by project minimum flows and generation flows than flows observed at Marietta
  - Deregulation (1998) had little impact on Conowingo flow magnitude and frequency
  - The Conowingo USGS gage appears to experience stage fluctuations not observed farther downstream

- Work Remaining
  - Operations modeling production runs

- Schedule
  - Completion of Study Report in April 2011


90000
80000
70000
60000
50000
40000
30000
20000
10000
0
Daily Average Flow (cfs)
Conowingo
Marietta
0
20
40
60
80
100
Cumulative Percentile (%)


30-min Instantaneous Flow (cfs)
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
Conowingo
Marietta
0
20
40
60
80
100
Cumulative Percentile (%)


90000
80000
70000
60000
50000
40000
30000
20000
10000
0
Flow (cfs)
0
20
40
60
80
100
% of Time Exceeded
Pre-Deregulation
Post-Deregulation

Conowingo 3.20-Salinity and Salt Wedge Encroachment

- Study Objectives
  - Determine if Project operations adversely impact downstream salinity levels
  - Determine if Project operations have the ability to change the frequency and duration of salinity level exceedences above drinking water standards
  - Identify and evaluate the potential biotic impacts from salinity changes in the lower Susquehanna River due to Project operations
- Work Completed
  - Collected salinity data from Havre de Grace (daily instantaneous) and MDNR stations (15-min continuous) from 1997-2010 and 2007-2010, respectively
  - Time series comparisons and correlations of salinity versus flow, tidal levels, wind speed
  - Salinity duration analyses
- Findings
  - Salinity levels varied season-to-season, with levels lowest during the spring and early summer, and highest in the fall and winter
  - Salinity levels rarely exceeded the EPA secondary (taste and appearance) standard for salinity (0.25 ppt)
    - Havre de Grace daily data exceeded 0.25 ppt three days in 13 years (one event)
    - At the MDNR station (15-min data) 225 out of 80,161 readings over 4 years exceeded 0.25 ppt (0.05%)
  - A sub-daily flow and salinity analysis showed project operations had no relationship with salinity level exceedences' frequency or duration
  - Based on published salinity tolerances, observe salinity changes had no impact on aquatic biota
- Work Remaining
  - None
- Schedule
  - Study Report has been completed

Conowingo 3.29-Effect of Project Operations on Downstream Flooding

- Study Objective
  - Use a hydraulic model to estimate water surface elevations for a full-range of flood events at Port Deposit
  - Document the areas of inundation and flooding depths during these events
  - Document the flow conditions during which flooding of the Port Deposit area has occurred
  - Identify the impact of the project on downstream water surface elevations
  - Determine the operational feasibility, generation effects, and implementation costs of any procedures that might attenuate flooding conditions

- Work Completed
  - Modeled flooding impacts at Port Deposit under 10, 50, 100 and 500-year flood events:
    - Existing conditions
    - No-dam (run-of-river) scenario
    - Three (3) alternative management scenarios
  - Completed inundation mapping of Port Deposit under existing conditions scenario for 10, 50, 100 and 500-year events

- Findings
  - Minor flooding occurs at Port Deposit at 250,000 cfs, and more major inundation begins to occur between 350,000 cfs and 481,000 cfs (~10-yr event).
  - Existing and alternative Conowingo Dam operations have little impact on flooding conditions at Port Deposit due to the limited storage available in Conowingo Pond
  - There do not appear to be any operational changes that could be made that would reduce Port Deposit flooding for the 10, 50, 100 or 500-yr storm events.

- Work Remaining
  - None

- Schedule
  - Study Report has been completed

Exelon

Recreation, Shoreline Management, Cultural Resources

Muddy Run 3.11- Recreational Inventory and Needs Assessment

- Study Objective
  - Conduct a recreation inventory in the vicinity of the Project to identify public access points within the Project boundary
  - Estimate the amount of recreational use occurring within the Project
  - Determine what, if any, enhanced and/or new recreation facilities are needed to support the recreational use of the Muddy Run Project
  - Determine if changes or improvements can be made to enhance recreational opportunities
- Work Completed
  - Inventory of Project-related recreational facilities and access
  - Estimate of existing and potential recreational use
- Findings
  - Existing facilities meet current and projected use
- Work Remaining
  - Consultation meeting with interested parties
  - Draft recreation plan
  - Final recreation plan
- Schedule
  - Consultation meeting with interested parties in Summer 2011
  - Draft recreation plan completed in Fall 2011
  - Final recreation plan in January 2012

Conowingo 3.26-Recreational Inventory and Needs Assessment

- Study Objective
  - Conduct a recreation inventory in the vicinity of the Project to identify public access points within the Project boundary
  - Estimate the amount of recreational use occurring within the Project
  - Determine what, if any, enhanced and/or new recreation facilities are needed to support the recreational use of the Conowingo Project
  - Determine if changes or improvements can be made to enhance recreational opportunities

- Work Completed
  - Inventory of Project-related recreational facilities and access
  - Estimate of existing and potential recreational use
- Findings
  - Existing facilities meet current and projected use
- Work Remaining
  - Consultation meeting with interested parties
  - Draft recreation plan
  - Final recreation plan

- Schedule
  - Consultation meeting with interested parties in Summer 2011
  - Draft recreation plan completed in Fall 2011
  - Final recreation plan in January 2012

Muddy Run 3.12- Shoreline Management

- Study Objective
  - Conduct an inventory of Exelon real estate assets in the vicinity of the Project and identify and classify current uses
  - Identify issues and constraints that affect land management and land use
  - Review current corporate land use guidelines and policies
  - Identify lands potentially needed (or not needed) for current and potential future project purposes.
- Work Completed
  - Research existing data (natural resources, local/regional plans and guidelines)
  - Develop existing land use maps
  - Developed Interim Shoreline Management Report
- Work Remaining
  - Develop constraints mapping based on available regional data and licensing studies
  - Integrate regional plans and guidelines with Licensee land management policies
  - Consultation meeting with interested parties
  - Develop Shoreline Management Plan (SMP)
- Schedule
  - Develop draft SMP in September 2011
  - Develop and distribute final SMP in December 2011

Conowingo 3.27-Shoreline Management

- Study Objective
  - Conduct an inventory of Exelon real estate assets in the vicinity of the Project and identify and classify current uses
  - Identify issues and constraints that affect land management and land use
  - Review current corporate land use guidelines and policies
  - Identify lands potentially needed (or not needed) for current and potential future project purposes.
- Work Completed
  - Research existing data (natural resources, local/regional plans and guidelines)
  - Develop existing land use maps
  - Developed Interim Shoreline Management Report
- Work Remaining
  - Develop constraints mapping based on available regional data and licensing studies
  - Integrate regional plans and guidelines with Licensee land management policies
  - Consultation meeting with interested parties
  - Develop Shoreline Management Plan (SMP)
- Schedule
  - Develop draft SMP in September 2011
  - Develop and distribute final SMP in December 2011

Muddy Run 3.10 Creel Survey at Muddy Run Recreation Lake

- Study Objectives
  - Determine the angling effort estimates
  - Determine the catch and harvest estimates and rates
  - Identify demographics and biological data of fish caught for both boat and shore anglers at Muddy Run Recreation Lake
- Work Completed
  - The survey was conducted April 3 through November 30, 2010
  - Boat interviews were conducted at the boat ramp/rental area and consisted of 1,033 anglers interviewed representing 531 fishing parties
  - Shore interviews were obtained from 760 anglers representing 414 parties at two access sites along the lake
- Findings
  - Boat fishing parties had an average of 2 anglers; greatest number of interviews occurred in summer; average fishing time was 3.6 hours
  - Shore fishing parties had an average of 2 anglers; greatest number of interviews occurred in summer; average fishing time was 2.5 hours
  - Length measurements of fish harvested by boat anglers were obtained from 129 fish representing 8 species or species groups
  - Length measurements of fish harvested by shore anglers were obtained from 163 fish of 5 species
  - Length measurements of fish released by boat anglers were obtained from 625 fish representing 12 species and 3 species groups
  - Largemouth bass represented 69% of the fish measured and released.
  - 82% of released largemouth bass were reported as legal (≥12 inches)
  - Length measurements of fish released by shore anglers were obtained from 228 fish
  - 80% of all anglers interviewed resided in Lancaster County or York County, Pa, and residents from 7 other states were interviewed
- Work Remaining
  - Analysis of data to provide estimates of fishing pressure, catch, harvest, and catch and harvest rates
- Schedule
  - Report to be completed in April 2011

Conowingo 3.25 Conowingo Pond Creel Survey

- Study Objectives
  - Determine the angling effort estimates
  - Determine the catch and harvest estimates and rates
  - Identify demographics and biological data of fish caught for both boat and shore anglers on Conowingo Pond
- Work Completed
  - The survey was conducted March 1 through November 30, 2010
  - Interviews were obtained from access points arrayed from the Norman Wood Bridge (Pa Rt. 372) downstream to Conowingo Dam
  - Completed boat interviews were conducted at seven boat ramps and consisted of 646 anglers representing 365 fishing parties
  - Completed shore interviews were conducted at access points and consisted of 57 parties
- Findings
  - Boat fishing parties had an average of 1.8 anglers; weekend boat parties accounted for over 76% of all interviews; average fishing time was 5.3 hours
  - Shore fishing parties had an average of 2.1 anglers; average fishing time was 2.1 hours; 80% of shore anglers were seeking “anything”
  - Length measurements of fish harvested by boat anglers were obtained from 44 fish representing 4 species
    - Flathead catfish accounted for 61% of all fish measured and harvested, Channel catfish accounted for 30% of all fish measures and harvested
  - Length measurements of fish harvested by shore anglers were obtained from 5 fish
  - Length measurements of fish released by boat anglers were obtained from 954 fish representing 13 species or species groups
    - 85% of all released black bass measured were reported as legal size (≥12 inches)
  - Length measurements of fish released by shore anglers were obtained from 65 fish representing 8 species of species groups
    - Black bass accounted for 51% of fish released by shore anglers
  - 65% of all anglers interviewed resided in Lancaster County and York County, PA, and Cecil County and Harford County, MD, and residents from 5 other states were interviewed
- Work Remaining
  - Analysis of data to provide estimates of fishing pressure, catch, harvest, and catch and harvest rates
  - Documentation of the Conowingo Pond winter fishery (Dec. 1, 2010 – Feb. 28, 2011) is in progress
- Schedule
  - Report to be completed in April 2011

Conowingo 3.25 Lower Susquehanna River Creel Survey

- Study Objectives
  - Determine the angling effort estimates
  - Determine the catch and harvest estimates and rates
  - Identify demographics and biological data of fish caught for both boat and shore anglers downstream of Conowingo Dam
- Work Completed
  - The survey was conducted March 1 through November 30, 2010
  - Interviews were obtained from access points arrayed from the northern-most reach of west shoreline below the Conowingo Dam tailrace downstream to the Amtrak bridge and Havre de Grace (mouth of the Susquehanna River)
  - Completed boat interviews were conducted at seven boat ramps and consisted of 797 anglers representing 383 fishing parties
  - Completed shore interviews were conducted at eleven access points and consisted of 554 parties
- Findings
  - Boat fishing parties had an average of 2.1 anglers; weekend boat parties accounted for over 70% of all interviews; average fishing time was 4.4 hours
  - Shore fishing parties average fishing time was 3.1 hours
  - Length measurements of fish harvested by boat anglers were obtained from 230 fish representing 7 species
    - White perch accounted for 48% of all fish measured and harvested
  - Length measurements of fish harvested by shore anglers were obtained from 389 fish of 13 species or species groups
  - Length measurements of fish released by boat anglers were obtained from 707 fish representing 14 species or species groups
    - Black bass comprised 31% of the released fish measured
    - 77% of all released black bass measured were reported as legal size (≥12 inches)
  - Length measurements of fish released by shore anglers were obtained from 431 fish representing 17 species of species groups
    - Striped bass accounted for 34% of fish released by shore anglers
  - 56% of all anglers interviewed resided locally in Baltimore County, Cecil County or Harford County, MD, and anglers from 9 other states and the District of Columbia were interviewed (PA (32%)and MD(65%) not included)
- Work Remaining
  - Analysis of data to provide estimates of fishing pressure, catch, harvest, and catch and harvest rates
- Schedule
  - Report to be completed in April 2011

Conowingo 3.32- Re-evaluate the Closing of the Catwalk

Exelon

- Study Objectives
  - Conduct a feasibility analysis to evaluate re-opening the Conowingo Project catwalk for recreational fishing by the general public
- Work Completed
  - Exelon retained an independent security consultant, Security Management Solutions (SMS).
  - SMS conducted a *Vulnerability and Security Assessment* of the Conowingo Project in August 2010. The assessment included an identification of critical assets, vulnerabilities, and potential consequences from an attack on the Project.
  - A separate *Vulnerability Assessment and Threat Assessment* of the Conowingo Project's Catwalk Platform was conducted in November 2010.
  - SMS used FERC's Dam Assessment Matrix for Security and Vulnerability Risk (DAMSVR) methodology to conduct the assessments.
- Findings
  - The Vulnerability Assessment concluded the "close proximity of the Cat Walk to the Conowingo Dam Powerhouse provides access to several operational assets."
  - The Vulnerability Assessment, therefore, recommends that the Conowingo Project "[k]eep the functional area attached to the Catwalk, and the entire Catwalk structure, closed to general public access for safety and security purposes."
- Work Remaining
  - Evaluate the need for fishing access at the Project to determine if it is adequate to meet demand (Conowingo RSP 3.26)
- Schedule
  - SMS has completed its vulnerability assessment and the final report will be reviewed by FERC.

Muddy Run 3.14-Cultural Resource Review and Assessment

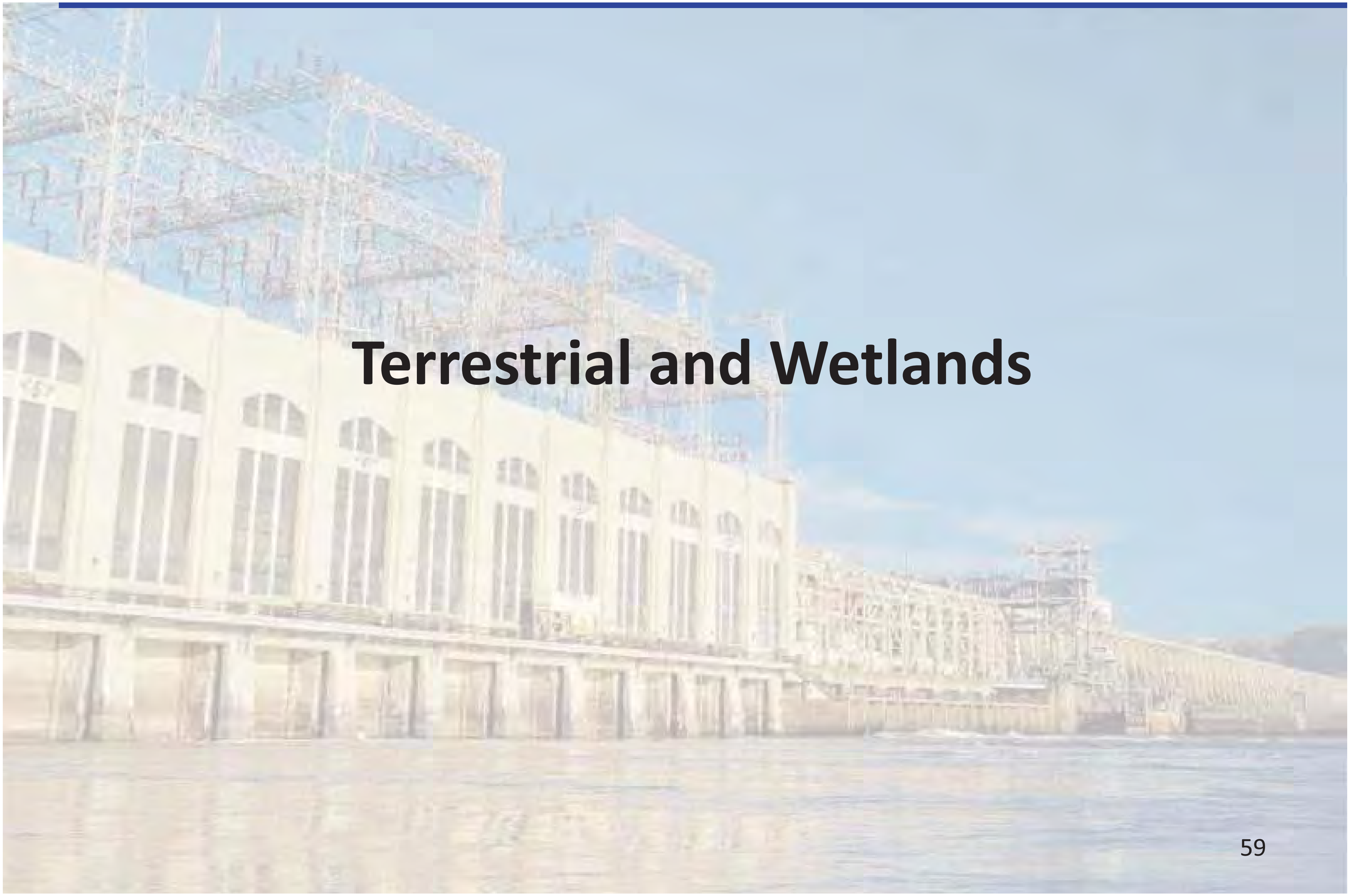
- Study Objectives
  - Identify properties listed or eligible for listing in the National Register of Historic Places (NRHP) in the Muddy Run Project Area of Potential Effect (APE) and to identify and assess possible effects from Project operations.
- Work Completed
  - Phase 1A archaeological assessment
    - Background research of historical documents and cultural resource site files
    - Field reconnaissance of the project shorelines
  - Preliminary historic structures assessment
    - Background research on previously identified architectural resources in the APE
    - Preparation of an historic context
    - Field reconnaissance of the APE
- Findings
  - Phase 1A archaeological assessment
    - Two sites were identified as having a Moderate to High Probability for archaeological deposits and are recommended as High Priority for Phase 1B field survey
  - Historic structures assessment
    - The Ritchie-Robinson House located at the southern end of the Project transmission line.
- Work Remaining
  - Phase 1B survey of two archaeological sites near Power Reservoir
  - Update the existing survey information on the Ritchie-Robinson House and its evaluation for NRHP eligibility.
- Schedule
  - Completion of Study Report in March 2011
  - Phase 1B evaluation (Summer 2011)
  - Ritchie-Robinson House NRHP evaluation (Summer 2011)

Conowingo 3.28-Cultural Resource Review and Assessment

- Study Objectives
  - Identify properties listed or eligible for listing in the National Register of Historic Places (NRHP) in the Conowingo Project Area of Potential Effect (APE) and to identify and assess possible effects from Project operations.
- Work Completed
  - Phase 1A archaeological assessment
    - Background research of historical documents and cultural resource site files
    - Field reconnaissance of the project shorelines
  - Preliminary historic structures assessment
    - Background research on previously identified architectural resources in the APE
    - Preparation of an historic context
    - Field reconnaissance of the APE
- Findings
  - Phase 1A archaeological assessment
    - Eight (8) sites were identified as having a Moderate to High Probability for archaeological deposits and are recommended as High Priority for Phase 1B field survey
  - Historic structures assessment
    - Three NRHP-listed architectural resources and three architectural resources determined NRHP-eligible are within the Project APE.
    - There are three previously identified resources within the APE (two in Maryland and one in Pennsylvania), that have as yet not been evaluated for the NRHP.
    - Sixteen (16) other sites 50 years or older for NRHP-eligibility within the Project APE.
- Work Remaining
  - Phase 1B survey of eight (8) archaeological sites
  - Phase II architectural survey within the APE to update information on the three previously identified resources and to evaluate 16 other sites 50 years or older for NRHP-eligibility within the Project APE.
- Schedule
  - Completion of Study Report in March 2011
  - Phase 1B evaluation (Summer 2011)
  - Phase II architectural survey (Summer 2011)

Muddy Run 3.13-Visual and Noise Assessment

- Study Objectives
  - Assess the visual impacts of the Muddy Run Project, particularly the effects of the angle and intensity of the lighting at night on the surrounding public and recreation areas.
  - Evaluate the impacts of noise generated from the facility on the surrounding public and recreation areas during both day and night operation.
- Work Completed
  - Audio and visual assessments were conducted in the spring, summer, fall, and winter of 2010 during both daylight and nighttime hours.
- Findings
  - Noise levels were comparable to areas not affected by the Project.
  - Project lighting is most noticeable at select locations (i.e., Conowingo Islands); however the Conowingo Islands have restrictions against public use at night, so any impacts to recreation is minor.
- Work Remaining
  - None
- Schedule
  - Study Report has been completed



Terrestrial and Wetlands

Muddy Run 3.7- Transmission Line Avian Interaction Study

- Study Objective
  - Collect data that describe avian use of Project transmission lines and structures
  - Determine if protection measures are needed to reduce electrocutions and collisions of large birds
- Work Completed
  - 86 hours of avian interaction observations (N=1,367) between April 2010 and October 2010
- Findings
  - Highest avian use area is where project lines and structures span Conowingo Pond
  - Avian mortality was not observed to be a significant occurrence
- Work Remaining
  - None
- Schedule
  - Study Report has been completed

Muddy Run 3.8- Study to Identify Habitat Use Areas for Bald Eagle

- Study Objectives
  - Determine abundance levels of bald eagles
  - Determine specific locations of foraging, roosting, and nesting habitat
  - Determine daily/seasonal patterns of use by migrant and nesting bald eagles
- Work Completed
  - Aerial flyover nesting surveys
  - Communal roost boundary delineations
  - Ground monitoring surveys of communal roosts
- Findings
  - One (1) breeding pair of eagles in study area
  - 1 active nest produced 3 eagle nestlings in 2010
  - 1 communal roost within study area; maximum number of individuals observed was 62 eagles
- Work Remaining
  - Winter 2011 roost monitoring surveys
  - Finalization of foraging area delineation with satellite telemetry data
- Schedule
  - 2010 Study Report has been completed; 2011 Study Report to be submitted in January 2012

Conowingo 3.23- Study to Identify Habitat Use Areas for Bald Eagle

- Study Objectives
  - Determine abundance levels of bald eagles
  - Determine specific locations of foraging, roosting, and nesting habitat
  - Determine daily/seasonal patterns of use by migrant and nesting bald eagles
- Work Completed
  - Aerial flyover nesting surveys
  - Communal roost boundary delineations
  - Ground monitoring surveys of communal roosts
- Findings
  - 12 breeding pairs of eagles
  - 11 active nests produced 15 eagle nestlings in 2010
  - 18 communal roosts within study area; maximum number observed was 105 eagles in one roost
- Work Remaining
  - Winter 2011 roost monitoring surveys
  - Finalization of foraging area delineation with satellite telemetry data
- Schedule
  - 2010 Study Report has been completed; 2011 Study Report to be submitted in January 2012

Muddy Run 3.15- Osprey Nesting Survey

- Study Objective
  - Identify locations within the project area used by osprey for nesting
- Work Completed
  - Surveys of Muddy Run power reservoir area
  - Surveys of Project Transmission Line ROW
- Findings
  - One osprey nest identified with at least one nestling fledged
  - 12 additional observations of osprey within project area
- Work Remaining
  - Nesting surveys planned for spring/summer 2011
- Schedule
  - 2010 Study Report has been completed; 2011 Study Report to be submitted in early 2012

Conowingo 3.30- Osprey Nesting Survey

- Study Objective
  - Identify locations within the project area used by osprey for nesting
- Work Completed
  - Surveys of Conowingo project area in Pennsylvania and Maryland
- Findings
  - 11 osprey nests identified (4 in Maryland, 7 in Pennsylvania)
  - Young fledged from at least 4 nests in project area
- Work Remaining
  - Nesting surveys planned for spring/summer 2011
- Schedule
  - 2010 Study Report has been completed; 2011 Study Report to be submitted in early 2012

Conowingo 3.31- Black-crowned Night-heron Nesting Survey

- Study Objective
  - Determine presence/absence of BCNH in project area
  - Verify existing and new nesting locations of BCNH in project area

- Work Completed
  - Nesting surveys per PGC protocol for BCHN in Pennsylvania
  - Additional Visual Encounter Surveys in Maryland (Conowingo Dam area)

- Findings
  - No BCNH nests were identified in project area
  - BCNH presence was verified below Conowingo Dam

- Work Remaining
  - 2011 nesting surveys planned

- Schedule
  - 2010 Study Report has been completed; 2011 Study Report to be submitted in early 2012

Muddy Run 3.9- Study to Identify Potential Habitat of Bog Turtle

Exelon

- Study Objective
  - To identify potential habitats
  - To survey all potential habitats for suitability to support bog turtle
  - To determine if bog turtle exist on project lands (as applicable)
- Work Completed
  - Search of project lands to identify wetland locations
  - Habitat evaluation of wetlands to identify potential bog turtle habitat
- Findings
  - No potential bog turtle habitat present in study area; therefore further presence/absence surveys are unnecessary
- Work Remaining
  - None
- Schedule
  - Study Report has been completed

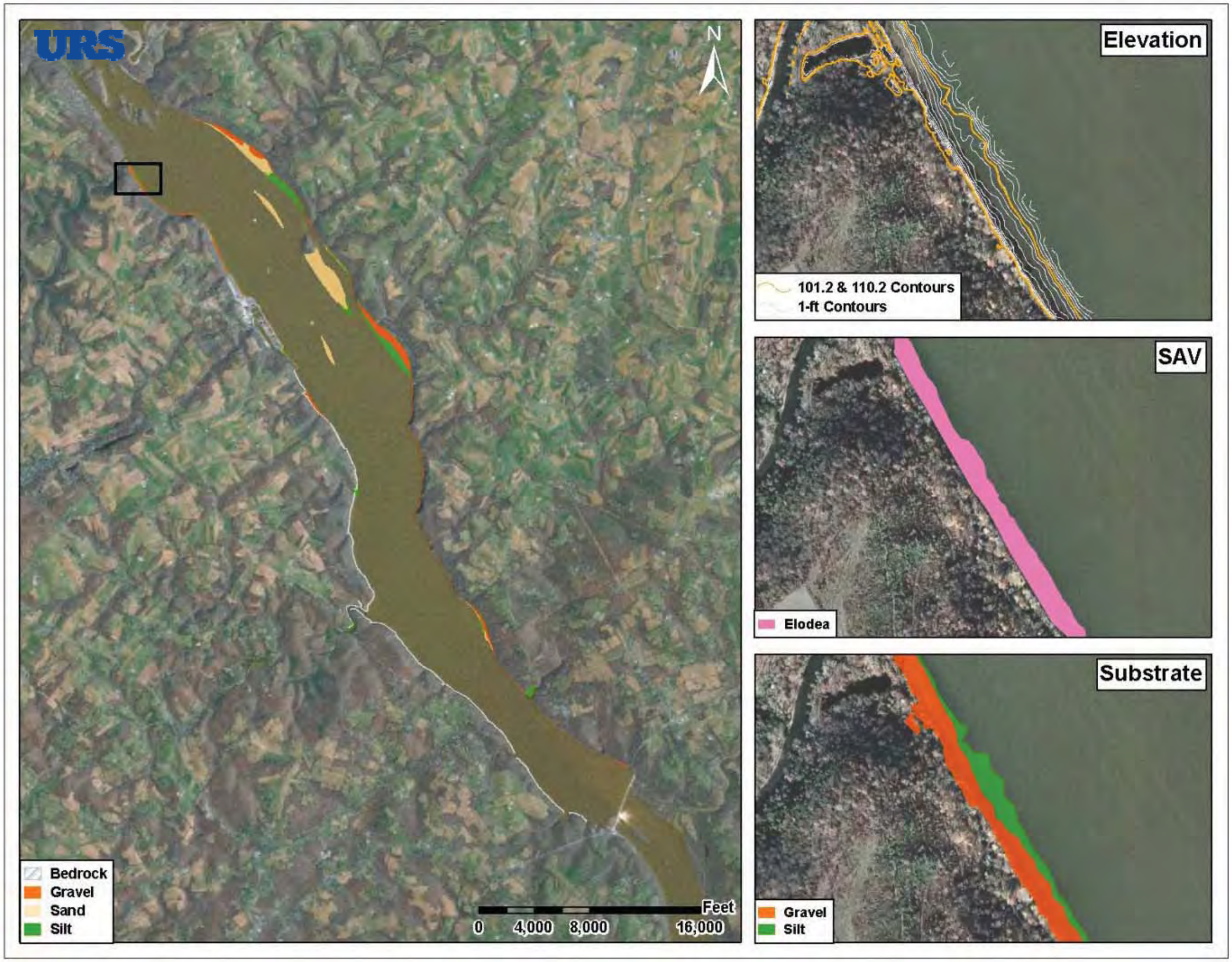
Muddy Run 3.9- Study to Identify Potential Habitat of Rough Green Snake

- Study Objective
  - To identify potential habitats
  - To survey all potential habitats for suitability to support rough green snake
  - To determine if rough green snake exist on project lands (as applicable)
- Work Completed
  - Evaluation of all project lands to identify potential rough green snake habitat
- Findings
  - Potential rough green snake habitat is present within study area
- Work Remaining
  - Presence/absence surveys for rough green snake in 2011
- Schedule
  - 2010 Study Report has been completed, 2011 Study Report to be submitted in early 2012

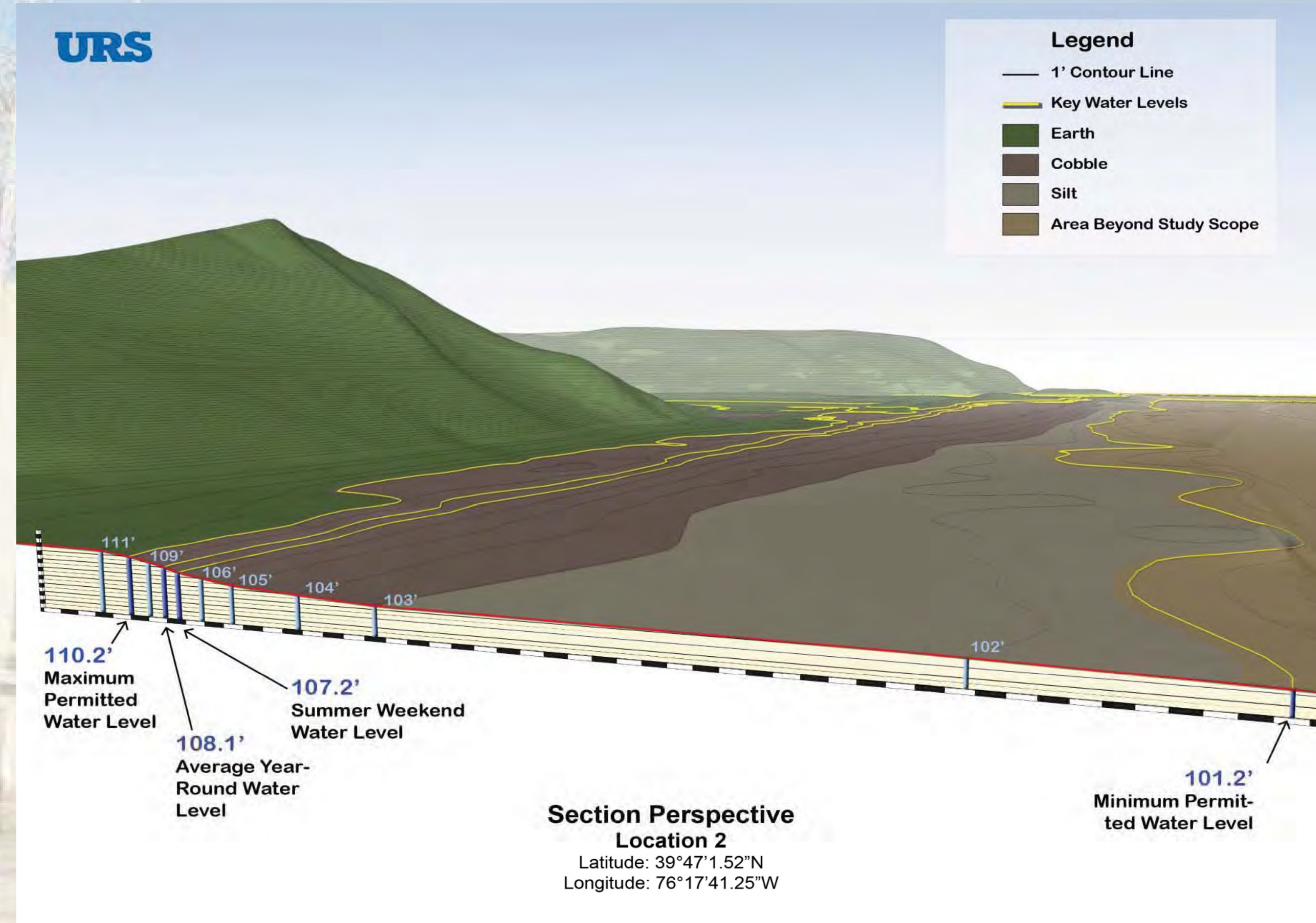
Conowingo 3.12 Water Level Management (Littoral Zone and Water Level Fluctuation)

- Study Objective
  - Quantify and describe the littoral habitat within the permitted 9-foot drawdown range (101.2 to 110.2 ft NGVD 1929)
  - Investigate effects of water level fluctuations over 1-foot contour intervals on littoral habitat, including EAV and SAV
  - Determine whether a need exists for enhancement of EAV and SAV in Conowingo Pond
- Work Completed
  - Development of 1-foot contour mapping of the littoral habitat from Hennery Island to Conowingo Dam
  - Quantification of habitat types within the permitted drawdown range
  - Quantification of water level fluctuations in the Pond based on historic water elevation data
  - Integration of aquatic habitat data and bathymetric data
- Findings
  - Current operational water level fluctuation is limited in magnitude and duration, providing favorable littoral habitat conditions for SAV growth in some areas
  - Limited habitat exists for growth of EAV and, in several areas, SAV based on natural geologic conditions
  - Variable substrate types exist in the littoral zone of Conowingo Pond
- Work Remaining
  - Analyses of integrated habitat and bathymetric data
- Schedule
  - Completion of Study Report in April 2011

Conowingo 3.12 Water Level Management (Littoral Zone and Water Level Fluctuation)



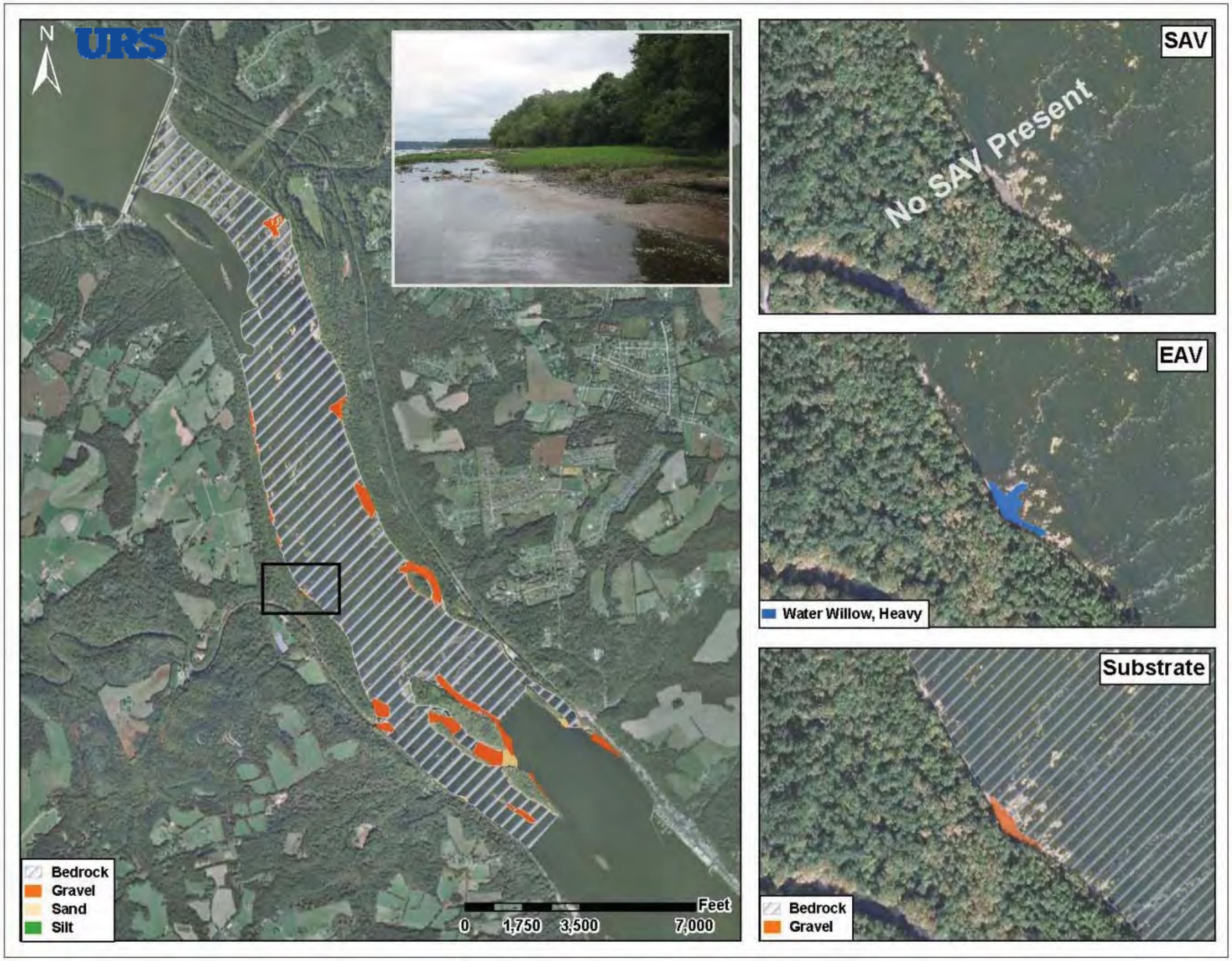
Conowingo 3.12 Water Level Management (Littoral Zone and Water Level Fluctuation)



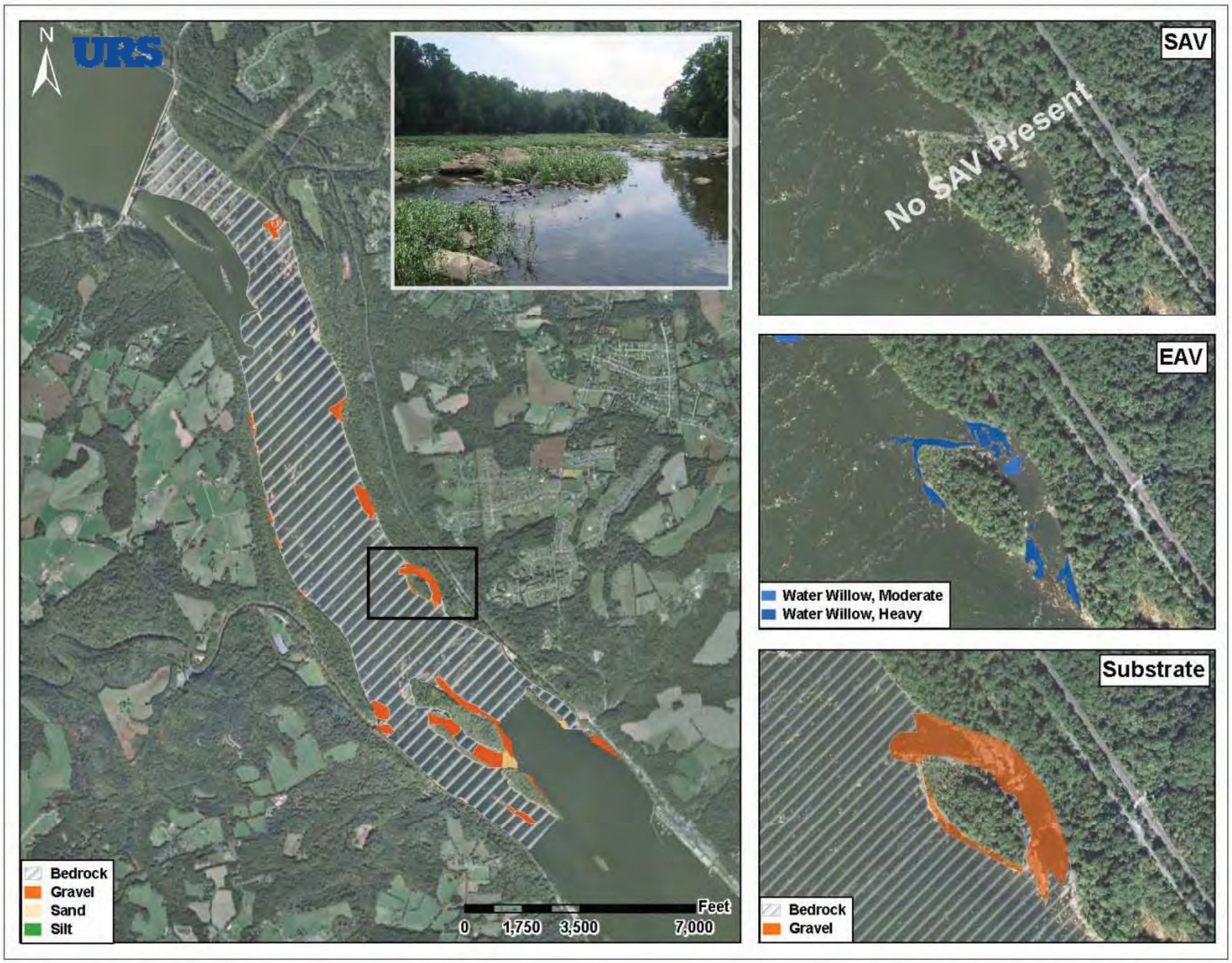
Conowingo 3.17 Downstream EAV/SAV Study (Water Level Vegetative Cover Study)

- Study Objective
  - Map the current distribution of EAV and SAV downstream of the Conowingo Dam
  - Identify adverse impacts of Project operations, if any, on existing EAV/SAV
  - Determine whether or not EAV and SAV can be enhanced downstream of the Conowingo Dam.
- Work Completed
  - Review of historic data, including VIMS surveys completed since 1978
  - Quantification of EAV and SAV below the Dam based on 2010 field surveys
- Findings
  - SAV growth is more prevalent in downstream portions of the study area where a combination of a lower river gradient and finer substrate composition is present
  - EAV growth is opportunistic, and is generally concentrated along the river margins and island perimeters
  - Non-native SAV species dominated the study area; EAV was comprised of mainly native species
- Work Remaining
  - Analysis of potential impacts to EAV and SAV communities based on hydraulic modeling data
- Schedule
  - Completion of Study Report in April 2011

Conowingo 3.17 Downstream EAV/SAV Study (Water Level Vegetative Cover Study)



Conowingo 3.17 Downstream EAV/SAV Study (Water Level Vegetative Cover Study)



Attachment C-Study Report Schedule

Study Report Schedule for the Conowingo Project

RSP No.	Study	Anticipated Date of Study Report Availability
3.1	Seasonal and Diurnal Water Quality in Conowingo Pond and below Conowingo Dam	March 2011
3.2	Downstream Fish Passage Effectiveness Study	March 2011
3.3	Biological and Engineering Studies of American Eel at the Conowingo Project	Complete-Biological Portion April 2011-Engineering Portion
3.5	Upstream Fish Passage Effectiveness Study	Complete
3.6	Conowingo East Fish Lift Attraction Flows	Complete
3.7	Fish Passage Impediments Study below Conowingo Dam	Complete
3.8	Downstream Flow Ramping and Fish Stranding Study	Complete
3.9	Biological and Engineering Studies of the East and West Fish Lifts	April 2011
3.10	Maryland Darter Surveys	Complete
3.11	Hydrologic Study of the Lower Susquehanna River	April 2011
3.12	Water Level Management (Littoral Zone and Water Level Fluctuation)	April 2011
3.13	Study to Assess Tributary Access in Conowingo Pond	Complete
3.14	Debris Management Study	Complete
3.15	Sediment Introduction and Transport (Sediment and Nutrient Loading)	April 2011
3.16	Instream Flow Habitat Assessment below Conowingo Dam	April 2011
3.17	Downstream EAV/SAV Study (Water Level Vegetative Cover Study)	April 2011
3.18	Characterization of Downstream Aquatic Communities	Complete
3.19	Freshwater Mussel Characterization Study below Conowingo Dam	Complete
3.20	Salinity and Salt Wedge Encroachment	Complete
3.21	Impact of Plant Operations on Migratory Fish Reproduction	Complete
3.22	Shortnose and Atlantic Sturgeon Life History Studies	Complete
3.23	Study to Identify Habitat Use Areas for Bald Eagle	Complete
3.24	Dreissenid Mussel Monitoring Study	Complete
3.25	Creel Survey of Conowingo Pond and the Susquehanna River below Conowingo Dam	April 2011
3.26	Recreational Inventory and Needs Assessment	Complete
3.27	Shoreline Management	Complete
3.28	Archaeological and Historic Cultural Resource Review and Assessment	March 2011
3.29	Effect of Project Operations on Downstream Flooding	Complete
3.30	Osprey Nesting Survey	Complete
3.31	Black-crowned Night Heron Nesting Survey	Complete
3.32	Re-evaluate the Closing of the Catwalk to Recreational Fishing	Complete

Study Report Schedule for the Muddy Run Project

RSP No.	Study	Anticipated Date of Study Report Availability
3.1	Water Quality Study	April 2011
3.2	Hydrologic Study of Muddy Run Water Withdrawal and Return Characteristics	April 2011
3.3	Entrainment and Impingement at Muddy Run Project Adult American Eel Telemetry Study-Pilot Study	Complete Complete
3.4	Impacts of Muddy Run Project on Conowingo Pond Fishes	April 2011
3.5	Nearfield Effects of the Muddy Run Project on Migratory Fishes	April 2011
3.6	Muddy Run Project Effects on Migratory Fishes: Interactions with the PBAPS Thermal Plume	Complete
3.7	Transmission Line Avian Interaction Study	Complete
3.8	Study to Identify Critical Habitat Use Areas for Bald Eagle	Complete
3.9	Bog Turtle and Rough Green Snake Habitat Study	Complete
3.10	Creel Survey of Muddy Run Recreation Lake	April 2011
3.11	Recreational Inventory and Needs Assessment	Complete
3.12	Shoreline Management	Complete
3.13	Visual and Noise Assessment of the Muddy Run Project	Complete
3.14	Archaeological and Historic Cultural Resource Review and Assessment	March 2011
3.15	Osprey Nesting Survey	Complete

Attachment D-Distribution List for FERC Project No. 405 and 2355

Kerry Anne Abrams
City of Port Deposit
Mayor
64 South Main Street
Port Deposit, MD 21904

Mr. Mark Arbogast
118 North Decatur Street
Strasburg, PA 17579

Mr. Charles Arbough
10523 Howard Ave
Cockeysville, MD 21030

Mr. Matt Ashton
Maryland Department of Natural Resources
Natural Resource Biologist III
Monitoring and Non-tidal Assessment
580 Taylor Ave., C-2
Annapolis, MD 21401

Mr. John W. Balay
Susquehanna River Basin Commission
Water Resources Management, Hydrologist
1721 North Front Street
Harrisburg, PA 17102-2391

Alex Balboa
1996 Waverly Drive
Bel Air, MD 21015-1100

Paula Ballaron
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

Mr. Thomas W. Beauduy
Susquehanna River Basin Commission
Deputy Director
1721 North Front Street
Harrisburg, PA 17102-2391

Mr. Al Blott
National Marine Fisheries Service
113 Bruce Boyer Street
PO Box 1692
North Kingstown, RI 02852

Mr. Mark Bryer
The Nature Conservancy
Director, Chesapeake Bay Program
5410 Grosvenor Lane, Suite 100
Bethesda, MD 20814

Lori Byrne
Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis, Maryland 21401

Mr. Richard A. Cairo
Susquehanna River Basin Commission
General Counsel
1721 North Front Street
Harrisburg, PA 17102-2391

Mr. Robert B. Campbell
Mason-Dixon Trail System
PA Director
811 Marvell Drive
York, PA 17402

Mr. Ben L. Cardin
United States Senate
Senator
509 Hart Senate Office Bldg
Washington, D.C. 20510

Ruth and Ed Cheslock
P.O. Box 82
Delta, PA 17314

Mr. Michael Chezik
U.S. Department of the Interior - Office of the Secretary
Regional Environmental Officer
200 Chestnut Street
Custom House, Room 244
Philadelphia, PA 19106-2904

John M. Cincilla
PPL Generation, LLC
Manager
2 N 9th Street
Allentown, PA 18101-1139

Mr. Kevin Colburn
American Whitewater
National Stewardship Director
1035 Van Buren Street
Missoula, MT 59802

Mary Colligan
National Marine Fisheries Service, Northeast Regional Office-DOC/NOAA
Assistant Regional Administrator for Protected Resources
55 Great Republic Drive
Gloucestar, MA 01930-2276

Mr. Wade Cope
Susquehanna River Basin Commission
1721 N. Front Street
Harrisburg, PA 17102

Donna Costango
City of Havre de Grace
711 Pennington Ave
Havre de Grace, MD 21078

Julie Crocker
National Marine Fisheries Service, Northeast Regional Office-DOC/NOAA
Protected Resources Division NMFS/NERO
55 Great Republic Drive
Gloucester, MA 01930

Mr. Phil Cwiek
U.S. Army Corps of Engineers, Baltimore District
Attn: CENAB-OP-RMN
P.O. Box 1715
Baltimore, MD 21203-1715

Mr. Andrew Dehoff
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

Mr. Thomas L. Denslinger P.E.
Pennsylvania Department of Environmental Protection
Chief, Water Use Management Section
P.O. Box 8555
Harrisburg, PA 17105-8555

Mr. David Densmore
U.S. Fish and Wildlife Service
Pennsylvania Field Office
315 S. Allen St. Suite 322
State College, PA 16801

Michele M. DePhilip
The Nature Conservancy In Pennsylvania
Director - Freshwater Conservation
2101 N Front Street
Harrisburg, PA 17110

Mr. Peter Dunbar
Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis, MD 21401

Mrs. Clara Eckelmeyer
9737 High Rock Road
Airville, PA 17302

Sheila Eyler
U.S. Fish and Wildlife Service, Maryland Fishery Resources Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

Elder Ghigiarelli
Maryland Department of Environment
Wetlands and Waterways Program, Deputy Administrator
1800 Washington Boulevard
Baltimore, MD 21230

Mr. Ralph Goodno
Lancaster County Conservancy
President & CEO
117 South West End Avenue
Lancaster, PA 17608

Mr. Dennis T. Guise
2313 Forest Hills Drive
Harrisburg, PA 17112-1068

Mr. Dan Haas
National Park Service - U.S. Department of Interior
200 Chestnut St. 5 th floor
Philadelphia, PA 19106

Mr. Jeffrey Halka
Maryland Geological Survey
Acting Director
2300 Saint Paul Street
Baltimore, MD 21218-5210

Mr. M. Brent Hare
Maryland Department of Natural Resources
Assistant Attorney General
c/o Maryland Energy Administration
1623 Forest Drive, Suite 300
Annapolis, MD 21401

Michael R. Helfrich
Lower Susquehanna Riverkeeper
324 W. Market Street
York, PA 17401

Mr. Michael Hendricks
Pennsylvania Fish and Boat Commission
450 Robinson Lane
Bellefonte, PA 16823

Mr. Jere Hess
2507 Shures Landing Road
Darlington, MD 21034

Mr. Alexander R. Hoar
U.S. Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035-9589

Jennifer Hoffman
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

Bonita C. Hoke
Pennsylvania Federation of Sportsmen's Clubs
Director
2426 North 2nd Street
Harrisburg, PA 17110-1104

James Hooper
Mason-Dixon Trail System
President, M-DTS
309 Bank Hill Road
Wrightsville, PA 17368

Donovan J. Houck
Pennsylvania Department of Environmental Protection
Environmental Planner
Rachel Carson State Office Building 400 Market Street
Harrisburg, PA 17101

Mr. Chris Iverson
1200 Nursery Road
Wrightsville, PA 17368

Linda C. Janey
Maryland Department of Planning
Assistant Secretary for Clearinghouse and Communication
301 West Preston Street Suite 1101
Baltimore, MD 21201-2305

Mr. James Kardatzke
U.S. Department of the Interior, Bureau of Indian Affairs
545 Mariott Drive, Suite 700
Nashville, TN 37214

Anne Ketchum
Pennsylvania Department of Conservation and Natural Resources
Executive Assistant
P.O. Box 8767
Harrisburg, PA 17105-8767

Juan Kimble
Safe Harbor Water Power Company
President
1 Powerhouse Road
Conestoga, PA 17516-9651

David S. Ladd
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

Lynn Lankshear
National Marine Fisheries Service, Northeast Regional Office-DOC/NOAA
55 Great Republic Drive
Gloucester, MA 01930

James Leigey
Pennsylvania Game Commission
Bureau of Land Management
2001 Elmerton Avenue
Harrisburg, PA 17106-9762

Mr. J. Rodney Little
Maryland Historical Trust
Director and SHPO
100 Community Place
Crownsville, MD 21032

Jacqueline Ludwig
Harford County
Water & Sewer Engineering & Administration
212 South Bond Street, Second Floor
Bel Air, MD 21014

Ms. Erin Lynam
Susquehanna River Basin Commission
Aquatic Ecologist, Water Resources Management
1721 North Front Street
Harrisburg, PA 17102-2391

Mrs. Monica Marcum
Broad Creek Civic Association
President
9211 Hines Road
Balto, MD 21234

Anthony McClune
Harford County Department of Planning and Zoning
Director
County Office Building 220 South Main Street
Bel Air, MD 21014

John McGillen
Maryland Department of Environment
Industrial Discharge Permits Division
1800 Washington Boulevard
Baltimore, MD 21230

Kristan McKinne
Lancaster County Conservancy
117 South West End Avenue
Lancaster, PA 17603

Douglas C. McLearen
Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Chief Division of Archaeology & Protection
400 North Street
Commonwealth Keystone Building, 2nd Floor
Harrisburg, PA 17120-0093

James J. McNulty
Pennsylvania Public Utility Commission
Acting Secretary
Commonwealth Keystone Building
400 North Street, 2nd Floor
Harrisburg, PA 17120

Glenn R. Melroy
U.S. Army Corps of Engineers
P.O. Box 2870
Portland, OR 97208

Kevin Mendik
National Park Service, Boston Support Office
15 State Street
Boston, MA 02109

Honorable Barbara A. Mikulski
United States Senate
Washington, DC 20510

Anita Miller
U.S. Department of Interior - Office of Environmental
Policy and Compliance
Philadephia Region
Custom House, Room 244
Philadelphia, PA 19106

Jeremy Miller
Pennsylvania Department of Environmental
Protection
909 Elmerton Avenue
Harrisburg, PA 17110

Larry Miller
U.S. Fish and Wildlife Service
Mid-Atlantic Fishery Resources Office, Project
Leader
P.O. Box 67000
1601 Elmerton Avenue
Harrisburg, PA 17110-7000

Jeral A. Milton
Legg Mason Tower
111 South Calvert Street, Ste 2700
Baltimore, MD 21202-6143

Mr. Steve Minkkinen
U.S. Fish and Wildlife Service, Maryland Fishery
Resources Office
Project Leader
177 Admiral Cochrane Drive
Annapolis, MD 21401

Joane D. Mueller
Maryland Department of Environment
MDE Clearinghouse Coordinator
1800 Washington Boulevard
Baltimore, MD 21230

Tracey Librandi Mumma
Pennsylvania Game Commission
2001 Elmerton Avenue
Harrisburg, PA 17110-9797

Margaret Niland
Harford Land and Trust
P.O. Box 385
Churchville, MD 21028

Debby Nizer
U.S. Army Corps of Engineers
Baltimore District, CENAB-OP-RPA
P.O. Box 1715
Baltimore, MD 21203

Janet Norman
U.S. Fish and Wildlife Service
Fish and Wildlife Biologist
Chesapeake Bay Field Office 177 Admiral Cochrane
Drive
Annapolis, MD 21401

John O'Shea
Atlantic State Marine Fisheries Commission
1444 Eye Street, NW 6th Floor
Washington, D.C. 20005

Jason E. Oyler
Pennsylvania Fish and Boat Commission
Office of Chief Counsel
P.O. Box 67000
1601 Elmerton Ave
Harrisburg, PA 17106-7000

M. Dukes Pepper Jr.
Pennsylvania Department of Environmental Protection
Office of Chief Counsel Assistant Counsel
909 Elmerton Avenue
Harrisburg, PA 17110-8200

Gary Petrewski P.E.
PPL Generation, LLC
Two North Ninth Street (GENPL6)
Allentown, PA 18101

Mr. Joseph Pfaff
Harford County Department of Parks & Recreation Director
702 North Tollgate Road
Bel Air, MD 21014

Mark Platts
Lancaster York Heritage Region
1706 Long Level Road
Wrightsville, PA 17368

Mr. David R. Poe
Dewey & LeBoeuf, LLC
Counsel for PPL Holtwood, LLC
1101 New York Avenue, NW
K Avenue, NW Suite 1100
Washington, DC 20005-4213

Niles Primrose
Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis, MD 21401

Mr. Don Pugh
American Rivers

Mr. Charles Ramsay
3527 Level Road
Churchville, MD 21028

Mary Ratnaswamy, PhD
U.S. Fish and Wildlife Service
Program Supervisor, Threatened and Endangered Species
177 Admiral Cochrane Drive
Chesapeake Bay Field Office
Annapolis, MD 21401

Michael Richardson
Maryland Department of Environment
1800 Washington Boulevard
Baltimore, MD 21230

Jim Richenderfer
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

Bill Richkus
Versar Inc.
9200 Rumsey Road
Columbia, MD 21045

Mr. Herb Sachs
Maryland Department of Environment
1800 Washington Blvd Suite 450
Baltimore, MD 21230

Robert Sadzinski
Maryland Department of Natural Resources
Natural Resources Biologist, Alosids
301 Marine Academy Drive
Stevensville, MD 21666

Steve Schreiner
Versar Inc.
9200 Rumsey Road
Columbia, MD 21045

Mr. Shawn A. Seaman
Maryland Department of Natural Resources
Project Manager
Tawes State Office Building B-3
580 Taylor Avenue
Annapolis, MD 21401

John Seebach
American Rivers
Director, Hydropower Reform Initiative
1101 14th St. NW, Suite 1400
Washington, D.C. 20005

John Seitz
York County Planning Commission
Water Resources Coordinator
28 East Market Street
York, PA 17401-1580

Mr. Eric S. Sennstrom
Cecil County Department of Planning & Zoning
Director
200 Chesapeake Blvd., Suite 2300
Elkton, MD 21921

Pam Shellenberger
York County Planning Commission
Chief, Long Range Planning
28 East Market Street
York, PA 17401-1580

Laurie E. Shepler
Pennsylvania Fish and Boat Commission
Office of Chief Counsel
P.O. Box 67000
Harrisburg, PA 17106-7000

Andrew Shiels
Pennsylvania Fish and Boat Commission
1735 Shiloh Road
State College, PA 16801

Ellen Shultzabarger
Pennsylvania Department of Conservation and Natural Resources (DCNR)
Environmental Review Specialist
P.O. Box 8552
Hamburg, PA 17105

Julie Slacum
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office 177 Admiral Cochrane Drive
Annapolis, MD 21401

Mr. Edward W. Slicer Jr.
Cecil County Department of Parks and Recreation
Grants Administrator
County Administration Building
200 Chesapeake Blvd Suite 1200
Elkton, MD 21921

Topher Smith
American Whitewater
394 Butler Rd
Reisterstown, MD 21136

Wayne Spilove
Pennsylvania Historical and Museum Commission
300 North Street
Harrisburg, PA 17120-0093

James S. Spontak
Pennsylvania Department of Environmental Protection
Southcentral Region Program Manager
909 Elmerton Avenue
Harrisburg, PA 17106-7000

Patricia Stabler
Chester Water Authority
100 Ashville Road
Nottingham, PA 19362

Scott W. Standish
Lancaster County Planning Commission
Director
150 N. Queen Street, Suite 320
Lancaster, PA 17603

Mr. Ronald Steelman
3529 Green Spring Road
Havre de Grace, MD 21078

Sara Strassman
American Rivers, River Restoration Program
Associate Director
355 N. 21st Street, Suite 309
Camp Hill, PA 17011

David Sutherland
U.S. Fish and Wildlife Service, Fish Passage Workgroup
Chair
177 Admiral Cochrane Drive
Annapolis, MD 21401

Andrew Tittler
U.S. Department of Interior
Office of the Solicitor, Northeast Region -Attorney
One Gateway Center, Suite 612
Newton, MA 02458-2802

Lisa H Tucker
Kirkpatrick & Lockhart, Preston Gates Ellis, LLP
Partner
1601 K Street, NW
Washington, D.C. 20007

Alliance for Chesapeake Bay
660 York Road Suite 100
Baltimore, MD 21212

Chesapeake Bay Foundation
6 Herndon Aveune
Annapolis, MD 21403

Lancaster County Parks & Recreation
1050 Rockford Road
Lancaster, PA 17602

York County Parks & Recreation
400 Mundis Race Road
York, PA 17406

York County Planning Commission
100 W. Market Street
York, PA 17401

Lower Chanceford Township
4120 Delta Road
Airville, PA 17302

Peach Bottom Township
545 Broad Street, Extended
Delta, PA 17314

Martic Township
370 Steinman Farm Road
Pequea, PA 17565

Drumore Township
1675 Furniss Road
P.O. Box 38
Drumore, PA 17518

Borough of Millersville
100 Municipal Drive
Millersville, PA 17551

Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Cecil County
200 Chesapeake Blvd., Suite 2300
Elkton, MD 21921

Harford County
212 South Bond Street
Bel Air, MD 21014

Fulton Township
777 Nottingham Road
Peach Bottom, PA 17563

City of Havre de Grace
400 Pennington Aveune
Havre de Grace, MD 21078

Borough of Oxford
401 Market Street
Oxford, PA 19363

City of Aberdeen
60 North Parke Street
Aberdeen, MD 21001

Town of Bel Air
39 Hickory Avenue
Bel Air, MD 21014

U.S. Environmental Protection Agency, Region III
Section Chief
1650 Arch Street
Philadelphia, PA 19103-2029

County of Lancaster
P.O. Box 83480
Lancaster, PA 17608-3480

Pennsylvania Department of Conservation and
Natural Resources
P.O. Box 2063
Harrisburg, PA 17105-2063

Pennsylvania Game Commission
2001 Elmerton Avenue
Harrisburg, PA 17110-9762

Pennsylvania Office of Attorney General
16th Floor Strawberry Square
Harrisburg, PA 17120

Upper Chesapeake Watershed Association
138 West Lanvale Street
Baltimore, MD 21217-4120

County of York, York County Courthouse
28 East Market Street
York, PA 17401-1501

Maryland Office of the Governor
Governor
State House
Annapolis, MD 21401

Pennsylvania Department of Conservation and
Natural Resources
Director
P.O. Box 8551
Harrisburg, PA 17105

Maryland Public Service Commission
6 St. Paul Centre, 16th Floor 6 Saint Paul Street
Baltimore, MD 21202-6806

Pennsylvania Department of Agriculture
2301 N. Cameron Street
Harrisburg, PA 17110-9405

Pennsylvania Wildlife Federation, PA Federation of Sportsmen's Club, Inc.
2426 North 2nd Street
Harrisburg, PA 17110

U.S. Fish and Wildlife Service
Director
P.O. Box 67000
Harrisburg, PA 17106-7000

Pennsylvania Office of the Governor
Governor
225 Main Capitol
Harrisburg, PA 17120

U.S. Department of the Interior, Bureau of Indian Affairs
1849 C Street, NW
Washington, D.C. 20420

U.S. Fish and Wildlife Service
Hadley
300 Westgate Center Drive
Hadley, MA 01035-9587

U.S. Fish and Wildlife Service
315 South Allen Street Ste 322
State College, PA 16801-4851

University of Maryland Center for Environmental & Estuarine Studies
Director
Cambridge, MD 21613

West Virginia Dept. of Education & Arts Division of Culture & History
Capitol Complex
Charleston, WV 25305

Delaware River Basin Commission
Executive Director
P.O. Box 7360
West Trenton, NJ 08628-2404

Christopher Urban
Pennsylvania Fish and Boat Commission
Chief - Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823-9620

Peter R. Valeri
Federal Energy Regulatory Commission
Regional Engineer
19 W 34th Street, Room 400
New York, NY 10001-3006

Mr. Clyde S. Van Dyke
Cecil County Department of Parks and Recreation
Director
County Administration Building
200 Chesapeake Blvd., Suite 1200
Elkton, MD 21921

Liana Vitali
Chesapeake Research Consortium
410 Severn Avenue, Suite 109
Annapolis, MD 21240

Herbert H. Ward
Upper Chesapeake Watershed Association
138 West Lanvale Street
Baltimore, MD 21217-4120

Douglas Weaver
York Haven LLC
York Haven Hydro Station
P.O Box 67
York Haven, PA 17370

Dale Weinrich
Maryland Department of Natural Resources
Matapeake Work Center
301 Marine Academy Drive
Stevensville, MD 21666

R. Timothy Weston
Kirkpatrick & Lockhart, Preston Gates Ellis, LLP
17 North 2nd Street Floor 18
Harrisburg, PA 17101-1638

Mr. John A. Whittaker, IV
Winston & Strawn, LLP
jwhittak@winston.com
1700 K Street, NW
Washington
DC, 20006

Cynthia Wilkerson
National Park Service
US Customs House Stewardship and Partnership
200 Chestnut Street
Philadelphia, PA 19106

William T. Wisniewski
U.S. Environmental Protection Agency - Region III
Deputy Regional Administrator
1650 Arch Street
Philadelphia, PA 19103-2029

David & Nancy Yohn
Citizen/Landowner
P.O. Box 658
Delta, PA 17314

Zhenxing (Jason Zhang Ph.D.
Susquehanna River Basin Commission
Water Resources Management, Hydrologist
1721 North Front Street
Harrisburg, PA 17102-2391

Andrew C. Zemba
P.O. Box 2063
Harrisburg, PA 14105-2301

United States Department of the Interior

NATIONAL PARK SERVICE
NORTHEAST REGION
15 State Street
Boston, Massachusetts 02109-3572

IN REPLY REFER TO:

April 25, 2011

Filed Electronically

Kimberly Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: Conowingo Hydroelectric Project FERC #405
Muddy Run Pumped Storage Project FERC #2355
Comments on Initial Study Reports

Dear Secretary Bose:

In response to the Initial Study reports and Revised Study Plans filed in 2011, the National Park Service offers the following comments on the Recreation Facilities Inventory and Estimated Recreation Use Report RSP 3.26 and the Interim Shoreline Management Report RSP 3.27 for the Conowingo Project and the Recreation Facilities Inventory and Estimated Recreation Use Report RSP 3.11 and Interim Shoreline Management Report RSP 3.12 for the Muddy Run Project.

Local, Regional and National Initiatives in the Project Areas

The Chesapeake Bay and its tributaries have been recognized by the Obama Administration as being of national significance, as per the Chesapeake Bay Protection & Restoration EO #13508, issued May 9, 2009. Amongst its requirements, the EO cites the need to increase public access to the Bay and rivers in the Chesapeake watershed. The implementation strategy includes a goal for increasing public access by 300 new sites by 2025, including the Susquehanna River.
http://executiveorder.chesapeakebay.net/default.aspx

The Commonwealth of Pennsylvania has embarked on the Conservation Landscape Initiative (CLI) to identify, connect and protect valuable recreational and land conservation opportunities and goals in an area that encompasses the Conowingo project area. To that end, numerous Federal, state and local government entities and Non-Governmental Organizations, including the Department of the Interior are working together towards the CLI's goals and the licensee is encouraged to join these efforts.
http://www.dcnr.state.pa.us/cli/lowersusquehanna/index.htm

http://www.fermatainc.com/?page_id=692

The NPS has a dedicated Chesapeake Bay Office located in Annapolis, Maryland to serve the public and the resources associated with the Chesapeake Bay and its tributaries, including the Susquehanna River, which provides roughly 50% of the freshwater received by the bay, virtually all of which flows through or over the Conowingo Dam.

Trail Systems

The Mason Dixon Trail (MDT) is a designated National Recreation Trail, administered by the NPS. The trail runs from its western terminus with the Appalachian Trail at Whiskey Springs to its eastern terminus with the Brandywine Trail in PA, after having crossed portions of Maryland and Delaware, including a section of the White Clay Creek which is a designated Wild & Scenic River. The trail runs along river right (at various points following roadways) joining the Susquehanna River near Wago Junction and Lowes Island, and continuing to below the Conowingo Dam where it crosses the river near Harve de Grace, MD. www.masondixontrail.org
www.americantrails.org/nationalrecreationtrails

The Susquehanna River Water Trail is a designated National Recreation Trail, administered by the NPS. It is part of the NPS' Chesapeake Bay Gateways and Watertrails Network. However, neither RSP mentions the existence of this river length long trail and the associated guide for paddlers on this popular water trail route. The states, communities, and regional non-profit and other non-governmental organizations along the river have identified significant gaps in public access to the Susquehanna River.

Significant planning exists for the advancement of public access to the Susquehanna. The Commonwealth, led by the Pennsylvania Fish and Boat Commission, developed a *Statewide Public Fishing and Boating Access Strategy* to guide planning and development and calls for HUC8 watershed-level planning and implementation. Based on nineteen criteria, the Lower Susquehanna ranks 2nd in priority out of 52 watershed units. http://www.fish.state.pa.us/accessplan.htm

At the local government level, Comprehensive Master, Open Space and Recreation Planning efforts are underway in key River Town communities to identify opportunities for increased access to the Susquehanna. Current efforts exist in Marietta and Wrightsville Boroughs, and a joint plan is being developed in Hellam Township and Hallam Borough.

In a letter dated March 18, 2011, Pennsylvania Governor Tom Corbett expressed strong support for the establishment of the Susquehanna River Connecting trail, which would connect with the designated Captain John Smith Chesapeake National Historic Trail (NHT) www.smithtrail.net.

General Comments on Conowingo Section 3.26 and Muddy Run Section 3.11

During the ISR meetings in March, 2011, several questions were raised about the adequacy of the scope and method of the recreational studies. The consultant primarily relied on recent Form 80 data and evaluated only those facilities in the project boundaries, not taking into account any nearby facilities (existing or closed) or recreational uses associated (or previously associated) with those facilities. In most cases, the licensee's consultant simply conducted on site surveys of users (without asking for zip code) and noted numbers of users relative to perceived capacity of each site. The overall conclusion was that there are adequate recreational facilities and public access points associated with both the Muddy Run the Conowingo projects. The methodology for identifying recreational use and adequacy of existing facilities was considerably flawed. The consultants did not consider many nearby facilities, did not make any attempt to identify or contact local and regional user groups, and did not send out any mailed surveys. Many key locations were missed or not included in the evaluation, including Rock Run boat ramp for example, which until a few years ago had been a major access below the Conowingo dam, but was summarily closed by Exelon shortly after taking over the projects just a few years ago. This was a heavily used facility that provided recreational access below the dam, and its closure has undoubtedly had effects on other facilities both in and near the Conowingo and Muddy Run project areas. By limiting their analysis to the project boundaries, the licensee, and therefore the FERC, does not have a real picture of recreational use in the project areas. In many cases during eastern relicensings, licensees have evaluated as far as 25 miles from the project boundary in order to encompass local and regional recreation opportunities and needs. This is especially important because nearby access locations, both currently in use and those that have been closed, should have been evaluated in the context of the project because it affects recreational use within the project boundary. By relying on current use data (arguably flawed in the scope and methodology of collection) and future demographics only, the licensee does not get an accurate or adequate picture of future recreational demand. As such, they have not satisfied the terms of FERC's February 4, 2010 Study Plan Determination.

Comments Specific to Conowingo 405

At page 1-11 in the Revised Study Plan dated December 22, 2009, the issue associated with parking and access to the Muddy Creek Gorge at Paper Mill Road was referenced in response to the comments filed July 13, 2009 by the Mason Dixon Trail System, Inc (MDTS). Exelon's response lumped this issue with general recreational enhancements that were to be looked at in the Recreational Facilities and Needs Assessment. The RSP 3.26 does not mention this access issue and refers only to the Muddy Creek Boat Ramp on the main stem of the Susquehanna River. The access at Paper Mill Road continues to see heavy use by boaters, day hikers and users of the MDT, however, access for parking has become extremely challenging for the public due to the claim of private ownership where the road crosses Muddy Creek. Survey markers are missing and in order to have any chance at a resolution to this issue, Exelon should resurvey the area to determine where its boundary is and upon the results of that survey, determine where and how to develop or enhance parking in this area, or an alternative location to be agreed upon after consultation with the MDT. A possible alternative would be the former PADOT lot on Route 74, located a mile or so upriver from the Paper Mill Road bridge area.

There are a number of additional problem locations associated with past relocations which have been brought to the attention of Exelon officials during the past several years and in particular, during the relicensing process. These issues, which have not been discussed in the RSP's, will be addressed under separate filing by the MDTS.

Subsequent to September 11, 2001, the licensee expanded its security perimeter, forcing a relocation of a portion of the MDT away from the river between the Conowingo Visitors center and Fisherman's Park and onto roads that are narrow and particularly unsafe for pedestrians. The MDTS has identified an alternative route to the licensee, but has been met with the general response that was reiterated at the March 2011 ISR meetings: The consultant hired by the licensee was asked to evaluate the risks of keeping the restrictions in place and they used FERC's standard Dam Assessment and Vulnerability Methodology. They cited the Department of Homeland Security's concurrence with the consultant's conclusions to keep everything closed that the licensee shut down after 9/11. However, the consultant was not asked to determine if those risks are real or if the closures need to continue. Exelon made their decision based on the consultants' recommendation, but Exelon's consultant noted during the March 2011 ISR meetings that its decision could be changed. Conowingo is one of few such dams that have continued their post 9/11 restrictions. The post 9/11 security closures have also affected the extremely popular and decades long tradition of fishing from the Conowingo Dam catwalk and restricting boaters near the dam. Closing of the catwalk makes little sense; the licensee could simply station someone on-site to check users. At present there is simply a person with a bullhorn telling boaters to move back, when the real threat, if any, comes from truck traffic that crosses the dam on Route 1. Exelon spent considerable money building a new ADA fishing access below the dam on river right, although this was done in the few years before the relicensing process commenced. Both York Haven and Safe Harbor have reopened their catwalks.

<u>General Comments for Conowingo Section 3.27 and Muddy Run Section 3.1 Pertaining to Project Lands</u>

The Shoreline Management Reports identified abutting land uses within 500 feet of the project boundary, which is inadequate, as it does not take into account visual and auditory impacts. The entire recreation report only looked at what is in the project boundary now, there was no evaluation of current or future needs or trends in the areas abutting and nearby to the project boundary. During the ISR meetings in March, 2011, the licensee's consultant explained that they had based their conclusions on future recreational needs and trends on the United States Forest Service 50-year growth projections. Such data presents only the broadest look at trends, and the state representatives from both PA and

MD stated during these meetings that they have far more pertinent, local and regionally specific data showing significant growth pressure, but that the consultants had not contacted any of the relevant resource agencies or local and regional non-government organizations when they did their studies. In addition, the current information contained in 3.27 does not show sensitive areas, such as wetlands, trails and steep slopes. The Conservation Land Initiative referenced above should have been a major source for data in order to develop a complete picture of the need for and opportunities to protect and conserve project and adjacent lands in the project areas and within the project boundaries.

The Conowingo RSP 3.26 at page 3-1 simply referenced the existence of Exelon owned lands, including 2,500 acres located above the high water line (project lands). Similarly, the Muddy Run RSP 3.11 at page 3.0 references 1,790 acres of project lands. The RSP's should include reference to the above referenced collective efforts (CLI) at the federal, state and local level, and should evaluate opportunities for conservation and protection of lands owned by the licensee in and adjacent to the project boundary, which are not integral to project operations, but whose protection would serve many of the goals set out in the Conservation Land Initiative.

The presence of the Ferncliff Nature Preserve, which is listed in the National Registry of Natural Landmarks as a National Natural Landmark (NNL), should be noted in the RSP. In particular any potential changes in land uses or access to the Exelon owned abutting the Preserve should be identified, and evaluated in the context of protecting adjacent lands as part of the CLI.

If you have any questions or comments regarding this letter, please contact Kevin Mendik at (617) 223- 5299, or Kevin_Mendik@nps.gov

Sincerely,

Kevin R. Mendik
NE Hydro Program Manager

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor
John R. Griffin, Secretary
Joseph P. Gill, Deputy Secretary

April 27, 2011

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St., N.E., Room 1A
Washington, DC 20426

RE: Conowingo Hydroelectric Project
Federal Energy Regulatory Commission (FERC) Number P-405
Comments on the Applicant's Initial Study Reports (ISR)

Dear Secretary Bose:

On behalf of the Maryland Department of Environment, the Maryland Department of Natural Resources (MDNR) Power Plant Research Program (PPRP) is submitting the attached comments in response to the Applicant's Initial Study Reports (ISR) filed with the Federal Energy Regulatory Commission (FERC) on February 22, 2011. These comments are being filed in regard to the application for a new license by the Exelon Generation Company, LLC (Applicant) for the Conowingo Hydroelectric Project (Conowingo / Project), located on the Susquehanna River in Cecil and Harford Counties, Maryland and Lancaster and York Counties, Pennsylvania.

Our comments on the Applicant's ISRs are provided as an attachment to this letter. Also, we generally support the comments that will be filed by the United States Fish and Wildlife Service (USFWS), Pennsylvania Fish and Boat Commission (PFBC), Pennsylvania Department of Environmental Protection, Susquehanna River Basin Commission (SRBC), The Nature Conservancy (TNC) and American Rivers. We thank you for the opportunity to provide comments on this important milestone in the relicensing process.

Sincerely,

Shawn A. Seaman
Program Manager
Maryland Department of Natural Resources
Power Plant Research Program

Attachment: Comments on the Applicant's Initial Study Reports

COMMENTS ON INITIAL STUDY REPORTS

With a few exceptions (notably study 3.32), we are only commenting on complete Initial Study Reports (ISRs) filed by the Applicant on February 22, 2011; however, we reserve the right and intend to submit comments on the remaining studies as they are filed with the FERC and we have time to fully review and evaluate them. The study summaries included in the Applicant's February 22, 2011 filing do not provide enough information for us to provide comments at this time; therefore, we also reserve the right to request additional studies in 2011, or beyond, if any of the incomplete studies are not adequate to address the impact issues and request that all optional 2011 studies be required by FERC. The incomplete studies include:

3.1 - Seasonal and Diurnal Water Quality in Conowingo Pond and below Conowingo Dam
3.2 - Downstream Fish Passage Effectiveness Study
3.4 - American Shad Passage Study
3.9 - Biological and Engineering Studies of the East and West Fish Lifts
3.11 - Hydrologic Study of the Lower Susquehanna River
3.12 - Water Level Management (Littoral Zone and Water Level Fluctuation)
3.15 - Sediment Introduction and Transport (Sediment and Nutrient Loading)
3.16 - Instream Flow Habitat Assessment below Conowingo Dam
3.17 - Downstream EAV/SAV Study (Water Level Vegetative Cover Study)
3.25 - Creel Survey of Conowingo Pond and the Susquehanna River below Conowingo Dam
3.28 - Archaeological and Historic Cultural Resource Review and Assessment

Many of the Study Reports were to be prepared and provided to participants for review and comment at the conclusion of the first year of study, as indicated in section 9 of each of these study plans. These reports were never provided to the stakeholders and, thus, when the ISRs were filed, they did not reflect our input.

3.3 - Biological and Engineering Studies of American Eel at the Conowingo Project

This particular report was issued as an interim draft that only covered study objective 3. The applicant stated that a complete report will be issued at a later date to address the remaining study objectives (1, 2, 4, 5, 6, 7, 8 and 9).

Study Comments (objective 3 only):

- Eel sampling conducted by the Applicant occurred in the spillway area and consisted of 258 eels. However, the USFWS collection efforts in the tailrace captured approximately 24,000 elvers.
- USFWS began their effort on May 31, 2010, while the Applicant initiated its eel collection efforts more than two weeks later on June 16, 2010.
- The report concludes that an earlier start date and greater attraction flows may be needed to substantially improve eel collections in the spillway area.
- USFWS notes in *Appendix A: USFWS 2010 Eel Collection Report, Conowingo Dam* that they have been unable to determine the triggers for elver migration at the Conowingo Dam.

Recommendations for Additional Studies:

- A 2011 study was proposed by the Applicant at the March 9-11, 2011 Study Report meeting. Start-up will begin in mid-May of this year (2011) and attempts will be made to increase attraction flows. An additional substrate may be tested for the elver ramps in addition to repositioning of the Enkamat substrate.

- Flow manipulations in the area of the ramps or positioning one of the ramps where there is additional flow and the other where flows are lower and/or directing flows alternately to one ramp and then the other to determine the level of flow needed for attraction may be illustrative during these preliminary siting studies.

3.5 - Upstream Fish Passage Effectiveness Study

Study Purpose: "...to determine the fish passage efficiency of the Conowingo East Fish Lift and to identify factors that may influence efficiency on a daily or seasonal basis. If factors are identified that may adversely affect efficiency, these factors can then be addressed to the extent they relate to project operations delay...."

FERC required a number of agency recommendations, including: 1) consider operational and structural factors affecting passage; 2) not use recreational anglers to collect test shad; 3) track fish from mid-April to Aug. 1; 4) conduct weekly tracking from river mouth to Holtwood dam; 5) add two remote stations; 6) assess influence of all independent variables on fish movement; 7) determine location of all tagged fish before, during, and after changes to project operations; 8) plot hourly locations of stranded fish on plan view maps. FERC could determine that testing of certain agency-recommended project manipulations is required in 2011.

Non-Compliance with the FERC-Approved Study Plan:

- Schedule – The Initial Study Report scheduled for January 21, 2011 was not filed on time (FERC approved an extension). A "Study Report" that was "...to be prepared and provided to participants for review and comment at the conclusion of the first year of study prior to filing the report with the Initial Study Report" (pg. 3-46) was never provided to the stakeholders and, thus, when the Initial Study Report was filed, it did not reflect any input from the participants.

- Fixed-location remote monitoring sites – Monitors were installed at the sites specified in the plan; however, Station 7 monitors, which were to monitor general shad movement in the tailrace, had a detection limit only to the upstream end of Rowland Island, while the tailrace is defined as the lower tip of Rowland Island in the study plan (pg. 3-45). Thus, Station 7 did not monitor fish in the tailrace as defined in the approved study plan.

- As per the FERC Director's letter (dated Feb. 4, 2010, pg. 3), the applicant was to "...consider both operational and structural factors that may affect successful or timely passage..." and "assess the influence of all independent variables on radio-tagged fish movement and behavior"; the only analyses presented in the study report were of fishway attraction effectiveness and upstream fish passage efficiency. On pg. 22 of the report, the statement is made that "...there did not appear to be a single variable that consistently provided the best fish passage conditions or guaranteed high rates of successful upstream passage....", no analysis is included in the report to substantiate that statement in compliance with the Director's instructions. No link was made between the findings of this study (Study 3.5) and those of Study 3.6, also specified in the Director's letter.

Study Comments:

- The significant number of forays into the East Fish Lift (EFL) was not analyzed in light of the physical parameters (e.g. flow, water temperature and crowding by gizzard shad) nor was the probability of capture in the EFL assessed relative to when the lift was operating. It appears from the data that the number of tagged shad captured in the EFL was related to when the lift was operated and may be a function of lift numbers (or timing of the lift relative to when the fish was present) which are related to crowding.

- There was no statistical analysis contrasting the behavior of the American shad that were not successfully passed and those that were. There was no analysis of differences in behavior, etc. related to physical parameters of the tailrace, operation of the EFL, and/or flow.

- The factors that could possibly affect passage efficiency and passage delay were not thoroughly discussed, researched or investigated as causative factors and the lack of any analysis of fish animations results in there being no scientific credible information to substantiate the conclusions drawn.

- This study lacks citations for statements such as: "*Drop back behavior related to post-tagging stress is typical of radio tagged shad and can affect migration behavior of up to 40% of the tagged fish.*" and "*While the exact cause of this inability of all fish in the EFL to successfully pass upstream is not understood, it is symptomatic of current fish lift designs for American shad*"

- The low passage rate of American shad through the EFL demonstrates the inadequacies of this lift. Flow conditions in 2010 were within normal limits but the operation of the dam in relation to turbine flow was not discussed and could be highly correlated to attractiveness to the dam, ability to hold fish close to the dam and may influence their ability to locate the EFL because of competing flows, none of which was discussed. In addition, the problem of Diffuser A and its possible influence on fish passage (mentioned on page 23) was never addressed further.

- If the SRAFRC goal of 2 million American shad is to be met above the York Haven project, conclusions of only 45% passage efficiency (check #) through this project, directly impacts this system goal. This also must be integrated with Study 3.9 and other studies to clearly present the difficulties that the Conowingo Dam imposes on successful American shad passage.

- Based on preliminary results and the animations, the delay to American shad passage is significant. The amount of time that American shad attempt to find the EFL is very significant and alarming. This reported delay not only decreases the fish's bioenergetics, but it likely forces spawning to occur below the Conowingo Dam and in habitat that is less suitable than upriver.

Recommendations for Additional Studies:

Criteria for Modification of Approved Study [18 CFR 5.15(d)]: as indicated above, approved studies were not conducted as provided for in the approved study plan. Therefore we request the following modification of this study for 2011, or beyond, based on how it was conducted in 2010:

- Results of this study should be integrated with the results of Study 3.6 as was specified in the FERC Director's letter.
- Statistical analysis of the behavior of the monitored shad relative to potential causative factors (e.g. flow, plant operation regimes, water temperature, crowding by gizzard shad, lift frequency and number) should be included in a revised version of this report.
- Fish behavior that is illustrated in the animation provided to the stakeholders should be quantitatively analyzed to assess all relationships between the behavior of the monitored fish and plant operations, as well as all the other contributing variables.
- Citations should be incorporated into a revised version of this report to provide the basis for currently unsubstantiated comments incorporated into the text.
- The Applicant should revise and amend the report in response to the comments provided here and provide a copy of the revised report to the stakeholders for final review.

3.6 - Conowingo East Fish Lift Attraction Flows

Study Purpose: 1) review and analyze applicable data from 2000 through 2009 under the designation of historical data (if available) as it relates to Conowingo turbine and East Fish Lift (EFL) operation data; 2) analyze and report turbine on/off times, duration of turbine operation, spill data, if applicable, and water temperature, in conjunction with attraction flow velocity data and hourly fish passage data, for 2010; and 3) analyze and report 2010 Conowingo station operation and fish passage data in conjunction with the passage of radio-telemetered American shad from Conowingo RSP 3.5-Upstream Fish Passage Effectiveness Study.

FERC also stated additional field studies in 2011 could be required if agencies recommend changes in project operations.

Non-Compliance with the FERC-Approved Study Plan:

- Schedule – The Initial Study Report scheduled for January 21, 2011 was not filed on time (FERC approved an extension). A "Study Report" that was "…to be prepared and provided to participants for review and comment at the conclusion of the first year of study prior to filing the report with the Initial Study Report" (pg. 3-54) was never provided to the stakeholders and, thus, when the Initial Study Report was filed, it did not reflect any input from the participants.
- The applicant states that no comparison of hourly fish passage to spill operations was conducted because the EFL is seldom operated during spill events. However, inclusion of spill was listed as a topic to be studied in the FERC Study Plan Determination.

- The applicant states that no separate analysis of river herring (alewife and blueback) was conducted because so few herrings had occurred at the EFL during the historic period. However, this had been listed as a topic of study in the Revised Study Plan.

- There was no statistical analysis of the attraction flow data collected in 2010 with regard to how this variable relates to shad passage. However, this was listed as an area of study in the Revised Study Plan and in the FERC Study Plan Determination.

- "Fast fish" operations are described on page 2 of the report in the section entitled, "Current Operation of the Conowingo East Fish Lift Facility," but if analysis was done on this operating scenario, it is not clearly described.

Study Comments:

- Three major topics were addressed by this study. First, historical data from the years 2001 through 2009 and data from 2010 were examined to determine how generation and EFL operations (project operations) influence American shad and gizzard shad passage. Second, attraction flows were monitored in 2010 but no statistical analysis was done to relate attraction flow to shad passage. Third, upstream-migrating American shad were tagged with radio transmitters and their locations monitored to evaluate migration patterns in relation to station operations. In the analyses of both the historical data and of the 2010 data, the applicant claims there is no consistent relationship between shad passage and turbine operation/generation. The applicant concludes that "attempts to improve the upstream passage of American shad should focus on the EFL rather than instituting specific flow regimes or operational schemes that may affect tailrace conditions near and outside of the EFL."

- The statistical analysis of the data is fundamentally flawed and precludes any judgment of the soundness of the conclusions on which these analyses are based. The fundamental flaws arise because the applicant attempted to relate power generation scenarios to fish passage without taking into consideration the many other variables that could potentially influence fish passage. Crucial variables that were ignored in the analysis include: 1) year, 2) day of year, and 3) hour of day. The annual variability in the population size of migrating shad is depicted in Figure 4.1-3 and the day to day variability is depicted in Figure 4.1-3 through Figure 4.1-12. Variability within individual days is also apparent in the data sets provided by the applicant.

- The format in which the data were provided by the applicant was not amenable to independent review or analysis by stakeholders. Multiple excel spreadsheets of raw data with multiple tables per sheet would require significant organization before any review could be done. Ideally, a single large table of data that included all of the relevant variables potentially affecting fish passage as well as the fish passage data should have been provided. Presumably such a table was constructed by the applicant for the purpose of the analyses they carried out.

- A central question that the applicant needed to answer was, "is the project operation in any way related to successful shad passage *if other sources of variation affecting shad passage are taken into account*." The applicant chose to use several separate t-tests comparing an individual generation scenario to all others for their analysis. This was a poor choice of statistical method because it is unable to partition variance to any other factors potentially influencing shad passage, namely year, Julian date, or time of day. There is a tremendous amount of variation in shad numbers among years (annual range 19,914-193-574 fish), among dates within a year, and among hours within a day. Lumping all of these data into two blocks to be compared (i.e., 1 focal scenario vs. all 291 other scenarios) results in a high amount of within-group variability ("noise"). This swamps out the differences between groups ("signal") which is what we are trying to detect. There are much more appropriate statistical approaches available to the applicant which would amplify the signal to noise ratio by taking into account these other sources of variation in shad passage.

- A set of Pearson correlations was also conducted by the applicant to explore relationships between turbine generation schemes, EFL equipment settings, water temperature, and tailrace water levels with hourly American shad and gizzard shad passage. Correlations do not establish causation but can be a useful tool in data exploration. However, this approach suffers from the same drawbacks as described for the t-tests in that many other contributing factors may have prevented detection of significant patterns. A separate issue is that insufficient information about what data were included in the correlations precludes an understanding of the results. For example, correlations are typically done between two continuous variables to answer the question, how is x related to y? However, the applicant reports correlations between shad passage and aspects of operational conditions that are not clearly defined. For example, what does it mean that a particular turbine is correlated with fish passage? Did they use the duration of operation as a continuous variable or enter on/off as a binary variable (0/1) or use some other characteristic of turbine function? The same issue is evident with many of the correlations. Without further explanation, these results cannot be interpreted.

- More information is needed in order to know whether duration of turbine operations was included in the Pearson correlations. Individual turbines are included in the correlations, but it is not clear what aspect of turbine operation is being correlated with shad passage.

- River flow as a variable is discussed as one of the operational scenarios. "Minimum flow generation occurred nearly 47% of the time." Minimum flow regimes downstream of Conowingo Dam are listed earlier in the report. Natural river flow is minimum flow under some circumstances. River flow does not appear to have been used as a continuous variable in any of the analyses.

- More information is needed to determine whether entrance gate velocity was examined in the correlation analysis. There is a variable called "gate setting" but it is not clearly defined. This was listed as a topic of study in the Revised Study Plan.

- Pg. iii – The last paragraph of the Executive Summary offers an opinion (….It appears that attempts to improve …upstream passage….should focus on the EFL rather than instituting specific flow regimes or operational schemes…..) that is unsupported by the analyses included in the report. Opinions should not be presented as scientific conclusions.

- Table 4.2-2 – This table presents shad passage rates versus various turbine operation regimes, but does so only for 2010. It appears similar data are available for many other years; that data should also be presented in similar tables.

- Pg 12. The statement: "Historic data (2001-2009) and data from 2010…….show that the EFL is effective at attracting 73% of the American shad in the tailrace….." The statement implies that the historical data support the 73% figure, when, in fact, the 73% figure is solely from the telemetry study done in 2010. Neither the historical data nor any analyses presented in the report provide an indication of what is the EFL attraction percentage of upstream migrating shad.

- Pg 13. The final paragraph of the conclusion section presents the opinion of the authors that future efforts to improve passage should focus only on the EFL and not on plant operations. This opinion is based on analyses in the report which did not adequately address the objectives of this study, as elaborated on above, and is thus an unsubstantiated conclusion.

Recommendations for additional studies:

Criteria for Modification of Approved Study [18 CFR 5.15(d)]: as indicated above, approved studies were not conducted as provided for in the approved study plan. Therefore we request the following modification of this study for 2011, or beyond, based on how it was conducted in 2010:

- The inadequate and inappropriate statistical analyses presented in this report should be deleted, and analyses conducted as described in the detailed comments above.
- Results of the revised analyses should be integrated with the findings of Study 3.5.
- Exelon should revise and amend the report in response to the comments provided here and provide a copy of the revised report to the stakeholders for final review.

3.7 - Fish Passage Impediments Study below Conowingo Dam

Study purpose: 1) determine if project operations adversely impact upstream migrations of American shad, river herrings (blueback herring and alewife), and Hickory shad; and 2) utilize the River2D model (see Conowingo Study 3.16-Instream Flow Habitat Assessment below Conowingo Dam) to ascertain if areas in the tailrace and other portions of the river below Conowingo Dam could present adverse velocity barriers under typical dam operating regimes

Non-Compliance with the FERC-Approved Study Plan:

- Schedule – The Initial Study Report scheduled for January 21, 2011 was not filed on time (FERC approved an extension). A "Study Report" that was "…to be prepared and provided to participants for review and comment at the conclusion of the first year of study prior to filing the report with the Initial Study Report" (pg. 3-57, Section 3.7.9) was never provided to the agencies and, thus, when the Initial Study Report was filed, it did not reflect any input from the participants.

Study Comments:

- Exelon states "there is no evidence to suggest that extreme water velocities present a barrier to upstream migration of American shad or river herrings." However, modeling results show that at full generation (a frequent occurrence during the day during the migration period), velocities approach 8 fps in select areas in the channel between the west shoreline and Rowland Island as well as in the tailrace proper and to the east of the island (Fig. 4.2-12). Shad have a maximum burst speed of 13 fps (maintainable less than 15 sec.) and a prolonged swim speed of no longer than 200 minutes. This suggests at least a delay or fatigue factor that these fish would experience when encountering full generation flow vs. typical run-of-river flows that would occur under natural conditions. Exelon should examine the flow records when fish are moving and compare the amount of time fish experience full generation flow vs. natural river flow during the migration period (for 2010 and 2011 since that is when telemetry data are or will be available) and for average flow during the migration period.

- Pg. 8: The Applicant should provide details of their model calibration with field data or reference the study that provides this information.

- Table 4.1-4: this table needs further explanation and annotation. The column labeled average speed does not correspond to the average distance over time, so it is unclear how this was calculated. The last 4 rows in this table have no explanation for the values there.

- Fig. 3.2-1: Where is the ADCP data applicable to this figure? The Applicant should reference another study if it is contained elsewhere.

Recommendations for additional studies:

Criteria for Modification of Approved Study [18 CFR 5.15(d)]: as indicated above, approved studies were not conducted as provided for in the approved study plan. Therefore we request the following modification of this study for 2011, or beyond, based on how it was conducted in 2010:

- Examine the flow records when fish are moving and compare the amount of time fish experience full generation flow vs. natural river flow during the migration period (for 2010 and 2011 since that is when telemetry data are or will be available) and for average flow during the migration period

- Provide details of model calibration with field data or reference the study that provides this information

- Further explain and annotate Table 4.1-4

- Provide the ADCP data applicable to figure 3.2-1

3.8 - Downstream Flow Ramping and Fish Stranding Study

Study purpose: 1) evaluate specific locations/habitats below Conowingo Dam where stranding potential exists, catalog the sites evaluated, and document the numbers, species affected, and their condition; 2) describe Project operations during the survey periods and the effects on water levels both near-field (i.e., tailrace-spillway) and far-field (i.e., flow attenuation); and 3) relate stranding potential and stranding consequences to the impacted fish populations.

FERC required additional study details, including surveys as soon as possible after peaking; recording number and condition of stranded fish; and photographic documentation.

Non-Compliance with the FERC-Approved Study Plan:

- Schedule – The Initial Study Report scheduled for January 21, 2011 was not filed on time (FERC approved an extension). A "Study Report" that was "…to be prepared and provided to the MDNR, PFBC, NOAA Fisheries, and the USFWS electronically for review and comment at the conclusion of the first year of study prior to filing the report with the Initial Study Report" (pg. 3-65, Section 3.8.9) was never provided to the agencies and, thus, when the Initial Study Report was filed, it did not reflect any input from the participants.

Study Comments:

- The Applicant reported on 12 stranding surveys conducted 4 times each in the spring, summer, and fall of 2010. They concluded that the stranding potential was highest in summer but that only 1% of fish observed were dead. They thus concluded that the consequences of this stranding were negligible. In spring, suffocation and desiccation appeared responsible for most fishes found dead, while in fall the principle consequence of stranding of adult fish is death by predation. Bald eagles and great blue herons are the primary predators with the primary prey species being gizzard shad and other resident species. Photo documentation is sparse in the report and should be better documented.

- The most obvious problem with this study is the infrequent site visits (n = 12) and the timing of the searches (well after first light). Although a biologist noted fish predation by birds and at times it was significant, there were no quantifiable estimates. During the initial study report meeting when we discussed this study, the contractor did note that predation of fish by birds was observed. Stranding of fish increases predation by animals and birds and also stresses the fish through confinement and exposure to degraded water quality. The mortality estimates presented in the tables are minimal only because of long-term effects of stranding and loss of feeding and reproductive potential.

- The graphs provided with the study clearly show the dramatic rise and fall of water levels associated with Conowingo Dam generation, but on sampled days it does not present the worse-case scenario. Although only immediate observations were made concerning the fish (dead or alive), the potential to impact a higher percentage of the fish trapped in pools was evident, therefore the 900 fish (18%) observed dead is a minimum value because of the fish totally removed through predation and the continued stress througb water quality degradation and predation.

- Hydraulic conditions described in the report are not worse-case-scenarios. Page 7 of the report gives ranges for the dewatering of a 2.4 feet to 6.0 feet drop, which is a significant biological difference in habitat for fish. However, this difference was not evaluated based on the estimated potential stranding area and the relationship between difference in water depth and visual observations.

- During the spring surveys when adult American shad will likely be encountered in the tailrace, 108 fish were observed stranded on 4 days and 46 (43%) were observed dead. This results in an average of 27 American shad per event and typically there are at least two peak / minimum flow events per day; this would result in 3,780 (27x2 = 54 x 70 days [if this is extrapolated for the entire American shad run estimated to be 70 days]) American shad stranded and resulting in a minimum of 1,625 stranding mortalities. This results in a significant impact on American shad restoration efforts in the tailrace.

- It also appears that dead/alive status was not noted in the Tables for many important species and no explanation was provided.

- This study did not attempt to quantify the total seasonal impacts of peaking and minimum flows on fish populations, especially river herring and American shad.

- It should be noted that no data were collected during the winter months, a time when the Applicant is permitted to "no flow" for up to 6 hours twice per day. Recreational angler reports have indicated significant stranding of walleye during this time period (Sadzinski, MD DNR personal communication).

- The report was very vague on when the last stranding event occurred prior to the search for fish. A longer delay likely leads to fewer observed fish stranded because of removals by birds, etc. The daily flow graphs were provided but when the study was conducted was not noted on these graphs.

- There was no discussion of habitat area versus stranding, although a map was provided that detailed the habitat types (Figure 2-1).

- The impact to fish populations is not clearly presented. The 1% mortality noted on page 16 only quantitatively estimates the number, but in no way estimates the total impact to fish populations. In fact, on page 16 it is stated *"Stranding of these abundant species provides abundant forage for numerous bald eagles and great blue herons when nesting and rearing young. Further, at least for carp, stranding leads to substantial spawning activity in many spillway reach pools."* This statement contradicts itself because it implies that stranding which is lethal to many fish, is beneficial to one species because it increases spawning. The alternative hypothesis is not presented – fish will spawn in unsuitable habitat, under poor spawning conditions when no alternative is available to them.

- There was no historical perspective of stranding presented in the report, including records of fish kills due to stranding and or low oxygen levels since the dam began operation.

Recommendations for additional studies:

Criteria for Modification of Approved Study [18 CFR 5.15(d)]: as indicated above, <u>approved studies were not conducted as provided for in the approved study plan</u>. Therefore we request the following modification of this study for 2011, or beyond, based on how it was conducted in 2010:

- Provide detailed photo documentation in a revised study report.

- Quantify the total seasonal impacts of peaking and minimum flows on fish populations, especially river herring and American shad.

- Annotate the daily flow graphs dates and times when the field studies were conducted.

- Analyze the correlation between habitat type and stranding.

- Provide a historical perspective of stranding, including records of fish kills due to stranding and or low oxygen levels since the dam began operation.

- Explain any correlations between habitat type and stranding

2011 Requested Study (3.8 Downstream Flow Ramping and Fish Stranding)

Observational and mapping studies to determine potential for stranding of American shad and river herring due to rapid decrease in flow from the project and use of operational and/or structural modifications to mitigate impacts stranding.

Goals and Objectives:

The 2010 study confirmed that plant operations at Conowingo Dam cause migratory and resident fish to become stranded in isolated pools in the Susquehanna River below Conowingo Dam. This study will provide more information on the frequency of such stranding and the occurrence and impact of fish-kills resulting from stranding. More importantly, the 2011 study will estimate the number of American shad and river herring killed during the 2011 spawning season and identify potential operational and structural modifications that might reduce stranding.

Resource Management Goals:

Minimize or eliminate fish mortality caused by stranding in isolated pools as a result of plant peaking.

Need:

During the early 1980's, fish kills were documented by Normandeau (formerly RMC) personnel on a daily basis in isolated pools in the spillpool area below Conowingo (Michael L. Hendricks, PFBC, personal communication). These pools become contiguous with the flowing river when the project is generating and become isolated when the project is in minimum flow mode. Fish enter these pools and the surrounding spillpool areas during generation, then become stranded at low flow. Predatory birds become accustomed to this daily event and gather in the spillpool area at dawn. Within the first hour of light the stranded fish are consumed and no evidence of a fish kill remains. These observations from the past were supported by the data collected in the 2010 survey. Additional fish kills were documented below Conowingo in 1965, 1976 and 1971 (Foerster and Reagan 1977; for full citations, see comment letter from Pennsylvania Fish and Boat Commission, PaFBC). These fish kills occurred in the tailrace at night and were attributed to low dissolved oxygen resulting from respiration of too many fish present in the tailrace and too little flow from the plant. Another fish kill occurred in May of 2001 resulting in the death of approximately 40,000 river herring (Luckett 2001). A definitive cause for this fish kill was never discovered. Dead fish were observed in the river at Port Deposit, covering an area from bank to bank, but no dead fish were observed in the Conowingo Tailrace and dissolved oxygen at station 643, just below the tailrace, never dipped below 5 mg/L. It is likely that these fish died when stranded in the spillpool which became cut-off from river flows due to nighttime reduction in project flows. The 2010 study supports this interpretation. The results of the 2010 study were surprising in that many American shad were stranded and more river herring were stranded than passed the fish lift. The general preference of American shad for the main channel and high flows suggested that stranding of American shad would be minimal. This was not the case in the 2010 survey. In addition the 2010 stranding study included only 4 surveys during the spring spawning season. This was not enough data to accurately describe the impact to populations of American shad and river herring. The study needs to be repeated in 2011 to:

- Estimate the number of American shad and river herring stranded and the proportion killed.
- Determine the points of exit and entry to the spillpool for American shad (radio telemetry study).
- Determine generation scenarios and diurnal patterns during which American shad enter, remain, and exit the spillpool (radio telemetry study).
- Identify potential operational and/or structural modifications that might reduce stranding.

The nexus between project operations and effects on the resource to be studied, and how the study results would inform the development of license requirements:

Conowingo Hydroelectric plant is operated in a peaking mode. When sufficient water is available, Conowingo generation fluctuates rapidly from 3,500, 5,000, 7,500, or 10,000 cfs (depending on FERC-ordered minimum flows) to 85,000 cfs, often on a daily or twice daily basis. The 2010 study showed that reduction of flow from full-generation to FERC- required minimum flow results in the creation of isolated pools which can result in fish kills. Operational or structural changes could re-connect these isolated pools and prevent such fish kills.

How the proposed study methodology is consistent with generally accepted practice in the scientific community:

This issue should be studied by a bathymetric survey, aerial or on-the-ground photography at various levels of low flows to locate such pools and determine at what flow levels they become isolated. Field observations of fish species and abundance in isolated pools would be conducted twice weekly during spring (14 surveys). This study would also suggest potential mitigating measures to prevent fish kills, such as operational modifications or structural modifications that would allow paths of egress for fish that would otherwise be trapped in pools.

Considerations of level of effort and cost involved in the proposed study, and explain why any alternative studies proposed by Exelon would not be sufficient to meet the stated information needs:

This is a simple, inexpensive study similar to the 2010 study but focusing on spring spawning season. Exelon did not propose 2011 studies to meet this need. Estimated cost for the study is moderate.

3.10 - Maryland Darter Surveys

Study purpose: to determine if Maryland darter are present in the Susquehanna River below Conowingo Dam and/or the lower riffles of Deer and Octoraro creeks.

Study Comments:

- At the outset, the methodology specifies a minimum of 10 full days of electrotrawling divided between the four sampling seasons (beginning with Fall 2010). The study report indicates that the Applicant was only able to conduct electrotrawling during January 2011 (4 days) and all of the sampling sites were several hundred yards downstream of the mouth of Deer Creek because of low water making conditions unsafe for navigation. Other methods of survey (seining, electrofishing, snorkeling) were conducted in Deer Creek and Octoraro Creek during the Fall of 2010 (4 dates during October/November).

- It is interesting to note that the Susquehanna River sites of the Maryland darter surveys only produced a single species; the tessellated darter. However, in study 3.8 (Downstream Flow Ramping and Fish Stranding Study) three species of darters were found; the greenside darter; banded darter; and tessellated darter. The sites for the official darter survey were all downstream from Rowland Island while the stranding studies were conducted upstream and to the east of Rowland Island. This may suggest that the spill pool area is better darter habitat or that darters get stranded at higher rates than other species or that the sampling method chosen for the official darter survey was not effective enough to find the other darter species or perhaps there are habitat differences between the two study areas that are more or less preferable to darters.

- The Chesapeake logperch, a rare species in Pennsylvania, was found at both the Deer Creek and Octoraro Creek sites but was not found at the Susquehanna River sites. Based on the example presented above regarding other darter species we suspect that a more intensive survey of the spill area would produce occurrences of the Chesapeake logperch.

Recommendations for additional studies:

- If an additional year of the Downstream Flow Ramping and Fish Stranding Study survey is required by FERC special attention should be paid to sampling for and collecting darter species including the Chesapeake logperch.

- Any darters that were vouchered during the stranding study should be re-checked to ensure their species identification is correct, with special attention paid towards possible misidentification of the Maryland darter and Chesapeake log perch.

3.13 - Study to Assess Tributary Access in Conowingo Pond

Study purpose: 1) identify potential blockages associated with Project operations to fish and recreational boating access into Conowingo Pond tributaries at the reservoir confluence under several commonly encountered water levels; 2) if access to fish is denied at certain water levels due to Project operations, identify those fish species most affected, when it occurs, and at what water levels; 3) develop potential mitigation options to enhance fish or recreational access if problems are encountered.

Non-Compliance with the FERC-Approved Study Plan:

- Impediments to boat access appear to be well identified as specified in the first goal of the study. However, Goal #2 is limited to a general discussion of some previous studies which were focused on anadromous species and may not fully consider use by other species. There is no discussion of Goal #3, mitigation.

Study Comments:

- Limited boat access into several large backwater tributaries was noted at a pool level of 109 due to low clearance (air draft) of railroad bridges. It is worth noting that these could be mitigated at some later date should these bridges be scheduled for replacement by the Norfolk Southern Rail Line.

- At a pool level of 106 or lower, boat access to some backwater tributaries may be restricted due to shoaling. Several ramps may be impacted at these levels as well.

- Fish access to the tributaries was assessed from previous studies which noted little evidence of use by anadromous species. It is suggested that herring and shad do not use these tributaries due to small catchment size and discharge. However, catchments smaller than these have been documented to support runs of herring across the Chesapeake region. If populations eventually rebound and numbers lifted to Conowingo Pool increase substantially then greater use of these streams could occur.

- Under normal spring conditions, operations would not impact fishes use of tributaries because most barriers are upstream natural features which exist at all levels. At a pool level of 106 or lower, shoals could prevent access to some shoreline tributaries and might also reduce use of some of the backwater tributaries. Under these conditions larger and more laterally compressed fishes such as American shad or gizzard shad might be less likely to navigate extensive shoal reaches than would smaller more fusiform fishes such as American eel or yellow perch.

- Species such as smallmouth bass and walleye are known to make upstream migrations prior to spawning in the Susquehanna and elsewhere. Several of the larger backwater tributaries may be large enough to host such migrations. The same concern for low pool levels during spring spawning periods would apply for these and other resident species.

Recommendations for additional studies:

- The Applicant should determine if restricted access is due to permanent features such as bedrock or riffles or if channels and ramp approaches are restricted due to excessive sedimentation. Unconsolidated sediments could be mitigated through dredging.

3.14 - Debris Management Study

Study purpose: 1. Analyze hydrologic conditions that initiate debris management actions; 2. Review current debris management practices to ensure that they are consistent with best management practices (BMPs); and 3. If not consistent with best management practices, assess need for additional practices to reduce impacts to Pond and downstream users.

Study Comments:

- The Applicant's RSP stated that one purpose of this study was to "analyze hydrologic conditions that initiate debris management actions". We supported this proposed analysis in order to illustrate typical river flow "triggers" that transport a significant quantity of debris to the Project and initiate debris management actions. However, the Applicant's study failed to address this. In their study report, the Applicant simply plotted the average monthly flow versus the annual quantity of debris (see Figure 4.3-1) and concluded that the figure "suggests the lack of obvious trends from the limited data available". The methodology utilized in this study does not provide any useful information regarding hydrologic conditions that initiate debris management actions.

- The Applicant's RSP stated that a purpose of this study was to "identify and evaluate potential improvements". In addition, under *Task 2: Debris Management Assessment* of the RSP, the Applicant states: "Current debris management practices will be evaluated" and "debris management practices at other hydroelectric facilities......will be evaluated." However, it does not appear the study report has evaluated any other potential improvements. The Applicant's study report discusses: 1) current and historical debris management practices at the Project, 2) current debris management practices at the three upstream impoundments, and 3) debris management practices at select FERC relicensing projects. According to the study report, the Applicant currently utilizes two gantry cranes with grapple attachments to remove debris from the intakes, as well as floating surficial debris from in front of the dam. Previously the Applicant has used a self-propelled skimmer barge to capture floating debris; however, the device was retired in 2008. The study report also identifies several debris management practices being utilized at the other facilities; such as trash rakes, collection efforts in the impoundment, skimmer walls and mechanical skimmer boats. However, the Applicant did not evaluate whether or not these current practices could improve debris management at the Project, they only reported them.

- According to data presented by the Applicant in Tables 4.2-1 and 4.2-2, the annual quantity of debris collected at the Project is steadily decreasing over time. For example; during the five year period between 1989 and 1993, an annual average of 3,470 cubic yards of debris was collected. During the next five year period on record, between 1994 and 1998, an annual average of 1,238.8 cubic yards of debris was collected, which is about 1/3 the previous five year average. Finally, during the last five years on record, between 2006 and 2010* (*2010 data is through May), the annual average of debris collected was 712.8 cubic yards, which is about 1/5 the 1989 through 1993 average. As the Applicant noted in their study report, a referenced study determined "an average of 75,000 cubic yards of debris is passed over or through each dam annually with the quantity of debris being nearly proportional to river flow". Since the annual quantity of debris transported to the Project is nearly proportional to river flow and the United States Geological Survey (USGS) records for the Marietta gage do not show a corresponding downward trend over the same period, the Applicant is simply collecting a smaller percentage of debris each year.

Recommendations for Report Revisions:

- We ask that the FERC require a proper analysis that will identify the hydrologic conditions that initiate debris management actions, as proposed in the RSP.
- We ask that the FERC require the Applicant to evaluate other known debris management practices, as proposed in the RSP.
- Why is there a data gap between 1998 and 2006 (quantity of debris collected)?
- Why was the self-propelled skimmer barge retired in 2008? What percentage of the total debris removed was floating debris removed by the skimmer barge?
- Is there any record of the weight or volume of the debris composition? e.g, woody debris, plastic, metal, etc.
- The Applicant should explain what conditions initiate their "clamming" efforts.
- The Applicant should conduct a literature review of debris management procedures followed at facilities outside of the Susquehanna River watershed and incorporate that review in this report, as was specified in the approved study plan.
- The Applicant should revise and amend the report in response to the comments provided here and provide a copy of the revised report to the agencies for final review.

3.18 - Characterization of Downstream Aquatic Communities

Study purpose: 1) characterize resident fish abundance, size structure, condition, and reproductive success below Conowingo Dam; 2) describe the benthic macroinvertebrate communities below Conowingo Dam collected by various common collection gears; and 3) provide updated information on these communities available through 2010 studies focused on other objectives.

FERC did not require collection of new field data but stated they 'may recommend field work in 2011 if the final literature-based study report does not provide enough information on the aquatic community' to evaluate operational changes to the project

Non-Compliance with the FERC-Approved Study Plan:

- Schedule – The Initial Study Report scheduled for January 21, 2011 was not filed on time (FERC approved an extension). A "Study Report" that was "…to be prepared and provided to participants for review and comment at the conclusion of the first year of study" (pg. 3-140, Section 3.18.9, referring to task 2) was never provided to the agencies and, thus, when the Initial Study Report was filed, it did not reflect any input from the participants.

Study Comments:

- A literature-based study was conducted to provide a characterization of the current aquatic community below Conowingo Dam. This was done by summarizing various reports of studies conducted over an approximate ten-year time frame, from the early 1980's into the early 1990's. The summary consisted of listing dominant taxa found during these studies (including the percent contribution of these taxa to the total abundance), describing life history patterns and tolerance levels of these dominant taxa, and summarizing the possible contribution of the dominant taxa as fish prey based on previous fish stomach analysis.

- The study concluded that the benthic community inhabiting the area below the dam was generally comprised of facultative and relatively tolerant warm-water taxa. In general, over the 10-year time frame, the percent contribution of the dominant taxa did not change. Tbe study also concluded that since the fishery below the dam *"appears robust"*, that the benthic community must be providing a *"more than adequate food base"*. There are many concerns with a statement like this, as well as major problems with the review. The study only reviewed the percent contribution of the dominant taxa to the total. An analysis of this sort will not capture a total decline in the population, if the rates of decline in the dominant taxa are similar to each other. An additional summary of total abundance patterns and abundances of the dominant taxa would address this concern.

- A quick calculation of mean total abundance and mean abundance of the dominant taxa collected during each year studied found some interesting results. Given the inherent problems with this calculation (i.e., sampling occurred during different seasons and habitats and were averaged over various minimum flow regimes), the results nonetheless deserve some attention. Only data collected using the t-sampler was included to avoid gear collection issues. In the 7 years included in this analysis, the first two data points were averaged from data collected before (summer) and after (fall) a minimum flow was required beyond the summer timeframe. The third data point was averaged from data collected during a period where the dam was required to maintain a minimum flow during the winter period (fall-winter). The 4th and 5th data points were averaged from data collected before (fall) and after (winter) the facility was allowed to operate under an intermittent shut down during the winter period. The 6th and 7th data points were averaged from data collected before (fall) and after (winter) when the facility was allowed to operate under an unrestricted shut down regime during the winter period. A linear regression line on total abundance over this time period appeared relatively flat over the sampling timeframe; however, a decline in the final year was noted. Of the three dominant taxa found to be a significant fish prey resource, Gammarus and Cheumatopsyche remained relatively flat, while chironomid abundance appeared to decrease over the sampling period. Of the three soft bodied worm species, that were dominant taxa but have not been recorded as dominant fish prey, two (Dugesia and Manayunkia) declined over the sampling period and one (Oligochaeta) increased although the increase was mainly the result of a large number collected in the 6th study year examined. Of the three other dominant taxa in the mollusk category, two Ferissia (a gastropod) and Sphaeridae (a clam) declined and Corbicula (the introduced Asiatic clam) increased over the sampling period.

- The Applicant's treatment of the characterization of the current aquatic community below Conowingo Dam was incomplete. A summary and interpretation of abundance patterns observed during the early years of the dam operating under minimum flow requirements would have added a great deal to the characterization. A current survey of macroinvertebrates below the dam would provide vital information as to the current status of the benthic community and could be used to examine the achievement of the current flow regime requirement since its establishment in the 1980's and 1990's; this data is at least twenty years old. Changes in flow ramping, fish assemblage and water quality all likely have affected species diversity and abundance below Conowingo Dam. Since there have been significant changes in these factors, the present state of macroinvertebrates is unknown.

- The report states: *None the less, the fishery below the dam described within subsequent sections of this report appears robust, suggesting that the invertebrate populations provide a more than adequate food base. The fish also appear be in good condition (see Section 9.0) The invertebrate data collected during the later years of the tailrace studies were taken after much of the current minimum flow release schedule had become operational. Hence, it seems unlikely that the community has changed appreciably, given the water quality and habitat constraints imposed upon it by impoundment.* Page 4-11. This statement is speculation because it assumes the presence of fish in good condition and indicates there are enough macroinvertebrates to feed them. American shad do not feed significantly during their spawning run and therefore this statement does not apply to them. In addition, most adult fish prefer to consume small fish and not macroinvertebrates. This conclusion would need some references to support such a strong conclusion on data that is over 20 years old and correlating to adult fish data collected in the last few years.

- It should be noted that the EFL and West Fish Lift (WFL) likely do not catch fish in relative abundance to the tailrace, especially the resident species (as noted on page 10-2). In addition, river herring and hickory shad are present in significant numbers below Conowingo Dam and are rarely caught in the lifts, which is likely due to exclusion due to high attraction flow coming through the lifts.

- There was no mention of gear selectivity and efficiency of one gear type or survey versus another (see Table E-17). In addition, on page 10-2 killifish were abundant below Conowingo Dam but never caught in the lifts.

Recommendations for additional studies:

Criteria for Modification of Approved Study [18 CFR 5.15(d)]: as indicated above, approved studies were not conducted as provided for in the approved study plan. Therefore we request the following modification of this study for 2011, based on how it was conducted in 2010:

- Evaluate total abundance patterns and abundances of the dominant taxa
- Provide a summary and interpretation of abundance patterns observed during the early years of the dam operating under minimum flow requirements
- Conduct a current survey of macroinvertebrates and fish below the dam to indicate the current status of these populations since minimum flows were implemented in the late 1980's. FERC indicated they *"may recommend field work in 2011 if the final literature-based study report does not provide enough information on the aquatic community' to evaluate operational changes to the project"*. We believe that the historical data presented, which is over 20 years old, has not accurately indicted the current status of macroinvertebrate and fish populations below the dam and the operational changes that have occurred since those surveys were conducted. See our study plan request for details.
- The Applicant should revise and amend the report in response to the comments provided here and provide a copy of the revised report to the agencies for final review.

3.19 - Freshwater Mussel Characterization Study below Conowingo Dam

Study purpose: 1) characterize the freshwater mussel community in the Susquehanna River below Conowingo Dam; and 2) determine if plant operations at Conowingo Dam affect the mussel community in this river reach.

FERC required: 1) search of museum holdings not just near the project; 2) recording river flow during surveys; 3) deposit of voucher specimens

Non-Compliance with the FERC-Approved Study Plan:

- Voucher specimens were not deposited as required
- The survey only partially accomplishes study purpose 1 and fails to accomplish study purpose 2; details of this non-compliance are listed below.

Study Comments:

Task 1 – Search for published and unpublished mussel locality records for the study area

Comment 1: The RSP states that *"the results of searches for published and unpublished freshwater mussel locality records from the study area will identify species likely to be found in the survey area. With such information, the crew will be able to review a reference collection of shells of these species in order to better ensure reliable and consistent identification during the survey.*

However, it should be noted that all personnel conducting the survey will be experienced in mussel survey and identification and that voucher specimens of all non-state and non-Federal listed species will be collected for deposit in a museum."

The report does not indicate that reference shell material was examined by personnel conducting the survey after compiling a list of species that were likely to be found. There are serious implications for management actions from even minimal levels of misidentification (Shea et al. 2011), especially in impact assessments. Additionally, no voucher specimens have been given to MDNR, which was a condition of the PI's scientific permit. Additional terms of the permit included contacting MDNR biologists when questionable live specimens were collected for specimen verification within 24 hours. This was not done even though the PI retained mussels for 24 hours for verification by MDNR biologists during a scheduled field visit.

Task 2 – Semi-quantitative survey to inventory the mussel species present and estimate their relative abundance

Comment 1: The RSP noted that the entire 4.5 mile study area (to the downstream end of Spencer Island) be sampled. This was not done as clearly illustrated by Figure 4.2-1. Some areas representative of a small fraction of habitats (e.g around the confluence of Octoraro Creek) were disproportionately sampled while other areas (Rueben Island to Steret Island and east of Spencer Island) were not sampled at all. Throughout the study plan development period, we stressed to the PI that a single method be chosen, be clearly stated, and employed in the study because we suspected that the entire area would not be sampled. Based upon the habitat base map provided by the PI we suggested that the macrohabitat categories be used to proportionally stratify semi-quantitative sampling and were led to believe that this strategy would be used. We also noted that constrained area timed searches could be employed as noted in literature provided (Smith et al. 2001) to the PI during RSP development and through personal communication.

Comment 2: How were semi-quantitative survey locations chosen? This was not specified in the RSP or report and does not appear to have followed methods mutually agreed upon between MDNR and the PI. There appears to be large areas of suitable mussel habitat that were not surveyed and poor spatial representation throughout the project area, including an emphasis on the shoreline, upper project reaches, and around the Octoraro Creek confluence. For example, sampling did not take place east of Spencer Island or west of Steret Island though both reaches are within project area and contain areas with suitable mussel habitat with known concentrations of mussels.

Comment 3: The RSP also states that *"the greater part of the survey effort will focus on searches of deposits of miner material which favor mussel burrowing."* This was not done; lower portions of the study area contain large expanses of finer substrates, specifically the area from Robert Island downstream to Spencer Island and the channels between islands. We agree the prevailing substrate in the upper reaches of the project area are cobble, boulder, and bedrock, but a considerable amount of fine substrate exists in depositional areas and flow refugia that is patchy, but ubiquitous. The area termed *"Ruffle"* is the predominant macrohabitat as classified by Normandeau and received relatively little sampling effort, even though our personal observation indicated that suitable mussel habitat and mussels are found throughout this habitat. We communicated this finding to the PI via email prior to the survey. In addition, mid-channel islands, where gravel substrates dominate and mussels are abundant, received very little attention compared to near shore islands. There also appears to be a bias towards sampling along the left descending half of the channel. We stressed during comment periods that a clearly defined allocation of survey effort be made (e.g. habitat stratification with proportional allocation or constrained areas searches throughout the reach). The PI should be familiar with these methods and references that provide examples (see review of methods in Strayer and Smith 2003, Smith et al. 2001, Villella and Smith 2005).

Comment 4: Why were multiple search patterns used including parallel transects, perpendicular transects, and searches originating from a central point? It was stressed during comment periods that a consistent method be used. Smith et al. (2001) and Villella and Smith (2005), which are implicit throughout the RSP and were provided to the PI, clearly describe what type and how the search methods should be employed.

Comment 5: According to the RSP, *"Areas where concentrations of mussels are found will be delineated as feasible and perimeters noted with a GPS field instrument. The first 100 individuals of Maryland S1-S3 species encountered will be tagged with a shell maker before returning them to the river bottom. After the first 100 individuals, 25% will be tagged. The locations of these species will be recorded, also, for addition to the habitat GIS coverage that already has been prepared."* No figures illustrate that the perimeter of mussel concentrations were delineated or noted with a GPS. Please discuss why this was not conducted. The body of the report noted that 54 of 71 Alewife floaters were tagged, yet Table 4.2-5 indicates 68 of 71 were tagged. Please discuss this discrepancy and why all specimens were not tagged. The PI was granted authority to hold live mussels for up to 24 hours so tagging could have be done the following day if necessary. Also, no habitat maps were presented that include the locations of S1-S3 species. It is imperative that their location be reported to resource agencies and integrated into the flow modeling to assess whether or not dam operations limit mussel distribution and abundance.

Task 3 – Quantitative sampling

Comment 1: There is no indication in the RSP as to how the quantitative survey areas were chosen. The two-phase, double sampling design (Smith et al. 2001, Villella and Smith 2005) states that quantitative sampling areas should be chosen randomly. We have additional questions regarding the choice of quantitative survey areas as it was not clearly stated in the RSP despite several requests for further detail. Why and how were the specific CPUE's chosen? How was the size of the survey area determined? Why were they predominantly along the left descending bank? Why were they not chosen randomly as the survey methods (Smith et al. 2001) indicate? How were areas surveyed by divers in the semi-quantitative survey sampled by waders during the quantitative survey?

Random selection is necessary to reduce bias and it was agreed upon between Exelon, Normandeau, and MDNR that five areas would be sampled from strata representing no-low, moderate, and high CPUE and be approved by MDNR upon inspection of semi-quantitative data. This did not happen; a unilaterally decision on the location was made without allowing MDNR to review data. Further changes to site selection were made in the field. Furthermore, there appears to be investigator bias towards areas easily accessible and wadeable habitat. This would compound upon the apparent bias in the selection of semi-quantitative survey locations. A distribution analysis of the semi-quantitative results shows no locations with low CPUE were sampled; therefore the quantitatively sampled areas do not represent the full range of mussel abundance, or the range and frequency to be sampled that was agreed upon. The areas surveyed represent moderate to very high CPUE; two are within the 95th percentile of mussel CPUE. It also appears that in some cases, the location that was sampled in the semi-quantitative survey was not quantitatively surveyed. CPUE from corresponding semi-quantitative locations should also be noted on data sheets in Appendix B for clarity.

Comment 2: In the report, five areas were said to be quantitatively surveyed. This number was agreed upon by the PI, Exelon and MDNR after the RSP was filed due to concerns over adequate sample size and coverage. However, according to the report one semi-quantitative survey location was chosen to represent two quantitative survey locations. As a result, only four independent quantitative survey areas were sampled.

Comment 3: According to the RSP, *"the first 100 individuals of Maryland S1-S3 species in each mussel bed will be tagged and their locations recorded with a GPS for addition to the habitat GIS coverage that already has been prepared."* The report does not indicate that Alewife floater (S3) was tagged during the quantitative survey, nor was their location recorded with a GPS. Habitat maps with this locality data were not provided.

Comment 4: Was a 1.5 mm sieve screen used as this is incredibly small? A 6 mm sieve screen is standard. It should also be noted that a benthic macroinvertebrate sieve pan was originally used because the PI did not have a standard sieve box used in mussel surveys. One was provided by MDNR.

Task 4 – Habitat parameter measurements

Comment 1: Until completion of RSP 3.16 and the integration with data from RSP 3.19, we cannot comment on this task. In light of the fact that several aspects of this study appear to be incorrectly implemented, along with inadequate spatial representation and sample size, and statements upon habitat condition and availability not based upon data, conclusions about to the effects of dam operations on freshwater mussel habitat and population cannot be supported due to a lack of valid survey data.

Comment 2: A range of substrate sizes and their corresponding classes are not provided.

Task 5 – Development of the study report

Comment 1: A report has been completed, yet numerous shortcomings, some of which are quite serious, have been identified. At this time, the task cannot be considered complete without addressing these deficiencies.

Comment 2: Discharge the day of sampling was not reported for any task.

Comment 3: In light of the fact that the quantitative sampling found nearly all the Eastern elliptio < 50 mm in excavations and that 50% of the mussels were found buried, had only an informal visual search been used, as was originally requested, how would the study results been affected (Richardson and Yokley 1996, Miller and Payne 1993)? Was the project area population, especially smaller individuals and uncommon species, adequately sampled to answer project objectives with the relatively few quantitative samples? Given the fact that only three species were detected and smaller individuals were nearly absent, we feel this clearly illustrates enough effort was not expended in quantitative sampling (Miller and Payne 1988, Smith et al. 2000).

Comment 3: The author used a reference of Eastern elliptio length at maturity from an oligotrophic Canadian Shield lake to make a statement regarding the population in a temperate, large river. Given mussel growth rates and length at age are highly variable (Lellis et al. unpublished data, Haag and Rypel 2010) why was such a comparison made? Furthermore, since this comparison was made, why were other catch-rates of Eastern elliptio from other studies not referenced to infer what could be a high catch-rate? There is considerable data available on Eastern Elliptio catch-rates (Strayer unpublished data, Lellis et al. unpublished data, Strayer and Smith 2003, Villella and Smith 2005. Similar comparisons should have been made regarding species richness, relative abundance, assemblage composition, length-frequency distributions, and population densities.

Comment 4: How does the author conclude that larger specimens were long-lived? Age at length data were not collected or referenced, although readily available, therefore the author can only speculate that an Eastern Elliptio of 170 mm was long-lived. While we would generally agree with such a statement, mussel growth rates are highly variable (Haag and Rypel 2010) and it is not uncommon for mussels to tolerate the altered environment downstream of a dam and survive for several decades even when extirpations and declines in others species took place (Layzer et al. 1993). Thus, because a handful of individuals have survived for many years, it does not mean that dam operation has no measurable or meaningful effects upon the entire mussel community.

Comment 5: Only a few semi-quantitative survey stations were within the tidal reach of the river; therefore, it is inappropriate to conclude that because densities were highest in the non-tidal reach, and subject to dam discharge, that the fauna are not affected by dam operations. In fact, the survey data and statements suggest otherwise. Mussel densities and CPUE were highest further downstream of the dam, including those approaching and some in the tidal portion of the river. Just 16% of semi-quantitative surveys took place in the lower mile of the project area. We feel that had the survey allocated more effort at the island complex and downstream of head of tide, data would further support our claims based on our personal observations of mussels in this area.

Comment 6: We agree with that the survey results that the species list is comparable to recent findings by MDNR and Dr. Tom Jones (Ashton 2009, Ashton 2010, Ashton and Devers unpublished data). However, our efforts have found one more species live, more individuals of two species, and generally higher catch-rates. In addition, because these efforts included tidally influenced reaches downstream of Spencer Island, we found the aforementioned species in greater abundance, which may indicate their upstream distribution is influenced by dam operation. We feel our data illustrate the findings of this study inadequately characterize the species richness, the relative abundance of some species, and overall population size and demographics within the project area.

Comment 7: We agree that reproduction is occurring at some unknown rate, but given <1% of the Eastern elliptio found would be considered juvenile we must conclude with current data that reproduction or survival must be very low. The absences of juveniles in other species also may suggest that host availability, reproduction, or survival to maturity may not be occurring for several reasons and limited by multiple facets of dam operation.

Comment 8: We disagree with the statement that the operation of Conowingo Dam does not affect the population of freshwater mussels downstream and there are no discernable, ecological effects. Data presented in this study clearly illustrate several discernable and significant effects upon the mussel community that can be attributed to dam operation. Several species recently collected or historically known from the Lower Susquehanna River Basin were not found in the project area (Meyer unpublished data) or were represented by single, dead valves. There is an obvious gradient of declining mussel CPUE as you move towards the dam and density is lowest near the dam. Size distributions are skewed towards older individuals even when taking into account substrate excavation, which found very few small mussels. Individuals that could be considered juveniles were not found for four of the five species collected; overall < 0.5% of the mussels found could be considered juvenile. Habitat is noted in several places as being unsuitable for mussels in the upper reaches and main channel (i.e. tailrace) of the project area because finer materials have been scoured, are easily eroded and not replaced, or water becomes stagnant and substrate covered with silt. We expect that study report 3.16 to further confirm that the aforementioned with simple and complex hydraulic variables. The conclusions about mussel abundance in relation to instream conditions were completely subjective and not based upon empirical evidence. Furthermore, nearly 20 years of peer-reviewed literature has documented direct and indirect effects of dams, including hydroelectric projects, on freshwater mussels, making such a general statement that the operations of Conowingo Dam have no effect on the freshwater mussel community within the project area improbable (Bogan 1993, Layzer et al. 1993, Blalock and Sickel 1996, Vaughn and Taylor 1997, Watters 1999, Freeman et al. 2003, Tiemann et al. 2007, Moles and Layzer 2008)

Specific comments that address the mussel study and report

1. Serious questions about the agreed upon survey design and methods in Task 2 and 3 stem from the reliance upon Maryland DNR for survey design literature, improper citation of design literature, survey implementation logistics, and even equipment. For example, the report cites methods as Strayer and Smith (2003) when in fact this reference is a review of freshwater mussel sampling methods and not a primary source. The correct citation of the survey design is Smith et al. (2001). Comments were made to the PI regarding potentially improper and questionable survey method implementation during post RSP meeting and field visits. Because no assurances were given to agencies, coupled with the reliance upon agencies for survey references and proper equipment, and observed mistakes in survey implementation, we can only assume that the PI had never before conducted a survey of such a complex design. It has become evident from communications during RSP development, after observing the semi-quantitative and quantitative survey, and during the reporting period that he was unfamiliar with a survey of such effort, the two-stage double sampling survey design itself, and standard protocols and equipment for quantitative mussel surveys despite the assurances from Exelon about the qualifications of the primary surveyor. On how many prior occasions has the PI conducted freshwater mussel surveys

using the specific methods employed? How many mussel surveys, regardless of method, have divers used in the study performed? How much experience does the dive crew have identifying mussels? Why did the PI not identify all mussels collected during Task 2 and 3? It is an accepted standard to have a single, qualified individual who holds the scientific collection permit identify mussels collected if others do not have several years' worth of experience.

2. Page 5 - According to the report timed searches were conducted at 72 locations for a total of 87.4 person-hours. This equates to 1.2 person-hours per semi-quantitative survey. This may be an insufficient level effort when trying to locate species at low density and determine species richness (Metcalfe-Smith et al. 2000) and alone cannot assess population size, density, or potential impacts (Miller and Payne 1988, Miller and Payne 1993, Obermeyer 1998, Strayer et al. 1997, Strayer and Smith 2003).

3. Pages 5 and 6 - Why are the semi-quantitative CPUE in Figure 4.2-2 and 4.2-3 presented in numerical order instead of longitudinal order (i.e. distance away from dam)? Numerical order is meaningless because the order of semi-quantitative survey locations does not proceed in a consistent direction. A single or additional figure would also be more appropriate to examine the overall CPUE regardless of survey method in relation to its true spatial location within the project area. The same could be said about the data presented in Tables 4.2-2 and 4.2-3. Measures of sample precision and error should be presented whenever noting a sample mean; either SE, CI, CV of mean CPUE for wading, diving, and overall values should be presented for each species and all mussels.

4. Page 6 - Our data suggest that Alewife floater and Eastern floater are not found in an approximately 1:1 ratio as found in the study. In fact, we rarely encountered Eastern floater throughout the past few years in both semi-quantitative and quantitative surveys. This may indicate frequent misidentifications given the PI's past questions about ways to distinguish between these two species and an underestimate of the S3 Alewife floater.

5. Page 6 - How did the author determine that CPUE >100 mussels/hour represented the "highest" catch rates? Since "high" CPUE's were only found at 8 of 72 stations (11%), this suggests that mussel abundance is low throughout most of the project area. In fact, twice as many semi-quantitative areas contained five or fewer mussels (22% of stations), which further indicate that mussels are rare or absent from a sizeable portion of available habitats. The remaining 66% of stations had CPUE < 100 mussels/hour, which would be low according to the report. Catch-rates and density from other studies of Atlantic Slope mussel communities (Lellis 2001, Villella and Smith 2005, Strayer et al. 1994, Meyer unpublished data) should have been used to determine what represents high and low CPUE instead of an arbitrary designation.

6. Page 7 - How did the author determine that habitat at locations with CPUE > 100 mussels/hour differ amongst one another and from many other locations? No data are presented that support such a statement or appeared to be collected from these locations beyond personal observation. It was also stated that the highest CPUE came from areas near islands further downstream with the exception of one site, yet islands further upstream contained the lowest CPUE. Please elaborate on this pattern as the presence of islands within the river does not appear related to CPUE, but in fact is related to distance away from dam. We feel that the data clearly illustrate a distinct cline of

increasing CPUE as you move further away from the dam, even when suitable habitat appears present. Furthermore, our CPUE data collected during July 2010 support this hypothesis.

7. Page 7 - No data are presented to state that habitat is not favorable to mussels where CPUE < 5 mussels/hour. As we interpret the author's statements, it suggests that the microhabitat is unsuitable because of dam operation at these locations, especially those further upstream near the dam or downstream of the tailrace. The lack of flow and silted substrates noted in the back channel of Mud Island suggests that minimum flow releases from the dam are insufficient to maintain flowing water over gravel substrate, specifically because the releases come from the tailrace located along the right descending bank.

8. Page 7 - Stating a range of lengths are evenly distributed when it represents predominantly very large individuals is misleading. Figure 4.2-4 does not illustrate a normal distribution or is evenly distributed, but is in fact skewed towards a population that does not represent all life stages of mussels when taking into account some reproduction likely takes place within in the project area. The author should also not speculate on age at length given no data on growth or age at length were collected or referenced. Furthermore, without indicating where in the study area juvenile mussels were found, speculating on their potential dispersal source is inappropriate.

9. Page 7 - How was < 71 mm determined to be a small Eastern Elliptio? Age at length (number of internal annuli from shell cross section) of Eastern Elliptio from Deer Creek found individuals of 70 mm in length to be 23-39 years old (Lellis et al. unpublished data), and in the Delaware River ranged from 11-34. This data from several populations within the Susquehanna and Delaware River basins suggests Eastern elliptio growth rates, maximum length, and maximum age are highly variable among populations.

10. Please comment on the semi-quantitative results in regards to search method, which illustrates a potential difference between the effectiveness of wading versus diving. The highest catch rates, except one, came from diving surveys. If more or all survey effort were put into a single search method (diving), as was stressed during the comment periods, more mussels may have been found. Data also suggest certain species were collected more effectively by diving versus wading (e.g. Yellow lampmussel). Availability of Normandeau divers should not have limited survey effort if diving was a more effective and appropriate search method. Surveys should have been postponed until they were again available or additional divers should have been contracted.

11. Page 8 - How were the results in Table 4.3.1 generated; there is no reference to a method? Standard errors are relatively large in comparison to sample means; please discuss what may have caused this. Less than 2% of the area within each quantitative survey area was sampled; does the PI feel this was sufficient effort given the abundance estimates, high measures of error, and the fact that roughly 0.03% the total project area was quantitatively surveyed? Furthermore, does the PI feel results from such a small area and sample size are appropriate make conclusions about the entire project area in light of MDNR, USFWS, and USGS data that included a greater sample size and found higher abundance and richness along with more precise density and population estimates?

12. Data collected during the project period by MDNR using similar methods, but with greater effort over a larger area using more appropriate sample sizes, dispute the findings of the study and also highlight the high level of uncertainty in this study's findings, which can be attributed to smaller sample size, improper design implementation, and potentially a lack of survey effort in areas where freshwater mussels would likely be at their highest abundance and densities in the lower reaches of the project area. Though we expended a greater amount of daily effort (person-hours), we found more individuals and more species. Our results also have lower variability, along with more precise density and population estimates. The PI was notified of this information as it became available during the study plan implementation and again prior to study report completion.

13. Several mussel species, including the state endangered Brook floater, Green floater, and Triangle floater, and in need of conservation Creeper, have been found in surveys conducted in upstream reaches of the Susquehanna River (Strayer and Fetterman 1999, Meyer pers. comm.) and were most likely historically present within the project area were not found in this survey.

We conclude that:

1. The survey only partially accomplishes Goal 1 and fails to accomplish Goal 2.

2. By not quantitatively sampling from within the full range of mussel CPUE across spatially representative locations within project area the study is limited in its ability to make conclusions about the entire mussel population and potential effects by the operation of Conowingo Dam, especially that along the right descending bank and in the lower mile of the river, which may experience different hydraulic forces and contain different habitat and species. Moreover, the apparent bias in locations of both the semi-quantitative and quantitative surveys further weakens the validity of the data.

3. Additional semi-quantitative surveys with divers for at least 1.2 and up to 2.5 person-hours per location is needed to properly characterize the mussels assemblage due to large areas of unsampled habitat within the project area, disproportionate sampling effort, and potential bias in survey locations. Specific areas to be targeted should be coordinated with resource agencies and include; east of Spencer Island, side channels between Wood and Robert islands, between Rueben and Steret islands along with Bird and Mud islands, and other areas where long distances (> 0.25 mile between survey locations) remain.

4. The sample size and area in quantitative surveys was insufficient to provide statistically acceptable levels of error in the density and population estimates, did not spatially represent the project area, were biased to the left descending bank, not randomly selected, and did not represent the range of CPUE observed. This took place despite persistent efforts by MDNR throughout the comment period and survey implementation to make the PI aware of these deficiencies. In addition, only four independent quantitative survey locations were sampled, though five were stated to be sampled.

Recommendations for additional studies:

Criteria for Modification of Approved Study [18 CFR 5.15(d)]: as indicated above, approved studies were not conducted as provided for in the approved study plan. Therefore we request the following modification of this study for 2011, based on how it was conducted in 2010:

Based on the comments and conclusions above, the study and its report are incomplete and can only be used to direct additional semi-quantitative and quantitative mussel sampling that should be carried out in 2011. There are substantial areas where semi-quantitative surveys were not conducted without justification. These areas should be surveyed in 2011; as Task 2 of the RSP noted, the entire 4.5 mile long reach would be surveyed regardless of habitat. In this task, a single, consistent sampling method (diving) and pattern must be used (line or strip transects parallel to flow). Pooled with the CPUE data from 2010, the areas to be quantitatively sampled (RSP Task 3) should then be re-evaluated and selected in direct consultation with resource agencies following the correct manor for the study design (two-phase with double sampling). The results of 2010 quantitative surveys should also be used to guide quantitative surveys in 2011, whose locations will be selected at random from the strata of catch-rates (high, medium, low to none) that represent of the range of CPUE, have appropriate numbers of quadrats to minimize sampling error, and be conducted with 50% excavation over larger expanses of mussel habitat. The number of quadrats, interval between systematic samples, and sample area should be determined by the Mussel Estimator Program based on input of preliminary data, and not determined arbitrarily, as this was a direct cause of the inadequate sampling effort that led to study deficiencies. In addition, the results of the flow modeling study (3.16) should attempt to be incorporated into the stratification so areas with varied levels of sheer stress are sampled to validate the flow model and support any future actions regarding the operation of the dam and its affects upon freshwater mussels. It is imperative this additional semi-quantitative and quantitative sampling effort must be planned and conducted with substantial input and oversight by resource agencies so that the deficiencies pointed out do not persist. Consequently, we strongly recommend that Exelon and Normandeau conduct appropriate mussel surveys using two-phase double sampling methods, in consultation with the resource agencies before and during the surveys (Smith et al. 2001, Villella and Smith 2005).

Comments on Exelon's Initial Study Report Meeting Notes Summary:
Bill hypothesized that Elliptios should be throughout Octoraro Creek because there were abundant hosts. Our alternative hypothesis is that compared to Deer Creek, the water quality of Octoraro Creek is quite poor and eel passage into Octoraro Creek has only been relatively recent, thus resulting in lower numbers of these mussels.

References

Ashton, M.J. 2009. Recent mussel surveys in the Susquehanna River below Conowingo Dam, Maryland. Ellipsaria 11(3): 12.

Ashton, M.J. 2011. Results from ongoing freshwater mussel surveys in the Susquehanna River and the first collection of Dreissena polymorpha below Conowingo Dam, Maryland. Ellipsaria 13(1): 15-16.

Blalock, H.N. and J.B. Sickel. 1996. Changes in mussel (Bivalvia: Unionidae) fauna within the Kentucky portion of Lake Barkley since impoundment of the lower Cumberland River. American Malacological Bulletin 13: 111-116.

Bogan, A.E. 1993. Freshwater bivalve extinctions (Mollusca: Unionoida): a search for causes. American Zoologist 33: 599-609.

Freeman, M.C., C.M. Pringle, E.A. Greathouse, and B.J. Freeman. 2003. Ecosystem level consequences of migratory faunal depletion caused by dams. American Fisheries Society Symposium 35: 255-266.

Haag, W.R., & A.L. Rypel. 2010. Growth and longevity in freshwater mussels: evolutionary and conservation implications. Biological Review: doi. 10.1111/j.1469-185X.2010.00146.x

Layzer, J.B., M.E. Gordon, & R.M. Anderson. 1993. Mussels: The forgotten fauna of regulated rivers. Regulated Rivers: Research and Management 8: 61-73.

Lellis, W.A. 2001. Freshwater mussel survey of the Upper Delaware Scenic and Recreational River: qualitative survey 2000. Report to the National Park Service, Milanville, PA.

Metcalfe-Smith, J.L., J. DiMaio, S.K. Staton, & G.L. Mackie. 2000. Effect of sampling effort on the efficiency of the timed search method for sampling freshwater mussel communities. Journal of the North American Benthological Society 19: 725-732.

Miller, A.C. & B.S. Payne. 1988. The need for quantitative sampling to characterize size demography and density of freshwater mussel communities. American Malacological Bulletin 6: 49-54.

Miller, A.C. & B.S. Payne. 1993. Qualitative versus quantitative sampling to evaluate population and community characteristics at a large-river mussel bed. American Midland Naturalist 130: 133-145.

Moles, K.R. and J.B. Layzer. 2008. Reproductive ecology of Actinonaias ligamentina (Bivalvia: Unionidae) in a regulated river. Journal of the North American Benthological Society 27: 212-222.

Obermeyer, B.K. 1998. A comparison of quadrats versus time snorkel searches for assessing freshwater mussels. American Midland Naturalist 139: 331-339.

Richardson, T.D. & P. Yokley. 1996. A note on sampling technique and evidence of recruitment in freshwater mussels (Unionidae). Archiv für Hydrobiologie 137: 135-140.

Shea, C.P., J.T. Peterson, J.M. Wisniewski, and N.A. Johnson. 2011. Misidentifications of freshwater mussels (Bivalvia: Unionidae): contributing factors, management implications, and potential solutions. Journal of the North American Benthological Society 30: 446-458.

Strayer, D.L., D.C. Hunter, L.C. Smith, & C.K. Borg. 1994. Distribution, abundance, and roles of freshwater clams (Bivalvia, Unionidae) in the freshwater tidal Hudson River. Freshwater Biology 31: 239-248.

Strayer, D.L., S. Claypool, and S.J. Sprague. 1997. Assessing unionid populations with quadrats and times searches. Pages 163-169 in Conservation and management of freshwater mussels II: initiatives for the future. UMCC, Rock Island, IL.

Strayer, D.L. and A.R. Fetterman. 1999. Changes in the distribution of freshwater mussels (Unionidae) in the Upper Susquehanna River basin, 1955-1965 to 1996-1997. American Midland Naturalist 142: 328-339.

Strayer, D.L., R.F. Villella, & D.P. Lemarie. 2001. Survey protocol for assessment of endangered freshwater mussels in the Allegheny River, Pennsylvania. Journal of the North American Benthological Society 20: 118-132.

Strayer, D.L., and D.R. Smith. 2003. A guide to sampling freshwater mussel populations. Monograph 8. American Fisheries Society, Bethesda, MD.

Tiemann, J.S., H.R. Dodd, N. Owens, & D.H. Wahl. Effects of low head dams on unionids in the Fox River, Illinois. Northeastern Naturalist 14: 125-138.

Vaughn, C.C., and& C.M. Taylor. 1999. Impoundments and the decline of freshwater mussels: a case study of an extinction gradient. Conservation Biology 13: 912-920.

Villella, R.V. & D.R. Smith. 2005. Two-phase sampling to estimate river-wide populations of freshwater mussels. Journal of the North American Benthological Society 24: 357-368.

Watters, G.T. 1996. Small dams as barriers to freshwater mussels. Biological Conservation 75: 79-85.

Watters, G.T. 2000. Freshwater mussels and water quality: A review of the effects of hydrologic and instream habitat alterations. Proceedings of the First Freshwater Mollusk Conservation Society Symposium, 1999.

3.20 - Salinity and Salt Wedge Encroachment

Study purpose: 1) determine if Project operations adversely impact downstream salinity levels; 2) determine if Project operations have the ability to change the frequency and duration of exceedances of salinity levels above drinking water standards; and 3) identify and evaluate the potential for impacts to biota from salinity changes in the lower Susquehanna River due to Project operations.

FERC required threshold EPA drinking water standard value of 0.25 ppt to be used in the evaluation.

Study Comments:

- The report is a thorough analysis of the effect of Susquehanna River flow and Conowingo project operations on salinity at the Havre de Grace water intake and in the upper Bay at a Maryland DNR monitoring site. Results indicate salinity levels are most correlated with 30- to 60-day moving averages of river flow and that short-term project operations at Conowingo have no effect on these salinity levels. This was similar to the result found by SRBC in the Conowingo Pond Management Plan. Interestingly, no correlation was found with wind speed or direction, previously reported as resulting in salinity problems at the Havre de Grace intake. No issues were found with respect to the effect of salinity on target species expected in this area; their tolerances were all well above observed salinity levels in this area.

- One minor correction: the citation to Table 4.3-1 on p. 7 should be to Table 4.6-1.

3.21 - Impact of Plant Operations on Migratory Fish Reproduction

Study Purpose: to determine if project operations impact migratory fish reproduction upstream of Conowingo Dam and Downstream in the Susquehanna River.
FERC required on-site ichthyoplankton sampling in 2011 at locations indicated in study 3.5

Non-Compliance with the FERC-Approved Study Plan:

- Schedule – The Initial Study Report scheduled for January 21, 2011 was not filed on time (FERC approved an extension). A "Study Report" that was "…to be prepared and provided to participants for review and comment at the conclusion of the first year of study" (pg. 3-159, Section 3.21.9, referring to task 2) was never provided to the agencies and, thus, when the Initial Study Report was filed, it did not reflect any input from the participants.

- The approved study plan indicates "….Hydraulic conditions and known habitat attributes of each study segment (upper Conowingo Pond and the river below Conowingo Dam) will be analyzed and compared to the published spawning requirements of the target species" (pg. 3-158). The Initial Study Report does not characterize the hydraulic conditions in Conowingo Pond, providing only a qualitative description (pg. 2, "…the upper portions of Conowingo Pond provide riverine conditions based on downstream proximity to the Holtwood Project. The majority of Conowingo Pond provides more lentic conditions with generally greater depths and lower water velocities…." Thus, the report does not provide any analysis of the habitat attributes as related to the spawning requirements of the target species. Downstream of the dam, such analyses are presumed to be presented in Study 3.16.

Study Comments:

- We disagree with the statement on p. iii of the Executive Summary that *"Hydraulic conditions of the Susquehanna River below Conowingo Dam are generally dictated by the Susquehanna River natural flow and by the operation of Safe Harbor Dam."* While water availability on a daily to weekly basis may be determined by natural river flows and releases from Safe Harbor Dam, Conowingo has the ability to and often does drastically affect downstream hydraulic conditions, changing flow from the daily minimum to its maximum hydraulic capacity of 86,000 cfs in a matter of minutes.

- On pg. 20, the statement is made that "Flows were highly episodic, often with the greatest magnitude discharge peaks occurring in April and May…" While that flow data was presented in graphs (Figure 5-1), there was no analysis done of the timing and magnitude of the ichthyoplankton collections for the various species specifically as it related to the episodic flows. While a detailed characterization of habitat availability for the species will be established in Study 3.16, in this study the empirical data should be analyzed to assess the relationship between fluctuating river flows and ichthyoplankton densities on a location-specific basis.

- On page 22 of the report, it is stated that "Based on these observations, suitable spawning habitat exists downstream of Conowingo Dam and in response to its operations, and that habitat is used annually and successfully by American shad. Given the controllable operating regimes (barring environmental anomalies) of Conowingo Dam, it is unlikely that routine operations of the Project will adversely impact American shad spawning success." However, while the initial part of this conclusion is based simply on the fact that eggs were collected in various areas below the dam, there is no analysis presented in the report to substantiate the conclusion drawn in the second sentence

- On pg 22, the statement that "…Since hickory shad appear to prefer the tributary streams, and the stock has improved, it is evident that suitable habitat is available and being successfully used for spawning in the Susquehanna River and Deer Creek tributary…" is a non sequitur. The success of hickory shad in Deer Creek says nothing about the suitability of habitat for the species in the Susquehanna River. Therefore the statement that ".....It is evident that operations of the Conowingo Project have not adversely impacted spawning of hickory shad." is unquantifiable and not substantiated by any analysis. Such analysis may not be possible since the hickory shad stock in the Susquehanna River and its tributaries has never been quantified.

- Throughout the report, conclusions are drawn that because eggs and/or larvae were captured below the dam, suitable habitat must be present. However, no statistical analyses are presented to justify such conclusions. Virtually none of the conclusions drawn in the report are substantiated by data or analyses.

- No analyses are presented in this report to achieve the purpose of the study, "to determine if project operations impact migratory fish reproduction upstream of Conowingo Dam and Downstream in the Susquehanna River"

3.22 - Shortnose and Atlantic Sturgeon Life History Studies

Study Purpose: 1. Literature review for shortnose and Atlantic sturgeon occurrence in the Susquehanna River, life history, and habitat requirements; 2. A comparison between Conowingo fish lift and any East Coast passage facilities where successful shortnose or Atlantic sturgeon upstream passage has been documented; 3. Analysis of habitat types below Conowingo Dam; 4. Documentation of sturgeon stranding below Conowingo Dam; and 5. Monitoring of the Susquehanna River for use by sturgeon.

FERC required a second array of receivers near the river mouth.

Study Comments:

- Analysis of habitat types below Conowingo Dam seems to be preliminary. In the context of the title of the study it is difficult to determine how habitat types are being analyzed. Habitat in this study appears to refer to the water column and its flow characteristics. However, an analysis of that nature should be characterized as hydraulic habitat. Nevertheless, an analysis of habitat cannot be conducted solely on hydraulic characteristics, based on the description of the study. The analysis also concludes that in general, suitable habitat is limited for all life stages of shortnose (and presumably Atlantic) although there is are no physical habitat characteristics presented in this study. It seems unlikely there is no gravel in this region given the visible habitat seen in some of the figures.

3.23 - Study to Identify Habitat Use Areas for Bald Eagle

Study Purpose: to determine the abundance levels of bald eagles, specific locations of foraging, roosting, and nesting habitat, and daily/seasonal patterns of use by migrant and nesting bald eagles within the Conowingo Project area.

Study Comments:

This study has generally followed the methodologies that were proposed except that some aspects of the study are ongoing.

- Task 1 completed during 2010; aircraft surveys were conducted to locate nesting territories and active nests; 12 breeding territories were documented of which 11 were active.

- Task 2 completed using August 2007 – February 2010 telemetry data to delineate eagle roosts.

- Task 3 is ongoing; summer ground surveys were completed (July through October) of eagle roosts (although consecutive dates per week were not surveyed). A second round of surveys was scheduled for the winter between January and March 2011. Shoreline surveys to assess overall eagle population at Conowingo are also ongoing and will be reported in the future.

3.24 - Dreissenid Mussel Monitoring Study

Study Purpose: 1) determine the presence and abundance of Dreissenid mussels, particularly zebra mussels (Dreissena polymorpha) within the Project boundary and; 2) determine potential mitigation measures to minimize the impacts of Dreissenid mussels to Project structures.
FERC required the study plan to clarify that zebra mussel veligers were found in Peach Bottom intake canal in 2009.

Study Comments:

- Pg. ii, line 9: Insert "Department of Natural Resources" before "Biologists".

- Pg. ii: The second objective of this study was to "identify potential mitigation measures to minimize the impact of Dreissenid mussels to Project structures", yet there isn't any mention of potential mitigation measures in the Executive Summary.

- Pg. 2, lines 29-30: Please be more specific than ".....a few adult zebra mussels......". We believe one dead adult zebra mussel was collected at the Conowingo dam, one dead adult mussel was found at Glen Cove Marina upstream from Conowingo, and four dead adult mussels were found in Muddy Run Reservoir, even further upstream, in the fall of 2008. Is that correct? If so, please add this detail to the text on pg. 2.

- Pg. 7, line 15: Please add this sentence to this paragraph: "On August 3, 2010, MDNR biologists collected and preserved an additional three adult zebra mussels (2-alive and 1-dead) found in the lower Susquehanna below Conowingo, bringing the total number of adult zebra mussels collected downstream from the Conowingo Dam in 2010 to 14 (10-alive and 4-dead).
-
- Pg. 8, line 16: What's the significance of 10,000 cfs?

- Pg. 9, lines 7-8: We don't agree that the evidence to date supports a statement that Dreissenid mussels are "....considered established.........within Conowingo Pond". Only two dead adults were collected in the Conowingo Pond during the fall of 2008 and none have been collected there since. A more accurate statement is that a Dreissenid mussel population "may be established........in the Conowingo Pool.....". Because a total of 14 adult zebra mussels were collected in 2010 in the lower Susquehanna River below Conowingo Dam, we would conclude that a population is likely established there. We also disagree with the conclusion about an "......established population of Dreissenid mussels located upstream of Conowingo Dam....." at the top of pg. 10.

- We suggest that the map of the lower Susquehanna River (last pg.) be extended to show the location of Muddy Run Reservoir, since it is mentioned on pg. 2.

3.26 - Recreational Inventory and Needs Assessment

Study Purpose: 1) conduct a recreation inventory in the vicinity of the Project to identify public access points within the Project boundary, 2) estimate the amount of recreational use occurring within the Project, and 3) determine what, if any, enhanced and/or new recreation facilities are needed to support the recreational use of the Conowingo Project.
FERC required a survey of fishing organizations within the project and on-site surveys at Fisherman's Park and downstream sites within the project. FERC also required re-evaluation of the restricted access line in the tailrace and an updated list of all project recreational sites beyond those in the RSP.

Study Comments:

The report for this study is based entirely on data collected between March 15, 2008 and March 14, 2009, to complete the FERC Form 80 for the Conowingo Project; consequently, the report fails to address any of FERC's requests as stated in its Study Plan Determination dated February 4, 2010. Exelon's analysis of its Form 80 data appears to be credible and supports the conclusion that the capacity of existing recreational facilities within the project boundaries will exceed projected demand through 2050; however, the study report shows no evidence that Exelon performed two of the four tasks described in its RSP:

Task 1: Literature Review and Outreach – no evidence of effort or planned effort

The study report offers no documentation of effort or methods to "conduct an internet literature search and contact readily known and identified recreational organizations and local, county, state and federal agencies to identify any commonly used formal and informal recreation access sites within the investigation" area prior to its 2008/2009 field survey of recreational use. The study report presents no evidence of a literature search or outreach conducted since the 2008/2009 recreational-use survey.

The RSP indicated that the search and outreach effort would include various birding clubs and organizations and that information from those groups would be used to supplement Exelon's existing information or birding activities in the area. The study report offers no evidence of such contact and indicates that Exelon relied entirely on its FERC Form 80 data related to birding to derive the reported estimates of birding activity at recreational facilities within the project area.

Task 2: FERC Form 80 Refined Data Analysis – completed and reported effectively

Task 3: Recreation Field Inventory of Access and Use – partially completed

The study report provides no evidence of effort to "consult with interested stakeholders prior to submitting the study report."

The study report provides no evidence of effort to "update and revise its recreation field site/facility inventory to confirm access sites identified in Task 1 and to document any additional sites that may have been overlooked, renovated, or constructed since the original inventory."

The study report offers incomplete evidence of effort to "document formal and informal access locations." No GPS coordinates are provided for any access location; however, the formal access locations are documented on a GIS map of the project. The existence of multiple informal access locations is mentioned, but no documentation of their locations is provided.

Task 4: Develop Study Report – completed, but missing significant information

The study report is missing information on methods and results of Tasks 1 and 3 as described above.

The FERC-mandated task of re-evaluating the restricted access line in the tailrace of the project was not conducted.

Other comments:

The study was vague about completing Objective 2 – Exelon assumed that since there was a vehicle parked at a particular site, it was using that site or if a counter counted a vehicle accessing a particular parking lot, it was used to extrapolate the total usage, this likely overestimates the usage for obvious reasons.

The study was based on people using the facilities and was not expanded to include non-users. In addition, the study was highly biased due to the areas surveyed, e.g. certain users took more time per area and were more frequently encountered or interviewed. It also does not include additional possible recreational areas closed to the public that could potentially be opened. These biases were never addressed in the study results.

To determine objective 3, above, recreational users and non-users would need to be interviewed. Not only were the methods to address this objective vague but no interviews were done to assess the needs of the recreational users. In short, if folks are not using the facility because they have different recreational priorities, are physically unable to access some sites or are unaware of the opportunities that exist, then they will not be interviewed by this survey. It also appears that recreational use was very low for all areas with few exceptions, even in the report when use was stated it used the word "only"(e.g. the parking lot was only at 8 percent capacity) indicating that there was significant under usage. No remedy or clarification was provided – see Table 9.3-1.

Also for Objective 3, no enhancements were discussed. Use of a facility does not mean that improvements or additions cannot be made.

The land side of Lapidum is not "unusable due to dense aquatic vegetation." It is shallow due to rapid sedimentation from the river flow. Regular dredging will help make both sides "usable." We are working with DNR's Engineering and Construction unit to begin the permitting process for dredging.

Recommended measures for additional study:

- Upgrades to Lapidum restroom (a Clivus Multrum composting system). Replace fixtures: waterless toilets/urinal and lighting; paint exterior trim; replace doors, upgrade mechanical systems.

- Construct Lapidum Contact station to provide information to anglers/boaters and other visitors. This is a main contact point for I-95 corridor visitors to the Lower Susquehanna River.

- Improve Deer Creek access points along Stafford Road. Add stone fill to pull-offs and re-grade for drainage, incorporate sustainable trails to fishing access points, repair "canoe launch" at Deer Creek and Susquehanna River confluence.

- Lower Susquehanna Heritage Greenway: Repair ~500LF section of boardwalk trail laid on top of rail road bed. Railroad ties are rotting and being shifted by water during storm events making entire boardwalk unstable. Not currently an immediate safety concern.

- Replace interpretive panels at Lapidum.

3.27 - Shoreline Management

Study Purpose: 1) conduct an inventory of Exelon real estate assets in the vicinity of the Project and identify and classify current uses; 2) identify issues and constraints that affect land management and land use; 3) review current corporate land use guidelines and policies; and 4) identify lands potentially needed (or not needed) for current and potential future project purposes. Study objectives 1 thru 3 are addressed in this report. Study objective 4 will be addressed during development of the Shoreline Management Plan (SMP).

FERC required expansion of tasks 1 and 2 to identify unique, sensitive and/or critical fish and wildlife habitat on the project shoreline.

Non-Compliance with the FERC-Approved Study Plan:

- Schedule – The Initial Study Report scheduled for January 21, 2011 was not filed on time (FERC approved an extension). A "Study Report" that was "...to be prepared and provided to participants for review and comment at the conclusion of the first year of study prior to filing the report with the Initial Study Report" (pg. 3-196, Section 3.27.9) was never provided to the agencies and, thus, when the Initial Study Report was filed, it did not reflect any input from the participants.

Study Comments:

- In the Interim Shoreline Management Report, the Applicant does not specifically point out specific unique, sensitive and/or critical fish and wildlife habitat identified along the shoreline (Project land and land within 500 feet of the Project boundary) as they had been asked to do by FERC.

- FERC approved the Applicant's RSP with certain modifications, including specifying that Tasks 1 and 2 of section 3.27.7 (methodology) should be expanded to identify unique, sensitive, and/or critical fish and wildlife habitat on the project shoreline. In the RSP, the Applicant points out that approximately 883 acres (36%) of Project lands contain Sensitive Resources, the same number and proportion that they included in the RSP. In the Interim report, they describe that the land categorized under "Class 5: Sensitive Resources" are "Project lands that contain and/or are managed or preserved for protection and enhancement of sensitive resources. Sensitive resources are defined as resources that are protected by the state, federal law, executive order. Sensitive resources also include other natural features that the Applicant considers important to the area of natural environment." Thus, unless no additional unique, sensitive, and /or critical fish and wildlife habitat was found, the lack of additional information and the consistent acreage and percentage suggests that expanded investigations and searches under Tasks 1 and 2 were not performed. Figures 3-1 through 3-6 of the Interim report do show the Project land and land within 500 feet of the Project boundary classified in the general "Sensitive Resources" category, but do not specifically indicate unique, sensitive, and/or critical fish and wildlife habitat.

3.29 - Effect of Project Operations on Downstream Flooding

Study Purpose: 1) Use a hydraulic model to estimate Water Surface Elevations (WSEs) for a full-range of flood events at Port Deposit; 2) Document the areas of inundation and flooding depths during these events; 3) Document the flow conditions during which flooding of the Port Deposit area has occurred; 4) Identify the impact of the project on downstream WSEs; and 5) Determine the operational feasibility, generation effects, and implementation costs of any procedures that might attenuate flooding conditions.

Study Comments:

- This study presents results of modeling of flood events at Port Deposit, showing the areas of inundation and depth for various size flood events, with and without the presence of the dam and various operational scenarios. Results indicate none of the alternative operating scenarios substantially changed flood levels or duration at Port Deposit.

- We agree with the report findings that any operation done at the dam will not likely reduce downstream flooding. There are no flood control dams on the river between Harrisburg and Conowingo to have any significant impacts on reducing flooding. The report evaluated flood events from the 1-year up to the 500-year storm during various alternatives of lowering the pool level and operating the flood gates to potentially reduce downstream flooding. Port Deposit located downstream begins to flood at about the 2-year storm or about 250,000 cfs.

- The maximum pool level is set at elevation 109.0. The 50 flood gates are opened to maintain elevation 109.0 during flood events. If the pool gets above elevation 109.9, flow overtops the flood gates and they cannot be lifted to avoid overtopping of the dam and US Route 1. These constraints provide only a very small amount of flood storage compared to the enormous watershed area of 27,100 square miles. In conclusion, operation of the dam has no effect on reducing flooding downstream. In fact, there are no real difference in downstream flooding between removal of the dam and regulating the dam with the lowest pool level and holding the flood waters as long as possible before gate operation.

- We recommend additional modeling alternatives, such as pool drawdown to the absolute minimum FERC elevation, to provide the maximum range of change that would be possible for the 3 management alternatives evaluated. We request further details on the hydraulic model, specifically how HEC-RAS was calibrated and confirmed with measured flood levels and whether a steady or unsteady flow model was used. We specifically want to know the range of uncertainty in flood levels expected for each of the event return intervals. Also elaborate for alternative 2 how and when the various stated pond levels were targeted within the model.

3.30 - Osprey Nesting Survey

Study Purpose: 1) conducting a review of existing literature, studies, or other data regarding known locations of osprey nests and/or frequent activity in the project area; 2) determining the presence/absence of the species in the project area; 3) verifying existing and new nesting locations of the osprey in the project area; and 4) monitoring activity levels in the project area.

Study Comments:

- Osprey nesting was investigated in the project area comprised of the Conowingo Pool and Dam areas. Proposed survey methods were followed more closely in the upper Pennsylvania portion of the study area, where osprey is a state-listed threatened species. Osprey nests were identified during field surveys on three dates within the prescribed survey period with 2 weeks between survey dates. Nest surveys in the lower part of the study area into Maryland were surveyed outside of prescribed survey period on 5 dates. Even then, the nest surveys likely adequately characterized osprey nesting in the vicinity of Conowingo Dam with 7 nests in Pennsylvania and 4 in Maryland, many of which were located on electrical transmission structures.

- Although the Study Plan referred to a second season of field study, "if necessary," the current report does not mention continuing the study.

3.31 - Black-crowned Night Heron Nesting Survey

Study Purpose: 1) conducting a review of existing literature, studies, or other data regarding known locations of heron nests and/or breeding activity in the project area; 2) determining the presence/absence of the heron in the project area; 3) verifying existing and new nesting locations of herons in the project area; and 4) monitoring heron activity levels in the project area.

Study Comments:

- Black-crowned night heron nesting was investigated in the project area comprised of the Conowingo Pool and Dam areas. Proposed methods were followed more closely in Pennsylvania, where the black-crowned night heron is state-listed as endangered. Field surveys were conducted on two dates within the proposed survey period (April 20 to May 1; although first survey date was April 19th), on dates least five days apart. Surveys in Maryland are presented as an afterthought following reports of herons at the dam. These surveys were conducted during June and well outside of the proposed survey period. No nesting herons were confirmed in either Pennsylvania or Maryland during the study. Although a second field season is referred to under Task 3 of the Study Plan, which describes reporting for the study, no mention of further field studies is mentioned in the report. Since the study is continuing for a second year, more attention should be paid to potential nesting in the lower portion of the study area that includes Maryland.

3.32 - Re-evaluate the Closing of the Catwalk to Recreational Fishing

Study Purpose: conduct a feasibility analysis to evaluate re-opening the Conowingo Project catwalk for recreational fishing by the general public.

Non-Compliance with the FERC-Approved Study Plan:

- The Applicant did not conduct a "feasibility analysis to evaluate re-opening of the Conowingo Project catwalk for recreational fishing..." We believe they conducted a vulnerability analysis and threat assessment, as the title of the report suggests, but it is unlikely they assessed the feasibility of implementing actions that would reduce threats to an acceptable level while providing access to fishermen.

- The vulnerability and threat assessment reports were not filed with FERC on or before February 22, 2011 and were thus unavailable to agencies for review

- The Applicant did not complete the recreational needs assessment of this part of the project relative to fishing access to the project area.

Recommended Actions:

- We ask that the FERC require the Applicant to file the vulnerability and threat assessment report with FERC so that it can be independently evaluated by authorized agencies

- We ask that the FERC require the Applicant to conduct a feasibility analysis, based on the vulnerability and threat assessment results, as was specified in the approved study plan.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Mid-Atlantic Fishery Resources Office
P.O. Box 67000
Harrisburg, PA 17106-7000
(717) 705-7838 Fax: (717) 705-7901

April 27, 2011

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E. Rom 1-A
Washington, D.C. 20426

RE: FERC No. 405 – 087, Conowingo Hydroelectric Project
Comments on Initial Study Reports

Dear Ms. Bose:

The U.S. Fish and Wildlife Service (Service) has reviewed the Exelon Generation Company, LLC's (Exelon or applicant) February 22, 2011 Filing of the Initial Study Reports (ISR) for the Conowingo Hydroelectric Project (Project), located on the Susquehanna River in Harford and Cecil counties, Maryland. Exelon's ISR was in response to its Proposed Study Plan (PSP) filed August 24, 2009, Revised Study Plan (RSP) filed December 22, 2009, and the February 4, 2010, Federal Energy Regulatory Commission's (Commission) issuance of a Study Plan Determination.

The Service is providing the following comments on Exelon's ISR, under the Commission's regulations, 18 C.F.R. § 5.15 (c) (4). The Service is filing its ISR comments and supporting documentation electronically, and we anticipate they will be available on the Commission's website (http://www.ferc.gov). To access these comments interested parties should go to the "eLibrary" link, and enter the docket number, P-405, to access the documents for the Conowingo Project.

GENERAL COMMENTS

Representatives of the Service attended the initial ISR meetings held by Exelon on March 9, 10, and 11, 2011 in Darlington, Maryland. At the meeting, we acknowledged the effort Exelon put into developing the ISR. However, we and other resource agencies provided a number of comments, corrections, and disagreements regarding Exelon's study reports.

In response to our oral comments Exelon has addressed some of our concerns in its ISR meeting summary. However, we are still in disagreement on some of the specifics of some studies and the need for Exelon to conduct additional analysis of data collected in 2010 and the need for additional studies in 2011. We provide the following study by study comments on Exelon's ISR using the numbering and study titles contained in the ISR for ease of cross-reference.

Changed Reporting Schedule

The Study Schedules contained in Revised Study Plan(s) filed by Exelon indicated that the ISR's would be filed with the Commission by January 21, 2011. Exelon requested and received from the Commission an extension for filing the ISR's until February 22, 2011. Exelon also noted that its February 22, 2011 filing would be incomplete as some study reports would likely require even more time to complete, and would filed over course of the following months as they were completed by Exelon. We note that even some of the reports that were filed on February 22, 2011 by Exelon were partial reports with reporting of some study tasks missing. Some we have not yet received. We have reviewed the study reports submitted with Exelon's February 22, 2011filing; however we have not had adequate time to conduct a thorough review of report materials submitted by Exelon following the February 22, 2011 deadline. We therefore, reserve the opportunity to provide comments on these later submissions as we complete our reviews. We also reserve the right to request additional studies or study modifications on those studies, and with regard to those topics, on which the reports were not timely completed.

The failure to provide study reports in a timely fashion should not be permitted to present a procedural harm to the trust resources the Service is tasked with protecting: the ISP provides for a two-year study period, with an opportunity to adjust the studies in progress, or ask for additional study, after one year. Licensees should not be permitted to short-circuit this study process and deny agencies and the public the opportunity for such requests for adjustments or additional study. To the extent that this means extension of the study period and consequent delay in the filing of a license application this is largely, in most cases, a conundrum of the applicant's own making that it should not profit from.

Lack of Consultation on Study Reports

The Revised Study Plan(s) included, in Section 9 of each study plan, a provision that the Initial Study Report was "...to be prepared and provided to participants for review and comment at the conclusion of the first year of study prior to filing the report with the Initial Study Report". We note that these *draft* study reports were not made available to the participants for review and comment prior to their being filed with the Commission as an ISR. They therefore did not reflect any review or comment by the agencies or other stakeholder participants in the Project licensing proceedings. We therefore reserve the opportunity to provide supplemental comments to those provided herein, pending any response by the applicant to reviews contained in this document.

COMMENTS ON EXELON'S INITIAL STUDY REPORTS

3.1 Seasonal and Diurnal Water Quality in Conowingo Pond and below Conowingo Dam

This study report was not submitted with Exelon's February 22, 2011 filing of the ISR. We therefore reserve the opportunity to provide comments on, or request modifications to, this study pending the completion of our review.

3.2 Downstream Fish Passage Effectiveness Study

This study report was not submitted with Exelon's February 22, 2011 filing of the ISR. We are providing some preliminary comments, however we reserve the opportunity to provide comments on this study pending the completion of our full review.

On Page 3, paragraph 4 of the report Exelon states "Researchers have found that more than 90% of fishes entrained at hydropower projects are small (<8 inches) (EPRI 1997) and that survival of small fish through turbines is high (often higher than 90%). High survival of small fish reduces the overall impact of entrainment to fish populations."

We agree that some studies show entrained fish are small, however Exelon provides no evidence that this is the case at the Project. Adult American shad and American eel will greatly exceed the 8 inch size cited here. We disagree that high survival of small fish reduces the overall impact of entrainment to fish populations. In the case of eels, there will likely be few to no eels under 8 inches moving downstream through the turbines because at this size eel behavior is to migrate upstream. Therefore, the survival of entrained adult eel that would attempt to migrate downstream past the Project will likely be very much lower than that inferred by Exelon and there will be no compensation by high entrainment survival of smaller eels.

3.3 Biological and Engineering Studies of American Eel at the Conowingo Project

Only a partial report was submitted with Exelon's February 22, 2011 filing of the ISR. We are providing some comments on the report that was provided, however we reserve the opportunity to provide additional comments on this study pending our receiving the full completion report.

We recommend that for Exelon's proposed 2011 study more of a decline angle should be placed at the upper end of the ramp crest where the ascending elvers make the "fall" into the collection container. We also recommend that the climbing substrate not extend all the way up to the apex of the ascending and descending ramp sections (i.e. a one foot section at the top with no climbing substrate). This will force the climbing elvers to swim the final section of the ascending ramp and they will not be able to use the substrate to "pull" themselves back up the descending ramp, thus avoiding capture.

We recommend increasing the volume of flow coming out of the spray bar and placing the bar directly over the apex of the ramp. The spray bar should provide an even sheet flow across the width of the ascending and descending ramps all the way to its terminus.

Exelon's study report "Estimated attraction flow volumes were 49 and 30 L/min (0.03 and 0.02 cfs) for the east and west ramps, respectively." Solomon and Beach (2004) recommend an attraction flow of 5-20 L/s. The flow at Exelon's east ramp trap is estimated at .81 L/s and the west ramp trap it is .5 L/s. The U.S. Fish and Wildlife Service trap at the Conowingo West Lift is estimated at 4.69 L/s. We recommend increasing the attraction flow at Exelon's traps to at least be equal to the effluent from the shad tanks located near the West Fish lift or 5 L/s.

We recommend using a larger collection tank at each of Exelon's traps similar to the 150 gallon tank used at the U.S. Fish and Wildlife Service trap at the Conowingo West Lift.

3.4 American Shad Passage Study

To our knowledge this study has not been conducted and no study report or update has been made available. We therefore have no comments at this time, but we reserve the opportunity to provide comments, and recommend study modifications, should Exelon provide a study report in the future.

3.5 Upstream Fish Passage Effectiveness Study

We note that the definition of "the number of fish available" provided in the study report is not consistent with the definition provided in the PSP or RSP and its use causes an inflation of the estimates of fish passage effectiveness and efficiency compared to the use of "the number of fish available" as defined in the PSP and RSP and agreed to by the agencies and the Commission. We recommend re-analysis of the data using the definition of "the number of fish available" in the PSP and RSP.

For the resource agency goal of restoring migratory fish stocks to the Susquehanna River basin, these fish must gain adequate access to river habitat upstream of the Conowingo Dam through safe, timely and effective passage through the Project area. For fish migrating upstream this will require that they: enter the Susquehanna River (all study fish accomplished this as they were all captured in the river); swim up to the Conowingo Dam, the first barrier to upstream migration (all study fish accomplished this as they were all initially captured directly downstream of the dam); locate and enter the fishway entrance (not all study fish were able to locate and enter the fishway, the ISR attributes this to the stress of capture and tagging, and potential problems with the attraction flow at the fishway entrance); be captured and crowded into the lift car, lifted up to the exit trough, and emptied into the exit trough; swim out of the exit trough and be able to swim upstream (not all study fish entered the fishway were able to accomplish this, the ISR attributes this to problems in the entrance channel and/or capture and crowding mechanism).

We agree with Exelon's conclusion that improvements must be made to upstream fish passage measures and facilities at the Project. However, we disagree with Exelon that additional study efforts and assessments should exclusively "focus on the physical elements of the EFL (e.g., Crowder Gate) and flow patterns within the EFL" as the sole consideration for improving fish passage at the Project. The study results from 2010 indicate problems with fish negotiating the tailrace and lower river section downstream of the Conowingo Dam, false attraction to the spillway where no fish lift entrance is available, and considerable delay in locating the fishway entrance and passing the project as a result of "searching" behavior in tailrace, spillway and river downstream of the project.

We recommend additional analyses of the 2010 data to assess the degree and potential cause of the searching delay, false attraction to the spillway, and the ability of fish to negotiate the lower river and tailrace up to the dam and fishway entrance. The frequency of occurrence assessments in Figures 4.4 and 4.5 offer an example of how generation could influence distribution and behavior of tagged fish during various project operations. New figures should be developed using the same generation bins in Figures 4.4 and 4.5 (plus spillage flow above station generation capacity if it occurred), however the y-axis should be the cumulative detection time (hours) for all fish detections in a particular area where telemetry monitors were deployed. There should be a separate figure developed for each of the following areas of interest: Area 1- Near field dam tailrace (group monitors for Units 1, 3, 5, 7, 8, 9, 10, and 11, plus fish entrance Gates A and C, and the frequency of occurrence bar for each generation bin should be color sub-divided for Francis units vs. Kaplan units vs. entrance gates); Area 2 - Spillway monitor; Area 3 – Rowland Island monitors; Area 4 – Spencer Island monitor; and Area 5 – Lapidum/Tomes Landing monitors. This analysis will provide for an assessment of area use for different generation scenarios.

We recommend that the 2010 animation for combined fish locations already provided by Exelon be expanded to present fish detection data for the entire 2010 study period.

Additional Radio Telemetry Study in 2011

Exelon has proposed an American shad radio telemetry study for 2011 to gather additional information on fish movement and behavior at the Project in general and in more detail in the Conowingo East Fish Lift at other areas in the spillway and river downstream of the project. Exelon prepared a study plan and circulated it to the agencies and other participants for review and comment. Following a meeting on the plan Exelon prepared an updated study plan based on the comments it received. In general we concur with the updated 2011 shad radio telemetry study plan provided it includes the additional analyses recommended above for the 2010 study.

Request for Data

We request that all data collected on fish detection and station operation be made available to us electronically as spread sheets or in database format along with the metadata regarding data collection, data verification, culling, compilation and analysis.

3.6 Conowingo East Fish Lift Attraction Flows

We have major concerns regarding the analysis conducted for this report. Exelon used a large number of t-tests to analyze the passage data and appeared to pick one project operating condition to compare to all other operation conditions. This is a poor analysis design, as it ignores differences in migratory fish run size due to years and time of operation within a year. In so doing Exelon ignores many other factors that can influence the capture and passage of migratory fish. It is therefore no wonder that Exelon did not find any "significant" differences among operating conditions. The variance in fish passage counts is huge over the data series. It appears as though the data is available to successfully partition the variance and determine how much is accounted for by a given operating condition, although not by the analysis used by Exelon in the study report.

We do not follow Exelon's reasoning behind the Pearson correlation they ran. We can see how correlating the fish passage counts with water temperature and tailrace level can be done, however we are not sure how Exelon can take the operation of a particular turbine unit and turn that into some number that can be correlated with passage counts. For example, what does the mean for Unit 11 of 0.25622 indicate? This needs to be further explained in the report.

We recommend conducting an analysis using a generalized linear model (GLM). With this analysis Exelon could use its 7 most used operation combinations as a class variable to determine which one is most effective. Other variables to include as covariates would be year (shad runs differ by year), date within a year (possibly Julian date to account for the increase and decrease in catches within a year), time of day, water temperature, and flow. We note the water temperature will likely be correlated with date, so Exelon may want to run one model with water temperature and date included, and another model with date and water temperature excluded. We recommend running this model with more than the 7 most used operation combinations; however there may not be adequate data for the range of the other covariates. At minimum, Exelon's analysis should account for differences among years, and differences among dates during the course of an annual spawning run.

We conclude that the way Exelon analyzed the data was overly simplistic and it's no wonder the analysis couldn't determine if one operation method was better than another. Exelon has the data to do a much better analysis. We recommend that the data be reanalyzed as stated above and summarized in a new report.

3.7 Fish Passage Impediments Study below Conowingo Dam

We request that the following information be added to the 2010 report. Update the radio telemetry analysis in 2011 with the results of Exelon's proposed 2011 American shad radio telemetry report. Examine the flow records when fish are moving and compare the amount of time fish experience full generation flow vs. natural river flow during the migration period (for 2010 and 2011 since that is when telemetry data are or will be available) and for average flow during the migration period. Provide details of the flow model calibration along with the field data or reference the study that provides this information. Further explain and annotate Table 4.1-4.

We also support the comments and recommendations of the Maryland Department of Natural Resources and the Pennsylvania Fish and Boat Commission regarding this study report.

3.8 Downstream Flow Ramping and Fish Stranding Study

We are concerned with the infrequent site visits (n = 12) and the timing of the imitation of the searches, well after first light. Although a consultant biologist noted fish predation by birds and that at times it was significant, there was no attempt to estimate fish loss to predation in the isolated pools and thus unavailable for observation during site visits. During the initial study report meeting when this study was discussed, the contractor did note that predation of fish by birds was observed. We note that stranding of fish in shallow pools increases the potential for predation by animals and birds and also stresses the trapped fish through confinement and exposure to degraded water quality. The mortality estimates presented in the report tables should be viewed as minimal estimates.

We also support the comments of the Maryland Department of Natural Resources and extensive comments of the Pennsylvania Fish and Boat Commission regarding this study report and the need for additional study in 2011.

3.9 Biological and Engineering Studies of the East and West Fish Lifts

This study report was not submitted with Exelon's February 22, 2011 filing of the ISR. We therefore reserve the opportunity to provide comments on, and request modifications of, this study pending the completion of our review of a study report.

3.10 Maryland Darter Surveys

We request that the original sampling plan that included winter and early spring sampling for Maryland darter, by means of electrofishing and seining in the tributary streams, be completed in the coming year. Since Exelon's consultants did not conduct creek sampling in December 2010, January, 2011, March, 2011 and April, 2011, for varying reasons, an additional winter/early spring sampling effort in the study creeks should be conducted from December, 2011 through April, 2012.

In addition, Exelon should provide the Service all original sampling data from the 2009-2010 Maryland Darter survey effort, upon which its study was designed to build upon and supplement, so that the sufficiency of sampling dates and effort can be determined.

We also support the comments of the Maryland Department of Natural Resources and Pennsylvania Fish and Boat Commission regarding this study report and the need for additional study in 2011.

3.11 Hydrologic Study of the Lower Susquehanna River

This study report was not submitted with Exelon's February 22, 2011 filing of the ISR. We therefore reserve the opportunity to provide comments on this study pending the completion of our review of a study report.

3.12 Water Level Management (Littoral Zone and Water Level Fluctuation)

This study report was not submitted with Exelon's February 22, 2011 filing of the ISR. We therefore reserve the opportunity to provide comments on this study pending the completion of our review of a study report.

3.13 Study to Assess Tributary Access in Conowingo Pond

We support the comments of the Maryland Department of Natural Resources and the Pennsylvania Fish and Boat Commission regarding this study report.

3.14 Debris Management Study

We support the comments of the Maryland Department of Natural Resources regarding this study report.

3.15 Sediment Introduction and Transport (Sediment and Nutrient Loading)

This study report was not submitted with Exelon's February 22, 2011 filing of the ISR. We therefore reserve the opportunity to provide comments on, and request modifications to, this study pending the completion of our review of a study report.

3.16 Instream Flow Habitat Assessment below Conowingo Dam

This study report was not submitted with Exelon's February 22, 2011 filing of the ISR. We therefore reserve the opportunity to provide comments on, and request modifications to, this study pending the completion of our review of a study report.

3.17 Downstream EAV/SAV Study (Water Level Vegetative Cover Study)

This study report was not submitted with Exelon's February 22, 2011 filing of the ISR. We therefore reserve the opportunity to provide comments on, and request modifications to, this study pending the completion of our review of a study report.

3.18 Characterization of Downstream Aquatic Communities

We support the comments and recommendations of the Maryland Department of Natural Resources and the Pennsylvania Fish and Boat Commission regarding this study report.

3.19 Freshwater Mussel Characterization Study below Conowingo Dam

We note that Exelon's goals for this study were to 1) Characterize the freshwater mussel community below Conowingo Dam, and 2) Determine if plant operations at Conowingo Dam affect the mussel community in this reach.

In order to assess the scientific integrity of this survey, one must first examine the stated goals. The first goal states that the "freshwater mussel community" will be characterized, indicating that only species richness will be measured. However, the study plan details methods for measuring density and abundance. It would be more appropriate to characterize freshwater mussel populations by measuring not only density and abundance of all species present but also indicators of population viability such as recruitment. In this case Goal 1 would read: Characterize freshwater mussel populations below Conowingo Dam. To determine if the operations at Conowingo Dam affect mussel populations, it is necessary to look not only at the number species that make up the community but also at the population structure and mussel distribution by species across the study area. Some species thrive in slow moving backwater while others live in riffles and runs.

Characterizing mussel species distribution through semi-quantitative surveys coupled with quantitative surveys would provide data that would help determine how operations at Conowingo Dam affect mussel populations. Therefore, Goal 2 should read: Determine if plan operations at Conowingo Dam affect mussel populations in this reach.

Methods stated in Exelon's report:

1) Search for published and unpublished mussel locality records for the study area
2) A semi-quantitative survey of the entire study area

It is unclear to us how the semi-quantitative survey sites were chosen. Although a habitat map was available it does not appear that semi-quantitative survey sites were representative of all habitat types. While habitat information is interesting, it should not be used to exempt areas within the study area from surveys. To adequately characterize the entire study area, all habitats should be sampled within established safety limits.

We note that the semi-quantitative survey sites should have been chosen randomly to represent the entire study area. Smith and Strayer (2003) details two types of sampling: Informal Sampling and Probability-Based Designs (Design-Based Inference). From the description of the methods in the ISR, it appears that the survey detailed in study 3.19 used informal sampling. Smith and Strayer (2003) write that "data collected using informal designs are of very limited use…informal sampling is most useful in preliminary surveys and for determining the presence of a mussel species at a site and should be avoided for other applications." They go on to describe several other methods of sampling that would have better characterized the freshwater mussel community below Conowingo Dam including simple random sampling, stratified sampling (sample sites could be stratified by wading and diving if cost is at issue), double sampling, two stage sampling, or distance sampling. The sampling design that most closely resembles the current method is double sampling for stratification (described on page 23 of Smith and Strayer 2003). Either a grid or transect lines should be laid over a map of the 4.5 mile long section of river and sites should be chosen randomly. If stratification is desired, it should be entirely based on cost per unit effort not on habitat. Based on the catch per unit effort at a site, quantitative survey sites should be chosen to represent high, medium, low, and 0 mussel densities.

Multiple search patterns were used in the semi-quantitative survey. We note that search methods should be standardized across all semi-quantitative survey sites. Either entire sections of the grid, transects, or 1 meter wide strips could be used.

According to the 3.19 report, quantitative surveys were conducted at 5 locations to represent the range in numbers of mussels observed during the semi-quantitative survey. This differs from the study design in which surveys were to be conducted in the areas with the highest density. It is unclear how quantitative survey locations were chosen. Methods should be described more clearly in a redraft of the report. Per comments in section 2, to best characterize the freshwater mussel community below Conowingo Dam, quantitative survey sites should be chosen to represent high, medium, low, and 0 mussel densities.

Data analysis was not clearly described. Was Dave Smith's mussel estimator program used to determine density and abundance? This was not detailed in the methods section of the report and needs to be addressed in a report redraft.

Measurement of habitat parameters should have been done where the quantitative sampling was conducted.

While no reference reach was used, there are examples in the literature of what healthy populations of freshwater mussel populations should look like. In addition, there are a number of studies of the effects of dam operations on freshwater mussels. It has been well documented that a change in operations can improve recruitment of mussels below dams. This literature should be detailed in the conclusions of a report redraft.

We also support the extensive comments and recommendations of the Maryland Department of Natural Resources on this study.

3.20 Salinity and Salt Wedge Encroachment

We support the comments and recommendations of the Maryland Department of Natural Resources on this study report.

3.21 Impact of Plant Operations on Migratory Fish Reproduction

We support the comments and recommendations of the Maryland Department of Natural Resources and the Pennsylvania Fish and Boat Commission on this study report.

3.22 Shortnose and Atlantic Sturgeon Life History Studies

On page 4, paragraph 2 of the report Exelon states: "Atlantic sturgeon abundance was high in the late 1800's and large scale commercial fisheries were created. The Delaware Bay fishery was the largest, but Chesapeake Bay supported several fisheries as well, specifically in the James, York, Rappahannock, Wicomoco / Pocomoke, Nanticoke, Choptank, Potomac, and Patuxent Rivers; apparently no landings were recorded for the upper Chesapeake Bay."

We note that it is likely that there was a sturgeon fishery in the Susquehanna River and there are historic reports of large sturgeon captured in the lower river from *The Status Review for Atlantic Sturgeon* (see excerpts below).

Status Review Pg 19: Chesapeake Bay and Tributaries (Potomac, Rappahannock, York, James, Susquehanna, Nanticoke), PA/MD/VA - Historically, Atlantic sturgeon were common throughout the Chesapeake Bay and its tributaries (Kahnle et al. 1998, Wharton 1957). There are several newspaper accounts of large sturgeon in the lower reaches of the Susquehanna River from 1765-1895, indicating that at one time, Atlantic sturgeon may have spawned there. Historically important sturgeon fisheries in Maryland occurred in the Potomac and incidental harvest of sturgeon was common in other Maryland tributaries. Several sightings were made by commercial fishermen and research biologists during 1978-1987 near the Susquehanna River mouth. Also, a deep hole (18 m) on the Susquehanna River near Perryville, MD, once supported a limited sturgeon fishery (R. St. Pierre, USFWS, personal communication). Maryland DNR personnel reported large mature female Atlantic sturgeon in the Potomac River in 1970, and in the Nanticoke River in 1972 (H. Speir, Maryland DNR, personal communication).

Status Review Page 41: "Chesapeake Bay and Tributaries (Potomac, Rappahannock, York, James, Susquehanna, Nanticoke), PA/MD/VA - Due to their upriver locations, most dams in the Chesapeake Bay have large freshwater tailways and probably did not obstruct Atlantic sturgeon spawning runs. A notable exception were four dams constructed from 1904-1932 in the Susquehanna River. Approximately 50 km of habitat were available to Atlantic sturgeon in the Susquehanna River prior to the construction of Holtwood Dam (rkm 39) in 1910. Access was further restricted in 1928 with the construction of Conowingo Dam (rkm 16) (Carricata 1997). Since 1965, fish lifts have intermittently operated at the Conowingo Dam. During years of fish lift operation, 1965-1966 and 1972 to the present, over 50 million fish representing 70 taxa, but no sturgeon, have been collected at the dam. Other major Chesapeake tributaries, including the James, York, Rappahannock, Potomac, Patuxent, Choptank, and Nanticoke Rivers were never impounded below tidal areas and should have continued to function as spawning migration corridors."

On page 39, paragraph 2of the report Exelon states "The objective of this study was to monitor the Susquehanna River for sonic transmitter tagged sturgeons at large in the system that could potentially use habitats in the Susquehanna River."

We note that it is not appropriate to determine sturgeon use of the Susquehanna River by attempting ONLY to monitor for sonic sturgeon tagged in other systems. Shortnose sturgeons are not likely to move between estuaries, even if movement through the C&D Canal has been documented. Because there is thought to be shortnose sturgeon spawning in the Potomac River, it is also possible there is a spawning population of shortnose sturgeon in the Susquehanna River. Even if those fish are genetically similar to the Delaware River stock, it does not mean that the Chesapeake Bay tributaries do not support spawning. Sturgeon captures in the Susquehanna River are limited in recent years likely due to lack of fishing effort. Most shortnose sturgeon captures reported through the Maryland Reward Program for Sturgeon in the Susquehanna River were reported by commercial catfish fishermen, who stopped fishing several years ago. Without any commercial fishing effort or scientific sampling effort in the Susquehanna River, it is not an accurate assessment to assume that no (or very few) sturgeon occur in the river below Conowingo Dam.

We support the comments and recommendations of the Maryland Department of Natural Resources and the Pennsylvania Fish and Boat Commission on this study report.

3.23 Study to Identify Critical Habitat Use Areas for Bald Eagle

We support the comments and recommendations of the Maryland Department of Natural Resources on this study report.

3.24 Zebra Mussel Monitoring Study

We support the comments and recommendations of the Maryland Department of Natural Resources on this study report.

3.25 Creel Survey of Conowingo Pond and the Susquehanna River below Conowingo Dam

This study report was not submitted with Exelon's February 22, 2011 filing of the ISR. We therefore reserve the opportunity to provide comments on, and request modifications to, this study pending the completion of our review of a study report.

3.26 Recreational Inventory and Needs Assessment

We support the comments and recommendations of the Maryland Department of Natural Resources and the Pennsylvania Fish and Boat Commission on this study report.

3.27 Shoreline Management

We support the comments and recommendations of the Maryland Department of Natural Resources on this study report.

3.28 Archaeological and Historic Cultural Resource Review and Assessment

This study report was not submitted with Exelon's February 22, 2011 filing of the ISR. We therefore reserve the opportunity to provide comments on, and request modifications to, this study pending the completion of our review of a study report.

3.29 Effect of Project Operations on Downstream Flooding

We support the comments and recommendations of the Maryland Department of Natural Resources on this study report.

3.30 Osprey Nesting Survey

We support the comments and recommendations of the Maryland Department of Natural Resources on this study report.

3.31 Black-crowned Night Heron Nesting Survey

We support the comments and recommendations of the Maryland Department of Natural Resources on this study report.

3.32 Re-evaluate the Closing of the Catwalk to Recreational Fishing

We support the comments and recommendations of the Maryland Department of Natural Resources on this study report.

In Conclusion

The Service appreciates the opportunity to provide comments on the completed studies. While we also provide preliminary comments on those studies completed late or incomplete, the Commission should expect additional comments and recommendations as reports are finalized. While the Service is aware that this is not as tidy as is contemplated by the ISP, and may pose difficulties in scheduling for the Applicant and the Commission, this difficulty was not of the Service's making, and the Service's interest should not be the ones to suffer thereby. We look forward to continuing to work on the ongoing licensing process for this project.

If you have any questions regarding our comments, please contact Larry Miller of the Mid Atlantic Fisheries Resource Office (717-705-7838 or Larry_M_Miller@fws.gov).

Sincerely,

Lawrence M. Miller
Project Leader
Mid-Atlantic Fishery Resources Office

CERTIFICATE OF SERVICE

Pursuant to Rule 2010 of the Commission's Rules of Practice and Procedure, I hereby certify that I have this day caused the U.S. Fish and Wildlife Service Comments on the Revised Study Plans for the Cononwingo Hydroelectric Project Relicensing Proceeding to be served upon each person designated on the official service list compiled by the Secretary for proceeding FERC No. 405 – 087.

Dated at Harrisburg, PA this 27th day of April, 2011.

Lawrence M. Miller
Project Leader
Mid-Atlantic Fishery Resource Office

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATERSHED MANAGEMENT PROGRAM

May 10, 2011

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888First Street, N.E.
Washington, DC 20246

Re: Conowingo Hydroelectric Project, FERC Project No. 405 Comments on 2010 Study Reports

Dear Secretary Bose:

The Pennsylvania Department of Environmental Protection appreciates the opportunity to provide comments to FERC on Exelon's Conowingo Hydroelectric Dam relicensing study reports for work performed in 2010 and for those reports that were submitted to FERC for public comment as of February 22, 2011. The FERC ILP process schedule included a deadline of January 21, 2011 for the submission of all reports for studies to be performed in 2010. On January 20, 2011, Exelon filed a request with FERC for an extension of that deadline until February 22, 2011. FERC granted the extension.

During March 9-11, 2011, Exelon hosted a three-day meeting in Darlington, MD to present overviews of the study reports and summaries. DEP staff attended those meetings to ask questions and provide feedback to Exelon on the individual study reports.

At that meeting, FERC's Emily Carter responded to questions about Exelon's delayed filing of the reports and the remaining unfiled, uncompleted reports. She stated that that those study reports not received by FERC as of the February 22, 2011 extended deadline would be open for public comment under the second year schedule. We understand that we will have until 2012 to file comments on late, presently unfiled or incomplete studies. However, she also stated that comments on the studies could be filed at <u>any</u> time. Based on Ms. Carter's statements, we reserve the right to submit comments on the remaining studies as they are filed and we have time to review and evaluate them. This includes possible recommendations for additional studies in 2011 and beyond if the missing and late study reports are not adequate to address the impact issues.

By this letter, the Pennsylvania Department of Environmental Protection supports and incorporates the comments of the Pennsylvania Fish and Boat Commission, the Susquehanna River Basin Commission, the Maryland Department of Natural Resources, and the U.S. Fish and Wildlife Service.

We look forward to continuing to work with FERC on the relicensing of the dams on the lower Susquehanna River. Thank you for the opportunity to comment.

Sincerely,

James S. Spontak, Manager
Watershed Management Program
PA DEP, Southcentral Region

JSS/MDP/lmt

A. Karen Hill, Esq.
Vice President
Federal Regulatory Affairs

Telephone 202.347.7500
Fax 202.347.7501
www.exeloncorp.com

Exelon Corporation
101 Constitution Avenue, NW
Suite 400 East
Washington, DC 20001

Via Electronic Filing

May 27, 2011

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Re: Conowingo Hydroelectric Project, FERC Project No. 405
Response to Agency Comments on the Initial Study Report and Meeting

Dear Secretary Bose:

In accordance with Title 18 Code of Federal Regulations (18 C.F.R.), Section 5.15 (c)(5) of the regulations of the Federal Energy Regulatory Commission (Commission or FERC), Exelon Corporation, on behalf of its wholly-owned subsidiary, Exelon Generation Company, LLC (Exelon), encloses for filing this response to comments on Exelon's Initial Study Report (ISR) and ISR meeting summary for the relicensing of the Conowingo Hydroelectric Project (Conowingo Project), FERC Project No. 405. The current license for the Conowingo Project expires on September 1, 2014.

On February 22, 2011, Exelon filed its ISR with the Commission as required by Section 5.15(c)(1) of the Commission's regulations. The ISR provided the information and data gathered by Exelon to date, as well as a detailed description of Exelon‟s progress in carrying out the Commission-approved study plan for the relicensing of the Project. The ISR meeting was held on March 9-11, 2011, and Exelon subsequently filed its meeting summary on March 28, 2011. On April 27, 2011, several resource agencies and public groups (stakeholders) filed written comments on the ISR and ISR meeting, including Commission staff, American Rivers, the Lower Susquehanna Riverkeeper (Riverkeeper), the Maryland Department of Natural Resources (MDNR), the National Park Service (NPS), the Nature Conservancy, the Pennsylvania Department of Environmental Protection (PADEP), the Pennsylvania Fish and Boat Commission (PFBC), the Susquehanna River Basin Commission (SRBC) and the United States Fish and Wildlife Service (USFWS).

In this response, Exelon addresses stakeholder requests for clarification as well as additional information or analysis for study reports submitted as part of the ISR. In addition, Exelon responds to stakeholders requests for additional studies or modifications to the FERC-approved study plan (see Attachment A). Exelon will address stakeholders‟ various interpretations of the study results in the License Application.

Exelon is filing this document with the Commission electronically. To access the document on the Commission's website (http://www.ferc.gov), go to the "eLibrary" link, and enter the docket number, P-405. Exelon is also making the document available for download at its corporate website. To access the document here, navigate to http://www.exeloncorp.com/powerplants/conowingo/relicensing/Pages/overview.aspx.

In addition to this electronic filing with the Commission, paper copies of the document are also available upon request to Colleen Hicks (610-765-6791). Finally, Exelon is making available to the public the document at the Visitor‟s Center at Muddy Run Recreation Park in Holtwood, Pennsylvania, and the Darlington Public Library in Darlington, Maryland, during regular business hours.

Exelon appreciates the work and involvement of Commission Staff, resource agencies, local governments, and members of the public in the development and work completed to date. If you have any questions regarding the above, please do not hesitate to contact Colleen Hicks. Thank you for your assistance in this matter.

Respectfully submitted,

Colleen Hicks

Colleen E. Hicks
Manager Regulatory and Licensing, Hydro
Exelon Power
300 Exelon Way
Kennett Square, PA 19348
Tel: (610) 765-6791
Email: Colleen.hicks@exeloncorp.com

A. Karen Hill
Vice President Federal Regulatory Affairs
Exelon Corporation
101 Constitution Ave.
Suite 400E
Washington, DC 20001
Tel: (202) 347-8092
Email: Karen.Hill@exeloncorp.com

Enclosure: Attachment A-Response to Agency Comments
Attachment B-Distribution List
Attachment C- Responses to Agency Comments on Conowingo 3.19-Freshwater Mussel Characterization Study
Attachment D-Resumes of Mussel Surveyors

3.1 Seasonal and Diurnal Water Quality in Conowingo Pond and Below Conowingo Dam

SRBC and the Nature Conservancy submitted comments on the Seasonal and Diurnal Water Quality in Conowingo Pond and Below Conowingo Dam (RSP 3.1) initial study report.

SRBC Comment 1:
"Exelon concludes in the study report that the discrete monitoring demonstrates that Station 643 is adequately representative of DO concentrations in the turbine boils; however, this conclusion is supported by an assessment of daily averaged data, not discrete hourly measurements."

Exelon Response:
The conclusion that Station 643 is representative of turbine boils was based on analysis of both hourly and average DO measurements within the context of the 2010 FERC approved study plan and MD State water quality standards. All hourly data were provided either in tabular or graphical form (Figure 4-27) and then separately in Appendix B of the initial study report for further analysis if needed. Additionally, conclusions were supplemented by the 2010 seasonal data collected at three transects downstream of Conowingo Dam and knowledge of the historical data.

Figure 4-25 in the initial study report provides the distribution of 635 discrete hourly DO measurements obtained from operating turbine boils during the 2010 study, as pre-specified by the FERC in the RSP. This figure was provided for rapid assessment of DO in the discharged water over multiple operational scenarios. Figure 4-27 shows the comparison of discrete hourly DO measurements of each turbine boil with that of Station 643 DO.

Table 4-5 of the initial study report shows the dates of hourly DO and water temperature measurements. Pages 13 and 14 of the initial study report describe the duration of operating turbines and various combinations of turbines. Figure 4-7 portrays these data in a graphical form and gives readers a perspective on the number of observations available for any analysis so desired. Since small turbines were operating on sampled dates, most measurements occurred in discharge boils of those turbines.

Of importance, however, is the use of average values to show compliance with the seasonal MD State water quality standards cited on initial study report page 20. They are either based on 7- day (February 1 through May 31) or 30 -day (June 1 through January 31) averaging period. These standards were met on a daily basis both in the turbine discharge boils as well as at Station 643.

SRBC Comment 2:
"Moreover, a uniform lag of one hour was used to account for travel time from the turbine outlets to Station 643, but it is highly unlikely that the travel time is uniform under the full range of operations from peaking to minimum releases. Regardless, reliance on Station 643 for monitoring DO concentrations is problematic from the standpoint of an extensive lag in observing potentially fatal occurrences of non-attaining DO concentrations, which were observed in the hourly monitoring data."

Exelon Response:
Historical observations made over a wide range of dam discharges suggest that a one hour lag is sufficient for this analysis. To the best of our knowledge, no fatal occurrences of DO were recorded in turbine discharge boils, at Station 643, or at the three transects downstream of the dam on sampled dates.

SRBC Comment 3:

"A final determination cannot be made from summarized results and averaged data. The importance of non-attaining DO concentrations in certain turbine boils can only be determined through an evaluation of discrete data points."

Exelon Response:
See Exelon Response to SRBC Comment 1 above.

Nature Conservancy Comment 1:
"Further, due to the spatial heterogeneity of the downstream channel and effect of turbine operations on downstream conditions, we believe that sub-daily variation of dissolved oxygen (DO) that may have consequences for downstream biota is masked by summarizing results as daily averages. Thus the ISR shows that the objectives of Study 3.1 cannot be met with the approved study methodology."

Exelon Response:
See Exelon Response to SRBC Comments 1 above.

Nature Conservancy Comment 2:
"We recommend the following modifications to the approved study as necessary to meet the study objectives. We recommend that additional monitoring of the turbine boils be completed to determine if there is potential bias of Station 643 and to characterize DO conditions under various flow, temperature, and operating conditions during late summer and fall months. This information is necessary to help Maryland Department of Environment issue the requisite water quality certification for this project."

Exelon Response:
Sampling of turbine discharge boils was carried out according to the FERC pre-specified scheme and dates and was dependent on which turbine or combinations of turbines were operating on those dates. In turn, the operational times of turbine(s) was dependent on minimum flow requirements, incoming river flows, Conowingo Pond level management, and power demand at the time. Exelon believes that the 2010 water quality study as conducted met the required objectives. See Exelon Responses to SRBC Comments 1-3 above.

Nature Conservancy Comment 3:
"In reviewing the study summary and Initial Study Report for Study 3.1, we made the following observations that support continued sampling at the turbine boils: Station 643 is on the west shore of the river, closer to the aerated Francis turbines (1-7) and furthest from the non-aerated Kaplan turbines (8-11). Figure 4.27 illustrates that the hourly samples taken at Station 643 are consistently higher than the hourly measurements taken at the individual boils. The report concludes that Station 643 is representative of DO conditions at the individual boils, but does not provide any statistical analysis to support this conclusion."

Exelon Response:
Turbine boil sampling dates for 2010 were selected by FERC and were followed exactly by Exelon in conducting the turbine boil monitoring. In addition, Exelon collected data along downstream transects that provide additional information regarding DO conditions beyond the immediate discharge zone. Exelon disagrees with the statement that hourly DO measurements at Station 643 are "consistently" higher than those taken in the individual turbine boil. Figure 4-33 clearly demonstrates that this is not the case. As shown, 33% of the time (85 of 255 hourly observations) there was no difference between the turbine boil DO value and that measured at Station 643. 72% of the time (184 of 255 hourly measurements) the difference between Station 643 and turbine boil DO was within + 0.5 mg/L. More importantly, Figure 4.33 demonstrates clearly that Station 643 is not biased toward measuring DO concentrations that are higher than those being discharged in the turbine boils. In fact, the distribution of

the differences between measurements made at Station 643 and the turbine boils is almost uniformly distributed around zero. This clearly demonstrates that there is no consistent bias in Station 643 measuring DO concentrations that are higher than being discharged from the turbines.

Nature Conservancy Comment 4:
"Further, emphasizing daily average DO masks diurnal variation observed in the samples."

Exelon Response:
Diurnal variations in DO at Station 643, due to natural processes of photosynthesis and respiration, were discussed in the initial study report and are common features in temperate water bodies. See also Exelon Responses to SRBC comments 1-3 above.

Nature Conservancy Comment 5:
"The Kaplan turbine boils were proportionately under sampled (87 out of a total of 635 total hourly observations, representing only 14% of observations). We acknowledge that the Kaplan turbines are operated less frequently during low flow conditions and therefore there may have been fewer opportunities to sample dissolved oxygen. For this reason, we do not believe the 2010 study period provides an adequate representation of typical operating conditions as they relate to DO concentrations. For example, according to Table 4.3, during 2010, only 11 hourly samples were taken on Unit 11. Six of 11 hourly DO samples (54%) were below 5 mg/L; hourly DO was below 5.0 mg/L on two of the three days at Unit 11."

Exelon Response:
Sampling scheme and dates for turbine boil(s) DO measurements in 2010 were pre-specified in the FERC study plan determination. The study plan determination specified that DO of all operating turbine boils be measured hourly between 0600 and 1800 hours. DO of operating turbine boils was sampled accordingly. Thus, if a given turbine operated for 1 hour on a sampled date, only one DO measurement could be obtained on that day. An opportunity to sample large turbine boils at low summer flows (less than 10,000 cfs), particularly for any length of time, is low due primarily to minimum flow requirements, inflows, Conowingo Pond level management, and emergency power demand. For example, if the incoming river flows are less than or equal to 5,000 cfs with no power emergency there is essentially zero probability of operation of Kaplan turbines.

Nature Conservancy Comment 6:
"Based on the data presented in Appendix B-1, observed DO concentrations downstream exhibit diurnal variation and vary spatially across the channel from west to east. Additional monitoring at the turbine boils is needed to determine whether there are potential DO barriers in the channel downstream of the project, including near the east fish lift."

Exelon Response:
Exelon does not agree that additional turbine boil sampling is necessary. Turbine boil sampling dates for 2010 were selected by FERC in its study plan determination and were follow exactly by Exelon in conducting the turbine boil monitoring. In addition, Exelon collected data along downstream transects, that provide additional information regarding DO conditions beyond the immediate discharge zone. There was no indication in any of the DO data collected in the tailwater area of DO concentrations sufficiently low and extending into the area of the east fish lift to suggest that a DO barrier of any type forms, even under extreme conditions of low flow, warm water temperatures, Kaplan unit operation and Conowingo Pond DO stratification. Moreover, DO concentrations during the fish migration season, when the fish lift is operating were all well above standards.

Nature Conservancy Comment 7:

"In order to conclude that the downstream temperature and DO conditions in 2010 are representative of typical operations, OEP Staff and parties would need to know how frequently various turbines are operated. This information has not been presented. Exelon did not adopt our recommendation that the PSP be amended to include development of a water quality model for the lower Susquehanna River and upper Chesapeake Bay. It provided the following explanation: "Exelon believes the Nature Conservancy study request for the development of a water quality model of the river reach below Conowingo Dam and the Upper Chesapeake Bay is not warranted, given that Exelon's use of existing water quality data can be used to adequately assess potential project operational impacts on water quality."

Exelon Response:
Exelon is not proposing any changes in operation and the water quality study, which was completed in accordance with the FERC study plan determination and adequately assesses any effects of the project on water quality.

3.3 Biological and Engineering Studies of American Eel at the Conowingo Project

MDNR, PFBC, USFWS, and the Lower Susquehanna Riverkeeper submitted comments on the Biological and Engineering Studies of American Eel at the Conowingo Project (Objective 3) report.

MDNR and PFBC Comment 1:
Eel sampling conducted by Exelon occurred in the spillway area and consisted of 258 eels. The USFWS collection efforts in the tailrace captured approximately 24,000 elvers. USFWS began their effort on May 31, 2010; while Exelon initiated its eel collection efforts more than two weeks later on June 16, 2010. The report concludes that an earlier start and greater attraction flows may be needed to substantially improve eel collections in the spillway area. USFWS notes in Appendix A: USFWS 2010 Eel Collection Report, Conowingo Dam that they have been unable to determine the triggers for elver migration at the Conowingo Dam.

Exelon Response:
A 2011 study is proposed by Exelon. Start-up will begin in late-May/early June (flows permitting) this year. Details of the study have been discussed with resource agency personnel. The study plan has been drafted and was issued to stakeholders on May 13, 2011.

Lower Susquehanna Riverkeeper Comment 1
The timing of this study avoided the peak migration period experienced in earlier eel collections performed by the USFWS. (see Attachment A, Table 1 of this document). "The initial collections occurred for a single 48-h period each week. After a short time, however, the ramps and attraction flows were set to fish continuously, and elver collections occurred each Monday, Wednesday, and Friday throughout the study period." The initial period began on June 16, 2010. The "continuous" collections did not begin until July 12, 2010. Appendix A, Table 2 of Study Report 3.3, the USFWS 2010 EEL COLLECTION REPORT, CONOWINGO DAM TAILRACE, shows that the 2010 eel migration declined significantly after July 9. There is no explanation of why the applicant waited until after the time that eels would be expected, to begin their continuous sampling. Using the phrase "after a short time" to describe the four-week delay before continuous collection occurred shows an effort to verbally diminish the impact that the applicant's delay in collection had on their results. This follows a previous pattern by the applicant of making efforts to diminish the impact that the project has as a blockage to American eel migration in their largest former habitat in the United States.

Exelon Response:
The sampling periodicity for the elver collections was completed in accordance with the FERC approved study plan. Specifically, as stated in the study plan, *"The spillway pool collection ramps will be fished weekly through September-October once spill likely is diminished typically by early June. One 48-h period will be fished in each sampling period. This component will determine seasonal use of the spillway pool by elvers as well as contrast spatial abundance with the tailrace."* Exelon‟s voluntary decision to increase sampling frequency to occur each Monday, Wednesday, and Friday after July 12, 2010 was in response to the relatively low number of elvers collected below the spillway compared to the tailrace collection area. This change in sampling frequency protocol, which was not required in the FERC approved study plan, was a constructive effort by Exelon to improve the study quality. Exelon has acknowledged on countless occasions that passage of American eel at the Conowingo Project is a key issue in the relicensing process. Exelon has made a good faith effort to engage stakeholders in the discussion of this issue, as well as expend time and financial resources to conduct several scientifically sound studies related to both upstream and downstream passage of this important species.

3.5 Upstream Fish Passage Effectiveness Study

USFWS, MDNR, PFBC, American Rivers, and Nature Conservancy submitted comments on the Upstream Fish Passage Effectiveness (RSP 3.5) initial study report.

PFBC Comment 1 (see also USFWS, MDNR, PFBC, and American Rivers):
The licensee changed the definition of tailrace (TR) from the Revised Study Plan to the Initial Study Report. In the RSP (Section 3.5.6), the TR is defined as the area from the Dam to the lower end of Rowland Island. The ISP defines the TR as from the Dam to the upper tip of Rowland Island. Some 32 shad were detected at the lower end of Rowland Island that were not detected above Rowland Island. Under the ISP, these would be considered TR fish and would be included with the 89 other TR fish for a total of 121 fish in the TR. Passage effectiveness would then be 33%, not 44% as reported in the ISR.

Exelon Response:
In the updated study report, the tailrace area will be defined as the area from the Dam to the lower end of Rowland Island. Although the definition of the tailrace in the initial study report was admittedly different, results would not be greatly impacted by increasing the size of the tailrace from the dam to the lower tip of Rowland Island due to dropback as defined in Section 2.0 (Background) of the Conowingo 3.5 report[1]. Thirty-one of the 32 shad counted at the lower tip of Rowland Island but not included as tailrace fish were in the process of dropback/fallback. Once these fish left the lower tip of Rowland Island they never returned upstream and would not have been counted as tailrace shad even by the expanded definition. One Lapidum released shad would be added to the group of tailrace shad in the expanded definition of the tailrace. The fish moved upstream to the lower tip of Rowland Island, as described in Section 4.3.2 (Non-Tailrace Shad) of the Conowingo 3.5 initial study report. Although this fish failed to move above Rowland Island, it would be included for tailrace analysis in the expanded tailrace definition, increasing the number of shad available to the EFL from 89 to 90. Upstream fish passage efficiency would than be changed from 44.9% (40 of 89) to 44.4% (40 of 90).

[1]The term dropback (or fallback) describes the downstream movement of an upstream migrating anadromous fish after tagging; this behavior is related to the tagging process. In a literature review of anadromous shad and herring studies using radio or acoustic tags, post-tagging dropback ranged from 8.6 to 100% (Frank *et al*., 2009). The spatial-temporal parameters (e.g., how long after release did it take the fish to start moving downstream, how fast did the fish move downstream, how far did the fish move downstream) used to define dropback varied among studies, yet the majority of researchers (63.6%) included fish with dropback in their analysis as long as the fish eventually returned upstream. Drop back behavior related to post-tagging stress is typical of radio tagged shad and can affect migration behavior of up to 40% of the tagged fish. (Olney *et al*. 2006).

PFBC Comment 2:
Fifteen of 23 fish with turbine passage were believed to have achieved short-term survival, but no information about delayed mortality was presented.

Exelon Response:
Consistent with the FERC-approved study plan, mobile tracking only covered the river from the tailrace down to the I-95 Bridge and only occurred through the end of July. Exelon does not know the fate of these 15 radio tagged shad downstream of the I-95 Bridge or after the end of July.

PFBC Comment 3 (see also American Rivers):
Need travel times to assess delay in passing or not passing:

Exelon Response:
Exelon will provide these data in the updated study report.

PFBC Comment 4 (see also American Rivers):
Describe time lapse between when a fish entered via gate C and when it was detected at C gate "upper entrance channel dropper antenna."

Exelon Response:
To address this issue, as well as other related items, Exelon would like to collaborate with the resource agencies and other stakeholders in building a consensus on what variables and statistical analysis should be used to examine upstream fish passage effectiveness for Conowingo 3.5, as well as for Conowingo 3.6 (Conowingo EFL Attraction Flows), and 3.7 (Fish Passage Impediments Study below Conowingo Dam) initial study reports. The updated study report will be reissued with the agreed upon variable statistical analysis.

PFBC Comment 5 (see also American Rivers):
Describe time (range, mean median) between last detection in lower EFL and exit of fishway. (How much time did fish spend in the exit trough?)

Exelon Response:
See Exelon response to PFBC Comment 4.

PFBC Comment 6 (see also American Rivers):
Under what generation scenarios did fish move from lower Rowland Island to the Tailrace? Analysis of this data might be useful in attracting the 32 fish that were detected at lower Rowland Island but never in the TR.

Exelon Response:
See Exelon response to PFBC Comment 4.

PFBC Comment 7:
Figure 4-7 shows few EFL forays between 7 and 8 AM. Where were the fish at that time?

Exelon Response:
This information will be provided in the updated study report.

PFBC Comment 8 (see also American Rivers):
Need composite plots of fish locations in tailrace and spillpool areas at each level of generation (7/4, 7/3, 6/4, 2/0, as per appendix C).

Exelon Response:
This information will be provided in the updated study report.

PFBC Comment 9:
Need data and animation for nights. Must know where and when shad go at night and when they return to TR.

Exelon Response:
Exelon will provide this data and analysis in the updated study report.

PFBC Comment 10:

Fish animations should have date, time and place of release and date and time of passage.

Exelon Response:
Exelon will provide this data in the updated study report.

PFBC Comment 11:
Explain surprisingly large # of fish in spillpool areas (26 far-field, 7 near-field) in terms of generation.

Exelon Response:
Exelon will provide this analysis in the update study report.

PFBC Comment 12:
Which of these fish were actually in spillpool and which were in the tailrace below the retaining wall?

Exelon Response:
Exelon will provide this analysis in the updated study report.

PFBC Comment 13:
Need animations of all fish combined from April 30 to the end of the study.

Exelon Response:
Exelon will provide this data in the updated study report.

MDNR Comment 1:
This study lacks citations for statements such as: "Drop back behavior related to post-tagging stress is typical of radio tagged shad and can affect migration behavior of up to 40% of the tagged fish." and "While the exact cause of this inability of all fish in the EFL to successfully pass upstream is not understood, it is symptomatic of current fish lift designs for American shad"

Exelon Response:
See Exelon Response to PFBC Comment 1.

MDNR Comment 2:
Statistical analysis of the behavior of the monitored shad relative to potential causative factors (e.g. flow, plant operation regimes, water temperature, crowding by gizzard shad, lift frequency and number) should be included in a revised version of this report.

Exelon Response:
See Exelon response to PFBC Comment 4.

MDNR Comment 3:
Fish behavior that is illustrated in the animation provided to the stakeholders should be quantitatively analyzed to assess all relationships between the behavior of the monitored fish and plant operations, as well as all the other contributing variables.

Exelon Response:
See Exelon response to PFBC Comment 4.

USFWS Comment 1 (see also American Rivers):
We recommend additional analyses of the 2010 data to assess the degree and potential cause of the searching delay, false attraction to the spillway, and the ability of fish to negotiate the lower river and

tailrace up to the dam and fishway entrance. The frequency of occurrence assessments in Figures 4.4 and 4.5 offer an example of how generation could influence distribution and behavior of tagged fish during various project operations. New figures should be developed using the same generation bins in Figures 4.4 and 4.5 (plus spillage flow above station generation capacity if it occurred), however the y-axis should be the cumulative detection time (hours) for all fish detections in a particular area where telemetry monitors were deployed. There should be a separate figure developed for each of the following areas of interest: Area 1- Near field dam tailrace (group monitors for Units 1, 3, 5, 7, 8, 9, 10, and 11, plus fish entrance Gates A and C, and the frequency of occurrence bar for each generation bin should be color subdivided for Francis units vs. Kaplan units vs. entrance gates); Area 2 - Spillway monitor; Area 3 – Rowland Island monitors; Area 4 – Spencer Island monitor; and Area 5 – Lapidum/Tomes Landing monitors. This analysis will provide for an assessment of area use for different generation scenarios.

Exelon Response:
See Exelon response to PFBC Comment 4.

USFWS Comment 2:
We recommend that the 2010 animation for combined fish locations already provided by Exelon be expanded to present fish detection data for the entire 2010 study period.

Exelon Response:
See Exelon response to PFBC Comment 10.

3.6 Conowingo East Fish Lift Attraction Flows

American Rivers, MDNR, PFBC, and USFWS submitted comments on the Conowingo East Fish Lift Attraction Flows (RSP 3.6) initial study report.

MDNR Comment 1:
"The statistical analysis of the data is fundamentally flawed and precludes any judgment of the soundness of the conclusions on which these analyses are based. The fundamental flaws arise because the applicant attempted to relate power generation scenarios to fish passage without taking into consideration the many other variables that could potentially influence fish passage. Crucial variables that were ignored in the analysis include: 1) year, 2) day of year, and 3) hour of day. The annual variability in the population size of migrating shad is depicted in Figure 4.1-3 and the day to day variability is depicted in Figure 4.1-3 through Figure 4.1-12. Variability within individual days is also apparent in the data sets provided by the applicant.

Exelon Response:
This comment as well as several other comments all relate to the statistical analysis of the data contained in this initial study report. The PFBC, USFWS, and American Rivers have all stated similar comments in their individual report comment letters. Exelon proposes scheduling a meeting with the agencies to discuss the methods of statistical analysis and variables deemed by the agencies to be acceptable to all parties to portray the relationship between fish passage, station operation, and environmental conditions. After any additional analyses are completed, an updated study report will be reissued.

MDNR Comment 2:
The format in which the data were provided by the applicant was not amenable to independent review or analysis by stakeholders. Multiple excel spreadsheets of raw data with multiple tables per sheet would require significant organization before any review could be done. Ideally, a single large table of data that included all of the relevant variables potentially affecting fish passage as well as the fish passage data should have been provided. Presumably such a table was constructed by the applicant for the purpose of the analyses they carried out.

Exelon Response:
As part of the process where Exelon and the agencies meet and decide on the input variables and method of analysis, we will discuss the specifics of format presentation for raw data.

MDNR Comment 3:
A central question that the applicant needed to answer was, "is the project operation in any way related to successful shad passage if other sources of variation affecting shad passage are taken into account." The applicant chose to use several separate t-tests comparing an individual generation scenario to all others for their analysis. This was a poor choice of statistical method because it is unable to partition variance to any other factors potentially influencing shad passage, namely year, Julian date, or time of day. There is a tremendous amount of variation in shad numbers among years (annual range 19,914-193-574 fish), among dates within a year, and among hours within a day. Lumping all of these data into two blocks to be compared (i.e., 1 focal scenario vs. all 291 other scenarios) results in a high amount of within-group variability ("noise"). This swamps out the differences between groups ("signal") which is what we are trying to detect. There are much more appropriate statistical approaches available to the applicant which would amplify the signal to noise ratio by taking into account these other sources of variation in shad passage.

Exelon Response:

See response to MDNR Comment 1.

MDNR Comment 4:
A set of Pearson correlations was also conducted by the applicant to explore relationships between turbine generation schemes, EFL equipment settings, water temperature, and tailrace water levels with hourly American shad and gizzard shad passage. Correlations do not establish causation but can be a useful tool in data exploration. However, this approach suffers from the same drawbacks as described for the t-tests in that many other contributing factors may have prevented detection of significant patterns. A separate issue is that insufficient information about what data were included in the correlations precludes an understanding of the results. For example, correlations are typically done between two continuous variables to answer the question, how is x related to y? However, the applicant reports correlations between shad passage and aspects of operational conditions that are not clearly defined. For example, what does it mean that a particular turbine is correlated with fish passage? Did they use the duration of operation as a continuous variable or enter on/off as a binary variable (0/1) or use some other characteristic of turbine function? The same issue is evident with many of the correlations. Without further explanation, these results cannot be interpreted.

Exelon Response:
See response to MDNR Comment 1.

MDNR Comment 5:
More information is needed in order to know whether duration of turbine operations was included in the Pearson correlations. Individual turbines are included in the correlations, but it is not clear what aspect of turbine operation is being correlated with shad passage.

Exelon Response:
See response to MDNR Comment 1.

MDNR Comment 6:
River flow as a variable is discussed as one of the operational scenarios. "Minimum flow generation occurred nearly 47% of the time." Minimum flow regimes downstream of Conowingo Dam are listed earlier in the report. Natural river flow is minimum flow under some circumstances. River flow does not appear to have been used as a continuous variable in any of the analyses

Exelon Response:
River flow is not the appropriate variable to use as it relates to fish passage at a particular hydro station. We attempt to maximize American shad passage at the EFL at all station discharges. Since the capacity of the Conowingo station may be less than or greater than the actual river flow at a given time, the EFL operation is dictated by station discharge and not actual river flow. The sentence "Minimum flow generation occurred nearly 47% of the time." means that the station was discharging the lowest amount of water allowed under the current license.

MDNR Comment 7:
More information is needed to determine whether entrance gate velocity was examined in the correlation analysis. There is a variable called "gate setting" but it is not clearly defined. This was listed as a topic of study in the Revised Study Plan.

Exelon Response:
See response to MDNR Comment 1. The term "gate setting" refers to the opening of the entrance gate that is currently in use. The entrance gate gauges located in the EFL control room read in "percent open". For example, when an entrance gate is closed (full up position), the gauge reads "0" and when the gate is

open halfway, the gauge reads 50%. The entrance gate setting is adjusted according to the tailrace level which corresponds to specific turbine discharge scenarios.

MDNR Comment 8:
Table 4.2-2 – This table presents shad passage rates versus various turbine operation regimes, but does so only for 2010. It appears similar data are available for many other years; that data should also be presented in similar tables.

Exelon Response:
Exelon agrees that the data are available to produce similar tables for other years, and will be provided in the updated study report. Note that this table focuses solely on the peak American shad passage periods in 2010 which occurred during two 7-day periods; one in late April and the other in mid-May.

MDNR Comment 9:
Pg 12. The statement: "Historic data (2001-2009) and data from 2010…….show that the EFL is effective at attracting 73% of the American shad in the tailrace….." The statement implies that the historical data support the 73% figure, when, in fact, the 73% figure is solely from the telemetry study done in 2010. Neither the historical data nor any analyses presented in the report provide an indication of what is the EFL attraction percentage of upstream migrating shad

Exelon Response:
Comment noted. The 73% figure relates only to the 2010 radio-tagged American shad that were detected in the EFL. We will address this item in the updated study report.

MDNR Comment 10:
Pg 13. The final paragraph of the conclusion section presents the opinion of the authors that future efforts to improve passage should focus only on the EFL and not on plant operations. This opinion is based on analyses in the report which did not adequately address the objectives of this study, as elaborated on above, and is thus an unsubstantiated conclusion.

Exelon Response:
See response to MDNR Comment 1.

MDNR Comment 12:
The inadequate and inappropriate statistical analyses presented in this report should be deleted, and analyses conducted as described in the detailed comments above. Results of the revised analyses should be integrated with the findings of Study 3.5. Exelon should revise and amend the report in response to the comments provided here and provide a copy of the revised report to the stakeholders for final review.

Exelon Response:
See response to MDNR Comment 1.

3.7 Fish Passage Impediments Study

American Rivers, Maryland DNR, PAFBC, USFWS and Commission staff submitted comments on the fish passage impediments below Conowingo Dam study (RSP 3.7) study report.

FERC Comment 1:
"A two-dimensional hydraulic model (River2D) was developed to ascertain if areas in the tailrace and other portions of the river below Conowingo dam could present adverse velocity barriers under typical dam operation regimes. In the report, there is no explanation for initial and boundary conditions and model parameters of River2D. Please provide the information in detail. For the calibration of the River2D, we assume that the measured ADCP data were compared with the River2D simulation results. In the final study report, please clarify and provide figures and/or tables for the model calibration."

Exelon Response:
This information has been provided by Exelon in the Conowingo 3.16 Instream Flow Habitat Assessment below Conowingo Dam initial study report.

MDNR Comment 1:
"Exelon states "there is no evidence to suggest that extreme water velocities present a barrier to upstream migration of American shad or river herrings." However, modeling results show that at full generation (a frequent occurrence during the day during the migration period), velocities approach 8 fps in select areas in the channel between the west shoreline and Rowland Island as well as in the tailrace proper and to the east of the island (Fig. 4.2-12). Shad have a maximum burst speed of 13 fps (maintainable less than 15 sec.) and a prolonged swim speed of no longer than 200 minutes. This suggests at least a delay or fatigue factor that these fish would experience when encountering full generation flow vs. typical run-of-river flows that would occur under natural conditions. Exelon should examine the flow records when fish are moving and compare the amount of time fish experience full generation flow vs. natural river flow during the migration period (for 2010 and 2011 since that is when telemetry data are or will be available) and for average flow during the migration period".

Exelon Response:
Regardless of high velocities present in the areas specified by the MDNR comment, shad quite frequently migrated to the tailrace, indicating that they were not impeded. Figures are presented (Figures 4.2-2 through 4.1-8) in the initial study report that illustrate telemetered shad migration in relation to Conowingo discharge. There was no apparent relationship in movement versus flow regimes. Nevertheless, Exelon will examine the flow records when fish are moving and compare the amount of time fish experience full generation flow vs. natural river flow during the migration period and for average flow during the migration period. This analysis will be included in the updated study report.

MDNR Comment 2:
"Pg. 8: The Applicant should provide details of their model calibration with field data or reference the study that provides this information."

Exelon Response:
See Exelon Response FERC Comment 1.

MDNR Comment 3:
"Table 4.1-4: this table needs further explanation and annotation. The column labeled average speed does not correspond to the average distance over time, so it is unclear how this was calculated. The last 4 rows in this table have no explanation for the values there."

Exelon Response:
The table will be further annotated with explanations. The average speed was the average speed of individual trips and cannot be calculated with data from this table. The headings for the final five rows were inadvertently omitted and will be restored.

MDNR Comment 4:
"Fig. 3.2-1: Where is the ADCP data applicable to this figure? The Applicant should reference another study if it is contained elsewhere."

Exelon Response:
This information was provided by Exelon in the Conowingo 3.16 Instream Flow Habitat Assessment below Conowingo Dam initial study report.

PFBC Comment 1:
"Page 5, last paragraph, the use of the term "foray" here is unclear. Does this refer to forays from tidewater to the TR?"

Exelon Response:
"Foray" was used as a term for one trip upstream by a given telemetered shad from the tidewater area. It is simply used in place of "trip" and can be replaced with "trip."

PFBC Comment 2:
The report concludes that there are no barriers to fish passage in the river reach from Rowland Island to tidewater. However, the following statements in the Executive Summary contradict the report's conclusion.

"Based on model outputs for discharges of 10,000 and 40,000 cfs, there were relatively few areas within the river where velocities were greater than the burst speeds of American shad and River herring were evident; there were some isolated areas of velocities approaching, but not exceeding, six fps. American shad and river herrings exhibit burst swim speeds of at least, if not greater than, six fps. Predicted velocities for a discharge of 86,000 cfs did show more areas of higher velocities approaching as high as seven to nine fps. These highest velocities were concentrated primarily in the tailrace and both sides of Rowland Island. It is expected that if migrating fish enter these higher velocity areas, they will likely avoid overpowering velocity fields and swim around the areas."

These statements do not agree with the report's conclusion because they clearly show that burst swimming speed for shad and herring is exceeded when generation reached the upper limits of the dam's discharge. They also don't take into account that flows reach the 80,000 cfs range on at least a daily basis throughout much of the fish passage season. Likewise, these fish are constantly and repeatedly being challenged to exhibit burst speed swimming modes which under a free-flowing river would only be encountered occasionally and/or the fish would migrate to the edge of flows as they progressed upstream. The dam blocks all such movement so the fish are challenged again and again to negotiate much higher than natural flow velocities, thereby depleting their energy reserves. There is a reason why shad have a "burst" speed and a normal "swimming or cruising" speed. Burst speed was not intended to be their primary rate of swimming."

Exelon Response:
Exelon does not see a contradiction between the Executive Summary and Conclusion in the initial study report. Shad and alewife burst speeds are above 10 fps, while blueback herring was reported to be approximately 6.7 fps.

PFBC Comment 3:
Data from the shad telemetry study should be examined for evidence that the high velocities in the TR are or are not impediments.

Table 4.1-2 shows that most fish made multiple trips to the dam. This table lists the averaged data for the trips of each fish but an additional table should show the total time and trip distance traveled by each fish. Repeated, but failed attempts, of individual fish to find the fishway and pass the dam exacts a physiological toll. It is important to know the total distance and time traveled per fish in addition to their averaged time. It is also important to know the fate of whether the fish that made a greater number of trips were among those that perished on the way back down through the turbines and whether there is a relationship between the two events.

Data are listed by fish ID number. The data should be grouped in several different ways to make it easier to discern patterns in forays, swimming speed based on ambient and project influenced river flows, project discharge, time of day, day of week. We request that data be sorted in enough table outputs to show whether the day of the week and project discharge is related to swimming speed and number of forays. For example, on typical weekends, generation schedules are different (flow releases are usually less frequent and of lower volume and lesser fluctuation duration) than on weekdays when power demands are greater. If there are flow related influences on fish migration patterns towards the dam as table 4.1-4 suggest then low flow days, such as are typical of weekends, may show correlated migration activities."

Exelon Response:
The Appendix Table lists pertinent data for each migration upstream by telemetered shad. These data include date, time of day, time to reach an area and distance traveled and are sufficient to address the PFBC‟s comment "..an additional table should show the total time and trip distance traveled by each fish." As for determining the fate of telemetered fish which passed upstream of the Project, Conowingo Report 3.5 should be referred to for those data. Fish IDs were the same for both reports. Exelon will look at the data in ways suggested by the PFBC to ascertain if correlations can be discerned between variables indicated by the PFBC.

USFWS Comment 1:
"We request that the following information be added to the 2010 report. Update the radio telemetry analysis in 2011 with the results of Exelon's proposed 2011 American shad radio telemetry report. Examine the flow records when fish are moving and compare the amount of time fish experience full generation flow vs. natural river flow during the migration period (for 2010 and 2011 since that is when telemetry data are or will be available) and for average flow during the migration period. Provide details of the flow model calibration along with the field data or reference the study that provides this information. Further explain and annotate Table 4.1-4.

Exelon Response:
These comments and concerns were addressed in responses to the MDNR and PFBC above.

3.8 Downstream Flow Ramping and Fish Stranding Study

MDNR, The Nature Conservancy, PFBC, and USFWS submitted comments on the Downstream Flow Ramping and Fish Stranding Study (RSP 3.8) initial study report.

USFWS Comment 1:
We are concerned with the infrequent site visits (n = 12) and the timing of the imitation of the searches, well after first light. Although a consultant biologist noted fish predation by birds and that at times it was significant, there was no attempt to estimate fish loss to predation in the isolated pools and thus unavailable for observation during site visits. During the initial study report meeting when this study was discussed, the contractor did note that predation of fish by birds was observed. We note that stranding of fish in shallow pools increases the potential for predation by animals and birds and also stresses the trapped fish through confinement and exposure to degraded water quality. The mortality estimates presented in the report tables should be viewed as minimal estimates.

Exelon Response:
The number of site visits (n-12) were agreed upon and included in the FERC study plan. In addition, the spring and summer surveys were initiated in the very early morning. In the fall, surveys were initiated during mid-morning, but this was generally right after the cessation of morning generation flows. The FERC approved study plan did not include a provision for estimating fish predation by birds.

MDNR Comment 1:
Hydraulic conditions described in the report are not worse-case-scenarios. Page 7 of the report gives ranges for the dewatering of a 2.4 feet to 6.0 feet drop, which is a significant biological difference in habitat for fish. However, this difference was not evaluated based on the estimated potential stranding area and the relationship between difference in water depth and visual observations.

Exelon Response:
The 2010 study was conducted in accordance with the FERC study plan determination.

MDNR Comment 2:
It also appears that dead/alive status was not noted in the Tables for many important species and no explanation was provided.

Exelon Response:
For Tables 4.1.2-1, 4.2.2-1, and 4.3.2-1, under the last column labeled "Dead Fish Observed", if a value is not present under the Number (No.) column, no dead fish of that particular species were observed.

MDNR Comment 3:
This study did not attempt to quantify the total seasonal impacts of peaking and minimum flows on fish populations, especially river herring and American shad.

Exelon Response:
The total number of fish present in the tailrace or the exact number of a particular species is unknown, as fish move into and out of the tailrace for several reasons. No data were collected in any relicensing study that would allow an estimate of these fish populations. In addition, this type of analysis was not part of the FERC study plan determination.

MDNR Comment 4:

It should be noted that no data were collected during the winter months, a time when the Applicant is permitted to "no flow" for up to 6 hours twice per day. Recreational angler reports have indicated significant stranding of walleye during this time period (Sadzinski, MD DNR personal communication).

Exelon Response:
The surveys were conducted as stated in the FERC approved revised study plan Task 2- Conduct field studies to identify if and when fish stranding occurs. The approved study plan did not involve conducting winter surveys. Also, the survey area is extremely rugged and was difficult to survey during optimal weather conditions which would preclude survey teams from safely studying the area in winter.

MDNR Comment 5:
The report was very vague on when the last stranding event occurred prior to the search for fish. A longer delay likely leads to fewer observed fish stranded because of removals by birds, etc. The daily flow graphs were provided but when the study was conducted was not noted on these graphs.

Exelon Response:
The daily flow graphs will be modified to signify when the individual surveys were conducted.

MDNR Comment 6:
There was no discussion of habitat area versus stranding, although a map was provided that detailed the habitat types (Figure 2-1).

Exelon Response:
The main purpose of the study as outlined in the revised study plan was to document fish stranding and locations of where the stranding occurred. Areas of fish stranding and pools were marked using GPS coordinates.

MDNR Comment 7:
The impact to fish populations is not clearly presented. The 1% mortality noted on page 16 only quantitatively estimates the number, but in no way estimates the total impact to fish populations. In fact, on page 16 it is stated "Stranding of these abundant species provides abundant forage for numerous bald eagles and great blue herons when nesting and rearing young. Further, at least for carp, stranding leads to substantial spawning activity in many spillway reach pools." This statement contradicts itself because it implies that stranding which is lethal to many fish, is beneficial to one species because it increases spawning. The alternative hypothesis is not presented– fish will spawn in unsuitable habitat, under poor spawning conditions when no alternative is available to them.

Exelon Response:
Refer to Exelon response to MDNR Comment 3. The statement relating to carp spawning is not implying that stranding is beneficial to carp spawning, but rather noting that a large amount of carp spawning activity was observed during some of the survey periods.

MDNR Comment 8:
There was no historical perspective of stranding presented in the report, including records of fish kills due to stranding and or low oxygen levels since the dam began operation.

Exelon Response:
The occurrence of some fish kills was noted and described in the PAD. This item was not part of the FERC study plan determination.

PFBC 2011 Study Recommendations (see also MDNR and Nature Conservancy 2011 Study Recommendations):

Observational and mapping studies to determine potential for stranding of American shad and river herring due to rapid decrease in flow from the project and use of operational and/or structural modifications to mitigate impacts stranding.

This issue should be studied by a bathymetric survey, aerial or on-the-ground photography at various levels of low flows to locate such pools and determine at what flow levels they become isolated. Field observations of fish species and abundance in isolated pools would be conducted twice weekly during spring (14 surveys). This study would also suggest potential mitigating measures to prevent fish kills, such as operational modifications or structural modifications that would allow paths of egress for fish that would otherwise be trapped in pools.

Exelon Response:

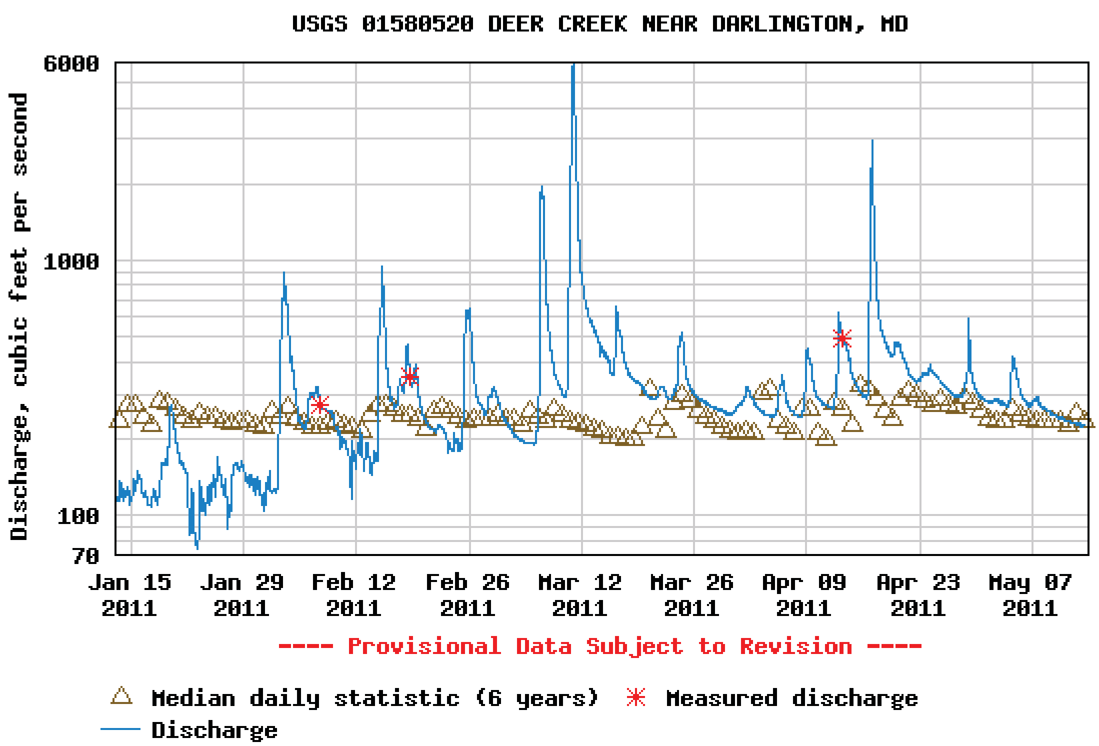
Exelon believes the spring, summer, and fall stranding studies conducted in 2010 were sufficient to determine the scope of project impacts on the stranding of American shad and river herring, as well as other species. In accordance with the FERC study plan determination, a total of 12 stranding surveys were conducted during the spring migration season, it is unclear what the additional surveys proposed would add in terms of new information. Exelon believes it would be more constructive to use the existing River2D hydraulic model, developed as part of Study 3.16 Instream Flow Habitat Assessment below Conowingo Dam, to delineate the area and locations dewatered under various minimum flow/generation flow combinations.

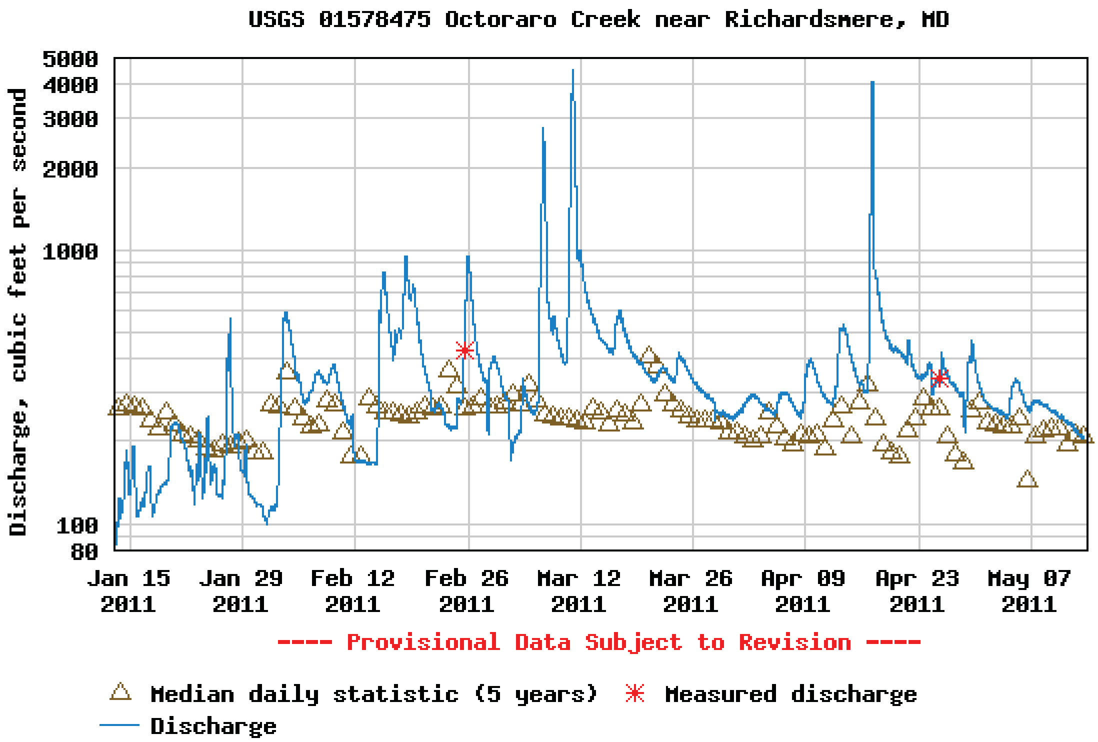
3.10 Maryland darter surveys

USFWS, MDNR, and PFBC submitted comments on the Maryland darter surveys (RSP 3.10) initial study report.

USFWS Comment 1:
"We request that the original sampling plan that included winter and early spring sampling for Maryland darter, by means of electrofishing and seining in the tributary streams, be completed in the coming year. Since Exelon's consultants did not conduct creek sampling in December 2010, January, 2011, March, 2011 and April, 2011, for varying reasons, an additional winter/early spring sampling effort in the study creeks should be conducted from December, 2011 through April, 2012."

Exelon Response:
The approved study plan stipulated the following: "Winter sampling, particularly in the river, will be flow and weather-dependent". Sampling in Deer and Octoraro creeks during winter by the combined electrofishing/seining technique was not possible due to ice in the streams (December-February) and high flows. However, sampling was conducted in the main river during January and February. Stream flows over much of the winter/spring period were unsafe and did not allow for the application of the electrofishing/seining technique. In both Deer and Octoraro creeks, effective use of the electrofishing/seining gear requires flows below 200 cfs, and preferably below 150 cfs. For most of January and February, and then constantly through mid May, flows in both streams were above 200 cfs with spikes up to 6,000 cfs (Deer Cr.) and up to nearly 5,000 cfs (Octoraro Cr.) (see streams flow history below). In 2011, sampling is scheduled to occur in the creeks via electrofishing/seining and snorkeling during the week beginning 22 May. Exelon believes the frequency and intensity of sampling conducted thus far is appropriate, and there is no need for additional sampling beyond that which has already been proposed in the approved study plan.





USFWS Comment 2:
"…Exelon should provide the Service all original sampling data from the 2009-2010 Maryland Darter survey effort, upon which its study was designed to build upon and supplement, so that the sufficiency of sampling dates and effort can be determined."

Exelon Response:
Exelon did not conduct any Maryland darter sampling prior to this survey (begun in October 2010). All data collected to date for Exelon were provided in the initial study report. USFWS may be referring to work supported by MDNR and USFWS. If available, those data will be included in the updated study report.

MDNR and PFBC Comment 1:
"It is interesting to note that the Susquehanna River sites of the Maryland darter surveys only produced a single species; the tessellated darter. However, in study 3.8 (Downstream Flow Ramping and Fish Stranding Study) three species of darters were found; the greenside darter; banded darter; and tessellated darter. The sites for the official darter survey were all downstream from Rowland Island while the stranding studies were conducted upstream and to the east of Rowland Island. This may suggest that the spill pool area is better darter habitat or that darters get stranded at higher rates than other species or that the sampling method chosen for the official darter survey was not effective enough to find the other darter species or perhaps there are habitat differences between the two study areas that are more or less preferable to darters."

Exelon Response:
That the Maryland darter survey produced one species during the winter (January) sampling in the lower river through use of only one gear type while three species were recorded in the summer/fall further upriver was not surprising. The issue is entirely gear related. Tessellated darters are more likely to be found in areas with softer (sand, silt) bottoms where the electrified benthic trawl is more effective. On

coarser substrates (e.g., uneven bedrock/boulder) where the other species are more likely to occur, the trawl can't fish as effectively right on the bottom. We anticipate the collection (or observation) of at least five darter species in the river when the combination of sampling techniques can be used. In previous work supported by MDNR, Dr. Richard Raesly has recorded five darter species in the river below the Deer Creek confluence. Access to reaches of the river near the mouths of the creek is anticipated for the spring-fall sampling periods. We will include the reach between the mouth of Octoraro Creek and Conowingo Dam if it can be accessed safely.

MDNR and PFBC Comment 2:
"The Chesapeake logperch, a rare species in Pennsylvania, was found at both the Deer Creek and Octoraro Creek sites but was not found at the Susquehanna River sites. Based on the example presented above regarding other darter species we suspect that a more intensive survey of the spill area would produce occurrences of the Chesapeake logperch."

Exelon Response:
For the same reasons explained in the response to MDNR Comment 2, we anticipate recording Chesapeake logperch in the river when the combination of planned gear types can be implemented in spring, summer, and fall 2011.

MDNR and PFBC Comment 3:
"Any darters that were vouchered during the stranding study should be re-checked to ensure their species identification is correct, with special attention paid towards possible misidentification of the Maryland darter and Chesapeake log perch."

Exelon Response:
No voucher collections were made, however the recognized expert with Maryland darter, Dr. Richard Raesly, Frostburg State University, is our lead Technical Expert and has participated in all sampling. Representative photographs will be taken during future sampling to demonstrate species identification accuracy.

3.11 Hydrologic Study of the Lower Susquehanna River

FERC and SRBC submitted comments on the Hydrologic Study of the Lower Susquehanna River (RSP 3.11) study summary.

FERC Comment 1:
"In table 2, you provided daily average low-flow statistics for US Geological Survey (USGS) gages at Marietta (No. 01578310) and Conowingo (No. 01576000). The results show that Conowingo tended to experience drier low-flow periods, although the drainage area of Conowingo is larger than that of Marietta. There is no explanation, however, for the low-flow analysis in the report. In the final study report, please provide a detailed explanation of the low-flow statistics for the Marietta and Conowingo gages."

Exelon Response:
The low-flow statistics are explained more fully in the initial study report (issued May 2011).

SRBC Comment 1:
"[Objective] 1) Describe the history of flow management practices in the lower Susquehanna River basin. This task is incomplete."

Exelon Response:
The initial study report, filed in May 2011, includes a flow management timeline and detailed list of major water users in the lower Susquehanna River.

SRBC Comment 2:
*"[**Objective] 2: Perform a statistical analysis to describe the lower Susquehanna River flow regime.** Objective 2 of the ISR Summary does not fully describe the Lower Susquehanna River Flow Regime. It only compares flow between the Marietta and Conowingo USGS gages; it does not include frequency distribution of 30-minute and daily flow levels, or fluctuations in seasonal flow."*

Exelon Response:
The initial study report submitted in May 2011 contains several statistics not shown in the study summary, including frequency distributions of 30-minute and daily flow levels. Additionally, monthly flow distribution curves and IHA-RVA analyses are shown in the initial study report, which both assess seasonal flow fluctuations.

SRBC Comment 3:
"[Objective] 3) Evaluate changes in Conowingo Project operations since a) minimum flow requirements were established (1989) and b) energy deregulation laws came into effect (1998). Only basic results are presented in the summary; a more detailed analysis of results will need to be performed upon completion of the task. The presentation of sub-daily data results is important and encouraging; however, Exelon also offers finding about annual flows and daily average metrics. SRBC staff cautions Exelon and FERC that any variations to the parameters can likely be attributed only to the varying flow patterns that were present on the Susquehanna River pre- and post-deregulation. The nature of the operation of the dam and the limited storage preclude significant alteration of daily average and annual flow characteristics."

Exelon Response:
Exelon‟s initial study report (May 2011) contained more detailed analyses comparing pre and post-deregulation periods. While sub-daily flow comparisons are the best way to compare pre and post-deregulation operations, Exelon provided additional daily average and annual flow statistics in order to present a more thorough and complete context to the analysis.

The sub-objective comparing Project operations prior to and after the minimum flow requirement establishment was removed from the submitted ISR for two reasons. First, the sub-objective of comparing flow records pre and post-minimum flow was not specified in RSP 3.11. The RSP did state that the minimum flow establishment should be discussed in the flow timeline, which Exelon complied with. Secondly, the Conowingo USGS gage had no sub-daily flow data prior to 2/2/1988, providing less than one year of data on which to base pre-1989 minimum flow settlement statistics. Exelon determined that this was an inappropriate amount of data upon which to base flow comparisons, and was thus unable to assess flow regime changes following the implementation of minimum flow requirements. While a reasonable amount of daily flow data were available, a daily timestep would provide no insight to Conowingo‟s sub-daily peaking impacts or flow fluctuations.

SRBC Comment 4:
*"**[Objective] 4) Confirm the accuracy of the Conowingo USGS gage.** The effort presented in response to this task does not validate the accuracy of the Conowingo USGS gage. The project sponsor indicates that the dam was releasing (at peak times) approximately 40,000 cubic feet per second (cfs), but the USGS gage recorded values ranging from 31,800 cfs to 47,000 cfs. The downstream stage recorders were likely not capable of discerning the slight change in stage that would accompany small discharge variations in a mile-wide channel."*

Exelon Response:
As detailed in the initial study report (May 2011), Exelon assessed the gage accuracy and was not able to confirm that the gage was providing accurate flow observations. To the contrary, Exelon found that under certain flow conditions it appeared that the USGS gage may be reporting a substantial flow error. Investigations indicated that there may be individual turbines influencing the gage readings. This seems likely, as the gage is located on the downstream face of the dam immediately next to where one of the turbines discharges.

SRBC Comment 5:
*"**[Objective] 5) Develop a bathymetric map of the tailwater area below Conowingo Dam.** The map presented in the summary depicts water depth at a flow of 86,000 cfs, or full generation. More useful would be a contour map of the river bottom, or water depths depicted at seasonal minimum release flows."*

Exelon Response:
A contour map of the riverbed was created, but because of the study reach‟s irregular riverbed it was difficult to interpret. Thus, Exelon provided a map of the river bottom in the form of a thermal (colored) plot in the initial study report (May 2011).

SRBC Comment 6:
"[Objective] 6) Conduct operations modeling production runs to evaluate various operation scenarios to understand how operation changes may impact water use in the Lower Susquehanna River. As stated on page 12 of the February 4, 2010, letter from FERC to Exelon, the project sponsor was to provide a comprehensive list of operation alternatives so that potential benefits to downstream reaches of operation could be evaluated. This comprehensive list of operation alternatives was not provided in the ISR Summary, although the model was characterized as undergoing final enhancements."

Exelon Response:
The initial study report submitted in May 2011 to FERC did not contain any operations modeling production runs, though a brief model description was submitted. Exelon will submit to the stakeholders a separate stand alone reports describing the details of the operations model. The report(s) will describe

model methodology, model calibration, and a “baseline” model production run. Exelon will consult with stakeholders in designing additional model production runs based on alternative operation schemes proposed.

3.13 - Study to Assess Tributary Access in Conowingo Pond

MDNR submitted comments on the Study to Assess Tributary Access in Conowingo Pond (RSP 3.13) initial study report. These comments were endorsed by US Fish & Wildlife and partially endorsed by PA Fish and Boat Commission.

MDNR Comment 1:
"Impediments to boat access appear to be well identified as specified in the first goal of the study. However, Goal #2 is limited to a general discussion of some previous studies which were focused on anadromous species and may not fully consider use by other species. There is no discussion of Goal #3, mitigation."

Exelon Response:
Use of Conowingo tributaries by other species (other than anadromous species) was addressed in section 3.3 of the initial study report. A discussion on mitigation was not included because there is no need for mitigation at the pond elevations commonly encountered (elv.107.2-109.2 NGVD) by recreational boaters during the peak recreational periods. Potential enhancements for recreational access will be addressed in the Recreation Management Plan.

MDNR Comment 2:
The Applicant should determine if restricted access is due to permanent features such as bedrock or riffles or if channels and ramp approaches are restricted due to excessive sedimentation. Unconsolidated sediments could be mitigated through dredging.

Exelon Response:
The shoaling observed at ramp approaches in Peters Creek, Conowingo Creek and Muddy Creek is primarily due to excessive sedimentation. Refer to Conowingo RSP 3.26.

3.14 Debris Management Study

MDNR submitted comments on the Debris Management Study (RSP 3.14) initial study report.

MDNR Comment 1:
The Applicant's RSP stated that one purpose of this study was to "analyze hydrologic conditions that initiate debris management actions". We supported this proposed analysis in order to illustrate typical river flow "triggers" that transport a significant quantity of debris to the Project and initiate debris management actions. However, the Applicant's study failed to address this. In their study report, the Applicant simply plotted the average monthly flow versus the annual quantity of debris (see Figure 4.3-1) and concluded that the figure "suggests the lack of obvious trends from the limited data available". The methodology utilized in this study does not provide any useful information regarding hydrologic conditions that initiate debris management actions.

Exelon Response:
The limiting factors in the debris study analysis are data availability and quality, not methodology. The first step in analyzing hydrologic conditions initiating debris management actions is to compare hydrologic data of the Susquehanna River with quantities of debris removal. This was accomplished by plotting quantities of debris collected at Conowingo Dam versus average monthly flows of the river measured at USGS gage No. 01576000 (Susquehanna River at Marietta, PA). Figure 4.3-1 in the initial study report depicts these data. Available quantitative data of debris collected from all four hydroelectric facilities of the lower Susquehanna River are provided in the initial study report and are limited. York Haven Hydro Station reported a 1985 estimate of 5,000 cubic yards of debris entering the headrace on an annual basis and a current estimate of debris removal of up to 25 cubic yards per year (letter dated October 9, 2010; Appendix B). Safe Harbor Water Power Corporation provided annual quantities of removal at Safe Harbor Dam (letter dated August 11, 2010; Appendix B). These data are given in Table 4.4.2.2-1 of the initial study report. PPL Holtwood, LLC reported 100 to 150 tons of wood debris annually removed at Holtwood Dam (letter dated November 8, 2010; Appendix B). Current data available directly from Conowingo Dam is reported in Table 4.2-2 (2006-2009) on an annual basis. Additionally, data of annual removal quantities for 1989 through 1998, as provided in a letter to FERC from the Project dated March 24, 1999, are reported in Table 4.2-1. Available data are recorded as annual totals and therefore cannot be correlated with monthly river flow. However, it is still possible that a large-scale megascopic correspondence of annual removal quantities with river flow might be evident in the data. A review of the data found that this was not the case. Therefore, as stated in the initial study report, the data in Figure 4.3-1 "suggests the lack of obvious trends from the limited data available."

Also, an editorial note, after reviewing Table 4.2-2 and Figure 4.3-1 Exelon realized the dumpster load calculations in the Table are incorrect. They should be as follows from 2006 through 2010 (1590, 2130, 1380, 2640, 1170) and the asterisk under the table should read: Each dumpster load is approximately 30 cy, each skimmer load is approximately 12 cy. These corrections will be made in the updated study report.

MDNR Comment 2:
The Applicant's RSP stated that a purpose of this study was to "identify and evaluate potential improvements". In addition, under Task 2: Debris Management Assessment of the RSP, the Applicant states: "Current debris management practices will be evaluated" and "debris management practices at other hydroelectric facilities……will be evaluated." However, it does not appear the study report has evaluated any other potential improvements. The Applicant's study report discusses: 1) current and historical debris management practices at the Project, 2) current debris management practices at the three upstream impoundments, and 3) debris management practices at select FERC relicensing projects. According to the study report, the Applicant currently utilizes two gantry cranes with grapple attachments

to remove debris from the intakes, as well as floating surficial debris from in front of the dam. Previously the Applicant has used a self-propelled skimmer barge to capture floating debris; however, the device was retired in 2008. The study report also identifies several debris management practices being utilized at the other facilities; such as trash rakes, collection efforts in the impoundment, skimmer walls and mechanical skimmer boats. However, the Applicant did not evaluate whether or not these current practices could improve debris management at the Project, they only reported them.

Exelon Response:

The RSP states study purposes are to "review debris management practices to ensure they are consistent with best management practices" and "if not consistent with best management practices, assess need for additional practices to reduce impacts to Pond and downstream users." To establish best management practices for debris removal at similar facilities, Exelon requested information on debris management practices employed at the three upstream hydroelectric facilities (York Haven, Safe Harbor, and Holtwood) from the facility operators. Responses to Exelon‟s request for information will be provided in Appendix B of the initial study report and summarized in the main text of the report in Section 4.4.

When available, debris management practices for FERC projects are readily accessible and represent current practices. Therefore, Exelon also reviewed debris management practices reported at projects that recently underwent FERC relicensing. To be relevant to the Conowingo Project, projects in the mid-Atlantic region of the country were examined (Claytor Lake Hydroelectric Project and Smith Mountain Hydroelectric Project, both in Virginia). In addition, the FERC filing of the Smith Mountain Project reported on the findings of a survey of facility operators and debris management plans filed with FERC. The debris management practices implemented at these facilities are also summarized in Section 4.4.

The review of the debris management practices of the three upstream facilities and other recent FERC relicensing projects indicates that the practices implemented at Conowingo Dam (described in Section 4.4) are similar to, and consistent with, the typical best management practices of other hydroelectric facilities. Exelon fulfilled the purpose stated above of reviewing debris management practices to ensure they are consistent with best management practices. Since Conowingo Dam practices are consistent with other facilities, it was not necessary to assess the need for additional practices.

3.15 Sediment Introduction and Transport (Sediment and Nutrient Loading)

FERC, SRBC and the Riverkeeper submitted comments on the Sediment Introduction and Transport (RSP 3.15) study summary.

FERC Comment 1:
A HEC-6 model was employed to calculate water surface and sediment bed surface profiles by computing the interaction between sediment material in the streambed and the flowing water-sediment mixture. The HEC-6 model was simulated to support the record of suspended sediment grain sizes transported past Conowingo dam and deposited in the upper Chesapeake Bay during four major storm events. In the report, however, there is no explanation for initial and boundary conditions and model parameters of the HEC-6 model. In the final study report, please provide a detailed description of this information and its calibration.

Exelon Response:
The HEC-6 model was developed and calibrated by the USGS (Hainly et al 1995)[1]. The model was hydraulically calibrated by the USGS for 1987 (calendar year) flows and closely replicated the high water profile of the 1972 Tropical Storm Agnes. Sediment transport was calibrated to estimates of monthly and annual inflows and outflows of sediment loads for calendar years 1987-89.

Inflow and outflow loads and the reservoir trap efficiencies for the calibration period were computed. According to the USGS, the model initially appeared to under-predict reservoir traps efficiencies for 1987 when compared to other models (Cohn et al 1989)[2] and empirical concentration and flow data. The USGS subsequently revised the model by having more coarse sediment enter the system. The available output data of the revised model for the three reservoir system as a whole, for the calibration year of 1987 and verification years of 1988 and 1989, is provided in Table 3.3.2.6-1 of the initial study report. Overall, the calibration data are limited, and were not available from the USGS.

The above information is described in the initial study report issued in May 2011. Exelon will also provide the HEC-6 model input data that was received from USGS in the updated study report.

---

[1] Hainly, R.A., L.A. Reed, H.N. Flippo, Jr., and G.J. Barton, 1995. Deposition and Simulation of Sediment Transport in the Lower Susquehanna River Reservoir System. United States Geological Survey Water-Resources Investigations Report 95-4122. 39p.

[2] Cohn, T.A., L.L. Delong, E.J. Gilroy, R.M. Hirsch, and O.K. Wells. 1989. Estimating constituent loads. Water Resources Research. 25(5):937-942.

3.18 Characterization of Downstream Aquatic Communities

MDNR and PAFBC submitted comments on the Characterization of Downstream Aquatic Communities (RSP 3.18) initial study report.

MDNR Comment 1:
The study only reviewed the percent contribution of the dominant taxa to the total. An analysis of this sort will not capture a total decline in the population, if the rates of decline in the dominant taxa are similar to each other. An additional summary of the total abundance patterns and abundances of the dominant taxa would address this concern.

Exelon Response:
A summary of the total abundance patterns and the abundances of the dominant taxa is possible for the years 1982 – 1984, where standing crop data are readily available. This information will be included in the updated study report.

MDNR Comment 2:
The applicants' treatment of the characterization of the current aquatic community below Conowingo Dam was incomplete. A summary and interpretation of abundance patterns observed during the early years of the dam operating under minimum flow requirements would have added a great deal to the characterization. A current survey of macroinvertebrates below the dam would provide vital information as to the current status of the benthic community and could be used to examine the achievement of the current flow regime requirement since its establishment in the 1980's and 1990's; this data is a least twenty years old. Changes in flow ramping, fish assemblage and water quality all likely have affected species diversity and abundance below Conowingo Dam. Since there have been significant changes in these factors, the present state of macroinvertebrates is unknown.

Exelon Response:
The FERC Study Plan Determination required Exelon to utilize existing empirical data to characterize macroinvertebrate and resident fish populations below Conowingo Dam, including assessments of reproduction, growth, and behavior. Exelon believes the data and analysis contained in the initial study report accomplish this objective. The initial study report provides an accurate list of taxa that are currently present below Conowingo Dam, as well as historical trends in taxa composition. In addition, Study 3.16-Instream Flow Habitat Assessment below Conowingo Dam analyzes the available habitat over a range of Project flows for several additional taxa identified by resource agencies. Any additional study, such as analysis of abundance patterns observed after the initiation of the current minimum flow regime, would do little to inform the development of new license conditions.

MDNR Comment 3:
It should be noted that the EFL and West Fish Lift (WFL) likely do not catch fish in relative abundance to the tailrace, especially the resident species (as noted on page 10-2). In addition, river herring and hickory shad are present in significant numbers below Conowingo Dam and are rarely caught in the lifts, which is likely due to exclusion due to high attraction flow coming through the lifts.

Exelon Response:
Some gear bias and selectivity is inherent for each of the gear types used in the analysis. It is not stated in the text that the catch of fish at the EFL and WFL are in relative abundance to the tailrace but rather the fish lift catches provide a "*baseline indicator of the dominant species in the lower Susquehanna River*. The „baseline" fish lift catches are bolstered by the additional studies utilizing other gear types (electrofishing, gill nets, ichthyoplankton, fish stranding). As stated in the introduction, (page 22) "*These*

data augment the fish lift collections in providing a more detailed spatially and temporally diverse characterization of the downstream fish populations in regards to species assemblage, condition, and habitat use. These studies included electrofishing, gillnet and ichthyoplankton sampling efforts from Conowingo Dam to the tidal zone just below Spencer Island."

MDNR Comment 4:
There was no mention of gear selectivity and efficiency of one gear type or survey versus another (see Table E-17). In addition, on page 10-2 killifish were abundant below Conowingo Dam but never caught in the lifts.

Exelon Response:
Some discussion about differences in gear types and relative effectiveness will be added, although gear targets are fairly obvious- ichthyoplankton young fish, gill nets (larger fish), electrofishing (larger and smaller fish). The purpose of including the additional studies is the potential provision of accounting for species that would otherwise not be noted by the fish lifts such as a killifish.

MDNR Comment 5:
Evaluate total abundance patterns and abundances of the dominant taxa.

Exelon Response:
Exploration of abundance patterns in the context of CPUE (i.e. normalized abundance) exists within the in the initial study report. For example, the following section is from the East Fish Lift section (page 55-56):

In all years combined (1991 to 2009), gizzard shad account for 86% of all fish collected (Table 5.3.2-2). In 1992, 2,351,351 gizzard shad were collected, the most of any species in any year (Table 5.3.2-2). In 1992, the highest CPUE for gizzard shad also occurred (3,925 fish per lift, Table 5.3.2-2). Routinely, American shad were the second most frequently collected species at the EFL. From 1991 to 2009 American shad comprised 7% of the overall catch per lift (Table 5.3.2-2). The proportional abundance of American shad CPUE at the fish lift ranged from 31% in 2000 to less than 1% in 1992 (Table 5.3.2-2). In 2001 the highest CPUE of American shad occurred (346 fish per lift, Table 5.3.2-2) and the lowest CPUE of American shad occurred in 1993 (10 fish per lift, Table 5.3.2-2). From 1991 to 2009, blueback herring comprised 4% of the overall CPUE at the EFL (Table 5.3.2-2). In 1997, 1999 and 2001 significant catches of blueback herring were made. In 2001, 510 herring per lift were collected (Table 5.3.2-2), the highest amount in any year and the second most proportionally abundant species that year after gizzard shad.

MDNR Comment 6:
Provide a summary and interpretation of abundance patterns observed during the early years of the dam operating under minimum flow requirements.

Exelon Response:
See Exelon Response to MDNR Comment 2.

MDNR Comment 7:
Conduct a current survey of macroinvertebrates and fish below the dam to indicate the current status of these populations since minimum flows were implemented in the late 1980's. FERC indicated they "may recommend field work in 2011 if the final literature-based study report does not provide enough information on the aquatic community to evaluate operational changes to the project". We believe that the historical data presented, which is over 20 years old, has not accurately indicated the current status

of macroinvertebrate and fish populations below the dam and the operational changes that have occurred since those surveys were conducted. See our study plan request for details.

Exelon Response:

The FERC Study Plan Determination required Exelon to utilize existing empirical data to characterize macroinvertebrate and resident fish populations below Conowingo Dam, including assessments of reproduction, growth, and behavior. Exelon believes the data and analysis contained in the initial study report accomplish this objective. The initial study report provides an accurate list of taxa that are currently present below Conowingo Dam, as well as historical trends in taxa composition. In addition, Study 3.16-Instream Flow Habitat Assessment below Conowingo Dam analyzes the available habitat over a range Project flows for several additional taxa identified by resource agencies. Any additional study, such as analysis of abundance patterns observed after the initiation of the current minimum flow regime, would do little to inform the development of new license conditions.

PFBC Comment 1:

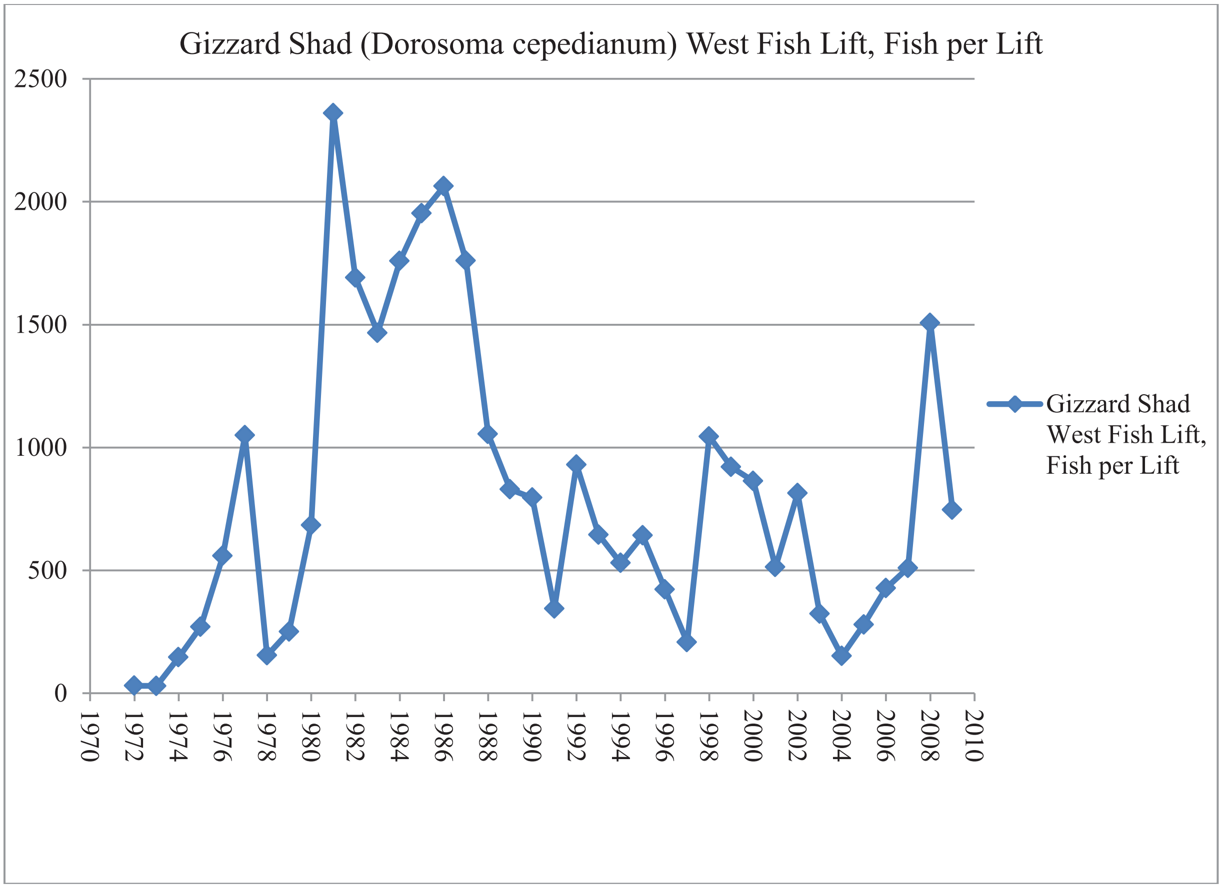
Page vi: "Smallmouth bass age and growth below Conowingo Dam were evaluated over a 4-year period from 1980 to 1983 (RMC 1985a). Mean fork length data depict a typical growth pattern. Based on mean FL attained by Age 4 (366 mm), most smallmouth bass were recruited to the harvestable population below Conowingo Dam (~305 mm TL) during their 4th year of life. Growth of smallmouth bass below Conowingo Dam was similar to or greater than that reported for several waters in PA and MD (RMC 1985a)." These data were collected in 1980 to 1983, before the explosion in gizzard shad abundance. More recent data is needed to evaluate smallmouth bass age and growth after the explosion in gizzard shad.

Exelon Response:

It‟s apparent from the data that a gizzard shad population spike occurred in the mid-70‟s. When the smallmouth bass collections for age and growth occurred, peak gizzard shad CPUEs were collected at the WFL, indicative that high gizzard shad population growth had and was occurring (i.e. samples not collected before but rather during the referenced explosion). In the executive summary (page3): "*Gizzard shad became the dominant species in 1977 and retained its dominance over the next three decades*."

Smallmouth bass exhibited a similar length weight for fish sampled in 2010 to those in the early 80‟s (Section 9, slope of length weight relationship is approximately 3% less than 80‟s collections). The similarity in length and weight relationship suggests continuity in the age and growth relationship of smallmouth bass between the two time periods.

Species	No.	CPUE	%	Rank
1972	24,849	30	10%	4
1973	45,668	30	4%	5
1974	119,672	146	7%	3
1975	139,222	271	15%	2
1976	382,275	559	33%	2
1977	742,056	1,050	63%	1
1978	55,104	154	20%	2
1979	75,553	251	38%	1
1980	275,736	684	74%	1
1981	1,156,662	2,361	85%	1
1982	1,226,374	1,692	61%	1
1983	950,252	1,466	92.4%	1



PFBC Comment 2:
Page viii: "Although several species have increased or declined in abundance, the fish species assemblage has remained moderately rich below Conowingo Dam with the same core group of species as was observed in the 1980's, and it is therefore inferred that diverse trophic interactions are supported." Such an inference is conjecture, not supported by data. The term "moderately rich" is not defined.

Exelon Response:
The data supports a finding of (pg 140) "A core assemblage consisting of gizzard shad, white perch, common carp, quillback, comely shiner, channel catfish, walleye, smallmouth and largemouth bass along with seasonal migrants like American shad, blueback herring, alewife, sea lamprey and striped bass form the primary group of inhabitants."… (pg 139) "The species assemblage of both the EFL and WFL catches, dominated by gizzard shad, channel catfish, common carp, and white perch, were similar to those observed in electrofishing, gill net, and ichthyoplankton sampling conducted below Conwowingo Dam during the 1980‟s" and establishes a nexus between the current fish lift catches and the special studies completed in the 80‟s. The dominant species were the same in all studies in the 80‟s and continue to dominate the catch in the fish lift today.

Section 7 analyzes the connection between the macro invertebrate community and the fish population (i.e. diverse trophic interaction). Although „inference" may be an inappropriate word, data in Section 7.1 "Fish Food Habits Below Conowingo Dam" provides evidence that diverse tropic interactions are supported. For example (page 119):

"The benthic invertebrate studies summarized in Section 4 noted which autochthonous food items (organisms originating from the sample locations) appeared most often in stomachs of some of the resident fishes below Conowingo Dam. Detailed stomach analyses of individual white perch, channel catfish and yellow perch taken by electrofishing in the tailrace below Conowingo Dam July through December 1982 and 1983 were reported by Weisberg and Janicki (1985). Small zooplankters were abundant in white perch stomachs, but caddisfly larva (Cheumatopsyche) and chironomid larva were more important on a frequency basis, with caddis larvae most important based on percent of the biomass eaten. Chironomids were most important to channel catfish numerically and on a frequency basis. However, similar to white perch, caddis larva formed most of the diet biomass. The amphipod Gammarus was the most important food of yellow perch."

As part of an Indicators of Biotic Integrity (IBI) under development by a consortium of agencies and Penn State University[3], rivers with >25 species were denoted to have „excellent" IBI for a large stream (i.e. > 20M). Species richness documented at the fish lifts is a good baseline indicator of the available taxa in the lower Susquehanna River. Moderately rich is an appropriate term for fish lift catches that average 40 taxa (West) and 33 taxa (East) per year relative to other rivers in PA (based on the categorization of <25 species as excellent).

As part of an IBI developed in MD[4], the calculated, „expected" value for the area near Conowingo would be 32 native species based on the watershed size.

*expected value species richness = m * log(watershed area in acres) + b.*
where m (slope) = 5.5701 (Eastern Piedmont)
watershed area in 17,600,000 acres (log watershed = 7.245513)
b (intercept)= -8.1135
*5.5701*7.245513+-8.1135= 32.2447301109916*

The species richness adjusted value from the IBI = observed value/expected value; in 100% of years at the East fish lift the score would be > 1.02, giving the area the highest rank of „5". Though, the IBI uses native species only for accounting species richness value, 36 of the species that have been collected at the fish lift are native to the lower Susquehanna[5]; accounting for only native fishes excludes many of the common game fish: largemouth & smallmouth bass, walleye, channel catfish, bluegill, pumpkinseed, etc.

By the metrics produced by PA & MD for their respective IBIs, the species richness at Susquehanna could reasonably be labeled „moderately rich".

---

[3] http://www.fish.state.pa.us/anglerboater/2010ab/vol79num4_julaug/05assess.pdf
[4] Roth, N. E., & Maryland. (2000). Refinement and validation of a fish index of biotic integrity for Maryland streams. Annapolis, Md: The Dept.
[5] (Native species list: SUSQUEHANNA RIVER MANAGEMENT PLAN Pennsylvania Fish and Boat Commission, Bureau of Fisheries, Division of Fisheries Management, 1601 Elmerton Avenue, P.O. Box 67000, Harrisburg, PA 17106-7000; http://www.fishandboat.com/water/rivers/susquehanna/susq_plan_2011_draft.pdf) and http://www.srbc.net/stateofsusq/documents/MDFishConservationFeatureArticle.PDF

PFBC Comment 3:
A number of figures suggest that there have been changes in the fish community since the original studies in the 1980's:

o White perch CPUE in the west fish lift is down (Figure A-15).

o Channel catfish CPUE in the west fish lift is down (Figure A-17).

o Shorthead redhorse CPUE in the west fish lift is down (Figure A-18).

o Species richness in the east fish lift is down (Figure B-2).

o Smallmouth bass CPUE in the east fish lift is down (Figure B-19).

o Channel catfish CPUE in the west fish lift is down (Figure A-17).

Exelon Response:
(From pg 139) *"Changes to the fish species assemblage were evident over the period studied"*
Some species have shown an increase in abundance (American Shad, smallmouth bass and walleye at west fish lift). The conclusion offers (pg 140) that "several species have increased or declined in abundance". Throughout the results related to each gear type (particularly the fish lifts) fluctuations in the catches of individual species are discussed.

For example (pg 53)
From 1991 to 2009, blueback herring comprised 4% of the overall CPUE at the EFL (Table 5.3.2-2). In 1997, 1999 and 2001 significant catches of blueback herring were made. In 2001, 510 herring per lift were collected (Table 5.3.2-2), the highest amount in any year and the second most proportionally abundant species that year after gizzard shad. Very few blueback herring have been collected since 2001 with none taken in 2006. Populations of blueback herring have been declining in the northeast due to a number of potential causes including habitat loss, targeted or by catch at sea via commercial fishing and increased numbers of striped bass and other types of predators (ASMFC 2009).

The information in the initial study report indicates that the available data is sufficient to provide an accurate representation of the species assemblage below Conowingo Dam.

PFBC Comment 4:
In order to truly characterize the conditions at this facility, more contemporary studies are the invertebrate communities are a necessity.

Exelon Response:
See Exelon response to MDNR Comment 7.

PFBC Comment 5:
No information more recent than the 1980s was provided on the year class abundance and reproduction success of resident fishes.

Exelon Response:
Several comparisons within the initial study report were provided between the studies of the 1980"s and the most recent fish community data. Ichthyoplankton sampling (now scheduled for 2012) will provide additional data to describe reproduction success of resident fishes.

PFBC Comment 6:
Condition factors were only presented for fish collected at the west fish lift in 2010 (Table 9.2-1). No comparison of condition factors was reported for any of the fish collections made dating back to the 1980s.

Exelon Response:
Original data do not exist (pg 78) "Because the studies were terminated following the settlement agreement, most collected data were only tabulated, processed electronically and stored on PECO"s mainframe system; these data were not analyzed or formally presented in any reports. The biological data stored on electronic media were subsequently lost." Without the original data, the requested comparisons cannot be made. Data presented in the initial study report are drawn from three progress reports and other available hard-copy data stored by Normandeau.

PFBC Comment 7:
Length weight data for 2010 was obtained from the West Fish Lift of adult fish headed upstream on spring spawning runs. Length weight data was not obtained from the 2010 summer stranded fish surveys. It is unclear during what time of year or location the fish length and weight data were obtained for the fish reported in Table 9.1-2 that were collected in the 1980s. Collecting length and weight data only from adult fish in spawning condition skews the relationship upward and may portray fish as being in better condition than actual. Length and weight data from various sizes for fish collected during a cross section of the seasons will produce a more accurate representation of fish health and condition.

Exelon Response:
Data from 1980s represent a combination of fish measured and weighed at the West Fish Lift augmented with fish taken by gill net and electrofishing at various locations in the river at all times of the year. The data do not include alewife, blueback herring or American shad, since they do not rear in the river. The intent of the length-weight regression analysis was to compare the fish from the 2010 West Fish Lift catch to historical data.

PFBC Comment 8:
Much of the data presented for this study relies on data collected from the West Fish Lift. These data need to be considered in the context of how and why the West Fish Lift was operated. It was designed to catch American shad, which are strong swimmers and can navigate higher flow velocities than many resident fishes. Also, it was operated almost exclusively only during the 6-8 week spring shad run. While resident species are collected in the WFL as evidenced by the data tables, it should not be viewed as an equal opportunity fish collecting/representative sampling device. On the contrary, smaller individuals of many resident species such as minnows, darters and many species that are not strong swimmers or don't make strong upstream movements are either under represented or not represented at all in the WFL samples. Sampling is biased towards fish that move upstream in the spring and adults and larger individuals of most species that are represented.

Exelon Response:
The „baseline" fish lift catches are bolstered by the additional studies (electrofishing, gill nets, ichthyoplankton, fish stranding) as the study states in the introduction (page 22) "*These data augment the fish lift collections in providing a more detailed spatially and temporally diverse characterization of the downstream fish populations in regards to species assemblage, condition, and habitat use. These studies included electrofishing, gillnet and ichthyoplankton sampling efforts from Conowingo Dam to the tidal zone just below Spencer Island."*

PFBC Comment 9:
Data from a reference reach above dams in the Susquehanna River is needed to compare benthic fauna.

Exelon Response:
FERC considered a similar request previously; the study plan approved by FERC does not require the comparison of the downstream aquatic community to a similar community elsewhere (i.e., a reference location). This renewed request is unlikely to add any new information that could be used for adopting reasonable PME measures. Also, see Exelon Response to MDNR Comment 7.

PFBC Comment 10:
It is common practice in environmental studies to calculate bio-assessment indices including: species richness, species evenness, Shannon's Diversity Index, Simpson's Diversity index, Berger-Parker index, Plafkin's EPT index, modified Hilsenhoff biotic index, percent dominant taxa, percent modified mayflies, family biotic index, EPT to Chironomid ratio, ratio of scraper and filtering collector functional feeding groups, percent Chironomidae, percent Tubificidae, etc. While species richness was calculated for fish collections, no other indices were calculated.

Exelon Response:
A total of three indices were either calculated or are readily discernable from the report tables. They are Richness Community, Population Density, and Percent Contribution of the Dominant Taxon. At the onset of Exelon‟s review, it considered a metric analysis but opted against one. While spatial and inter-year metric comparisons can be calculated from this quantitative data set, these comparisons would not lend themselves to an accurate depiction of the community because the raw numbers for many of the rare and uncommon taxa were not available. We also considered condensing the data into an IBI determination similar to that currently in-use by MDNR for its Maryland Biological Stream Survey (MBSS). That protocol, however, is designed to address biotic integrity from much smaller first, second, and third, order streams and was not applicable. As a result of these limitations, Exelon adopted a descriptive approach that focused on the behavioral and ecological characteristics of most common taxa resident below the dam. Exelon believes its analysis is sufficient to meet the objective contained in the FERC Study Plan Determination, which was to characterize the macroinvertebrate and resident fish populations below Conowingo Dam.

PFBC Comment 11:
Length frequency tables should be provided for this fish used in the length weight relationship calculations. This will allow reviewers to evaluate whether only larger representatives for each species were included in the analyses which would tend to skew the relationships upward.

Exelon Response:
Exelon will provide length frequency tables in the updated study report.

PFBC Comment 12:
The table on length/weight relationships need to indicate by year, time of year and gear method when the data were collected.

Exelon Response:
See Exelon response to PFBC Comment 6.

PFBC Comment 13:

The report needs an opinion or rationale for the fact that many more taxa of fish than invertebrates were found during the field collections. In most warm water riverine systems the number of invertebrate taxa typically exceeds the number of fish taxa.

Exelon Response:

The characterization recorded 71 invertebrate genera identified (a 10-year time frame). When taken to the genus/species taxonomic endpoint, the count increases to 115. Were it possible to identify all individuals fully to the species level the total would be higher. From 1972 to 2009 (38 years of study) the West Fish Lift produced 72 taxa (species and hybrids) of fish from inspection of over 31.5 million individuals. As expected, there are more invertebrate species present below the dam than there are fish species. Exelon"s analysis meets the objective contained in the FERC Study Plan Determination, which required a characterization of the macroinvertebrate and resident fish populations below Conowingo Dam.

3.19 Freshwater Mussel Characterization Study

Introduction
The magnitude of the comments received is such that Exelon has provided both a generalized response as well as a point-by-point response to comments and questions raised by the reviewers (see Attachment C). FERC, American Rivers, the USFWS and MDNR submitted comments on Conowingo Study 3.19 Freshwater Mussel Characterization Study below Conowingo Dam (Conowingo 3.19).

Overview of Comments:
The comments fell into four general categories, which concerned: 1) Study Objectives (USFWS); 2) Field and Data Analysis Methods (MDNR, USFWS); 3) RSP-Specified Deliverables (MDNR) and 4) Study Conclusions (American Rivers, FERC, MDNR, USFWS).

Background:
Exelon‟s 2010 mussel survey was one of several mussel surveys that have been conducted on the lower Susquehanna River in recent years. In 2008, 2009 and 2010, the Maryland Department of Natural Resources Natural Heritage Program (Natural Heritage) sponsored semi-quantitative and quantitative mussel surveys in the lower Susquehanna River below Conowingo Dam (Ashton and Devers, unpublished data). The data was summarized in the March edition of *Ellipsaria*, reporting live and dead mussel species believed to potentially exist in the lower Susquehanna River below Conowingo Dam. Thus, several datasets exist that, when combined, may provide a diverse assessment of the lower Susquehanna River mussel community.

In Conowingo 3.19 stakeholder study comments, comparisons were made between the data collected for Conowingo 3.19, Ashton and Devers (unpublished data) and other unpublished study results. To consolidate study results, Table 1 presents the Conowingo 3.19 study results next to the Ashton and Devers (unpublished data) study results. The only difference in species composition is the 2010 Natural Heritage survey tentatively identified dead (spent) northern lance (*Elliptio fisheriana*) shells (one pair of valves). Otherwise, the species composition is identical between the Conowingo 3.19 study and the Natural Heritage surveys.

Table 1. Freshwater mussels potentially occurring in the Susquehanna River below Conowingo Dam, Maryland and recent accounts of their presence or absence. This table is adapted from Ashton and Devers (unpublished data), with addition of Exelon's mussel characterization study data and mussel common names.

		Exelon	MDNR's Natural Heritage Program		
Common Name	Species	2010	2008	2009	2010
triangle floater	*Alasmidonta undulata*	N[1]	N	N	N
brook floater	*Alasmidonta varicosa*	N	N	N	N
alewife floater	*Anodonta implicata*	L[2], D[3]	L, D	L, D	L, D
eastern elliptio	*Elliptio complanata*	L, D	L, D	L, D	L, D
northern lance	*Elliptio fisheriana*	N	N	N	D
yellow lampmussel	*Lampsilis cariosa*	L, D	N	N	L, D
eastern lampmussel	*Lampsilis r. radiata*	L	N	N	L, D
green floater	*Lasmigona subviridis*	N	N	N	N
tidewater mucket	*Leptodea ochracea*	D	L, D	L, D	L, D
eastern pondmussel	*Ligumia nasuta*	N	N	N	N

Common Name	Species	Exelon 2010	MDNR's Natural Heritage Program 2008	2009	2010
eastern floater	*Pyganodon cataracta*	L, D	L, D	L, D	L, D
creeper	*Strophitus undulatus*	D	N	N	D

[1] N=None collected.
[2] L=Live individuals were collected.
[3] D=Spent (empty or dead) valves were collected.

Study Objectives:
The objectives as stated in Conowingo RSP 3.19 Freshwater Mussel Characterization Study below Conowingo Dam are to:

1) Characterize the freshwater mussel community in the Susquehanna River below Conowingo Dam; and
2) Determine if plant operations at Conowingo Dam effect the mussel community in this river reach.
A brief discussion on each study objective follows.

Exelon believes that Objective 1 can be met using existing datasets. Exelon believes that the Conowingo 3.19 field data is appropriate for the purpose of characterizing the existing mussel community, particularly if it is supplemented with other mussel survey data. Thus, Exelon believes that study Objective 1 can be achieved by combining and analyzing mussel survey data from the Conowingo 3.19 study and the mussel surveys referenced in Ashton and Devers (unpublished data).

Taken at face value, Objective 2 is simply a threshold question: do plant operations effect the downstream mussel community? Exelon believes that the compendium of data available from the Conowingo 3.19 study, Ashton and Devers (unpublished data), the habitat analysis (Conowingo 3.16) and the sedimentation analysis (Conowingo 3.15) can be useful to adequately answer this question in an updated study report.

Field and Data Analysis Methods:
Generally, methodological questions fell into one of three categories as follows: a). was the field design of the semi-quantitative survey such that representative samples could be collected to characterize the mussel community below Conowingo Dam(?); b). was the field design of the quantitative surveys such that they could be used to expand and broaden the results of the semi-quantitative surveys(?); and c). was the analysis conducted sufficient to determine if Project operations were impacting the mussel community downstream of Conowingo Dam(?). Each of the questions is addressed below.

The species composition data collected in the semi-quantitative study for Conowingo 3.19 in 2010 is nearly identical to the data collected in the three years of surveys conducted in the same river reach by Natural Heritage Program (Ashton and Devers, unpublished data) as illustrated in Table 1. As such, Exelon believes that the four studies, when combined, sufficiently characterize the mussel community below Conowingo Dam. Since the species composition data is supported by four semi-quantitative studies, it is unclear how additional semi-quantitative surveys would provide any additional useful information to further characterize the mussel community below Conowingo Dam; therefore, we are not proposing additional semi-quantitative surveys in 2011 as we believe the data available sufficiently addresses Objective 1 without the use of the quantitative survey data.

The Principal Investigator‟s (PI) explanation of how and why the quantitative sampling sites were chosen is included in Attachment C. What is not clear, regardless of agreement on the methods of site selection, is how this data will be used to achieve either of the study objectives. It seems that the semi-quantitative data is adequate to achieve Objective 1 (characterization of the mussel community) and that the compendium of data (through semi-quantitative, quantitative, Ashton and Devers (unpublished data), habitat (Conowingo 3.16) and sedimentation (Conowingo 3.15) studies) is adequate to meet Objective 2 (is there a Project effect on the downstream mussel community?). This analysis will be included in an updated study report.

RSR-Specified Deliverables:

The comment letters provided by FERC, American Rivers, the USFWS and MDNR indicate deviations from the study plan after completion of the field survey and with submission of the report. These comments have been addressed in Attachment C. Exelon will issue an updated study report after consulting with the concerned stakeholders about these comments.

Study Conclusions:

Several stakeholders expressed disagreement with the conclusions Exelon drew from the analyses provided in the Conowingo 3.19 initial study report. Analysis of the mussel data and effects on the mussel community were reported in two study reports: Conowingo 3.19 and Conowingo RSP 3.16 Instream Flow Habitat Assessment below Conowingo Dam (Conowingo 3.16). Conowingo 3.16 provided spatial analyses comparing shear stress at various flows, and also analyzed mussels‟ reported shear stress tolerances throughout the river. In addition, the Conowingo 3.15 Sedimentation Report gives insights to present and historic substrate information that has relevance to Objective 2. Given the report‟s recent submission and the recent receipt of data from Ashton and Devers (unpublished data), Exelon will issue an updated study report for Conowingo 3.19, Exelon believes that a substantive discussion of conclusions is not warranted until all of the pertinent information has been provided in the revised study report, and after all mussel-related analyses have been reviewed by the stakeholders.

3.20 Salinity and Salt Wedge Encroachment

MDNR and SRBC submitted comments on the Salinity and Salt Wedge Encroachment (RSP 3.20) initial study report.

SRBC Comment 1:
"Exelon makes the determination that Project operations do not affect salinity or salt wedge encroachment based on poor correlations between Project outflow and observed salinity, but did not include a correlation assessment for 15-minute flows…SRBC staff encourages Exelon to perform a correlation analysis for the 15-minute flows, although due to extreme variability of instantaneous flows during peaking, we expect that the correlation will also be poor."

Exelon Response:
Although not clearly stated in the text, the MDNR correlations results in Table 4.3-1 were performed using 15-minute flow data[6]. Each 15-min salinity reading had a uniquely calculated moving average flow for the stated time period prior to the reported reading. For example, the 1-day moving average flow for a salinity reading on 7/29/2007 7:30[7] was calculated as the average flow observed between 7/28/2007 7:45 and 7/29/2007 7:30, while the 1-day moving average flow for a salinity reading on 7/29/2007 7:45 was calculated as the average flow between 7/28/2007 8:00 and 7/29/2007 7:45. To address SRBC"s request, correlations have been calculated for moving average time periods shorter those initially reported, including a correlation with the 15-min instantaneous flow readings (Table 1). The augmented results show that correlations become increasingly worse as the moving average time period decreases, with the instantaneous and 1-hour moving average flow values providing the worst correlation. This further supports the original conclusion that longer-term flows drive salinity levels in the river, with short-term flow variations having no noticeable salinity impacts.

SRBC Comment 2:
"Figure 4.4-4 suggests that salinity levels do begin to increase during minimum release operations, and decline when peaking resumes. With only one month of data plotted, it is not possible to make a definitive conclusion regarding the interaction between Project operations and salinity levels."

Exelon Response:
Figures 4.4-4 and 4.4-5 were intended to show salinity and flow dynamics during high-salinity periods. Each plot shows approximately one month of salinity and flow values for two years, resulting in four plots showing approximately one month of data. In addition to these plots, time series plots show Conowingo daily average flow versus MDNR 15-min salinity data (Figures 4.4-1 and 4.4-2) and Havre de Grace daily instantaneous salinity data (Figures 4.4-3), providing the longer term trends not shown in Figures 4.4-4 and 4.4-5. Collectively, these plots show the full period investigated for both salinity data sets. The long time period shown in Figure 4.4-3 makes trends somewhat difficult to depict. For better clarity, this figure is shown broken into two periods (1997-2003, 2004-2010) in Figure 1 and Figure 2.

SRBC Comment 3:
SRBC noted that "the comparison between tidal elevations and salinity were for a duration of eight days, and SRBC staff is not able to draw any conclusion from the plot presented, particularly considering that many other factors (flow variations, wind, storms) could be disproportionately influencing the salinity levels in that small timeframe."

[6] Havre de Grace salinity observations were correlated with daily average flow data.
[7] All times are listed in 24-hour format, such that 4:00 AM is 4:00, and 4:00 PM is 16:00.

Exelon Response:
Correlations and Figure 4.3-2 showed that tidal influences normally had little to no relationship to observed salinity levels. However, there appeared to be distinct tidal influences during high salinity events that were not otherwise present. The time series shown was an example of such a situation. The figure showed salinity levels clearly rising and falling with tidal elevations for several days in a row. Yet, prior to and after the high salinity event, tidal influences appeared to have a negligible salinity influence. This pattern was also evident for other years during high salinity events that were not plotted in the initial study report, such as the additional period shown in Figure 3. Correlations were performed using the full 15-min data analysis period (2007-2010), and were not limited to the periods shown in exemplary time series plots.

SRBC Comment 4:
SRBC stated that "…when comparing flows from both the Conowingo USGS gage and the Marietta USGS gage to the salinity of the Susquehanna River downstream of the project, the project sponsor only compared the salinity of the MDNR salinity observations and not the HDG salinity observations." Later stating that "SRBC staff urges Exelon to compare salinity of the HDG observations with that of the two USGS gages in a similar format to the comparison in Figures 4.4-5 and 4.4-5 [sic]." It is assumed the comment was referring to Figures 4.4-4 and 4.4-5.

Exelon Response:
The text of Section 4.3 describes correlations that compared Havre de Grace salinity observations to Marietta and Conowingo USGS gage flows, showing rather poor correlations in both cases. While daily data time series plots were investigated, the 15-min salinity plots were generally more telling, particularly during high salinity events. Additionally, the first paragraph of Section 4.1 compares the Havre de Grace and MDNR salinity readings, showing that the 15-min (MDNR) readings typically mimicked the Havre de Grace salinity data in pattern, though not magnitude. Thus, the 15-min data provides a more detailed view of what happened in between Havre de Grace readings. Finally, more detailed flow and salinity time series plots are shown in Figure 1 and Figure 2 in response to comment 2 providing a similar comparison as in Figures 4.4-4 and 4.4-5.

SRBC Comment 5:
Finally, SRBC states that "Exelon should determine and report the timing of those measurements (i.e., whether the measurements are collected at the same time every day, and at what time of day)."

Exelon Response:
Section 3 in the initial study report states that "Beginning in 1997, the City of Havre de Grace collected instantaneous daily salinity values at the Havre de Grace water supply intake at high tide (D. Geiger, Personal Communication, 2010). Since a tidal cycle is approximately 12.5 hours, readings would occur at slightly different times in consecutive days, with various sample times covering the time of day over long terms. While the daily instantaneous readings are not as telling as the 15-min MDNR observations, since instantaneous reading are taken at high tide they should represent the most saline reading that would be observed throughout the day, as evidenced by 15-min time series plots.

Table 1: Salinity Correlations to Moving Average Flow Reciprocals (1/Moving Average Flow). This is a modified version of Table 4.3-1 from the initial study report.

Moving Average Window	MDNR salinity observations R^2	MDNR RMSE (ppt)	HDG salinity observations R^2	HDG RMSE (ppt)
Instantaneous	0.394	0.0245		
1-hour	0.394	0.0245		
3-hour	0.397	0.0244		
6-hour	0.406	0.0242		
12-hour	0.439	0.0235		
18-hour	0.477	0.0227		
1	0.493	0.0224	0.158	0.0125
3	0.556	0.0210	0.200	0.0122
5	0.601	0.0199	0.213	0.0121
7	0.627	0.0192	0.220	0.0121
14	0.698	0.0173	0.224	0.0120
21	0.746	0.0159	0.225	0.0120
30	0.758	0.0155	0.234	0.0120
45	0.756	0.0156	0.227	0.0120
60	0.734	0.0162	0.215	0.0121

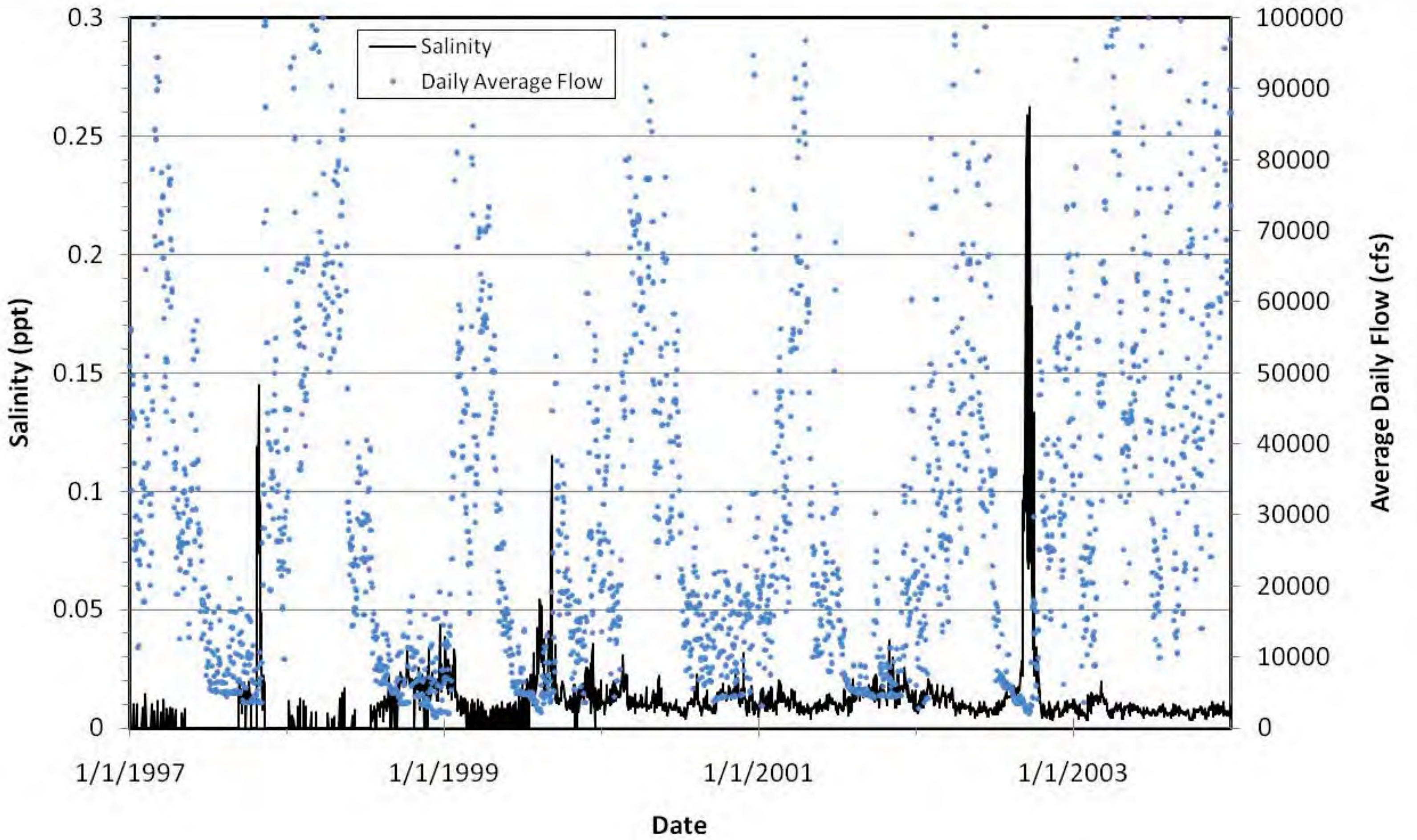


Figure 1: Time Series of HDG Salinity Observations and Conowingo USGS Gage Daily Average Flow. This is a Modified Version of Figure 4.4-3 from the initial study report.

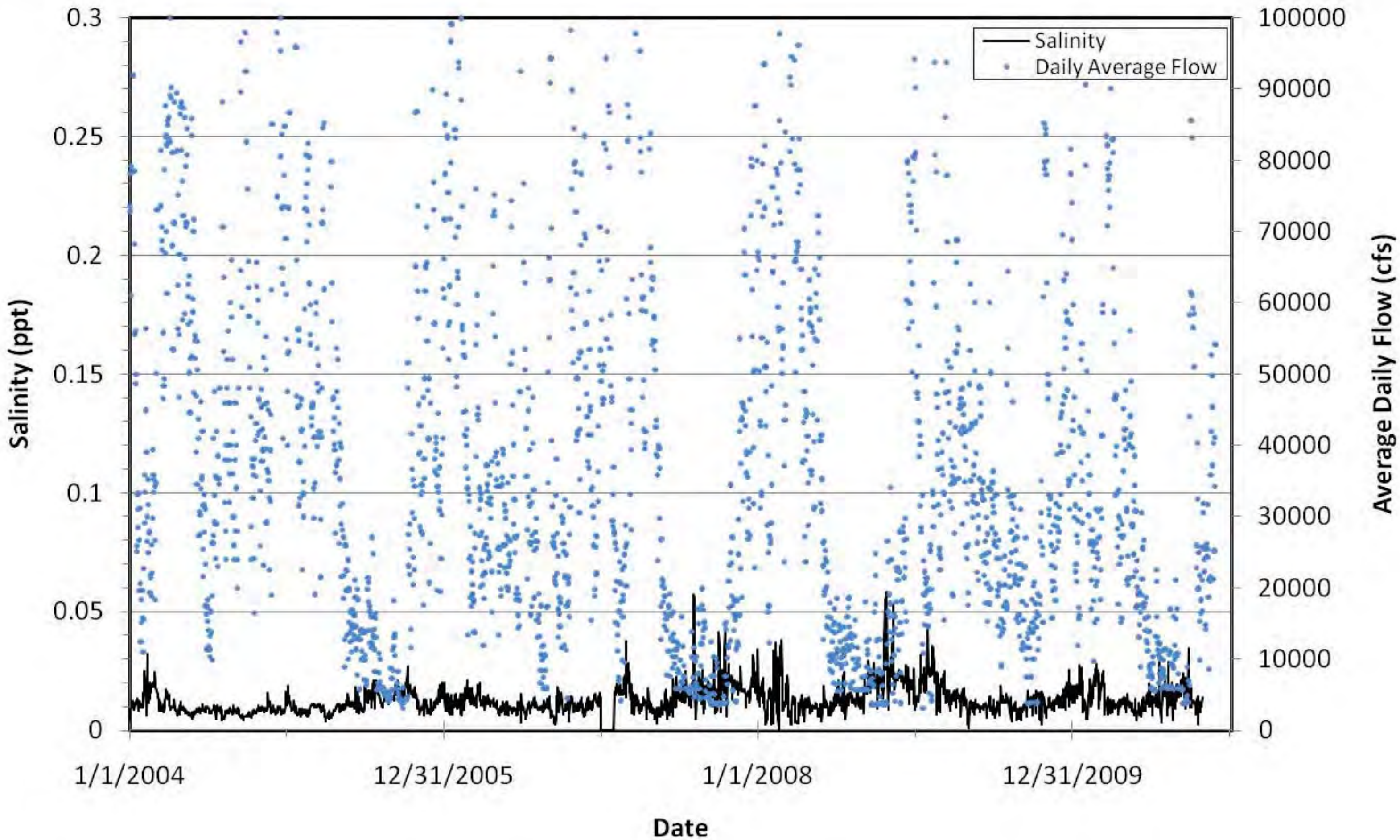


Figure 2: Time Series of HDG Salinity Observations and Conowingo USGS Gage Daily Average Flow. This is a Modified Version of Figure 4.4-3 from the initial study report.

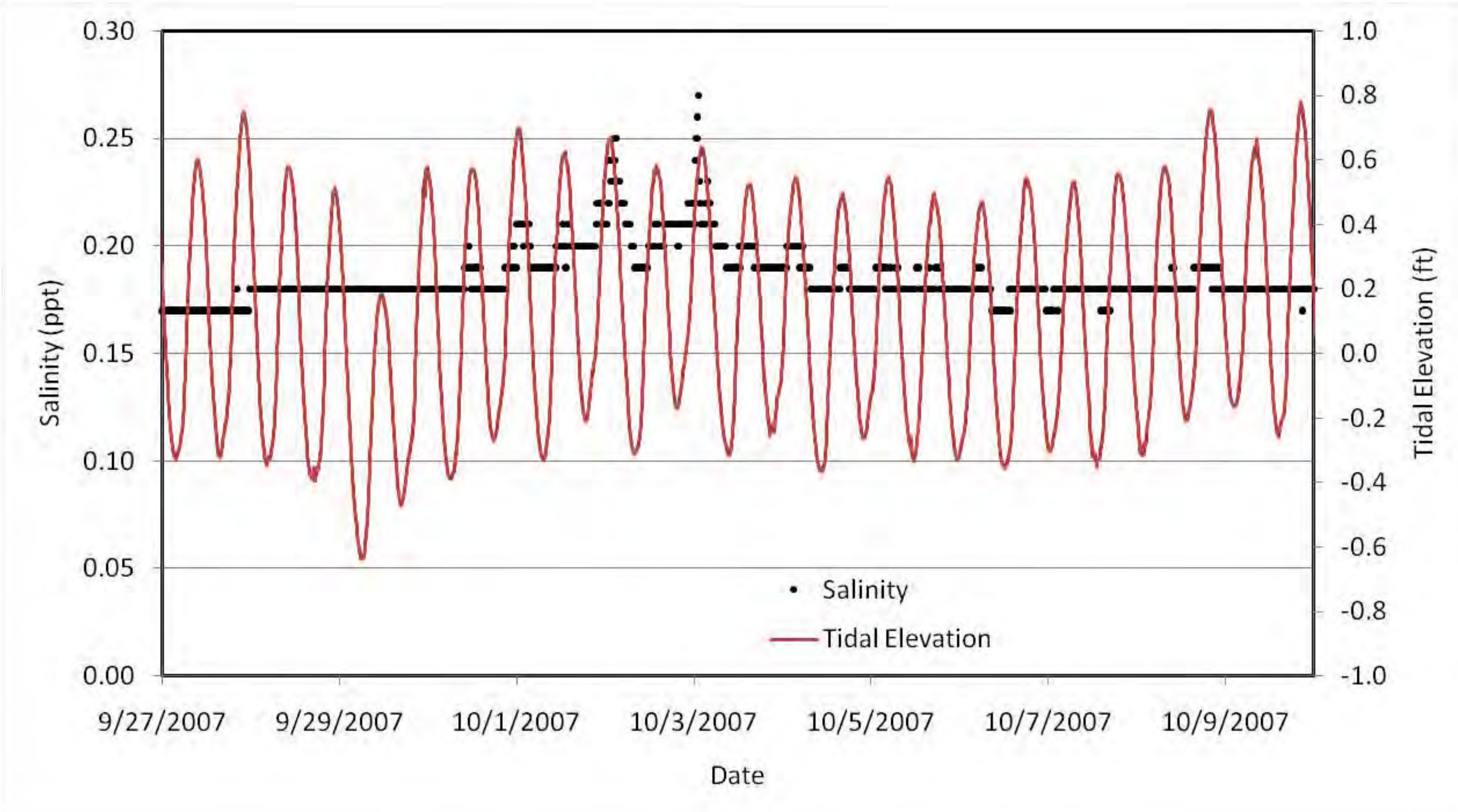


Figure 3: Tidal elevations (red line) and MDNR 15-min salinity (black dots) time series plot for the high salinity period in 2007.

3.21 Impact of Plant Operations on Migratory Fish Reproduction

MDNR and PFBC submitted comments on the Impact of Plant Operations on Migratory Fish Reproduction (RSP 3.21) initial study report.

MDNR and PFBC Comment 1:

On pg. 20, the statement is made that "Flows were highly episodic, often with the greatest magnitude discharge peaks occurring in April and May…" While that flow data was presented in graphs (Figure 5-1), there was no analysis done of the timing and magnitude of the ichthyoplankton collections for the various species specifically as it related to the episodic flows. While a detailed characterization of habitat availability for the species will be established in Study 3.16, in this study the empirical data should be analyzed to assess the relationship between fluctuating river flows and ichthyoplankton densities on a location-specific basis.

Exelon Response:

The data collected in the earlier studies referenced were not conducive to analysis of ichthyoplankton densities. A new ichthyoplankton study proposed for 2011 (delayed until 2012 due to high flows) will be designed to collect ichthyoplankton and discharge data in appropriate periodicity to address this concern.

MDNR Comment 2:

No analyses are presented in this report to achieve the purpose of the study, "to determine if project operations impact migratory fish reproduction upstream of Conowingo Dam and Downstream in the Susquehanna River"

Exelon Response:

The analysis of project operations on spawning and incubation habitat for a variety of species, including American shad, was completed as part of Study 3.16-Instream Flow Habitat Assessment below Conowingo Dam.

PFBC Comment 2:

The licensee needs to gather station generation data for the previous ichthyoplankton studies and relate egg collection, particularly for American shad, to generation status. Need a 2011 study, as per the FERC Study Plan Determination of 2/4/2010, to document hickory shad spawning areas and establish the relationship between American shad spawning and station operation. Study of existing spawning activity, as measured by ichthyoplankton samples in the mainstem river below Conowingo Dam to Port Deposit to determine if migratory fish are reproducing in this river reach and to describe the relationship between station operations and migratory fish reproduction for the 2011 study and for previous ichthyoplankton studies.

Exelon Response:

See Exelon response to MDNR and PFBC Comment 1, the ichthyoplankton study proposed by Exelon for 2011 (now 2012) (see April 2011 study plan) will address these issues. There is no need to develop a new study to examine the specific impacts to hickory shad, since this aspect will be covered in the existing study.

3.22 Shortnose and Atlantic Sturgeon Life History Studies

PFBC, MDNR, and USFWS submitted comments on the Shortnose and Atlantic Sturgeon Studies (RSP 3.22) initial study report.

PFBC Comment 1:
Additional information should be provided that results in a recommendation by the licensee as to what steps need to be taken at Conowingo dam to improve conditions for passage of shortnose sturgeon.

Exelon Response:
As described in Section 2.6 of the Initial Study Report, there are several features that may be used for comparison of the Conowingo east fish lift with other fish passage facilities that have passed shortnose sturgeon, including: river width, river discharge, fishway attraction flow / proportion of attraction flow to river discharge, and fishway entrance configuration. Of those, attraction flow volume and entrance configuration might be incorporated into designs to potentially improve the likelihood of sturgeon passage. The two considerations are necessarily linked; any entrance channel designs to facilitate sturgeon passage must allow for discharge of the higher volume of attraction flow in conjunction with existing / other entrances while maintaining appropriate velocities. Entrance design would include minimizing height above the river bottom, preferably without a standard entrance weir. Alternatively, a ramped approach to the entrance may be considered.

A feasibility and cost analysis of fishway entrance design and attraction flow enhancement will be included in the updated study report. However, any proposed measures to improve sturgeon passage will be made in the draft license application.

MDNR Comment 1:
Analysis of habitat types below Conowingo Dam seems to be preliminary. In the context of the title of the study it is difficult to determine how habitat types are being analyzed. Habitat in this study appears to refer to the water column and its flow characteristics. However, an analysis of that nature should be characterized as hydraulic habitat. Nevertheless, an analysis of habitat cannot be conducted solely on hydraulic characteristics, based on the description of the study. The analysis also concludes that in general, suitable habitat is limited for all life stages of shortnose (and presumably Atlantic) although there is are no physical habitat characteristics presented in this study. It seems unlikely there is no gravel in this region given the visible habitat seen in some of the figures.

Exelon Response:
The analysis of sturgeon habitat was completed as part of Study 3.16-Instream Flow Habitat Assessment below Conowingo Dam.

3.24 Dreissenid Mussel Monitoring Study

MDNR submitted comments on the Dreissenid Mussel Monitoring Study (RSP 3.24) initial study report.

MDNR Comment 1:
Pg. ii, line 9: Insert "Department of Natural Resources" before "Biologists.

Exelon Response:
The insert will be added to the updated study report.

MDNR Comment 2:
Pg. ii: The second objective of this study was to "identify potential mitigation measures to minimize the impact of Dreissenid mussels to Project structures", yet there isn't any mention of potential mitigation measures in the Executive Summary.

Exelon Response:
This paragraph can be added before the last paragraph in the executive summary. "The Dreissenid mussel fouling prevention/control options considered most applicable for use at Conowingo Dam are listed within the initial study report. This general list was based on "potential" use, not actual feasibility, advantages, disadvantages, costs, or comparisons with other options. The purpose of this list is to provide a general starting point for Conowingo personnel to develop an effective mussel control program."

MDNR Comment 3:
Pg. 2, lines 29-30: Please be more specific than ".....a few adult zebra mussels……". We believe one dead adult zebra mussel was collected at the Conowingo dam, one dead adult mussel was found at Glen Cove Marina upstream from Conowingo, and four dead adult mussels were found in Muddy Run Reservoir, even further upstream, in the fall of 2008. Is that correct? If so, please add this detail to the text on pg. 2.

Exelon Response:
The following sentences can be added after the sentence described above: "One dead adult zebra mussel was collected from a strainer sample at Conowingo Dam, one dead adult zebra mussel was found attached to a boat motor that was removed for winter storage at Glen Cove Marina upstream of Conowingo Dam. Also four dead adult zebra mussels (shells only) were found along shore of the Muddy Run Reservoir during a low elevation level (Figure 2-1)."

MDNR Comment 4:
Pg. 7, line 15: Please add this sentence to this paragraph: "On August 3, 2010, MDNR biologists collected and preserved an additional three adult zebra mussels (2-alive and 1-dead) found in the lower Susquehanna below Conowingo, bringing the total number of adult zebra mussels collected downstream from the Conowingo Dam in 2010 to 14 (10-alive and 4-dead).

Exelon Response:
The sentence can be added to reflect the additional collected zebra mussel specimens.

MDNR Comment 5:
Pg. 8, line 16: What's the significance of 10,000 cfs?

Exelon Response:

Exelon believes that when zebra mussels spawn in the upper Conowingo Pond, they would have the potential to settle out of the water column and attach to a substrate before passing through Conowingo Dam with river flows less than 10,000 cfs.

MDNR Comment 6:
We suggest that the map of the lower Susquehanna River (last pg.) be extended to show the location of Muddy Run Reservoir, since it is mentioned on pg. 2.

Exelon Response:
A figure will be added to the updated study report depicting the location of the Muddy Run Reservoir.

3.26 Recreational Inventory and Needs Assessment

SGHA, NPS, USFWS, MDNR, PFBC, PaDEP and M-DTS submitted comments on the Recreational Facility Inventory and Estimated Recreation Use (RSP 3.26) initial study report.

SGHA Comment 1:
"The Recreation Facility Inventory and Estimated Recreation Use Report lacks reference to the Susquehanna River Water Trail."

Exelon Response:
Exelon will include references to the Susquehanna River Water Trail and other designated water trails in the Project area in the updated study report.

NPS Comment 1:
"The methodology for identifying recreational use and adequacy of existing facilities was considerably flawed. The consultants did not consider many nearby facilities, did not make any attempt to identify or contact local and regional user groups, and did not send out any mailed surveys. Many key locations were missed or not included in the evaluation, including Rock Run boat ramp for example, which until a few years ago had been a major access below the Conowingo dam, but was summarily closed by Exelon shortly after taking over the projects just a few years ago. This was a heavily used facility that provided recreational access below the dam, and its closure has undoubtedly had effects on other facilities both in and near the Conowingo and Muddy Run project areas. By limiting their analysis to the project boundaries, the licensee, and therefore the FERC does not have a real picture of recreational use in the project areas. In many cases during eastern relicensings, licensees have evaluated as far as 25 miles from the project boundary in order to encompass local and regional recreation opportunities and needs. This is especially important because nearby access locations, both currently in use and those that have been closed, should have been evaluated in the context of the project because it affects recreational use within the project boundary. By relying on current use data (arguably flawed in the scope and methodology of collection) and future demographics only, the licensee does not get an accurate or adequate picture of future recreational demand. As such, they have not satisfied the terms of FERC's February 4, 2010 Study Plan Determination."

Exelon Response:
Exelon‟s process to collect recreational use and capacity data for Project facilities is a standard methodology that has been successfully used for recreational studies at many other FERC licensed projects. Data were collected during 2008/09 in part to provide data for the 2009 filing of the FERC Form 80‟s for both projects; however, the methodology was augmented beyond the typical Form 80 data needs to ensure Exelon would have a statistically valid methodology for sampling and data collection to address FERC recreational licensing requirements for both projects. Exelon followed the methodology as outlined in its study plans submitted for both projects. The Rock Run boat ramp is outside the Conowingo Project boundary and had historically been leased to individuals and operated as a commercial marina operation. The site contained marina-related maintenance buildings, private seasonal residential cottages, and several camper/RV sites directly on the bank of the river. A small ramp provided launching for small boats. Due to environmental and public safety concerns, Exelon cancelled the lease in November 2010 and oversaw the removal all structural improvements, except the boat ramp, in December 2010/January 2011. This included the marina structures, a partially demolished cottage and other cottages, camper trailers/RV‟s and appurtenant structures, debris, the sub standard electrical system and all sub surface disposal systems. The site was not closed during the demolition/rehabilitation/stabilization and remains open for members of the public wishing to use the site and boat ramp. Exelon will include general information on other near-by non-project public recreational facilities in the Recreation Management Plan. Exelon provided an estimate of future recreational demand

based on growth coefficients developed as part of "Projections of Outdoor Recreation Participation to 2050" as published by the USDA Forest Service. This statistical model has been used effectively by the US Forest Service and by other FERC applicants as a reasonable methodology for assessing long term capacity potential. In addition, as a standard FERC requirement recreational use and capacity data for the projects will be updated every six years through the FERC Form 80 process. This data will be used in future years to assess the recreation use and facility capacities every six years.

NPS Comment 2:
"At page 1-11 in the Revised Study Plan dated December 22, 2009, the issue associated with parking and access to the Muddy Creek Gorge at Paper Mill Road was referenced in response to the comments filed July 13, 2009 by the Mason Dixon Trail System, Inc (MDTS). Exelon's response lumped this issue with general recreational enhancements that were to be looked at in the Recreational Facilities and Needs Assessment. The plan does not mention this access issue and refers only to the Muddy Creek Boat Ramp on the main stem of the Susquehanna River. The access at Paper Mill Road continues to see heavy use by boaters, day hikers and users of the MDT, however, access for parking has become extremely challenging for the public due to the claim of private ownership where the road crosses Muddy Creek. Survey markers are missing and in order to have any chance at a resolution to this issue, Exelon should resurvey the area to determine where its boundary is and upon the results of that survey, determine where and how to develop or enhance parking in this area, or an alternative location to be agreed upon after consultation with the MDT. A possible alternative would be the former PADOT lot on Route 74, located a mile or so upriver from the Paper Mill Road bridge area.

Exelon Response:
Exelon has recently completed a property survey of this non-project land and confirmed that Exelon does own the property. Exelon will address this issue in the Recreation Management Plan.

NPS Comment 3:
Subsequent to September 11, 2001, the licensee expanded its security perimeter, forcing a relocation of a portion of the MDT away from the river between the Conowingo Visitors center and Fisherman's Park and onto roads that are narrow and particularly unsafe for pedestrians. The MDTS has identified an alternative route to the licensee, but has been met with the general response that was reiterated at the March 2011 ISR meetings: The consultant hired by the licensee was asked to evaluate the risks of keeping the restrictions in place and they used FERC's standard Dam Assessment and Vulnerability Methodology. They cited the Department of Homeland Security's concurrence with the consultant's conclusions to keep everything closed that the licensee shut down after 9/11. However, the consultant was not asked to determine if those risks are real or if the closures need to continue. Exelon made their decision based on the consultants' recommendation, but Exelon's consultant noted during the March 2011 ISR meetings that its decision could be changed. Conowingo is one of few such dams that have continued their post 9/11 restrictions. The post 9/11 security closures have also affected the extremely popular and decades long tradition of fishing from the Conowingo Dam catwalk and restricting boaters near the dam. Closing of the catwalk makes little sense; the licensee could simply station someone on-site to check users. At present there is simply a person with a bullhorn telling boaters to move back, when the real threat if any, comes from truck traffic that crosses the dam on Route 1. Exelon spent considerable money building a new ADA fishing access below the dam on river right, although this was done in the few years before the relicensing process commenced. Both York Haven and Safe Harbor have reopened their catwalks.

Exelon Response:
Exelon will consult with MDTS regarding the potential relocation of the Mason-Dixon Trail near Conowingo Dam based on the findings specific to such a relocation contained in Exelon"s Conowingo Dam security assessments reports.

The 400 yard upstream and downstream boating exclusion area at Conowingo Dam is a State of Maryland boating regulation. This will be noted in the updated study report. Changes to the boating exclusion area should be done through proper legislative processes.

See Exelon Response regarding closure of the catwalk to the public.

PFBC Comment 1:
"The analysis of future recreational needs is flawed. Analysis of current use and future demographics is not sufficient to determine need. Potential users must be surveyed to determine if existing facilities meet their needs, as required in the FERC Study Plan Determination of 2/4/2010: "The plan proposes a literature review to identify recreational organizations that would be utilized as data sources as well as surveyed via phone. To ensure that sufficient input from the angling community is solicited, the list of entities included in the literature review phone surveys must include fishing organizations within the project because of the apparent popularity of angling." The observation that use is low does not necessarily suggest that the facility meets needs, current or future. Lack of use may be attributed to lack of specific components. For example, lack of clean, usable sanitary facilities may discourage potential users."

Exelon Response:
See Exelon Response to NPS 1 regarding methodology. Exelon has conducted a literature review to identify recreational organizations for consultation. Consultation with such organizations will be conducted in 2011 by means of local/regional consultation meetings and follow up contact as necessary. Exelon conducted a recreational user preference survey during 2010/11 and is currently compiling and analyzing the data. The results of consultations and recreational use preference surveys will be included in the Recreation Management Plan.

PFBC Comment 2:
"The FERC Study Plan Determination of 2/4/2010 requires the licensee: "To ensure recreational safety is adequately assessed in terms of current project operation, the study plan must be revised to indicate that the location of the line designated to restrict boaters from accessing the tailrace will specifically be re-evaluated as part of the study." Apparently this was not done and is not in the ISR."

Exelon Response:
See Exelon Response to NPS 3 regarding the upstream and downstream boating exclusion area at Conowingo Dam.

PFBC Comment 3:
In survey interviews, the licensee neglected to collect zip code data from users. This data is very useful in determining how far users are willing to travel to use the facilities provided. The distance traveled can be an additional measure of the quality of the facilities provided.

Exelon Response:
While Exelon agrees that zip code data is useful in determining the distance some users may be willing to travel to use facilities, it is only applicable to those users whose sole or primary destination is a Project related site, facility, or opportunity. It is not necessary to determine origination points or travel distances for the licensing of the projects. As stated above, Exelon is completing a recreation user preference survey to provide data on user opinions of existing facilities, access, opportunities, and conditions and the need for enhancements, improvements and additional facilities, access and opportunities within the Project. Additional data on the quality of and/or need for facilities will be gathered in the upcoming consultation process.

PFBC Comment 4:
"The licensee did not consider Rock Run Landing in the study because it is not in the project area. Rock Run Landing is owned by the licensee and, for many years, was leased to individuals. Facilities included space for 5-6 house trailers which served as summer homes, numerous travel trailers or motor homes, a dock with mooring for 20-30 small boats, rental boats, and a launch ramp. The users of this facility were the true "river rats" of the lower Susquehanna River and used the river for angling and hunting at a much greater frequency than most other users. Many of these individuals fished the river almost every day. At some point, the licensee terminated the leases for this property. All users have moved out and the property is no longer used. The exclusion of this property left one boat launch to be surveyed in the recreation survey (Lapidum). Since Lapidum has limited parking, additional boat launches are needed to serve the river from Conowingo Dam to Port Deposit. Rock Run Landing also provided an important safety function. Boating in the river reach from the head-of-tide to Conowingo Dam requires a small boat with little draft. These boats are not very safe in rough, wind-driven waves. The location of the Lapidum ramp is over ½ mile from the head of tide. When a strong south wind is blowing up the river, navigating from the head-of-tide to Lapidum can be very dangerous. These strong south winds can come up very quickly and create a hazard for small boat anglers fishing above the head-of-tide. Rock Run Landing provided a protected alternative for boats using the non-tidal river. Steele Island, just upstream from Rock Run Landing, provided a sheltered travel route from Conowingo Dam to a launch ramp. Thus. The loss of this ramp represents a safety hazard in addition to the loss of recreational opportunities."

Exelon Response:
See Exelon Response to NPS 1 regarding the Rock Run Landing. The ramp remains open for public use and as a shelter in unsafe boating conditions.

PFBC Comment 5:
"There is a need for additional parking and trails to provide river access on the east bank of the river from the mouth of the Octoraro Creek to Port Deposit. There is a critical need for additional parking at boat ramps that provide access to the Susquehanna River below Conowingo Dam. There is a critical need for additional parking in the vicinity of the mouth of Deer Creek and along Deer Creek. "

Exelon Response:
As stated above, Exelon is completing a recreation user preference survey to provide data on user opinions of existing facilities, access, opportunities, and conditions and the need for enhancements, improvements and additional facilities, access and opportunities within the Project. Additional data on the quality of and/or need for facilities will be gathered in the upcoming Recreation Management Plan consultation process. The results of consultations and recreational use preference surveys, and recommendations for enhancements, will be included in the updated study report.

PFBC Comment 6:
"The hours of operation need to be listed for all sites to allow a better understanding of their current use and potential. Statements such as "There was no nighttime recreation activity, as measured by camping, at the site." are made repeatedly and are misleading since no overnight camping facilities are available at most of the sites. Under 7.3 the following statement was made "No overnight camping facilities are available within the Conowingo Project". As written, one might conclude that the sites are not being used for overnight camping when in reality there is no opportunity to participate in overnight camping."

Exelon Response:
Exelon will provide hours of operation for sites with specified operating hours, and will clarify and revise language regarding overnight use within the Project. This information will be included in the Recreation Management Plan.

PFBC Comment 7:
"This report needs to be reviewed for accuracy to ensure that all of the statements about use and opportunities for use are accurate. "

Exelon Response:
Revised and final reposts will be reviewed for accuracy and consistency. Agencies have requested the study data from the submitted Recreational Use Study. This data will be made to available to all interested agencies.

PFBC Comment 8:
"Attempts need to be made to ascertain the residence or zip code location of facility users. "

Exelon Response:
See Exelon Response to PFBC 3 regarding collecting zip code information.

PFBC Comment 9:
"How often were parking areas filled to capacity?"

Exelon Response:
Exelon will review data collected for each site during 2008/09 for weekend and holiday survey days and compare use against capacity to determine how often parking areas were filled to capacity and include this information in the Recreation Management Plan.

PFBC Comment 10:
"Discussion of the Conowingo Pond boat launches does not include description of what pond levels permit use of these ramps. "

Exelon Response:
Exelon will research and investigate Conowingo Pond boat ramps to determine functionality of ramps at various pond levels and provide this information in the Recreation Management Plan.

PFBC Comment 11:
"Local groups and individuals need to be surveyed to determine recreational needs. "

Exelon Response:
See Exelon responses to PFBC 1 and 3 regarding consultation with local groups.

MDNR Comment 1:
"Limited boat access into several large backwater tributaries was noted at a pool elevation of 109 due to low clearance (air draft) of railroad bridges. It is worth noting that these could be mitigated at some later date should these bridges be scheduled for replacement by the Norfolk Southern Rail Line. At a pool elevation of 106 or lower, boat access to some backwater tributaries may be restricted due to shoaling. Several ramps may be impacted at these levels as well. The Applicant should determine if restricted access is due to permanent features such as bedrock or riffles or if channels and ramp approaches are restricted due to excessive sedimentation. Unconsolidated sediments could be mitigated through dredging."

Exelon Response:
See Exelon response to PFBC 10 regarding boat ramp data.

MDNR Comment 2:
"The study report offers no documentation of effort or methods to "conduct an internet literature search and contact readily known and identified recreational organizations and local, county, state and federal agencies to identify any commonly used formal and informal recreation access sites within the investigation" area prior to its 2008/2009 field survey of recreational use. The study report presents no evidence of a literature search or outreach conducted since the 2008/2009 recreational-use survey.

The RSP indicated that the search and outreach effort would include various birding clubs and organizations and that information from those groups would be used to supplement Exelon's existing information or birding activities in the area. The study report offers no evidence of such contact and indicates that Exelon relied entirely on its FERC Form 80 data related to birding to derive the reported estimates of birding activity at recreational facilities within the project area."

Exelon Response:
See Exelon response to PFBC 1 regarding literature research and consultation.

MDNR Comment 2:
"The study report provides no evidence of effort to "consult with interested stakeholders prior to submitting the study report." The study report provides no evidence of effort to "update and revise its recreation field site/facility inventory to confirm access sites identified in Task 1 and to document any additional sites that may have been overlooked, renovated, or constructed since the original inventory."
The study report offers incomplete evidence of effort to "document formal and informal access locations." No GPS coordinates are provided for any access location; however, the formal access locations are documented on a GIS map of the project. The existence of multiple informal access locations is mentioned, but no documentation of their locations is provided."

Exelon Response:
See Exelon response PFBC 1 regarding consultation. The recreation field site/facility inventory is updated on a regular basis to account for changes being made to various recreation facilities (i.e., Muddy Creek boat ramp improvements, Funks Pond upgrades, etc.). Project facilities will continue to be improved/upgraded by Exelon and site operators and the inventory to be revised as such changes occur and will be reflected in the Recreation Management Plan. GPS documentation of all formal and appropriate informal recreation sites will be provided in the Recreation Management Plan.

MDNR Comment 3:
"The study report is missing information on methods and results of Tasks 1 and 3 as described above. The FERC-mandated task of re-evaluating the restricted access line in the tailrace of the project was not conducted."

Exelon Response:
Exelon will provide additional information on methods and results of literature review and outreach (Task 1) and recreation field inventory (Task 3) in the Recreation Management Plan. See Exelon response 3 to NPS regarding the boating exclusion areas at Conowingo Dam.

MDNR Comment 4:
"The study was vague about completing Objective 2 – Exelon assumed that since there was a vehicle parked at a particular site, it was using that site or if a counter counted a vehicle accessing a particular parking lot, it was used to extrapolate the total usage, this likely overestimates the usage for obvious reasons.

The study was based on people using the facilities and was not expanded to include non-users. In addition, the study was highly biased due to the areas surveyed, e.g. certain users took more time per area and were more frequently encountered or interviewed. It also does not include additional possible recreational areas closed to the public that could potentially be opened. These biases were never addressed in the study results.

To determine objective 3, above, recreational users and non-users would need to be interviewed. Not only were the methods to address this objective vague but no interviews were done to assess the needs of the recreational users. In short, if folks are not using the facility because they have different recreational priorities, are physically unable to access some sites or are unaware of the opportunities that exist, then they will not be interviewed by this survey. It also appears that recreational use was very low for all areas with few exceptions, even in the report when use was stated it used the word "only" (e.g. the parking lot was only at 8 percent capacity) indicating that there was significant under usage. No remedy or clarification was provided – see Table 9.3-1."

Exelon Response:
See Exelon response to NPS 1 regarding methodology used for the recreational use study.

MDNR Comment 5:
"Also for Objective 3, no enhancements were discussed. Use of a facility does not mean that improvements or additions cannot be made."

Exelon Response:
See Exelon response to PFBC 5 regarding enhancements/improvements.

MDNR Comment 6:
"Recommended measures for additional study: Upgrades to Lapidum restroom (a Clivus Multrum composting system). Replace fixtures: waterless toilets/urinal and lighting; paint exterior trim; replace doors, upgrade mechanical systems. Construct Lapidum Contact station to provide information to anglers/boaters and other visitors. This is a main contact point for I-95 corridor visitors to the Lower Susquehanna River. Improve Deer Creek access points along Stafford Road. Add stone fill to pull-offs and re-grade for drainage, incorporate sustainable trails to fishing access points, repair "canoe launch" at Deer Creek and Susquehanna River confluence. Lower Susquehanna Heritage Greenway: Repair ~500LF section of boardwalk trail laid on top of rail road bed. Railroad ties are rotting and being shifted by water during storm events making entire boardwalk unstable. Not currently an immediate safety concern. Replace interpretive panels at Lapidum."

Exelon Response:
See Exelon response to PFBC 5 regarding enhancements/improvements.

M-DTS Comment 1:
"The Conowingo Hydroelectric Project, FERC Project No. 405: Initial Study Report failed to mention the fact the trail was on roads in the vicinity of the dam and request had been made to relocate the trail. On March 1, 2011 comments were submitted to FERC about this omission in the study report. We look forward to working with Exelon to relocate the trail to a safe route that does not impact the Dam's security."

Exelon Response:
See Exelon response to NPS 3 regarding the relocation of the Mason-Dixon Trail near Conowingo Dam.

3.27 Shoreline Management
NPS, USFWS, MDNR and PaDEP submitted comments on the Shoreline Management (RSP 3.27) initial study report.

NPS Comment 1:
"The Shoreline Management Reports identified abutting land uses within 500 feet of the project boundary, which is inadequate, as it does not take into account visual and auditory impacts. The entire recreation report only looked at what is in the project boundary now, there was no evaluation of current or future needs or trends in the areas abutting and nearby to the project boundary. During the ISR meetings in March, 2011, the licensee's consultant explained that they had based their conclusion on future recreational needs and trends on the United States Forest Service 50-year growth projections. Such data present only the broadest look at trends, and the state representatives from both PA and MD stated during these meetings that they have far more pertinent, local and regionally specific data showing significant growth pressure, but the consultants had not contacted any of the relevant resource agencies or local and regional non-government organizations when they did their studies. In addition, the current information contained in 3.27 does not show sensitive areas, such as wetlands, trails and steep slopes. The Conservation Land Initiative referenced above should have been a major source of data in order to develop a complete picture of the need for and opportunities to protect and conserve project and adjacent lands in the project areas and within the project boundaries."

Exelon Response:
Visual and auditory reviews will be conducted if it is determined, during continuing consultation, that there is an impact being created to areas located adjacent to the projects. However, Exelon has already conducted a visual and noise assessment for the Muddy Run Project (see Study 3.14), which also encompasses many areas of the Conowingo Project shoreline. Sensitive areas based on existing data and other licensing studies will be included in the shoreline management plan.

NPS Comment 2:
"The RSP's should include reference to the above referenced collective efforts (CLI) at the federal, state and local level, and should evaluate opportunities for conservation and protection of lands owned by the licensee in and adjacent to the project boundary, which are not integral to project operations, but whose protection would serve many of the goals set out in the Conservation Land Initiative."

Exelon Response:
Federal, state and local planning efforts regarding land management within the project areas will be addressed in the shoreline management plan.

NPS Comment 3:
"The presence of the Ferncliff Nature Preserve, which is listed in the National Registry of Natural Landmarks as a National Natural Landmark (NNL), should be noted in the RSP. In particular any potential changes in land uses or access to the Exelon owned abutting the Preserve should be identified, and evaluated in the context of protecting adjacent lands as part of the CLI."

Exelon Response:
The Ferncliff Nature Preserve will be noted in the sensitive resources in the shoreline management plan

MDNR Comment 1:
"In the Interim Shoreline Management Report, the Applicant does not specifically point out specific unique, sensitive and/or critical fish and wildlife habitat identified along the shoreline (Project land and land within 500 feet of the Project boundary) as they had been asked to do by FERC."

Exelon Response:
See Exelon response to NPS Comment 1regarding sensitive resources.

MDNR Comment 2:
"FERC approved the Applicant's RSP with certain modifications, including specifying that Tasks 1 and 2 of section 3.27.7 (methodology) should be expanded to identify unique, sensitive, and/or critical fish and wildlife habitat on the project shoreline. In the RSP, the Applicant points out that approximately 883 acres (36%) of Project lands contain Sensitive Resources, the same number and proportion that they included in the RSP. In the Interim report, they describe that the land categorized under "Class 5: Sensitive Resources" are "Project lands that contain and/or are managed or preserved for protection and enhancement of sensitive resources. Sensitive resources are defined as resources that are protected by the state, federal law, executive order. Sensitive resources also include other natural features that the Applicant considers important to the area of natural environment." Thus, unless no additional unique, sensitive, and /or critical fish and wildlife habitat was found, the lack of additional information and the consistent acreage and percentage suggests that expanded investigations and searches under Tasks 1 and 2 were not performed. Figures 3-1 through 3-6 of the Interim report do show the Project land and land within 500 feet of the Project boundary classified in the general "Sensitive Resources" category, but do not specifically indicate unique, sensitive, and/or critical fish and wildlife habitat."

Exelon response:
Information regarding sensitive resources is dependent upon data from other studies being conducted as part the licensing of the Project. This information was not available at the time the initial study report was submitted. Data from other licensing studies will be included in the Shoreline Management Plan.

3.29 Effect of Project Operations on Downstream Flooding

FERC and SRBC submitted comments on the Effect of Project Operations on Downstream Flooding (RSP 3.29) initial study report.

FERC Comment 1:
"For determining how project operations affect flooding levels and durations downstream of the Conowingo Project, a HEC-RAS model was developed that extends from approximately 1,350 ft downstream of Holtwood dam to the mouth of the Susquehanna River at the Chesapeake Bay. The model contains 28 cross sections from Conowingo dam to the Susquehanna River mouth; however, there is no explanation of the cross sections, model input parameters, or model calibration in the report. Please provide figures for the 28 cross sections, a table for the HEC-RAS model parameters, and figures and/or tables relating to the model calibration"

Exelon Response:
Exelon will provide the requested cross sections, model parameters and model calibration data in the updated study report.

MDNR Comment 1:
"We recommend additional modeling alternatives, such as pool drawdown to the absolute minimum FERC elevation, to provide the maximum range of change that would be possible for the 3 management alternatives evaluated."

Exelon Response:
Exelon questions the necessity of conducting an additional model run evaluating the maximum drawdown allowed by the current FERC license (101.2 ft NGVD 1929). The Peach Bottom Atomic Power Station begins experiencing cooling problems when the elevation of Conowingo Pond drops below elevation 104.2 ft, NGVD 1929. Therefore, Conowingo Pond is never drawn down below this level. Given this constraint, analyzing an alternative that entails a drawdown to the minimum FERC license elevation seems unnecessary.

MDNR Comment 2:
We request further details on the hydraulic model, specifically how HEC-RAS was calibrated and confirmed with measured flood levels and whether a steady or unsteady flow model was used. We specifically want to know the range of uncertainty in flood levels expected for each of the event return intervals.

Exelon Response:
In accordance with FERC and MDNR comments, further details on the hydraulic model calibration will be provided. To provide an estimate of model uncertainty, comparisons between modeled stages and USGS gage rating curve elevations will be provided in the updated study report.

MDNR Comment 3:
"Also elaborate for alternative 2 how and when the various stated pond levels were targeted within the model"

Exelon Response:
Pond elevations were targeted by opening or closing crest gates based on pond inflows. Since all non-regulator gates were identical, this was done by calculating crest gate capacity based on pond elevation (e.g. 10,000 cfs at a given elevation) and determining how many gates needed to be open to pass the current inflow. The intent of alternative 2 was to see if simply maintaining the pond at lower levels

throughout the storm would reduce peak outflows by reducing pond elevation (and thus outflow) at peak flows. Thus, the targeted pond level was held throughout the entire model run. In reality, this did not work as well as intended because targeting a specific elevation simply lead to more gates opening and passing the same amount of flow.

3.30: Osprey Nesting Survey

MDNR submitted comments on the Osprey Nesting Survey (RSP 3.30) initial study report.

MDNR Comment 1:
Although the Study Plan referred to a second season of field study, "if necessary," the current report does not mention continuing the study.

Exelon Response:
Exelon is conducting a second season of field study in 2011, and will issue the updated study report characterizing results both 2010 and 2011 surveys.

3.31: Black-crowned Night Heron Nesting Survey

MDNR submitted comments on the Black-crowned Night Heron Survey (RSP 3.31) initial study report.

MDNR Comment 1:
Black-crowned night heron nesting was investigated in the project area comprised of the Conowingo Pool and Dam areas. Proposed methods were followed more closely in Pennsylvania, where the black-crowned night heron is state-listed as endangered. Field surveys were conducted on two dates within the proposed survey period (April 20 to May 1; although first survey date was April 19th), on dates least five days apart. Surveys in Maryland are presented as an afterthought following reports of herons at the dam. These surveys were conducted during June and well outside of the proposed survey period. No nesting herons were confirmed in either Pennsylvania or Maryland during the study. Although a second field season is referred to under Task 3 of the Study Plan, which describes reporting for the study, no mention of further field studies is mentioned in the report. Since the study is continuing for a second year, more attention should be paid to potential nesting in the lower portion of the study area that includes Maryland.

Exelon Response:
Exelon is conducting a second season of field study in 2011, and will issue an updated study report characterizing results both 2010 and 2011 surveys. More effort will be given to indentifying potential nesting locations in the lower portion of the study area.

3.32: Re-Evaluate the Closing of the Catwalk to Recreational Fishing

Commission staff, MDNR and the Riverkeeper submitted comments on the Re-Evaluate the Closing of the Catwalk to Recreational Fishing study (RSP 3.32) initial study report.

MDNR Comment 1:
We ask that the FERC require the Applicant to file the vulnerability and threat assessment report with FERC so that it can be independently evaluated by authorized agencies.

Exelon Response:
Exelon will maintain a copy of the vulnerability and threat assessment report at the Conowingo Project, where it can be reviewed by FERC staff.

FERC Comment 1:
As evidenced from the comments received at the Initial Study Report Meeting, the Conowingo catwalk is an important resource to local fisherman and closing the catwalk has resulted in the loss of a prime fishing location along the Susquehanna River. As such, Conowingo Study 3.32 was required to re-evaluate the reasons behind the catwalk remaining closed and determine if any possible measures could be put in place to allow the catwalk to reopen. The results of this study were also meant to help inform Conowingo Study 3.26, The Recreation Inventory and Needs Assessment, and help determine whether the fishing opportunities currently available at the Conowingo Project are adequate. As currently completed, Conowingo 3.32 does not meet these goals. The study results included in the Initial Study Report indicate that only a Vulnerability and Security Assessment was completed and while this information is important, the study needs to follow-through with an assessment of the feasibility of actually reopening the catwalk.

Exelon Response:
Exelon will conduct a feasibility assessment to analyze reopening the catwalk to recreational fishing.

MDNR Comment 2:
We ask that the FERC require the Applicant to conduct a feasibility analysis, based on the vulnerability and threat assessment results, as was specified in the approved study plan.

Exelon Response:
See Exelon response to FERC comment 1.

Riverkeeper 1:
This study, or lack thereof, completed avoided the point of the study. The purpose of the study was: conduct a feasibility analysis to evaluate re-opening the Conowingo Project catwalk for recreational fishing by the general public. The original license of the Conowingo Dam gave this catwalk to the citizens who were negatively impacted by the project. The objective of this study was to determine what efforts would have to be made to allow the applicant to fulfill their requirement for being allowed to operate the project. Other catwalks on the lower Susquehanna River dams have not been closed to the public for "national security" reasons. No evidence was provided for the need of closing the catwalk, and no cost/benefit analyses were provided to show due diligence in this matter. Again, the applicant shows its disdain for the citizens that are impacted by the project.

Exelon Response:
Exelon will conduct a feasibility assessment to analyze reopening the catwalk to recreational fishing.

Attachment B-Distribution List for FERC Project No. 405

Kerry Anne Abrams
City of Port Deposit
Mayor
64 South Main Street
Port Deposit, MD 21904

Mr. Mark Arbogast
118 North Decatur Street
Strasburg, PA 17579

Mr. Charles Arbough
10523 Howard Ave
Cockeysville, MD 21030

Mr. Matt Ashton
Maryland Department of Natural Resources
Natural Resource Biologist III
Monitoring and Non-tidal Assessment
580 Taylor Ave., C-2
Annapolis, MD 21401

Mr. John W. Balay
Susquehanna River Basin Commission
Water Resources Management, Hydrologist
1721 North Front Street
Harrisburg, PA 17102-2391

Alex Balboa
1996 Waverly Drive
Bel Air, MD 21015-1100

Paula Ballaron
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

Mr. Thomas W. Beauduy
Susquehanna River Basin Commission
Deputy Director
1721 North Front Street
Harrisburg, PA 17102-2391

Mr. Al Blott
National Marine Fisheries Service
113 Bruce Boyer Street
PO Box 1692
North Kingstown, RI 02852

Mr. Mark Bryer
The Nature Conservancy
Director, Chesapeake Bay Program
5410 Grosvenor Lane, Suite 100
Bethesda, MD 20814

Lori Byrne
Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis, Maryland 21401

Mr. Richard A. Cairo
Susquehanna River Basin Commission
General Counsel
1721 North Front Street
Harrisburg, PA 17102-2391

Mr. Robert B. Campbell
Mason-Dixon Trail System
PA Director
811 Marvell Drive
York, PA 17402

Mr. Ben L. Cardin
United States Senate
Senator
509 Hart Senate Office Bldg
Washington, D.C. 20510

Ruth and Ed Cheslock
P.O. Box 82
Delta, PA 17314

Mr. Michael Chezik
U.S. Department of the Interior - Office of the Secretary
Regional Environmental Officer
200 Chestnut Street
Custom House, Room 244
Philadelphia, PA 19106-2904

John M. Cincilla
PPL Generation, LLC
Manager
2 N 9th Street
Allentown, PA 18101-1139

Mr. Kevin Colburn
American Whitewater
National Stewardship Director
1035 Van Buren Street
Missoula, MT 59802

Mary Colligan
National Marine Fisheries Service, Northeast Regional Office-DOC/NOAA
Assistant Regional Administrator for Protected Resources
55 Great Republic Drive
Gloucestar, MA 01930-2276

Mr. Wade Cope
Susquehanna River Basin Commission
1721 N. Front Street
Harrisburg, PA 17102

Donna Costango
City of Havre de Grace
711 Pennington Ave
Havre de Grace, MD 21078

Julie Crocker
National Marine Fisheries Service, Northeast Regional Office-DOC/NOAA
Protected Resources Division NMFS/NERO
55 Great Republic Drive
Gloucester, MA 01930

Mr. Phil Cwiek
U.S. Army Corps of Engineers, Baltimore District
Attn: CENAB-OP-RMN
P.O. Box 1715
Baltimore, MD 21203-1715

Mr. Andrew Dehoff
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

Mr. Thomas L. Denslinger P.E.
Pennsylvania Department of Environmental Protection
Chief, Water Use Management Section
P.O. Box 8555
Harrisburg, PA 17105-8555

Mr. David Densmore
U.S. Fish and Wildlife Service
Pennsylvania Field Office
315 S. Allen St. Suite 322
State College, PA 16801

Michele M. DePhilip
The Nature Conservancy In Pennsylvania
Director - Freshwater Conservation
2101 N Front Street
Harrisburg, PA 17110

Mr. Peter Dunbar
Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis, MD 21401

Mrs. Clara Eckelmeyer
9737 High Rock Road
Airville, PA 17302

Sheila Eyler
U.S. Fish and Wildlife Service, Maryland Fishery Resources Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

Elder Ghigiarelli
Maryland Department of Environment
Wetlands and Waterways Program, Deputy Administrator
1800 Washington Boulevard
Baltimore, MD 21230

Mr. Ralph Goodno
Lancaster County Conservancy
President & CEO
117 South West End Avenue
Lancaster, PA 17608

Mr. Dennis T. Guise
2313 Forest Hills Drive
Harrisburg, PA 17112-1068

Mr. Dan Haas
National Park Service - U.S. Department of Interior
200 Chestnut St. 5 th floor
Philadelphia, PA 19106

Mr. Jeffrey Halka
Maryland Geological Survey
Acting Director
2300 Saint Paul Street
Baltimore, MD 21218-5210

Mr. M. Brent Hare
Maryland Department of Natural Resources
Assistant Attorney General
c/o Maryland Energy Administration
1623 Forest Drive, Suite 300
Annapolis, MD 21401

Michael R. Helfrich
Lower Susquehanna Riverkeeper
324 W. Market Street
York, PA 17401

Mr. Michael Hendricks
Pennsylvania Fish and Boat Commission
450 Robinson Lane
Bellefonte, PA 16823

Mr. Jere Hess
2507 Shures Landing Road
Darlington, MD 21034

Mr. Alexander R. Hoar
U.S. Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035-9589

Jennifer Hoffman
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

Bonita C. Hoke
Pennsylvania Federation of Sportsmen's Clubs
Director
2426 North 2nd Street
Harrisburg, PA 17110-1104

James Hooper
Mason-Dixon Trail System
President, M-DTS
309 Bank Hill Road
Wrightsville, PA 17368

Donovan J. Houck
Pennsylvania Department of Environmental Protection
Environmental Planner
Rachel Carson State Office Building 400 Market Street
Harrisburg, PA 17101

Mr. Chris Iverson
1200 Nursery Road
Wrightsville, PA 17368

Linda C. Janey
Maryland Department of Planning
Assistant Secretary for Clearinghouse and Communication
301 West Preston Street Suite 1101
Baltimore, MD 21201-2305

Mr. James Kardatzke
U.S. Department of the Interior, Bureau of Indian Affairs
545 Mariott Drive, Suite 700
Nashville, TN 37214

Anne Ketchum
Pennsylvania Department of Conservation and Natural Resources
Executive Assistant
P.O. Box 8767
Harrisburg, PA 17105-8767

Juan Kimble
Safe Harbor Water Power Company
President
1 Powerhouse Road
Conestoga, PA 17516-9651

David S. Ladd
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

Lynn Lankshear
National Marine Fisheries Service, Northeast Regional Office-DOC/NOAA
55 Great Republic Drive
Gloucester, MA 01930

James Leigey
Pennsylvania Game Commission
Bureau of Land Management
2001 Elmerton Avenue
Harrisburg, PA 17106-9762

Mr. J. Rodney Little
Maryland Historical Trust
Director and SHPO
100 Community Place
Crownsville, MD 21032

Jacqueline Ludwig
Harford County
Water & Sewer Engineering & Administration
212 South Bond Street, Second Floor
Bel Air, MD 21014

Ms. Erin Lynam
Susquehanna River Basin Commission
Aquatic Ecologist, Water Resources Management
1721 North Front Street
Harrisburg, PA 17102-2391

Mrs. Monica Marcum
Broad Creek Civic Association
President
9211 Hines Road
Balto, MD 21234

Anthony McClune
Harford County Department of Planning and Zoning
Director
County Office Building 220 South Main Street
Bel Air, MD 21014

John McGillen
Maryland Department of Environment
Industrial Discharge Permits Division
1800 Washington Boulevard
Baltimore, MD 21230

Kristan McKinne
Lancaster County Conservancy
117 South West End Avenue
Lancaster, PA 17603

Douglas C. McLearen
Pennsylvania Historical and Museum Commission Bureau for Historic Preservation
Chief Division of Archaeology & Protection
400 North Street
Commonwealth Keystone Building, 2nd Floor
Harrisburg, PA 17120-0093

James J. McNulty
Pennsylvania Public Utility Commission
Acting Secretary
Commonwealth Keystone Building
400 North Street, 2nd Floor
Harrisburg, PA 17120

Glenn R. Melroy
U.S. Army Corps of Engineers
P.O. Box 2870
Portland, OR 97208

Kevin Mendik
National Park Service, Boston Support Office
15 State Street
Boston, MA 02109

Honorable Barbara A. Mikulski
United States Senate
Washington, DC 20510

Anita Miller
U.S. Department of Interior - Office of Environmental Policy and Compliance
Philadephia Region
Custom House, Room 244
Philadelphia, PA 19106

Jeremy Miller
Pennsylvania Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110

Larry Miller
U.S. Fish and Wildlife Service
Mid-Atlantic Fishery Resources Office, Project Leader
P.O. Box 67000
1601 Elmerton Avenue
Harrisburg, PA 17110-7000

Jeral A. Milton
Legg Mason Tower
111 South Calvert Street, Ste 2700
Baltimore, MD 21202-6143

Mr. Steve Minkkinen
U.S. Fish and Wildlife Service, Maryland Fishery Resources Office
Project Leader
177 Admiral Cochrane Drive
Annapolis, MD 21401

Joane D. Mueller
Maryland Department of Environment
MDE Clearinghouse Coordinator
1800 Washington Boulevard
Baltimore, MD 21230

Tracey Librandi Mumma
Pennsylvania Game Commission
2001 Elmerton Avenue
Harrisburg, PA 17110-9797

Margaret Niland
Harford Land and Trust
P.O. Box 385
Churchville, MD 21028

Debby Nizer
U.S. Army Corps of Engineers
Baltimore District, CENAB-OP-RPA
P.O. Box 1715
Baltimore, MD 21203

Janet Norman
U.S. Fish and Wildlife Service
Fish and Wildlife Biologist
Chesapeake Bay Field Office 177 Admiral Cochrane Drive
Annapolis, MD 21401

John O'Shea
Atlantic State Marine Fisheries Commission
1444 Eye Street, NW 6th Floor
Washington, D.C. 20005

Jason E. Oyler
Pennsylvania Fish and Boat Commission
Office of Chief Counsel
P.O. Box 67000
1601 Elmerton Ave
Harrisburg, PA 17106-7000

M. Dukes Pepper Jr.
Pennsylvania Department of Environmental Protection
Office of Chief Counsel Assistant Counsel
909 Elmerton Avenue
Harrisburg, PA 17110-8200

Gary Petrewski P.E.
PPL Generation, LLC
Two North Ninth Street (GENPL6)
Allentown, PA 18101

Mr. Joseph Pfaff
Harford County Department of Parks & Recreation
Director
702 North Tollgate Road
Bel Air, MD 21014

Mark Platts
Lancaster York Heritage Region
1706 Long Level Road
Wrightsville, PA 17368

Mr. David R. Poe
Dewey & LeBoeuf, LLC
Counsel for PPL Holtwood, LLC
1101 New York Avenue, NW
K Avenue, NW Suite 1100
Washington, DC 20005-4213

Niles Primrose
Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis, MD 21401

Mr. Don Pugh
American Rivers

Mr. Charles Ramsay
3527 Level Road
Churchville, MD 21028

Mary Ratnaswamy, PhD
U.S. Fish and Wildlife Service
Program Supervisor, Threatened and Endangered Species
177 Admiral Cochrane Drive
Chesapeake Bay Field Office
Annapolis, MD 21401

Michael Richardson
Maryland Department of Environment
1800 Washington Boulevard
Baltimore, MD 21230

Jim Richenderfer
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

Bill Richkus
Versar Inc.
9200 Rumsey Road
Columbia, MD 21045

Mr. Herb Sachs
Maryland Department of Environment
1800 Washington Blvd Suite 450
Baltimore, MD 21230

Robert Sadzinski
Maryland Department of Natural Resources
Natural Resources Biologist, Alosids
301 Marine Academy Drive
Stevensville, MD 21666

Steve Schreiner
Versar Inc.
9200 Rumsey Road
Columbia, MD 21045

Mr. Shawn A. Seaman
Maryland Department of Natural Resources
Project Manager
Tawes State Office Building B-3
580 Taylor Avenue
Annapolis, MD 21401

John Seebach
American Rivers
Director, Hydropower Reform Initiative
1101 14th St. NW, Suite 1400
Washington, D.C. 20005

John Seitz
York County Planning Commission
Water Resources Coordinator
28 East Market Street
York, PA 17401-1580

Mr. Eric S. Sennstrom
Cecil County Department of Planning & Zoning
Director
200 Chesapeake Blvd., Suite 2300
Elkton, MD 21921

Pam Shellenberger
York County Planning Commission
Chief, Long Range Planning
28 East Market Street
York, PA 17401-1580

Laurie E. Shepler
Pennsylvania Fish and Boat Commission
Office of Chief Counsel
P.O. Box 67000
Harrisburg, PA 17106-7000

Andrew Shiels
Pennsylvania Fish and Boat Commission
1735 Shiloh Road
State College, PA 16801

Ellen Shultzabarger
Pennsylvania Department of Conservation and Natural Resources (DCNR)
Environmental Review Specialist
P.O. Box 8552
Hamburg, PA 17105

Julie Slacum
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office 177 Admiral Cochrane Drive
Annapolis, MD 21401

Mr. Edward W. Slicer Jr.
Cecil County Department of Parks and Recreation
Grants Administrator
County Administration Building
200 Chesapeake Blvd Suite 1200
Elkton, MD 21921

Topher Smith
American Whitewater
394 Butler Rd
Reisterstown, MD 21136

Wayne Spilove
Pennsylvania Historical and Museum Commission
300 North Street
Harrisburg, PA 17120-0093

James S. Spontak
Pennsylvania Department of Environmental Protection
Southcentral Region Program Manager
909 Elmerton Avenue
Harrisburg, PA 17106-7000

Patricia Stabler
Chester Water Authority
100 Ashville Road
Nottingham, PA 19362

Scott W. Standish
Lancaster County Planning Commission
Director
150 N. Queen Street, Suite 320
Lancaster, PA 17603

Mr. Ronald Steelman
3529 Green Spring Road
Havre de Grace, MD 21078

Sara Strassman
American Rivers, River Restoration Program
Associate Director
355 N. 21st Street, Suite 309
Camp Hill, PA 17011

David Sutherland
U.S. Fish and Wildlife Service, Fish Passage Workgroup Chair
177 Admiral Cochrane Drive
Annapolis, MD 21401

Andrew Tittler
U.S. Department of Interior
Office of the Solicitor, Northeast Region -Attorney
One Gateway Center, Suite 612
Newton, MA 02458-2802

Lisa H Tucker
Kirkpatrick & Lockhart, Preston Gates Ellis, LLP
Partner
1601 K Street, NW
Washington, D.C. 20007

Alliance for Chesapeake Bay
660 York Road Suite 100
Baltimore, MD 21212

Chesapeake Bay Foundation
6 Herndon Aveune
Annapolis, MD 21403

Lancaster County Parks & Recreation
1050 Rockford Road
Lancaster, PA 17602

York County Parks & Recreation
400 Mundis Race Road
York, PA 17406

York County Planning Commission
100 W. Market Street
York, PA 17401

Lower Chanceford Township
4120 Delta Road
Airville, PA 17302

Peach Bottom Township
545 Broad Street, Extended
Delta, PA 17314

Martic Township
370 Steinman Farm Road
Pequea, PA 17565

Drumore Township
1675 Furniss Road
P.O. Box 38
Drumore, PA 17518

Borough of Millersville
100 Municipal Drive
Millersville, PA 17551

Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Cecil County
200 Chesapeake Blvd., Suite 2300
Elkton, MD 21921

Harford County
212 South Bond Street
Bel Air, MD 21014

Fulton Township
777 Nottingham Road
Peach Bottom, PA 17563

City of Havre de Grace
400 Pennington Aveune
Havre de Grace, MD 21078

Borough of Oxford
401 Market Street
Oxford, PA 19363

City of Aberdeen
60 North Parke Street
Aberdeen, MD 21001

Town of Bel Air
39 Hickory Avenue
Bel Air, MD 21014

U.S. Environmental Protection Agency, Region III
Section Chief
1650 Arch Street
Philadelphia, PA 19103-2029

County of Lancaster
P.O. Box 83480
Lancaster, PA 17608-3480

Pennsylvania Department of Conservation and Natural Resources
P.O. Box 2063
Harrisburg, PA 17105-2063

Pennsylvania Game Commission
2001 Elmerton Avenue
Harrisburg, PA 17110-9762

Pennsylvania Office of Attorney General
16th Floor Strawberry Square
Harrisburg, PA 17120

Upper Chesapeake Watershed Association
138 West Lanvale Street
Baltimore, MD 21217-4120

County of York, York County Courthouse
28 East Market Street
York, PA 17401-1501

Maryland Office of the Governor
Governor
State House
Annapolis, MD 21401

Pennsylvania Department of Conservation and Natural Resources
Director
P.O. Box 8551
Harrisburg, PA 17105

Maryland Public Service Commission
6 St. Paul Centre, 16th Floor 6 Saint Paul Street
Baltimore, MD 21202-6806

Pennsylvania Department of Agriculture
2301 N. Cameron Street
Harrisburg, PA 17110-9405

Pennsylvania Wildlife Federation, PA Federation of Sportsmen's Club, Inc.
2426 North 2nd Street
Harrisburg, PA 17110

U.S. Fish and Wildlife Service
Director
P.O. Box 67000
Harrisburg, PA 17106-7000

Pennsylvania Office of the Governor
Governor
225 Main Capitol
Harrisburg, PA 17120

U.S. Department of the Interior, Bureau of Indian Affairs
1849 C Street, NW
Washington, D.C. 20420

U.S. Fish and Wildlife Service
Hadley
300 Westgate Center Drive
Hadley, MA 01035-9587

U.S. Fish and Wildlife Service
315 South Allen Street Ste 322
State College, PA 16801-4851

University of Maryland Center for Environmental & Estuarine Studies
Director
Cambridge, MD 21613

West Virginia Dept. of Education & Arts Division of Culture & History
Capitol Complex
Charleston, WV 25305

Delaware River Basin Commission
Executive Director
P.O. Box 7360
West Trenton, NJ 08628-2404

Christopher Urban
Pennsylvania Fish and Boat Commission
Chief - Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823-9620

Peter R. Valeri
Federal Energy Regulatory Commission
Regional Engineer
19 W 34th Street, Room 400
New York, NY 10001-3006

Mr. Clyde S. Van Dyke
Cecil County Department of Parks and Recreation
Director
County Administration Building
200 Chesapeake Blvd., Suite 1200
Elkton, MD 21921

Liana Vitali
Chesapeake Research Consortium
410 Severn Avenue, Suite 109
Annapolis, MD 21240

Herbert H. Ward
Upper Chesapeake Watershed Association
138 West Lanvale Street
Baltimore, MD 21217-4120

Douglas Weaver
York Haven LLC
York Haven Hydro Station
P.O Box 67
York Haven, PA 17370

Dale Weinrich
Maryland Department of Natural Resources
Matapeake Work Center
301 Marine Academy Drive
Stevensville, MD 21666

R. Timothy Weston
Kirkpatrick & Lockhart, Preston Gates Ellis, LLP
17 North 2nd Street Floor 18
Harrisburg, PA 17101-1638

Mr. John A. Whittaker, IV
Winston & Strawn, LLP
jwhittak@winston.com
1700 K Street, NW
Washington
DC, 20006

Cynthia Wilkerson
National Park Service
US Customs House Stewardship and Partnership
200 Chestnut Street
Philadelphia, PA 19106

David & Nancy Yohn
Citizen/Landowner
P.O. Box 658
Delta, PA 17314

Zhenxing (Jason Zhang Ph.D.
Susquehanna River Basin Commission
Water Resources Management, Hydrologist
1721 North Front Street
Harrisburg, PA 17102-2391

William T. Wisniewski
U.S. Environmental Protection Agency - Region III
Deputy Regional Administrator
1650 Arch Street
Philadelphia, PA 19103-2029

Andrew C. Zemba
P.O. Box 2063
Harrisburg, PA 14105-2301

Attachment C-Responses to Agency Comments on Conowingo 3.19-Freshwater Mussel Characterization Study

3.19 Freshwater Mussel Characterization Study

FERC, American Rivers, the USFWS, and MDNR submitted comments on the Freshwater Mussel Characterization Study below Conowingo Dam (RSP 3.19) initial study report.

FERC Comment 1:
In the February 2010 Study Plan Determination, staff recommended that Exelon deposit voucher specimens collected during sampling into a state or regional museum. The Initial Study Report states that "[s]amples of the dead shells were collected as voucher specimens for transfer to MDNR and deposit in a museum." Please specify where voucher specimens will be permanently deposited.

Exelon Response:
The voucher specimens will be permanently deposited in:

Delaware Museum of Natural History
4840 Kennett Pike
P.O. Box 3937
Wilmington, DE 19807
www.delmnh.org

FERC Comment 2:
The December 22, 2009 Revised study Plan states that "[r]epresentative individuals of each species will be photographed." Please provide diagnostic photographs for each species observed during this study.

Exelon Response:
Photographs will be provided in the updated study report.

FERC Comment 3:
You conclude in the Initial Study Report that "…any effects of the Conowingo Project operation on the downstream mussel community are not discernable and likely not ecologically significant." It is not clear that the data collected for this study support this broad conclusion, particularly without additional historic data for comparison. For instance, figures 4.2-2 and 4.2-3 of the Initial Study Report indicate more mussels per search hour in the semi-quantitative surveys with increasing distance from the dam; a similar pattern is reported for the quantitative surveys. An alternate interpretation of these data could be that Conowingo Project operation inhibits the ability of freshwater mussel populations to remain established in proximity to Conowingo dam, suggesting a project effect. However, it is understood that substrate type also influences the distribution of freshwater mussels within the project boundary. Please include a more detailed discussion of available habitat within the project boundary, and how this may influence the freshwater mussel distributions reported in this study.

Exelon Response:
FERC and several other reviewers have commented on the apparent downstream increase in the number of mussels per search hour recorded in the semi-quantitative survey. FERC has suggested in its comment that available habitat may play a role. Habitat mapping and how it was used to select the semi-quantitative survey stations is described in Exelon‟s Response to FERC Comment 5. Discussion of habitat in the study reach and the role that it may play in defining the mussel community in the study reach are discussed in this response.

Most of the non-tidal part of the study reach and part of the upstream end of the tidal part of the study reach is quite rugged, consisting of boulders and massive bedrock formations with strong water currents, even at relatively low flow. The only substrate materials (sand and gravel) likely to support mussels is present in small deposits located behind boulders and in low points between and on top of bedrock formations. Larger quantities of sand, gravel, and cobble are present at the confluence of Octoraro Creek and along the shoreline of islands located along the river‟s east shoreline. Bedrock and small and large boulders also are present. Secondary channels located between the islands and the river‟s east shoreline contain sand, gravel, cobble, boulder and bedrock with occasional silt deposits. River bottom in the tidal part of the study reach is dominated by bedrock and boulders at its upstream limit, with sand, gravel, and cobble present downstream. There are several islands located in the tidal part of the study reach, with shorelines containing cobbles and boulders with interstitial sand and gravel.

The non-tidal part of the study reach is a high energy environment in which water flow scours the river bottom. Water flow velocity is reduced in the non-tidal part of the study reach.

The rugged river bottom conditions that are present now may have been present for a long time. The Conowingo 3.15 Sediment Introduction and Transport Study states in its Executive Summary: "Prior to the construction of Conowingo Dam, the river in the Project area was likely very similar to the condition of the river today downstream of the dam. A natural barrier existed at the site of the dam, and flow was strong enough to inhibit sediment deposition until near the mouth of the river." Further discussion of available habitat in the study reach and how this may influence mussel distributions will be provided in the updated study report.

FERC Comment 4:
During the Initial Study Report Meeting and the follow-up conference call on the Freshwater Mussel Characterization Study (March 25, 2011), there were several questions on the experience level of the researchers conducting the field work. Please consider including each researcher's resume as an addendum to the report that supports their experience with sampling and identification of freshwater mussels, particularly species found within the Lower Susquehanna River.

Exelon Response:
Attachment D contains resumes for seven Normandeau biologists who conducted the Conowingo mussel study. Four other biologists functioned as boat operators/radiomen. Resumes for these individuals are not included because they were not responsible for mussel identification, nor for survey.

William S. Ettinger (the Principal Investigator) led the overall effort. Mr. Ettinger is an aquatic biologist with 37 years of experience conducting macroinvertebrate and other studies in fresh, estuarine, and marine environments. He has led freshwater mussel surveys since 2001, including several in the mainstem Susquehanna River, and he is competent in identification of Susquehanna River mussels. His resume is abbreviated (compared to the other resumes) in that only mussel surveys (18) and mussel habitat surveys (2) are listed. Mr. Ettinger led the wading party in the field during the semi-quantitative survey, assisted by Don Mason and Mike Mettler. Both men are competent in identification of Susquehanna River mussels. Mr. Mason has conducted at least 15 mussel surveys since 1997. Mr. Mettler has conducted 9 mussel surveys since 2001.

Alan Frizzell led the diving party in the field during the semi-quantitative survey, assisted by Erik Fel‟Dotto and Chris Baker. Each of the men is a biologist and SCUBA diver. All three men are competent in identification of Susquehanna River mussels. Mr. Frizzell has conducted at least 14 mussel surveys since 1997, Mr. Fel‟Dotto has conducted at least 12 mussel surveys since 2001, and Mr. Baker has conducted at least 8 mussel surveys since 2003. Many of them were conducted with Mr. Ettinger.

Mr. Ettinger led the quantitative survey party in the field, assisted by Mr. Mettler and Bryan Lees. Mr. Lees is an aquatic biologist with much field experience, particularly in collection of benthic macroinvertebrates, but with little experience in mussel identification. However, his inexperience in mussel identification was not a liability because Mr. Ettinger and Mr. Mettler saw and identified all mussels observed during the quantitative survey.

Reliable identification of all mussels observed was ensured in several ways. First, the species likely to be encountered in the study were identified in literature and museum search. Then, Mr. Ettinger reviewed shells of these species contained in the collections of the Delaware Museum of Natural History. Three biologists brought personal reference collections into the field for use as necessary. All of the study team reviewed the species the evening before the surveys began.

One morning during the semi-quantitative surveys, MDNR‟s Matt Ashton led a short discussion on distinguishing between eastern floater and alewife floater. Mr. Ashton offered this opportunity and the study team accepted it because it afforded an opportunity to sharpen identification skills.

During the semi-quantitative surveys, the wading party and the diving party surveyed independently. Each party was responsible for its identifications, with all three members of a party examining difficult mussels and then coming to agreement in identification. Any uncertain identifications beyond this point were discussed when the wading party and the diving party got together at the end of each day.

FERC Comment 5:
Please include a more detailed, clear discussion of how semi-quantitative and quantitative sampling locations were selected. If there were areas not sampled due to safety concerns or operation schedules, this should be explicitly discussed within the report.

Exelon Response:
Semi-quantitative Survey Station Selection
The approved Conowingo RSP states "The entire approximately 4.5 mile long study area in the Susquehanna River downstream of Conowingo Dam will be surveyed for mussels. Most of the river bottom is expected to be rocky (cobble, boulder, and bedrock), which is not preferred mussel habitat. Therefore, the survey effort will focus on search of deposits of finer material (mixed silt, sand, and gravel) which favor mussel burrowing. Nevertheless, the opportunity to find and identify mussels stranded on rocky substrate will not be ignored." It is stated up front that in the approved study plan that the surveys will focus on favorable mussel habitat. The semi-quantitative mussel survey was conducted at 72 locations selected using a habitat map of the non-tidal part of the study reach. This map, including an enlargement of the area near the confluence of Octoraro Creek, is included in this response as Figures 4.4.6-1 and 4.4.6-2. The non-tidal part of the study reach is approximately 3.5 miles in length. No habitat map was prepared for the approximately 1.0 mile long tidal part of the study reach.

Semi-quantitative survey stations were selected in the field in order to maximize the opportunity to locate and search substrate (sand, gravel, and cobble mix) most likely to support mussels. This was an important consideration because most (70%) of the non-tidal part of the study reach and part of the upstream end of the tidal part of the study reach consists of boulders and massive bedrock formations that are not preferred mussel habitat. Mussels in these river bottom conditions were likely to be encountered in small deposits of sand and gravel behind boulders and in low points in between and on top of bedrock formations, and there was concern that survey location selection randomly and *a priori* by use of a grid laid over a map might miss these isolated locations.

Despite the fact that the semi-quantitative survey stations were selected in the field, an effort was made to distribute the stations throughout the study reach and to allocate stations to all of the habitat compartments identified in Figures 4.4.6-1 and 4.4.6-2, approximately in proportion to their acreage in the study reach. How this was accomplished and the associated reasoning is described below.

The locations of these stations were the result of a decision to concentrate the survey effort where potential hydroelectric plant impacts would be expected to be the greatest, noting that habitat conditions seemed relatively uniform throughout the largest habitat compartment. The habitat compartments identified in the non-tidal part of the study reach and their total acreage and the total acreage of the tidal component of the study reach are shown in Table 1. As described two paragraphs above, the largest part of the non-tidal study reach (and the entire study reach) was habitat referred to as "ruffle" (a combination of the terms riffle and run) that is characterized as quite rugged, made up almost entirely of boulders and massive bedrock formations with strong water currents, even at relatively low river flow. This habitat compartment (P5) made up 46.2% of the total study reach. Twenty-four survey stations (33.3% of the total number of survey stations) were located in Compartment P5. Most (19) of these survey stations were located in the upstream two-thirds of Compartment P5, with five stations located in the downstream end of the compartment just upstream of the tidal/non-tidal waters boundary.

Tidal waters made up 34.3% of the study reach and 13 survey stations (18.1% of the total) were located in it (Table 1). These stations were located in the river‟s west channel, extending from west of Spencer Island upstream to near the upstream tip of Robert Island and downstream in the river‟s east channel to the downstream tip of Robert Island. No survey stations were located between Wood Island and the downstream two-thirds of Robert Island because of dense submerged aquatic vegetation in this area, which made motorboat navigation and mussel survey difficult. No survey stations were located in the river‟s east channel east of Spencer Island. This decision was based on belief that the habitat east of Spencer Island likely did not differ from the upstream habitat in the east channel or the habitat in the channel west of Spencer Island.

Habitat Compartment P5 and tidal waters made up a total of 80.5% of the study reach (Table 1). A total of 24 other compartments made up the remaining 19.5% of the study reach. Survey stations were located in 14 of them. Compartments P3 – Shallow Run and P4 – Shallow Pool, totaling 44.1 acres (2.9% of the survey reach), were the largest compartments not surveyed. These compartments, located along the river‟s west shoreline near the upstream end of the study reach, were characterized in the habitat survey as swift river current environments containing substantial bedrock and inadvisable to survey for safety reasons. It should be noted that survey results from the compartments located immediately upstream (P1 – deep run and P2 – shallow run) indicated only a total of 22 eastern elliptio (10.5 mussels per search hour) at three stations. The substrate conditions were described as 70-90% bedrock at these locations. Based on these observations, it is unlikely that Compartments P3 and P4 support many mussels. It also is unlikely that any species new to the study are present in these compartments.

Eight other habitat compartments that were not sampled totaled 4.6 acres, 0.3% of the study reach. Compartments P15 – Perched Backwater Pool, P16 – Vegetated Outcrop with Diverse Habitats, and O1 – Dry Side Channel were, in fact, terrestrial habitats that contained water only because they were submerged part of the time. The remaining five compartments (O2 through O4, O8, and O10) of shallow riffle, shallow pool, or deep pool were located at the Octoraro Creek confluence and were not surveyed because of substrate conditions (loose gravel or thick silt) unfavorable to mussels. These compartments totaled 2.7 acres.

The above discussion shows that the semi-quantitative survey station locations were selected in a planned and reasoned manner. The stations were distributed in the study reach with the largest numbers of them located in the two largest habitat compartments and the rest of them located in most of the other compartments. The compartments that were not surveyed were omitted due to safety concerns, temporary submergence, or substrate unsuitable to mussels. A total of 72 survey stations were searched for mussels in the 4.5 miles of study reach. This is an average of 16 stations per mile, or one every 330 linear feet.

Quantitative Survey Station Selection

Mussels were sampled quantitatively at five locations (stations) that were selected to represent an expected range of mussel density, based on the semi-quantitative survey results. These five locations corresponded to four particular semi-quantitative survey stations located nearby. The number of mussels observed per search hour at the four semi-quantitative survey stations was 45.7, 100.0, 234.7, and 317.5, which approximately evenly divided the range of the number of mussels observed per search hour (0 to 317.5) at the 72 semi-quantitative survey stations.

Two considerations were involved in quantitative survey station selection. First, to select locations representing the range of the number of mussels observed per search hour at the 72 semi-quantitative survey stations. Secondly, the physical conditions of the river bottom at the selected quantitative survey stations had to allow use of the sampling equipment and methodology. In other words, the river bottom substrate had to be relatively free of large boulders and bedrock that would make problematic the use of the 0.25 m^2 survey quadrat within a 15 meters by 30 meters grid established on the river bottom.

These two considerations were met by the selected quantitative stations. That most of these stations were located near the islands along the river‟s east shoreline is largely based on river bottom substrate considerations. In fact, it should be noted that QS-5 was intended to be located closer to Semi-quantitative Station D-23, near the upstream end of Robert Island. However, it was necessary to move QS-5 closer to Robert Island so that it could be located in river bottom substrate in which the sampling could be conducted.

Two of the quantitative survey stations (QS-3 and QS-4) were located near Semi-quantitative Station D-26. Originally, it had been planned to locate only one quantitative survey station near an individual semi-quantitative survey station, although not stated explicitly in the study plan. However, a decision was made in the field to locate QS-4 upstream of QS-3 because it appeared that more mussels were visible on the surface of the river bottom at this location, compared to QS-3, thereby allowing an opportunity to measure mussel density in an area where mussel density was expected to be higher.

USFWS Comment 1:

It is unclear to us how the semi-quantitative survey sites were chosen. Although a habitat map was available, it does not appear that semi-quantitative survey sites were representative of all habitat types. While habitat information is interesting, it should be used to exempt areas within the study area from surveys. To adequately characterize the entire study area, all habitats should be sampled within established safety limits.

We note that the semi-quantitative survey sites should have been chosen randomly to represent the entire study area. Smith and Strayer (2003) details two types of sampling: Informal Sampling and Probability-Based Designs (Design-Based Inference). From the description of the methods in the ISR, it appears that the survey detailed in study 3.19 used informal sampling. Smith and Strayer (2003) write that "data collected using informal designs are of very limited use…informal sampling is most useful in preliminary surveys and for determining the presence of a mussel species at a site and should be avoided for other applications." They go on to describe several other methods of sampling that would have better characterized the freshwater mussel community below Conowingo Dam including simple random sampling, stratified sampling (sample sites could be stratified by wading and diving if cost is at issue), double sampling, two stage sampling, or distance sampling. The sampling design that most closely resembles the current method is double sampling for stratification (described on page 23 of Smith and Strayer 2003). Either a grid or transect lines should be laid over a map of the 4.5 mile long section of *river and sites should be chosen randomly. If stratification is desired, it should be entirely based on cost per unit effort not on habitat. Based on the catch per unit effort at a site, quantitative survey sites should be chosen to represent high, medium, low, and 0 mussel densities.*

Multiple search patterns were used in the semi-quantitative survey. We note that search methods should be standardized across all semi-quantitative survey sites. Either entire sections of the gird, transects, or 1 meter wide strips could be used.

According to the 3.19 report, quantitative surveys were conducted at 5 locations to represent the range in numbers of mussels observed during the semi-quantitative survey. This differs from the study design in which surveys were to be conducted in the areas with the highest density. It is unclear how quantitative survey locations were chosen. Methods should be described more clearly in a redraft of the report. Per comments in section 2, to best characterize the freshwater mussel community below Conowingo Dam, quantitative survey sites should be chosen to represent high, medium, low, and 0 mussel densities.
Data analysis was not clearly described. Was Dave Smith's mussel estimator program used to determine density and abundance? This was not detailed in the methods section of the report and needs to be addressed in a report redraft.

Measurement of habitat parameters should have been done where the quantitative sampling was conducted.

While no reference reach was used, there are examples in the literature of what healthy populations of freshwater mussel populations should look like. In addition, there are a number of studies of the effects of dam operations on freshwater mussels. It has been well documented that a change in operations can improve recruitment of mussels below dams. This literature should be detailed in the conclusions of a report redraft.

Exelon Response:
See Exelon Response to FERC Comment 5 and MDNR Comment 24. Habitat parameters were measured where the quantitative survey was conducted. This is indicated in Section 4.4 Habitat Parameter Measurements in the initial study report.

MDNR Comment 1:
The RSP states that "the results of searches for published and unpublished freshwater mussel locality records from the study area will identify species likely to be found in the survey area. With such information, the crew will be able to review a reference collection of shells of these species in order to better ensure reliable and consistent identification during the survey. However, it should be noted that all personnel conducting the survey will be experience in mussel survey and identification and that voucher specimens of all non-state and non-Federal listed species will be collected for deposit in a museum.

The report does not indicate that reference shell material was examined by personnel conducting the survey after compiling a list of species that were likely to be found. There are serious implications for management actions from even minimal levels of misidentification (Shea et al. 2011), especially in impact assessments. Additionally, no voucher specimens have been given to MDNR, which was a condition of the PI's scientific permit. Additional terms of the permit included contacting MDNR biologists when questionable live specimens were collected for specimen verification within 24 hours. This was not done even though the PI retained mussels for 24 hours for verification by MDNR biologists during a scheduled field visit.

Exelon Response:

Reference shell material was examined by personnel conducting the survey after compilation of a list of mussel species that were likely to be found. Exelon Response to FERC Comment 4 provides more information on assurance of proper mussel identification, including qualifications of the surveyors.

Voucher specimens will be provided to MDNR and then permanently deposited in:

Delaware Museum of Natural History
4840 Kennett Pike
P.O. Box 3937
Wilmington, DE 19807
www.delmnh.org

MDNR Comment 2:
The RSP noted that the entire 4.5 mile study area (to the downstream end of Spencer Island) be sampled. This was not done as clearly illustrated by Figure 4.2-1. Some areas representative of a small fraction of habitats (e.g. around the confluence of Octoraro Creek) were disproportionately sampled while other areas (Rueben Island to Steret Island and east of Spencer Island) were not sample at all. Throughout the study plan development period, we stressed to the PI that a single method be chosen, be clearly stated, and employed in the study because we suspected that the entire area would not be sampled. Based upon the habitat base map provided by the PI we suggested that the macrohabitat categories be used to proportionally stratify semi-quantitative sampling and were led to believe that this strategy would be used. We also noted that constrained area timed searches could be employed as noted in literature provided (Smith et al. 2001) to the PI during RSP development and through personal communication.

Exelon Response:
Although not stated in the initial study report, the semi-quantitative survey stations were proportionally stratified among the habitat compartments shown on the habitat base map. Several areas of the two largest habitat compartments contained no survey stations because the compartments were considered to be adequately surveyed elsewhere in the study reach. Exelon Response to FERC Comment 5 describes semi-quantitative survey station selection, including how the survey stations were proportionally stratified.

MDNR Comment 3:
How were semi-quantitative survey locations chosen? This was not specified in the RSP or report and does not appear to have followed methods mutually agreed upon between MDNR and the PI. There appears to be large areas of suitable mussel habitat that were not surveyed and poor spatial representation throughout the project area, including an emphasis on the shoreline, upper project reaches, and around the Octoraro Creek confluence. For example, sampling did not take place east of Spencer Island or west of Steret Island though both reaches are within project area and contain areas with suitable mussel habitat with known concentrations of mussels.

Exelon Response:
See Exelon Response to FERC Comment 5.

MDNR Comment 4:
The RSP also states that "the greater part of the survey effort will focus on searches of deposits of finer material which favor mussel burrowing." This was not done; lower portions of the study area contain large expanses of finer substrates, specifically the area from Robert Island downstream to Spencer Island and the channels between islands. We agree the prevailing substrate in the upper reaches of the project area are cobble, boulder, and bedrock, but a considerable amount of fine substrate exists in depositional areas and flow refugia that is patchy, but ubiquitous. The area terms "Ruffle" is the predominant

macrohabitat as classified by Normandeau and received relatively little sampling effort, even though our personal observation indicated that suitable mussel habitat and mussels are found throughout this habitat. We communicated this finding to the PI via email prior to the survey. In addition, mid-channel islands, where gravel substrates dominate and mussels are abundant, received very little attention compared to near shore islands. There also appears to be a bias towards sampling along the left descending half of the channel. We stressed during comment periods that a clearly defined allocation of survey effort be made (e.g., habitat stratification with proportional allocation or constrained areas searches throughout the reach). The PI should be familiar with these methods and references that provide examples (see review of methods in Strayer and Smith 2003, Smith et al. 2001, Villella and Smith 2005).

Exelon Response:

See Exelon Response to FERC Comment 5.

MDNR Comment 5:

Why were multiple search patterns used including parallel transects, perpendicular transects, and searches originating from a central point? It was stressed during comment periods that a consistent method be used. Smith et al. (2001) and Villella and Smith (2005), which are implicit throughout the RSP and were provided to the PI, clearly describe what type and how the search methods should be employed.

Exelon Response:

A variety of search patterns were used by the surveyors, including parallel transects oriented upstream, downstream, or at angles to river flow. In other instances, the surveyor‟s movements were not parallel to each other, originating from a central point. These multiple search patterns were used because the rugged river bottom conditions present in much of the study reach prevented use of a uniform search pattern at many stations.

In the comment, MDNR refers to Smith, *et al.* (2001), a scientific journal article entitled "Survey protocol for assessment of endangered freshwater mussels in the Allegheny River, Pennsylvania", as guidance in search patterns to be used in semi-quantitative mussel sampling. The only guidance in Smith, *et. al.* (2001) that is apparent to the PI are statements that mussel search via snorkeling progressed in an upstream direction, whereas mussel search with SCUBA progressed in a downstream direction in the reported study. No guidance was given in regard to dealing with boulders or other river bottom obstructions.

MDNR Comment 6:

According to the RSP, "Areas where concentrations of mussels are found will be delineated as feasible and perimeters noted with a GPS field instrument. The first 100 individuals of Maryland S1-S3 species encountered will be tagged with a shell marker before returning them to the river bottom. After the first 100 individuals, 25% will be tagged. The locations of these species will be recorded, also, for addition to the habitat GIS coverage that already has been prepared." No figures illustrate that the perimeter of mussel concentrations were delineated or noted with a GPS. Please discuss why this was not conducted. The body of the report noted that 54 of 71 Alewife floaters were tagged, yet Table 4.2-5 indicates 68 of 71 were tagged. Please discuss this discrepancy and why all specimens were not tagged. The PI was granted authority to hold live mussels for up to 24 hours so tagging could have been done the following day if necessary. Also, no habitat maps were presented that include the locations of S1-S3 species. It is imperative that their location be reported to resource agencies and integrated into the flow modeling to assess whether or not dam operations limit mussel distribution and abundance.

Exelon Response:

No perimeters of mussel concentrations were delineated with a GPS field instrument because none were clearly defined. However, the locations of all semi-quantitative and quantitative survey stations were recorded via GPS-acquired coordinates.

The statement in the text of the initial study report that 54 of 71 alewife floaters were tagged is correct. Table 4.2-5 also is correct because it lists the tag numbers of 54 alewife floaters. There is a gap in the sequence of the tag numbers (036 through 049) that may confuse the reader.

Seventeen alewife floaters were not tagged because severe weather forced the study team to leave the river early one afternoon. Rather than confine the alewife floaters overnight in a dive bag and risk stressing them in the warm river water, the PI decided to return them to the river bottom to ensure their survival.

MDNR Comment 7:
There is no indication in the RSP as to how the quantitative survey areas were chose. The two-phase, double sampling design (Smith et al. 2001, Villella and Smith 2005) states that quantitative sampling areas should be chosen randomly. We have additional questions regarding the choice of quantitative survey areas as it was not clearly stated in the RSP despite several requests for further detail. Why and how were the specific CPUE's chosen? How was the size of the survey area determined? Why were they predominantly along the left descending bank? Why were they not chosen randomly as the survey methods (Smith et al. 2001) indicate? How were areas surveyed by divers in the semi-quantitative survey sampled by waders during the quantitative survey?

Random selection is necessary to reduce bias and it was agreed upon between Exelon, Normandeau, and MDNR that five areas would be sampled from strata representing no-low, moderate, and high CPUE and be approved by MDNR upon inspection of semi-quantitative data. This did not happen; a unilaterally decision on the location was made without allowing MDNR to review data. Further changes to site selection were made in the field. Furthermore, there appears to be investigator bias towards areas easily accessible and wadeable habitat. This would compound upon the apparent bias in the selection of semi-quantitative survey locations. A distribution analysis of the semi-quantitative results shows no locations with low CPUE were sampled; therefore the quantitatively sampled areas do not represent the full range of mussel abundance, or the range and frequency to be sampled that was agreed upon. The areas surveyed represent moderate to very high CPUE; two are within the 95th percentile of mussel CPUE. It also appears that in some cases, the location that was sampled in the semi-quantitative locations should also be noted on data sheets in Appendix B for clarity.

Exelon Response:
See Exelon Response to FERC Comment 5.

MDNR Comment 8:
In the report, five areas were said to be quantitatively surveyed. This number was agreed upon by the PI, Exelon and MDNR after the RSP was filed due to concerns over adequate sample size and coverage. However, according to the report one semi-quantitative survey location was chose to represent two quantitative survey locations. As a result, only four independent quantitative survey areas were sampled.

Exelon Response:
Five quantitative survey stations were established and quantitative sampling was accomplished at these locations. MDNR is correct that two quantitative survey stations were located near one semi-quantitative survey station. The reasoning for this is described in Exelon Response to FERC Comment 5.

MDNR Comment 9:

According to the RSP, "the first 100 individuals of Maryland S1-S3 species in each mussel bed will be tagged and their locations recorded with a GPS for addition to the habitat GIS coverage that already had been prepared." The report does not indicate that Alewife floater (S3) was tagged during the quantitative survey, nor was their location recorded with a GPS. Habitat maps with this locality data were not provided.

Exelon Response:
Only three alewife floater were found during the quantitative survey. They were returned live, but not tagged, to the river bottom where they were found. None were tagged because so few were found. GPS coordinates for their locations were not reported in the initial study report, but will be provided in the updated study report.

MDNR Comment 10:
Was a 1.5 mm sieve screen used as this is incredibly small? A 6 mm sieve screen is standard. It also should be noted that a benthic macroinvertebrate sieve pan was originally used because the PI did not have a standard sieve box used in mussel surveys. One was provided by MDNR.

Exelon Response:
The 1.5 mm mesh screen was not used to sieve the quantitative samples. In fact, MDNR‟s 6 mm mesh sieve box was used. MDNR offered use of this sieve box in the field and the offer was accepted, largely because MDNR‟s sieve box was lighter in construction and somewhat easier to use than Exelon‟s contractor‟s sieve box that contained the same mesh.

The study plan did not have a sieve mesh size specified in it. Therefore, Exelon‟s contractor did have a smaller mesh sieve available in the field in case MDNR requested its use in order to capture smaller mussels than would be retained on standard 6 mm mesh. However, MDNR indicated that use of 6 mm mesh was satisfactory.

MDNR Comment 11:
A range of substrate sizes and their corresponding classes are not provided.

Exelon Response:
The range of substrate sizes and their corresponding classes are:

Substrate Type	Size Class (metric)	Size Class (English
Detritus/Organic	NA	NA
Mud/soft clay	NA	NA
Silt	< 0.062 mm	< 0.00244 in
Sand	0.062 – 2 mm	0.00244 – 0.0787 in
Gravel	2 – 64 mm	0.0787 – 2.52 in
Cobble/rubble	64 – 250 mm	2.52 – 9.84 in
Boulder	250 – 4000 mm	9.84 – 157.5 in
Bedrock	NA	NA

These will also be provided in the initial study report.

MDNR Comment 12:
Discharge the day of sampling was not reported for any task.

Exelon Response:

The Semi-quantitative Survey was conducted on August 9-13, 2010 and the Quantitative Survey was conducted on August 31 and September 1-3, 2010. River discharge, as measured by the Conowingo USGS gage, was approximately 5,500 cfs during these surveys on all dates. This information will be included in the updated study report.

MDNR Comment 13:
In light of the fact that the quantitative sampling found nearly all the Eastern elliptio < 50 mm in excavations and that 50% of the mussels were found buried, had only an informal visual search been used, as was originally requested, how would the study results been affected (Richardson and Yokley 1996, Miller and Payne 1993)? Was the project area population, especially smaller individuals and uncommon species, adequately sampled to answer project objectives with the relatively few quantitative samples? Given the fact that only three species were detected and smaller individuals were nearly absent, we feel this clearly illustrates enough effort was not expended in quantitative sampling (Miller and Payne 1998, Smith et al. 2000).

Exelon Response:
MDNR‟s comment largely questions adequacy of the quantitative survey effort in locating small mussels (e.g., ≤ 50 millimeters in shell length) as well as detecting species present in relatively small numbers. In response, it is informative to compare with Exelon‟s quantitative data, a dataset recently obtained from MDNR. MDNR emailed quantitative mussel survey data (Ashton and Devers unpublished data) obtained by MDNR, USFWS, and USGS personnel on August 3, 2010 in a gravel-cobble shoal located along the river‟s east shoreline, upstream of the VFW post on MD Route 222. This location is opposite Robert Island, approximately one-quarter mile downstream of the tidal/non-tidal waters boundary.

A total of 274 eastern elliptio were found in 396 0.25 m^2 quadrats that were sampled. Of these 274 eastern elliptio, 15 were ≤ 50 millimeters in shell length, or 5.5% of the total sample. In the Exelon quantitative sampling, a total of 110 eastern elliptio were found in 150 0.25 m^2 quadrats that were sampled. Of these 110 eastern elliptio, 8 were ≤ 50 millimeters in shell length, or 7.3% of the total sample.

In regard to adequacy to locate uncommon species, the Ashton and Devers unpublished data indicate that each of three species (eastern floater, yellow lampmussel, and eastern lampmussel) were represented by only one individual in the 396 samples. A small number (3) of one of these species (eastern floater) was identified in the 150 samples collected by Exelon. Yellow lampmussel and eastern lampmussel were not. However, because both of these species were identified in Exelon‟s semi-quantitative survey effort, they were not lost from the species list compiled for the study reach.

MDNR Comment 14:
The author used a reference of Eastern elliptio length at maturity from an oligotrophic Canadian Shield lake to make a statement regarding the population in a temperate, large river. Given mussel growth rates and length at age are highly variable (Lellis et al. unpublished data, Haag and Rypel 2010) why was such a comparison made? Furthermore, since this comparison was made, why were other catch-rates of Eastern elliptio from other studies not referenced to infer what could be a high catch-rate? There is considerable data available on Eastern Elliptio catchrates (Strayer unpublished data, Lellis et al. unpublished data, Strayer and Smith 2003, Villella and Smith 2005). Similar comparisons should have been made regarding species richness, relative abundance, assemblage composition, length-frequency distributions, and population densities.

Exelon Response:
As part of the updated study report development, Exelon will work with the stakeholders to determine if there are relevant studies from other rivers for comparison and to procure such data, if applicable.

MDNR Comment 15:
Serious questions about the agreed upon survey design and methods in Task 2 and 3 stem from the reliance upon Maryland DNR for survey design literature, improper citation of design literature, survey implementation logistics, and even equipment. For example, the report cites methods as Strayer and Smith (2003) when in fact this reference is a review of freshwater mussel sampling methods and not a primary source. The correct citation of the survey design is Smith et al. (2001). Comments were made to the PI regarding potentially improper and questionable survey method implementation during post RSP meeting and field visits. Because no assurances were given to agencies, coupled with the reliance upon agencies for survey references and proper equipment, and observed mistakes in survey implementation, we can only assume that the PI had never before conducted a survey of such a complex design. It has become evident from communications during RSP development, after observing the semi-quantitative and quantitative survey, and during the reporting period that he was unfamiliar with a survey of such effort, the two-stage double sampling survey design itself, and standard protocols and equipment for quantitative mussel surveys despite the assurances from Exelon about the qualifications of the primary surveyor. On how many prior occasions has the PI conducted freshwater mussel surveys using the specific methods employed? How many mussel surveys, regardless of method, have divers used in the study performed? How much experience does the dive crew have identifying mussels? Why did the PI not identify all mussels collected during Task 2 and 3? It is an accepted standard to have a single, qualified individual who holds the scientific collection permit identify mussels collected if others do not have several years' worth of experience.

Exelon Response:
See Exelon Response to FERC Comment 4, and MDNR Comment 10.

MDNR‟s comment states that the initial study report improperly cited mussel survey design literature when Strayer and Smith (2003) was included, stating that this publication is "a review of freshwater mussel sampling methods and not a primary source". While it may be that Strayer and Smith (2003) is not a primary source, the publication‟s title is *A Guide to Sampling Freshwater Mussel Populations* and it contains much detail on various survey designs, including the systematic sampling with multiple random starts design employed in the quantitative mussel survey.

MDNR Comment 16:
Page 5 - According to the report timed searches were conducted at 72 locations for a total of 87.4 person-hours. This equates to 1.2 person-hours per semi-quantitative survey. This may be an insufficient level effort when trying to locate species at low density and determine species richness (Metcalfe-Smith et al. 2000) and alone cannot assess population size, density, or potential impacts (Miller and Payne 1988, Miller and Payne 1993, Obermeyer 1998, Strayer et al. 1997, Strayer and Smith 2003).

Exelon Response:
The mean of 1.2 search hours per semi-quantitative survey station is recognized as a small number. Nevertheless, it is not considered an insufficient level of effort in a study reach that contains a large area of rugged river bottom where mussels were found only in isolated small patches of sand and gravel deposited behind boulders and in low points in between and on top of bedrock formations. In other instances, survey stations were located in small habitat compartments located near the confluence of Octoraro Creek or in small isolated pools located between islands and the river‟s east shoreline. A measure of the sufficiency of the search time is the great similarity in the number and identity of mussel species recorded in Exelon‟s study and by MDNR and Dr. Tom Jones in 2008-2010 as discussed in the initial study report‟s Section 5.1.

MDNR Comment 17:

Pages 5 and 6 - Why are the semi-quantitative CPUE in Figure 4.2-2 and 4.2-3 presented in numerical order instead of longitudinal order (i.e. distance away from dam)? Numerical order is meaningless because the order of semi-quantitative survey locations does not proceed in a consistent direction. A single or additional figure would also be more appropriate to examine the overall CPUE regardless of survey method in relation to its true spatial location within the project area. The same could be said about the data presented in Tables 4.2-2 and 4.2-3. Measures of sample precision and error should be presented whenever noting a sample mean; either SE, CI, CV of mean CPUE for wading, diving, and overall values should be presented for each species and all mussels.

Exelon Response:
In retrospect, it may have been better to list the semi-quantitative survey stations in downstream longitudinal order in the appropriate tables and figures. An additional figure relating the numbers of mussels observed per search hour to spatial location in the study reach would aid in interpretation of the data. It also is agreed that measures of sample precision and error should have been provided with all computed means. The revisions will be made in the updated study report.

MDNR Comment 18:
Page 6 - Our data suggest that Alewife floater and Eastern floater are not found in an approximately 1:1 ratio as found in the study. In fact, we rarely encountered Eastern floater throughout the past few years in both semi-quantitative and quantitative surveys. This may indicate frequent misidentifications given the PI's past questions about ways to distinguish between these two species and an underestimate of the S3 Alewife floater.

Exelon Response:
Alewife floater and eastern floater can be difficult to distinguish. However, the PI is confident in identification of these two species. Compared to other semi-quantitative survey stations, larger numbers of eastern floater were found at the following stations – W-6 (8 individuals), W-15 (8), D-2 (8), D-23 (5), and W-14 (4). Most of these stations were located along the shoreline of islands where habitat conditions known to favor eastern floater may occur (sand or muddy substrates in slow-moving water).

Questions from the PI on ways to distinguish alewife floater and eastern floater may have been misinterpreted. One morning during the semi-quantitative survey, MDNR‟s Matt Ashton led a short discussion on distinguishing between the two species. Mr. Ashton offered this opportunity and the study team accepted it because it was offered an opportunity to sharpen identification skills.

MDNR Comment 19:
Page 6 - How did the author determine that CPUE >100 mussels/hour represented the "highest" catch rates? Since "high" CPUE's were only found at 8 of 72 stations (11%), this suggests that mussel abundance is low throughout most of the project area. In fact, twice as many semiquantitative areas contained five or fewer mussels (22% of stations), which further indicate that mussels are rare or absent from a sizeable portion of available habitats. The remaining 66% of stations had CPUE < 100 mussels/hour, which would be low according to the report. Catch-rates and density from other studies of Atlantic Slope mussel communities (Lellis 2001, Villella and Smith 2005, Strayer et al. 1994, Meyer unpublished data) should have been used to determine what represents high and low CPUE instead of an arbitrary designation.

Exelon Response:
The PI‟s intent was to identify those CPUEs that were the highest obtained in the semi-quantitative survey and, in fact, CPUEs > 100 mussels per hour were the highest observed. In retrospect, it may have been advisable to compare study values with CPUEs available elsewhere. However, Lellis (2001) and Meyer unpublished data are not readily available to the PI and perhaps to others.

MDNR Comment 20:
Page 7 - How did the author determine that habitat at locations with CPUE > 100 mussels/hour differ amongst one another and from many other locations? No data are presented that support such a statement or appeared to be collected from these locations beyond personal observation. It was also stated that the highest CPUE came from areas near islands further downstream with the exception of one site, yet islands further upstream contained the lowest CPUE. Please elaborate on this pattern as the presence of islands within the river does not appear related to CPUE, but in fact is related to distance away from dam. We feel that the data clearly illustrate a distinct cline of increasing CPUE as you move further away from the dam, even when suitable habitat appears present. Furthermore, our CPUE data collected during July 2010 support this hypothesis.

Exelon Response:
See Exelon Response to FERC Comment 3.

MDNR Comment 21:
Page 7 - Stating a range of lengths are evenly distributed when it represents predominantly very large individuals is misleading. Figure 4.2-4 does not illustrate a normal distribution or is evenly distributed, but is in fact skewed towards a population that does not represent all life stages of mussels when taking into account some reproduction likely takes place within in the project area. The author should also not speculate on age at length given no data on growth or age at length were collected or referenced. Furthermore, without indicating where in the study area juvenile mussels were found, speculating on their potential dispersal source is inappropriate.

Exelon Response:
The statements in the initial study report that "the alewife floater were relatively large (80-137 mm) and evenly distributed along the range of sizes", that "most of the eastern floater were in nearly the same range (80-135 mm) and evenly distributed with exception of the higher end where a total of twelve 110 and 155 mm individuals were observed", and "the yellow lampmussel were very evenly distributed from 63 to 108 mm" clearly apply only to the shell length size ranges that are enumerated. These statements do not refer to mussels smaller or larger than the size ranges enumerated. Clarifications will be provided in the revised study report.

No statement was made in the initial study report that Figure 4.2-4 illustrates a normal distribution, nor that there is an even distribution of mussels across shell length. Neither page 7 nor the entire Section 4.2 Semi-Quantitative Mussel Survey in the initial study report contains any speculation on age at length of any of the mussels found.

MDNR Comment 22:
Page 7 - How was < 71 mm determined to be a small Eastern Elliptio? Age at length (number of internal annuli from shell cross section) of Eastern Elliptio from Deer Creek found individuals of 70 mm in length to be 23-39 years old (Lellis et al. unpublished data), and in the Delaware River ranged from 11-34. This data from several populations within the Susquehanna and Delaware River basins suggests Eastern elliptio growth rates, maximum length, and maximum age are highly variable among populations.

Exelon Response:
An eastern elliptio <71 mm in shell length is a small mussel when the others are measured in the range of 71 to 170 mm in shell length. It is understood that eastern elliptio growth rates, maximum length, and maximum age are variable among populations.

MDNR Comment 23:

Please comment on the semi-quantitative results in regards to search method, which illustrates a potential difference between the effectiveness of wading versus diving. The highest catch rates, except one, came from diving surveys. If more or all survey effort were put into a single search method (diving), as was stressed during the comment periods, more mussels may have been found. Data also suggest certain species were collected more effectively by diving versus wading (e.g. Yellow lampmussel). Availability of Normandeau divers should not have limited survey effort if diving was a more effective and appropriate search method. Surveys should have been postponed until they were again available or additional divers should have been contracted.

Exelon Response:
MDNR assumes that all surveys conducted by the diving team employed SCUBA gear. In fact, this was not the case. SCUBA gear was employed in water depths generally in excess of 4 feet. In shallower depths, the diving team used snorkels. It should be noted that it is stated in the initial study report that the diving team used SCUBA gear at survey locations in deeper water and masks and snorkels where depth permitted. Furthermore, the semi-quantitative survey results are listed by wading team stations and diving team stations in Tables 4.2-2 and 4.2-3, respectively, not by the gear employed.

Use of both snorkel and SCUBA gear in the same survey is commonplace. MDNR often refers to Smith et al. (2001), a scientific journal article entitled "Survey protocol for assessment of endangered freshwater mussels in the Allegheny River, Pennsylvania", as guidance in proper conduct of mussel surveys. Both snorkel and SCUBA gear were used in the reported survey.

MDNR Comment 24:
Page 8 - How were the results in Table 4.3.1 generated; there is no reference to a method? Standard errors are relatively large in comparison to sample means; please discuss what may have caused this. Less than 2% of the area within each quantitative survey area was sampled; does the PI feel this was sufficient effort given the abundance estimates, high measures of error, and the fact that roughly 0.03% the total project area was quantitatively surveyed? Furthermore, does the PI feel results from such a small area and sample size are appropriate make conclusions about the entire project area in light of MDNR, USFWS, and USGS data that included a greater sample size and found higher abundance and richness along with more precise density and population estimates?

Exelon Response:
The statistical analysis of the quantitative data was conducted using the USGS Mussel Estimation Program, available at http://www.lsc.usgs.gov/aeb/2068/index.asp. It is believed that this program is widely used in analysis of quantitative mussel survey data.

It is informative to compare with Exelon‟s quantitative data, a dataset recently obtained from MDNR. MDNR emailed quantitative mussel survey data (Ashton and Devers unpublished data) obtained by MDNR, USFWS, and USGS personnel on August 3, 2010 in a gravel-cobble shoal located along the river‟s east shoreline, upstream of the VFW post on MD Route 222. This location is opposite Robert Island, approximately one-quarter mile downstream of the tidal/non-tidal waters boundary. Ashton and Devers unpublished data and the Exelon quantitative data collected in 2010 are listed in Table 2. Both sets of data are quite similar. MDNR‟s total mussel density estimate (2.95 $\pm$ 0.23 mussels per meter^2) is within the range shown for Exelon‟s five quantitative stations (2.13 $\pm$ 0.58 to 4.27 $\pm$ 1.18 mussels per meter^2). Five species were identified in the MDNR samples, whereas only three species were identified in Exelon‟s samples. However, the same species (eastern elliptio and alewife floater) were the most abundant species in both sets of samples and in nearly the same relative abundance. The third species (eastern floater) identified in Exelon‟s samples also was identified in MDNR‟s samples. In addition, single individuals of two other species (yellow lampmussel and eastern lampmussel) were identified in

MDNR‟s samples, likely a result of the greater number of samples collected by MDNR (396), compared to Exelon (150).

Standard error often is expressed as a percent of the estimated sample mean, a statistic known as the coefficient of variation, or CV. The smaller the percentage, the more precise the estimated mean. CVs computed for total mussels and for eastern elliptio, only, at each of Exelon‟s five quantitative survey stations, ranged from 8.5% to 27.6% and 5.8% to 27.8%, respectively. CVs computed for total mussels and for eastern elliptio, only, in Ashton and Devers unpublished data were 7.8% and 7.6%.

In its comments, MDNR often refers to Smith, *et al.* (2001), a scientific journal article entitled "Survey protocol for assessment of endangered freshwater mussels in the Allegheny River, Pennsylvania", as guidance in proper conduct of quantitative mussel sampling. This article reports that CVs for the four species found in greatest density (a total of 88.9% of all mussels found) in quantitative sampling ranged from 13.6 to 23.1%, an interval very similar to that reported for the quantitative sampling in the initial study report.

MDNR Comment 25:
Data collected during the project period by MDNR using similar methods, but with greater effort over a larger area using more appropriate sample sizes, dispute the findings of the study and also highlight the high level of uncertainty in this study's findings, which can be attributed to smaller sample size, improper design implementation, and potentially a lack of survey effort in areas where freshwater mussels would likely be at their highest abundance and densities in the lower reaches of the project area. Though we expended a greater amount of daily effort (personhours), we found more individuals and more species. Our results also have lower variability, along with more precise density and population estimates. The PI was notified of this information as it became available during the study plan implementation and again prior to study report completion.

Exelon Response:
See Exelon Response to MDNR Comment 24.

MDNR Comment 26:
Several mussel species, including the state endangered Brook floater, Green floater, and Triangle floater, and in need of conservation Creeper, have been found in surveys conducted in upstream reaches of the Susquehanna River (Strayer and Fetterman 1999, Meyer pers. comm.) and were most likely historically present within the project area were not found in this survey.

Exelon Response:
No live individuals of any of the species listed in MDNR‟s comment were found in Exelon‟s mussel study. However, one dead (empty) shell of the creeper was found and this was reported in the initial study report. No dead (empty) shells of the other three species were found.

None of the four species were reported in the initial study report as found, either in terms of live individuals or dead (empty) shells, by MDNR and Dr. Tom Jones in 2008-2010. However, Ashton (2011) reported collection of dead (empty) shell(s) of the creeper in 2010.

MDNR Comment 27:
We conclude that: 1. The survey only partially accomplishes Goal 1 and fails to accomplish Goal 2.
2. By not quantitatively sampling from within the full range of mussel CPUE across spatially representative locations within project area the study is limited in its ability to make conclusions about the entire mussel population and potential effects by the operation of Conowingo Dam, especially that along the right descending bank and in the lower mile of the river, which may experience different

hydraulic forces and contain different habitat and species. Moreover, the apparent bias in locations of both the semi-quantitative and quantitative surveys further weakens the validity of the data. 3. Additional semi-quantitative surveys with divers for at least 1.2 and up to 2.5 person-hours per location is needed to properly characterize the mussels assemblage due to large areas of unsampled habitat within the project area, disproportionate sampling effort, and potential bias in survey locations. Specific areas to be targeted should be coordinated with resource agencies and include; east of Spencer Island, side channels between Wood and Robert islands, between Rueben and Steret islands along with Bird and Mud islands, and other areas where long distances (> 0.25 mile between survey locations) remain. 4. The sample size and area in quantitative surveys was insufficient to provide statistically acceptable levels of error in the density and population estimates, did not spatially represent the project area, were biased to the left descending bank, not randomly selected, and did not represent the range of CPUE observed. This took place despite persistent efforts by MDNR throughout the comment period and survey implementation to make the PI aware of these deficiencies. In addition, only four independent quantitative survey locations were sampled, though five were stated to be sampled.

Exelon Response:
See Exelon"s Response under Section 3.19 Freshwater Mussel Characterization Study.

MDNR Comment 28:
Criteria for Modification of Approved Study [18 CFR 5.15(d)]: as indicated above, approved studies were not conducted as provided for in the approved study plan. Therefore we request the following modification of this study for 2011, based on how it was conducted in 2010:

Based on the comments and conclusions above, the study and its report are incomplete and can only be used to direct additional semi-quantitative and quantitative mussel sampling that should be carried out in 2011. There are substantial areas where semi-quantitative surveys were not conducted without justification. These areas should be surveyed in 2011; as Task 2 of the RSP noted, the entire 4.5 mile long reach would be surveyed regardless of habitat. In this task, a single, consistent sampling method (diving) and pattern must be used (line or strip transects parallel to flow). Pooled with the CPUE data from 2010, the areas to be quantitatively sampled (RSP Task 3) should then be re-evaluated and selected in direct consultation with resource agencies following the correct manor for the study design (two-phase with double sampling). The results of 2010 quantitative surveys should also be used to guide quantitative surveys in 2011, whose locations will be selected at random from the strata of catch-rates (high, medium, low to none) that represent of the range of CPUE, have appropriate numbers of quadrats to minimize sampling error, and be conducted with 50% excavation over larger expanses of mussel habitat. The number of quadrats, interval between systematic samples, and sample area should be determined by the Mussel Estimator Program based on input of preliminary data, and not determined arbitrarily, as this was a direct cause of the inadequate sampling effort that led to study deficiencies. In addition, the results of the flow modeling study (3.16) should attempt to be incorporated into the stratification so areas with varied levels of sheer stress are sampled to validate the flow model and support any future actions regarding the operation of the dam and its affects upon freshwater mussels. It is imperative this additional semi-quantitative and quantitative sampling effort must be planned and conducted with substantial input and oversight by resource agencies so that the deficiencies pointed out do not persist. Consequently, we strongly recommend that Exelon and Normandeau conduct appropriate mussel surveys using two-phase double sampling methods, in consultation with the resource agencies before and during the surveys (Smith et al. 2001, Villella and Smith 2005).

Exelon Response:
See Exelon"s Response under Section 3.19 Freshwater Mussel Characterization Study.

REFERENCES

Ashton, M. 2011. Results from ongoing freshwater mussels surveys in the Susquehanna River and the first collection of *Dreissena polymorpha* below Conowingo Dam, Maryland. Ellipsaria 13(1): 15-16.

Ashton, M. and J. Devers. Unpublished data describing quantitative freshwater mussel sampling conducted in the Susquehanna River downstream of Conowingo Dam on August 3, 2010.

Smith, D.R., R.F. Villella, and D.P. Lemarie. 2001. Survey protocol for assessment of endangered freshwater mussels in the Allegheny River, Pennsylvania. Journal of the North American Benthological Society 20: 118-132.

Strayer, D.L. and D.R. Smith. 2003. A guide to sampling freshwater mussel populations. American Fisheries Society, Monograph 8, Bethesda, MD. 103 pp.

Villella, R.V. and D.R. Smith. 2005. Two-phase sampling to estimate river-wide populations of freshwater mussels. Journal of the North American Benthological Society 24: 357-368.

Table 1. Number of Semi-Quantitative Mussel Survey Stations by Habitat Compartment[1].

Habitat Compartment and Symbol	Study Reach Total Acres	Study Reach Percent Composition	Survey Stations Total	Survey Stations Percent Composition
P1 - Deep Run	24.8	1.6	2	2.8
P2 - Shallow Run	17.7	1.2	1	1.4
P3 - Shallow Run	28.5	1.9	0	0.0
P4 - Shallow Pool	15.6	1.0	0	0.0
P5 - Ruffle (Riffle-Run)	695.2	46.2	24	33.3
P6 - Shallow Run	32.0	2.1	4	5.6
P7 - Backwater	4.2	0.3	1	1.4
P9 - Deep Pool	70.9	4.7	6	8.3
P10 - Shallow Pool	37.9	2.5	3	4.2
P11 - Deep Pool	25.0	1.7	4	5.6
P12 - Side Channel	9.1	0.6	1	1.4
P13 - Side Channel	3.8	0.3	2	2.8
P14 - Side Channel	7.1	0.5	4	5.6
P15 - Perched Backwater Pool[2]	0.3	0.0	0	0.0
P16 - Vegetated Outcrop with Diverse Habitats[2]	1.4	0.1	0	0.0
O1 - Dry Side Channel[2]	0.2	0.0	0	0.0
O2 - Shallow Riffle	0.2	0.0	0	0.0
O3 - Shallow Riffle	0.2	0.0	0	0.0
O4 - Shallow Riffle	1.2	0.1	0	0.0
O5 - Shallow Riffle	0.4	0.0	1	1.4
O6 - Shallow Pool	2.9	0.2	3	4.2
O7 - Shallow Riffle	0.3	0.0	1	1.4
O8 - Shallow Pool	0.4	0.0	0	0.0
O9 - Interconnected Shallow Pools	8.3	0.6	2	2.8
O10 - Deep Pool	0.7	0.0	0	0.0
Tidal waters	516.0	34.3	13	18.1
Total	1504.2	100.0	72	100.0

[1] This compilation is for the entire 4.5 miles-long study reach. Note that Habitat Compartments P1 through O10 are located in non-tidal waters and that component habitat compartments in tidal waters were not determined. The non-tidal reach is approximately 3.5 miles in length, whereas the non-tidal reach is approximately 1.0 mile in length.

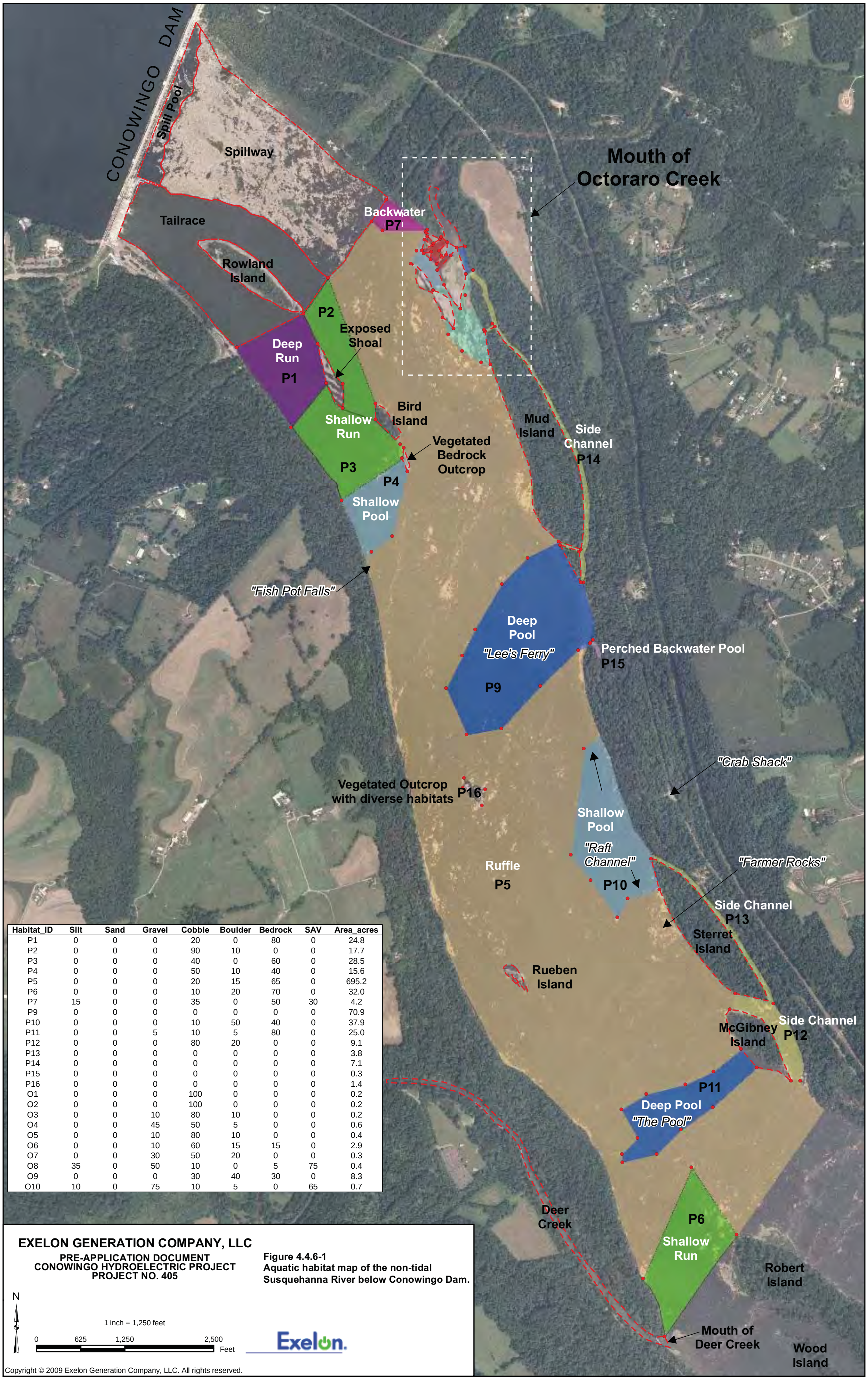
[2] Habitat Compartments P15, P16, and O1 are, in fact, terrestrial habitats that sometimes are submerged.

Table 2. Quantitative mussel survey data, including MDNR[1] data.

Exelon				MDNR		
Quantitative Station	Species	Density[2]	CV (%)	Species	Density[2]	CV (%)
QS-1	eastern elliptio	2.00 ± 0.46	23.0	eastern elliptio	2.77 ± 0.21	7.6
	alewife floater	0.13 ± 0.13	100.0	alewife floater	0.15 ± 0.03	20.0
	Total	2.13 ± 0.58	27.2	eastern floater	0.01	
				yellow lampmussel	0.01	
QS-2	eastern elliptio	1.73 ± 0.26	15.0	eastern lampmussel	0.01	
	alewife floater	0.13 ± 0.13	100.0	Total	2.95 ± 0.23	7.8
	eastern floater	0.27 ± 0.13	48.1			
	Total	2.13 ± 0.26	12.2			
QS-3	eastern elliptio	4.00 ± 0.23	5.8			
	eastern floater	0.13 ± 0.13	100.0			
	Total	4.13 ± 0.35	8.5			
QS-4	eastern elliptio	4.13 ± 1.15	27.8			
	alewife floater	0.13 ± 0.13	100.0			
	Total	4.27 ± 1.18	27.6			
QS-5	eastern elliptio	2.80 ± 0.61	21.8			
	Total	2.80 ± 0.61	21.8			
Total Number of Samples		150 (30 at each station)			396	
Total Number of Species		3			5	
Total Number of Individuals:						
eastern elliptio		110 (94.8%)			274 (93.8%)	
alewife floater		3 (2.6%)			15 (5.1%)	
eastern floater		3 (2.6%)			1 (0.4%)	
yellow lampmussel		-			1 (0.4%)	
eastern lampmussel		-			1 (0.4%)	
Total		116			292	

[1] These data received by email from Matt Ashton (MDNR) on May 11, 2011. They are taken from a Power Point entitled "Susquehanna River 2010". The data were collected by MDNR, USFWS, and USGS personnel and are Ashton and Devers unpublished data.

[2] Mean number per meter2 of river bottom ± 1 standard error.



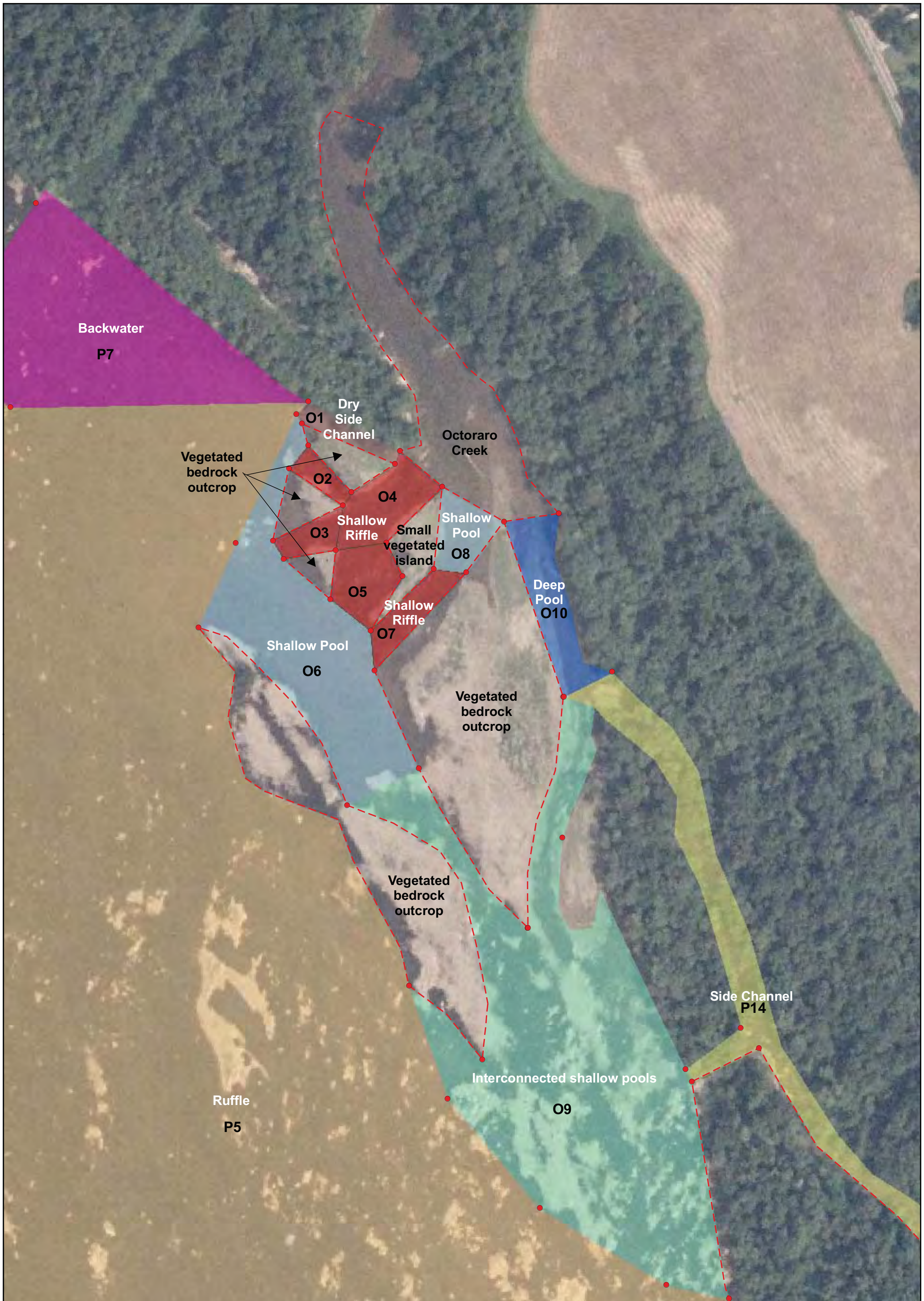
Habitat_ID	Silt	Sand	Gravel	Cobble	Boulder	Bedrock	SAV	Area_acres
P1	0	0	0	20	0	80	0	24.8
P2	0	0	0	90	10	0	0	17.7
P3	0	0	0	40	0	60	0	28.5
P4	0	0	0	50	10	40	0	15.6
P5	0	0	0	20	15	65	0	695.2
P6	0	0	0	10	20	70	0	32.0
P7	15	0	0	35	0	50	30	4.2
P9	0	0	0	0	0	0	0	70.9
P10	0	0	0	10	50	40	0	37.9
P11	0	0	5	10	5	80	0	25.0
P12	0	0	0	80	20	0	0	9.1
P13	0	0	0	0	0	0	0	3.8
P14	0	0	0	0	0	0	0	7.1
P15	0	0	0	0	0	0	0	0.3
P16	0	0	0	0	0	0	0	1.4
O1	0	0	0	100	0	0	0	0.2
O2	0	0	0	100	0	0	0	0.2
O3	0	0	10	80	10	0	0	0.2
O4	0	0	45	50	5	0	0	0.6
O5	0	0	10	80	10	0	0	0.4
O6	0	0	10	60	15	15	0	2.9
O7	0	0	30	50	20	0	0	0.3
O8	35	0	50	10	0	5	75	0.4
O9	0	0	0	30	40	30	0	8.3
O10	10	0	75	10	5	0	65	0.7

EXELON GENERATION COMPANY, LLC

PRE-APPLICATION DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

Figure 4.4.6-1
Aquatic habitat map of the non-tidal Susquehanna River below Conowingo Dam.

Exelon.



EXELON GENERATION COMPANY, LLC

PRE-APPLICATION DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

Figure 4.4.6-2
Aquatic habitat map of the non-tidal
Susquehanna River near Octoraro Creek

N

1 inch = 200 feet

0 100 200 400 Feet

x:\GISMaps\project_maps\pad\conowingo\Figure 4.4.6-2 (Aquatic Habitat Mapping).mxd 3/9/2009 2:31:06 PM

Attachment D-Resumes of Mussel Surveyors

WILLIAM S. ETTINGER

Branch Office Manager
Principal Aquatic Ecologist

Mr. Ettinger manages Normandeau's Lewes, DE office. His education and expertise are in aquatic, estuarine, and marine ecology, specializing in macroinvertebrates, physical habitat, hydrology, and water quality. He has wide experience in diverse areas of natural resource impact assessments and is currently responsible for evaluation of effects of acid mine drainage, dredging, industrial effluents, water diversion, and power plant operations on aquatic biota, particularly benthic macroinvertebrates. His experience includes freshwater mussel surveys (including federal and state-listed species), bathymetric data acquisition in several states, characterization of river bottom substrates using side-scan sonar, and survey of aquatic resources in support of waterfront redevelopment permitting.

EDUCATION

M.S.	1974, Entomology, Pennsylvania State University
B.S.	1972, Fundamental Sciences, Lehigh University

PROFESSIONAL EXPERIENCE

1983-Present	Normandeau Associates
1979-1983	Skelly and Loy
1974-1979	Ichthyological Associates, Inc.

PROFESSIONAL AFFILIATIONS

American Entomological Society
American Fisheries Society
Freshwater Mollusk Conservation Society
North American Benthological Society
Pennsylvania Academy of Science

SELECTED PROJECT EXPERIENCE

Exelon Energy, Inc. (2010-Present) – Survey of freshwater mussels in the Susquehanna River downstream of Conowingo Dam in Maryland in support of hydroelectric relicensing. This effort included semi-quantitative survey in a 4.5-mile river reach, followed by quantitative sampling in five selected areas within that reach. Search methodology included use of SCUBA in deeper water. Project Manager/Principal Investigator.

Environmental Solutions and Innovations, Inc. (2010) –Survey for dwarf wedgemussel and other mussels in the footprint of a proposed pipeline crossing of the upper Delaware River. Biologist.

Hunt Engineers, Architects & Land Surveyors, Inc. (2010) – Survey of freshwater mussels in the Chemung River at the Madison Avenue Bridge in Elmira, NY. The bridge project involved placement of scour protection around the piers. Project Manager/Principal Investigator.

Fisher Associates (2010) – Survey of freshwater mussels in the Chemung River at the Centerway Arch Bridge in Corning, NY. Part of the bridge project involved concrete repairs to the piers. Project Manager/Principal Investigator.

Aqua Pennsylvania, Inc. (2010) – Survey of freshwater mussels downstream of a lowhead dam in the Shenango River in Sharon, PA. The dam project involved repair of general deficiencies. Project Manager/Principal Investigator.

National Park Service (2009) – Survey of freshwater mussels and submerged aquatic vegetation at the Chesapeake and Ohio Canal National Historical Park in Pool 4 of the Potomac River. The project involved repair to an historic retaining wall along the river's one shoreline. Project Manager/Principal Investigator.

Matrix New World Engineering (2009) – Survey for dwarf wedgemussel (*Alasmidonta heterodon*) habitat in an unnamed tributary to the Paulins Kill, near Sparta, NJ. Project Manager/Principal Investigator.

Kleinschmidt Associates, Inc. (2008) – Survey for dwarf wedgemussel (*Alasmidonta heterodon*) habitat in Yards Creek, tributary to the Paulins Kill, near Blairstown, NJ, in support of hydroelectric relicensing. Project Manager/Principal Investigator.

AREVA NP, Inc. (2007) – Preliminary survey of mussels present in the Susquehanna River at Berwick, PA. This survey was conducted as part of electric utility intake and discharge structure siting. Principal Investigator.

Gannett Fleming, Inc. (2004-2008) – Survey of the fish and mussels present in the Susquehanna River at Wilkes-Barre, PA. This river reach would be affected by proposed construction of an inflatable dam. Project Manager/Principal Investigator

PPL Resources, Inc. (2006-2010) – Assessment of fly ash spill impacts to the mussel and periphyton communities in the Delaware River at Martins Creek Generating Station. The survey included search for mussels in shallow wadeable habitats and in deep pools with SCUBA at locations upstream and downstream of the fly ash entry point. Principal Investigator.

Hunt Engineers, Architects, & Land Surveyors, Inc. (2006) – Survey of freshwater mussels present in the Susquehanna River at Oneonta, NY. This survey was conducted on short notice in order to support NYSDOT's emergency stabilization of a riverbank below NYS Route 23. Water depth required use of SCUBA. Project Manager/Principal Investigator.

Kleinschmidt Associates, Inc. (2005) – Survey of mussels present in the Susquehanna River at Holtwood Dam as part of a hydroelectric relicensing effort. This survey was conducted in the impoundment (Lake Aldred) upstream of the dam and in the tailrace and free-flowing river downstream. Principal Investigator.

Skelly and Loy, Inc. (2003-2005) – Survey of freshwater mussels in the Susquehanna River in the vicinity of planned construction of a sewer force main river crossing. The effort was focused on search for two state species of concern, the green floater (*Lasmigona subviridis*) and the yellow lampmussel (*Lampsilis cariosa*) and, subsequently, relocation of these species from the project area. Because of waters in excess of 5 feet depth, SCUBA was required. Project Manager/Principal Investigator.

McFarland-Johnson, Inc. (2003) – Survey of freshwater mussels in the Chenango River in the vicinity of the I-81/NYS Route 17 interchange project in Binghamton, NY. The effort was focused on search for the NYS threatened species, the green floater (*Lasmigona subviridis*), and one federal species of concern, the yellow lampmussel (*Lampsilis cariosa*). Because of varied physical conditions, SCUBA as well as snorkeling was required. Project Manager/Principal Investigator.

STV, Inc. (2004-2010) – Survey of freshwater mussels and characterization of the fish community present in the Delaware River at the I-95 Bridge, West Trenton, NJ. Water depth required use of SCUBA. In addition, Section 7 Consultation on the federally-listed shortnose sturgeon. Project Manager/Principal Investigator.

Amy S. Greene Environmental Consultants, Inc. (2003) – Survey of freshwater mussels at several highway bridge crossings over the Paulins Kill and Wall Kill Rivers in Sussex County, New Jersey. The target species included the federally- and state-listed dwarf wedgemussel (*Alasmidonta heterodon*) and the state-listed triangle floater (*Alasmidonta undulata*). Project Manager/Principal Investigator.

Amy S. Greene Environmental Consultants, Inc. (2003) – Survey of freshwater mussels in the Raritan River at Raritan, Manville, and Somerville, New Jersey. Five prospective impact areas from sanitary sewer construction were searched, primarily for the state endangered species, the brook floater (*Alasmidonta varicosa*). Project Manager/Principal Investigator.

C&S Engineers, Inc. (2001) – Survey of a marina and the nearby Niagara River for three Federally-listed endangered mussel species – the clubshell (*Pleurobema clava*), the pink mucket (*Lampsilis abrupta*), and the fat pocketbook (*Potamilus capax*). The effort involved search by SCUBA divers as well as wading. Project Manager/Principal Investigator.

Allegheny Energy (2000) – Survey of mussels present in portions of Pools 4 and 5 of the Potomac River near Hagerstown, MD. This effort confirmed the presence of a state-listed endangered species (green floater – *Lasmigona subviridis*), which had not been observed for over 20 years. Principal Investigator.

SPECIAL TRAINING

Attended 1991 and 1992 Workshops on Freshwater Bivalves of Pennsylvania, presented by Dr. Arthur E. Bogan at the Carnegie Museum of Natural History, Pittsburgh, PA.

Attended 2008 workshop entitled Freshwater Mussels: Problems, Resources, and Taxonomy, presented by Dr. Arthur E. Bogan at the 2008 Association of Mid-Atlantic Aquatic Biologists meeting at Cacapon State Park, Berkeley Springs, WV, 2-3 April 2008.

Attended 2011 workshop entitled Identification and Taxonomy of Mussels, presented by Dr. Arthur E. Bogan at the 2011 Association of Mid-Atlantic Aquatic Biologists meeting at Cacapon State Park, Berkeley Springs, WV, 7-8 April 2011.

DONALD P. MASON

Aquatic Ecologist

Mr. Mason has over 25 years' experience assessing the effects of habitat alteration on aquatic ecosystems. His specialties include evaluating the effects of hazardous substances, hydropower, and commercial development on fish and benthic macroinvertebrate communities. Mr. Mason has conducted and managed studies using freshwater macroinvertebrates as pollution indicators, assessed the impacts of road and highway construction on aquatic communities, and searched for rare, threatened, or endangered mussels and other aquatic species.

EDUCATION

M.S. 1982, Entomology, University of New Hampshire
B.A. 1976, Biology, Plymouth State College

PROFESSIONAL EXPERIENCE

1985-Present	Normandeau Associates
1983-1985	Battelle New England Marine Research Laboratory
1982-1983	Normandeau Associates
1982	Charles T. Main, Inc.

PROFESSIONAL AFFILIATIONS

North American Benthological Society
New England Association of Environmental Biologists
Freshwater Mollusk Conservation Society

SELECTED PROJECT EXPERIENCE

Delaware River Joint Toll Bridge Commission (2010-Present) – Delaware River (PA/NJ) Scour Remediation Mussel Survey; Led a team of SCUBA divers to search for Rare, Threatened and Endangered (RTE) freshwater mussels near bridges that were scheduled for scour remediation. Since scour remediation efforts may adversely affect freshwater mussels near the rehabilitated piers, state-listed RTE mussel species were relocated to suitable habitat outside of the areas of impact. Responsible for obtaining and collecting permits; conducting the mussel search; relocating listed species to unaffected areas; and submitting reports to the PA Fish and Boat Commission and to the NJ Department of Environmental Protection, all on an expedited two month schedule.

Environmental Solutions and Innovations, Inc. (2010) – Delaware River Dwarf Wedgemussel Survey (PA/NJ); Provided technical expertise for a dwarf wedgemussel (*Alasmidonta heterodon*) survey for a proposed pipeline crossing over the Delaware River. The client was required by Pennsylvania Fish and Boat Commission and the U.S. Fish and Wildlife Service New Jersey Field Office to have a certified dwarf wedgemussel surveyor on the survey crew. Responsible for providing certified dwarf wedgemussel surveyor expertise.

Exelon (2010) – Susquehanna River Mussel Survey (MD); Provided freshwater mussel survey expertise for a survey downstream of Conowingo Dam on the Susquehanna River for the Conowingo Hydroelectric Relicensing Project. Field Biologist.

Florida Power and Light (2008-Present) – Fort Halifax Dam Removal Fish and Mussel Relocation Project (ME); Led a crew of 20 staff and volunteers to search for yellow lampmussel (*Lampsilis cariosa*) and tidewater mucket (*Leptodea ochracea*) as the Fort Halifax Dam was removed and the upstream impoundment was dewatered. Both of these species are threatened in the State of Maine. A total of 10,221 threatened mussels were relocated with less than one percent mortality. Project Manager.

Massena Electric Department (2007-2010) – Grasse River Benthic Macroinvertebrate and Mussel Survey (NY); Conducted seasonal benthic macroinvertebrate sampling throughout the Grasse River from Louisville to Massena, NY using kick nets (qualitative) and Ponar grabs (quantitative). Also, worked with SCUBA divers to qualitatively and quantitatively survey freshwater mussels (Unionidae) throughout the Grasse River during 2007, 2008, and 2009. A total of nine mussel species were identified. Technical Director.

PPL Resources, Inc. (2006) – Assessment of fly ash spill impacts to the mussel and periphyton communities in the Delaware River at Martins Creek Generating Station. The survey included search for mussels in shallow wadeable habitats and in deep pools with SCUBA at locations upstream and downstream of the fly ash entry point. Field Biologist.

Secor International Incorporated (2005-2006) - Baseline Investigation of the Little Mississinewa River (IN); Sediment in the Little Mississinewa River, Randolph County, IN is contaminated with PCBs from a former electrical manufacturer. Sediments at several locations along seven miles of the river will be dredged and replaced with clean material as remediation. Fish tissue and benthic macroinvertebrate community data were collected to establish baseline conditions prior to remediation. Principal Investigator.

South Shore Tri-Town Development Corporation (2001-Present) - Tri-Town Wildlife Surveys; This site, located on the former South Weymouth Naval Air Station property (MA), has areas contaminated with petrochemicals and demolition debris. Sampled the west branch of French's Stream to search for three species included on the Massachusetts Natural Heritage and Endangered Species Program list, the Mystic Valley Amphipod (*Crangonyx aberrans*), the Spatterdock (or Spring Blue) Darner (*Aeshna mutata*), and the Mocha Emerald (*Somatochlora linearis*). Specimens of the Mystic Valley Amphipod were collected on site, however neither of the dragonflies was found. Responsible for data collection and report preparation. Principal Investigator.

Beazer Homes Corp. (2006) - Andover Junction Brook Habitat Assessment and Mussel Survey (NJ); Assessed the aquatic habitat and conducted a freshwater mussel survey along 3,000 feet of streambed in Andover Junction Brook and an unnamed tributary stream, both located on a proposed planned unit development property in Andover Borough, NJ. This study was conducted to determine the species composition and relative abundance of the on-site mussel community and to determine whether Dwarf Wedge Mussel (*Alasmidonta heterodon*), a freshwater mussel included on the Federal List of Endangered Species, was present on the property. Project Manager.

Fryeburg Aquifer Resource Committee. (2006) - Baseline Investigation of Aquatic Biota in Wards Brook and Lovewell Pond (ME); Potential impacts associated with proposed additional water withdrawals from the Wards Brook aquifer, for commercial bottling, on the ecology of Wards Brook and Lovewell Pond was studied. Two of the primary ecological concerns addressed in this study included 1) the paucity of baseline information on the aquatic biota (fish, mussels, invertebrates) in Wards Brook and Lovewell Pond and, 2) impacts of groundwater withdrawal on these biota and water quality. Principal Investigator.

Upper Peninsula Power Company (2004) – Assessment of the Silver Lake Dam Breach on Downstream Mussel Fauna (MI); Led a crew of six investigators to assess the effects of the Silver Lake Dam breach on downstream mussel fauna. The survey was conducted along 32 miles of the river from Silver Lake to the river mouth at Lake Superior and included assessments of mussel habitat quality, species composition, and population density. A total of five mussel species were found throughout the study area, including cylindrical papershell (*Anodontoides ferussacianus*), giant floater (*Pyganodon grandis*), fatmucket (*Lampsilis siliquoidea*), eastern elliptio (*Elliptio complanata*), and white heelsplitter (*Lasmigona complanata*). Project Manager.

Vanasse Hangen Brustlin, Inc. (2003-2004) - Missisquoi Bay Bridge Project, Lake Champlain (VT) Freshwater Mussel Survey and Relocation; Surveyed and relocated Vermont state-listed threatened and endangered freshwater mussels that would potentially be impacted during construction of a bridge to replace the Route 78 causeway/bridge. A total of 418 mussels, including two Vermont state-listed endangered species, the Fragile Papershell (*Leptodea fragilis*) and the Pink Heelsplitter (*Potamilus alatus*), and one state-listed threatened species, the Giant Floater (*Pyganodon grandis*), were relocated using SCUBA divers to areas outside of the influence of construction activities. Responsible for leading the field crew and report preparation. Program Manager.

Vanasse Hangen Brustlin, Inc. (2000-2004) - Missisquoi Bay Bridge Project, Lake Champlain (VT); This multi-faceted study included studies on the movements of the state threatened spiny-soft shell turtle (*Trionyx spiniferus*) using radiotelemetry, a fish habitat and creel survey, and a state-listed freshwater mussel survey and relocation (see above) in relation to an existing causeway and a proposed new bridge. Responsible for data collection and report preparation. Crew Leader/Program Manager.

Public Service Company of New Hampshire (2003) - Merrimack River (NH) Brook Floater Survey; Surveyed 24 river miles using SCUBA divers, to search for populations of Brook Floater mussels (*Alasmidonta varicosa*), a NH state-listed endangered species. This study was conducted to evaluate the susceptibility of this species to impacts associated with hydroelectric generation and was the most extensive survey ever conducted for this species in the New Hampshire portion of the Merrimack River. This survey established several new records on the extent and location of brook floater populations in the Merrimack River. Responsible for leading the field crew and preparing the final report. Project Manager.

City of Manchester (CT) (1994, 1996, 1998) - A bioassessment of the fish and benthic macroinvertebrate communities in the Hockanum River was conducted as part of the discharge permit application for the Manchester, CT Sanitary Landfill and sewage treatment plant. Benthic communities were sampled using artificial substrate (rock basket) samples and kick samples, then analyzed separately using EPA's Rapid Bioassessment Protocol level 3 (RBP III). Fish data were analyzed using RBP level 5. Responsible for data collection, analysis, and report preparation. Aquatic Communities Technical Director.

Dexter Corporation (CT) (1997) - Surveyed 300 ft of streambed in Stony Brook (CT), near an aqueduct proposed for reconstruction, to look for Dwarf Wedge Mussels (*Alasmidonta heterodon*). *A. heterodon* is a federally listed endangered species that is sensitive to sedimentation and would have been adversely affected by construction activities. Responsible for conducting the field survey and report preparation. Project Manager.

New Hampshire DOT (1997) - Supervised a dive team that searched a section of the Johns River (NH), crossed by a bridge proposed for reconstruction, to look for Dwarf Wedge Mussels (*Alasmidonta heterodon*). *A. heterodon* is a federally listed endangered species which would have been adversely affected by construction activities. Responsible for project management, field data collection, and report preparation. Project Manager.

Smith College (1997) - Paradise Pond (MA) Dredging Mitigation Project; Worked closely with the client as well as State and Federal regulatory personnel to develop mitigation plans to alleviate impacts of dredging operations on a downstream population of Dwarf Wedge Mussel (*Alasmidonta heterodon*), a federally-listed endangered species. Technical Director.

City of Brockton (MA) (1997) - Supervised a dive team that surveyed the shoreline of Silver Lake, MA in search of two freshwater mussels included in the Massachusetts list of species of special concern, Eastern Pond Mussel (*Ligumia nasuta*) and Tidewater Mucket (*Leptodea ochracea*). Responsible for supervising the field crew and report preparation. Project Manager.

Northeast Maritime (1997) - Conducted a freshwater mussel search and evaluated mussel habitats in several streams that would be crossed by a gas pipeline in central Maine. The main purpose of this study was to identify habitats and populations of state and Federally listed rare, threatened, and endangered mussel species, primarily Dwarf Wedge Mussel (*Alasmidonta heterodon*), Brook Floater Mussel (*A. varicosa*), Yellow Lamp Mussel (*Lampsilis cariosa*) and Tidewater Mucket (*Leptodea ochracea*). Project Biologist.

SE Technologies, Inc. (1997) - Collected benthic macroinvertebrate data using EPA's Rapid Bioassessment Protocols level 2 (RBP II) and conducted an endangered aquatic species search near a closed electroplating facility to determine whether groundwater or surface runoff from the site was adversely affecting the aquatic biological community in Fivemile River (CT). Responsible for data collection, analysis, and report preparation. Project Manager.

SPECIAL TRAINING

OSHA 40-Hour Safety Certification

OSHA 8-Hour Safety Certification Refresher (Current)

Rapid Bioassessment Protocols (RBP)

Hazardous Material Supervisors Training (OSHA 29 CFR 1910.120)

First Aid and CPR

Habitat Evaluation Procedures (HEP)

SELECTED PRESENTATIONS

Mason, D.P. Survey for the Presence of Dwarf Wedge Mussels (*Alasmidonta heterodon*) in the Paulins Kill River, NJ. Presented to the 24th Annual Meeting of the New England Association of Environmental Biologists, March 2000, Jackson, NH.

Mason, D.P. and W.E. Hearn. Effects of fluctuating flows on benthic communities. Presented to the 37th Annual Meeting of the North American Benthological Society, May 1989, Guelph, Ontario, Canada.

Mason, D.P., S.L. Radke, K.T. Tracewski, and P.C. Johnson. Eclosion of gypsy moth (Lepidoptera: Lymantriidae) egg masses held under constant conditions as a function of sampling date. Presented to the 52nd Annual Meeting of the Eastern Branch of the Entomological Society of America, September 1980, Baltimore, MD.

SELECTED PEER-REVIEWED ARTICLES AND PUBLICATIONS

Haney, J.F., T.R. Beaulieu, R.P. Berry, D.P. Mason, C.R. Miner, E.S. McLean, K.L. Price, M.A. Trout, R.A. Vinton, and S.J. Weiss. 1983. Light intensity and relative light change as factors regulating stream drift. Archiv fur Hydrobiologie 97(1):73-88.

Mason, D.P. 1982. Physical and hydrochemical effects on stream insect communities in the White Mountain National Forest of New Hampshire. M.S. Thesis, University of New Hampshire, Durham, New Hampshire. 106 pp.

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

MICHAEL K. METTLER

Environmental Scientist

Mr. Mettler has a wide range of training and experience in environmental sampling and measurement. He has operated echosounders, side-scan sonar, and global positioning system (GPS) equipment in bathymetric and sediment surveys of the Ohio River and other waters. In addition, Mr. Mettler collects groundwater and surface water, sediment, and soil samples for laboratory analysis.

Mr. Mettler has extensive biological sampling experience. He has surveyed fish communities using electrofishing, seining, and ichthyoplankton netting techniques and collected benthic macroinvertebrate samples with sediment grab samplers, box samplers, and kick nets. Mr. Mettler also has conducted surveys for endangered freshwater mussels.

EDUCATION

B.S. 1996, Marine Science, Kutztown University

PROFESSIONAL EXPERIENCE

1996-Present	Normandeau Associates
1994-1996	Kutztown University, Housing and Residence Life Office

PROFESSIONAL AFFILIATIONS

Society of American Military Engineers (SAME)

SELECTED PROJECT EXPERIENCE

Exelon Energy, Inc. (2010-Present) – Survey of freshwater mussels in the Susquehanna River downstream of Conowingo Dam in Maryland in support of hydroelectric relicensing. This effort included semi-quantitative survey in a 4.5-mile river reach, followed by quantitative sampling in five selected areas within that reach. Search methodology included use of SCUBA in deeper water. Field Biologist

Monsanto/Conestoga-Rovers & Associates Inc. (2004 and 2008-Present) – Collect fish for a tissue contaminant study along 70 miles of the Kanawha River located in southern West Virginia. The fish were captured with an assortment of sampling techniques to include electrofishing, gill nets, and trot lines. All samples are collected and delivered to the client for processing and shipment to a subcontract laboratory. Field Biologist

Monsanto/Conestoga-Rovers & Associates (2007-Present) - Phase I of the Kanawha River EE/CA Work Plan required Normandeau to collect sediment from a 14-mile section of the Kanawha River. The Work Plan required the collection of 53 surficial sediment samples and 49 sediment cores using a submersible vibracore to a sediment depth of 10 feet. Phase II of the Kanawha River EE/CA Work Plan required Normandeau to collect 10 cores from the Kanawha River to a maximum sediment depth of 10 feet to be used as confirmatory samples. Field Crew Lead

Exelon Nuclear (2006-Present) – Assist with groundwater initiative for four Exelon nuclear facilities located in PA and NJ. Responsibilities include field oversight for the four mid-Atlantic facilities for the collection of ground and surface water samples. Task Manager

Exelon Nuclear (2005-Present) – Assist with program to monitor marine fish populations in the water supply and discharge canal at a coastal NJ nuclear electric generating facility during scheduled and unscheduled power outage events. The program requires surveying fish populations and determining their stress levels using underwater viewing cameras and fish collection surveys. Field Biologist

Anonymous Client (2001 - Present) – Assists with fish ichthyoplankton (IP) tow sampling on a 42-ft. trawler for an IP study on the Hudson River. Also conducted box trap studies and otter trawls. Field Technician

Waste Management, Inc. Landfills (1998-Present) - Environmental technician responsible for collecting groundwater, surface water, and leachate samples and monitoring methane levels of groundwater wells and landfill boundaries. Field Biologist

Hunt Engineers, Architects & Land Surveyors, Inc. (2010) – Survey of freshwater mussels in the Chemung River at the Madison Avenue Bridge in Elmira, NY. The bridge project involved placement of scour protection around the piers. Field Biologist

Fisher Associates (2010) – Survey of freshwater mussels in the Chemung River at the Centerway Arch Bridge in Corning, NY. Part of the bridge project involved concrete repairs to the piers. Field Biologist

Aqua Pennsylvania, Inc. (2010) – Survey of freshwater mussels downstream of a lowhead dam in the Shenango River in Sharon, PA. The dam project involved repair of general deficiencies. Field Biologist

National Park Service (2009) – Survey of freshwater mussels and submerged aquatic vegetation at the Chesapeake and Ohio Canal National Historical Park in Pool 4 of the Potomac River. The project involved repair to an historic retaining wall along the river's one shoreline. Field Biologist

U.S. EPA/Weston Solutions, Inc. (2009) - Under an EPA Region II RST Contract, Weston was tasked to investigate sediment in a portion of the Delaware River that runs behind the Roebling Steel Site in Florence, Burlington County, New Jersey. The work performed by Normandeau under the scope of work included the furnishing of all labor, equipment, materials, and other facilities and incidentals necessary to conduct vibracore borings at fifty-one (51) locations. Sample locations were subject to tidal influence. Field Team Lead

Independent Construction Materials (2008) - Conducted a hydrographic/bathymetric survey utilizing synchronized fathometer and DGPS mapping equipment in a flooded gravel quarry in Morgantown, PA. As part of the contract deliverables, we were able to supply the client a bathymetric contour map of the quarry within two days of completing the field survey. PM/Field Team Lead/Instrument Operator

AREVA NP, Inc. (2007) – Preliminary survey of mussels present in the Susquehanna River at Berwick, PA. This survey was conducted as part of electric utility intake and discharge structure siting. Field Biologist

Exelon Power (2005 - 2007) - Responsible for conducting fish entrainment and impingement sampling studies at five electric power facilities located in Pennsylvania and New Jersey, one nuclear and four fossil fuels facilities. Field Biologist.

PPL Resources, Inc. (2006-2010) – Assessment of fly ash spill impacts to the mussel and periphyton communities in the Delaware River at Martins Creek Generating Station. The survey included search for mussels in shallow wadeable habitats and in deep pools with SCUBA at locations upstream and downstream of the fly ash entry point. Field Biologist

CDM Federal/Hopewell (2006) - Work performed by Normandeau under this work assignment for CDM included the furnishing of all labor, equipment, materials and other facilities and incidentals necessary for the collection of 20 deep water samples from a lake and a pond in an abandoned gravel pit; measure bathymetry of the gravel pit; and measure thermal gradients of the two impoundments. Field Team Lead/Instrument Operator

Gannett Fleming, Inc. (2004-2008) – Survey of the fish and mussels present in the Susquehanna River at Wilkes-Barre, PA. This river reach would be affected by proposed construction of an inflatable dam. Field Biologist

Viacom (2004) – Normandeau Associates was contracted to conduct fish and crayfish sampling from three locations in Stout's Creek near Bloomington, Indiana. Sampling was conducted to obtain fish tissue samples from three locations near Bennett's Dump, and crayfish samples from one location. Fish were collected using a pram electrofishing unit. Field Team Leader

Pennsylvania Power & Light (2004) – Conducted a hydrographic/bathymetric survey utilizing synchronized fathometer and DGPS mapping equipment along several miles of the Susquehanna River in York County PA. Collected sub-centimeter horizontal positions and vertical elevations point data using an RTK GPS unit. Field Team Lead/Instrument Operator

Cummings/Riter (2004) – Collected sediment and soil samples from the Shenango River adjacent to a Superfund Site located in Sharon, PA. The project required collecting multiple sediment cores from 72 coring locations. Sample cores were collected using a submersible vibracore mounted on a work barge, S/S hand augers, and impact corer. Field Supervisor

C&S Engineers, Inc. (2001) – Survey of a marina and the nearby Niagara River for three Federally-listed endangered mussel species – the clubshell (Pleurobema clava), the pink mucket (Lampsilis abrupta), and the fat pocketbook (Potamilus capax). The effort involved search by SCUBA divers as well as wading. Field Biologist

U.S. Army Corps of Engineers, Huntington District (2001) – Operated echosounder and linked differential GPS to obtain bathymetric data in 110 miles of the Ohio River. Instrument and boat operator

U.S. Army Corps of Engineers, Nashville District (2001) – Operated echosounder and linked differential GPS to obtain bathymetric data in reservoir in western North Carolina. Instrument operator

Anonymous Clients (1998-2001) - Responsible for installing and operating fish entrainment and impingement sampling equipment for several studies at two large refineries in Delaware. Conducted day and night ichthyoplankton tows. Field Biologist

U.S. Army Corps of Engineers (1999-2000) – Study of survival of Juvenile Salmon through a hydroelectric turbine using radio-telemetry. The study was conducted at McNary and Bonneville Dams on the Columbia River, in the state of Washington. Field Biologist

CH2M Hill (Texas) (1998-2000) – As a part of the Port Arthur Remediation Team working at a refinery in Southeastern Texas, I worked on a assortment of projects that included sediment sampling with vibracoring equipment, surface sediment sampling with Ponar, pore-water sampling, surface water sampling, and soil sampling using direct push rig. Assorted responsibilities included Sample Team Leader, Site Safety Coordinator, and GPS operator.

New York Department of Environmental Conservation (1999) – Stock assessment study to monitor size, age, incidence of repeat spawning, sex ratio, and species composition of Alewife and Blueback Herring spawning populations in the Hudson and Mohawk River (NY) systems. Field Biologist

U.S. Army Corps of Engineers, Huntington District (1998) - Conducted a side-scan sonar survey of bottom sediment in 100 miles of the Ohio River and the entire navigable Kanawha River (WV). Side–Scan Sonar Operator

South Carolina Electric & Gas (1998) - Study of survival of juvenile herring passing through a hydroelectric turbine at the Columbia Station located on the Conagree River. Lead Chase Boat Operator

Corning-Asahi Video Products (1996-1998) - Conducted chronic whole effluent toxicity testing using *Pimephales promelas* (fathead minnow), and *Ceriodaphnia dubia* for NPDES permit compliance monitoring. The tests were conducted according to PA DEP regulations. Lab Technician

Merck and Company (1996-1998) - Conducted chronic whole effluent toxicity testing using *Pimephales promelas* (fathead minnow), and *Ceriodaphnia dubia* for NPDES permit compliance monitoring. The tests were conducted according to PA DEP regulations. Lab Technician

U.S. Army Corps of Engineers, Pittsburgh District (1997) - Conducted a side-scan sonar survey of 86 miles of the Ohio River using a high resolution sonar linked to differential GPS. Conducted a ground-truthing survey designed to correlate sonar signature with actual grain size as determined by use of an underwater video camera and Ponar grab sampling. Side–Scan Sonar Operator

SELECTED TRAINING

OSHA 40-Hour Safety Certification

OSHA 8- Hour Safety Certification Refresher (Current)

OSHA Confined Space Entrant, Attendant, Supervisor Certification

FEMA-Public Assistance Operation 1. IS-631 Certification

FEMA-Intro to Debris Operations in FEMA's Public Assistance Program. IS-632 Certification

FEMA-Special Considerations for FEMA Public Assistance Projects. IS-600 Certification

Advanced (PADI) Scuba Diver with Night and Drift Diver specialties

PA Fish and Boat Commission Boating and Safety Training

National Safety Council/ First Aid-Level 2 with blood-borne pathogens

National Safety Council/ Adult CPR

OSHA Hazardous Waste Site Supervisor Training

ALAN FRIZZELL
Dive Operation Manager/Biologist

Mr. Frizzell is Dive Operation Manager overseeing all dive projects performed by Normandeau Associates. Coordinates dive safety, education and equipment maintenance. Professional scientific diver since 1987, logging over 4,000 dives.

Mr. Frizzell is also Biologist/Field Technician with experience in the collection of finfish, benthic macroinvertebrates, plankton, and water quality data in marine, estuarine, and freshwater habitats; microscopic and gross identification of marine flora and fauna; data processing and compilation of lobster larvae annual report; and captaining up to 42-foot boats. Mr. Frizzell also has conducted surveys for endangered freshwater mussels.

EDUCATION

B.S. 1980, Biology, minor in Chemistry, Keene State College

PROFESSIONAL EXPERIENCE

1986-Present Normandeau Associates

PROFESSIONAL AFFILIATIONS

American Academy of Underwater Sciences
Diver Alert Network

SELECTED PROJECT EXPERIENCE

Exelon Energy, Inc. (2010-Present) – Survey of freshwater mussels in the Susquehanna River downstream of Conowingo Dam in Maryland in support of hydroelectric relicensing. This effort included semi-quantitative survey in a 4.5-mile river reach, followed by quantitative sampling in five selected areas within that reach. Search methodology included use of SCUBA in deeper water. Dive Operation Manager/Biologist.

Delaware River Joint Toll Bridge Commission (2010-Present) – SCUBA survey for mussels near the piers of multiple bridges in support of environmental permitting for river scour remediation measures. Dive Operation Manager/Biologist.

Seabrook Nuclear Generating Station, NH (1999-Present) - Underwater video Inspection and Cleaning of offshore Intake Structures. On-line biofouling removal. Field Technician/ Diver.

Bowline Generating Plant Hudson River, NY (1994-Present) - Barrier net placement around intake. Dive Operation Manager.

Florida Power and Light., Seabrook Nuclear Generating Station, NH (1986-Present) - Environmental monitoring studies including off-shore and on-site samples; finfish collection using trawl, beach seine and impingement methods; ichthyoplankton collection with boat-towed hoop nets and entrainment sampling on-site; intertidal and subtidal studies of flora and fauna through non-destructive methods of transect and quadrant, destructive methods of air-lifting and artificial settling stones; *Mya* larvae collection with hoop nets; lobster larvae collection using Neuston nets and counting/identification of Stages I through V; water quality profile collections through YSI water temperature collection with onset probes and downloading information into computers; crustacean collection and measurement of green and *Cancer* crabs; *Mya arenaria* random plotting through aerial view of flats which are later sampled; underwater videotaping. Dive Operation Manager.

Massena Electric Department (2007-2009) – Grasse River Benthic Macroinvertebrate and Mussel Survey (NY); SCUBA survey of the mussels in the Grasse River from Louisville to Massena, NY. A total of 9 mussel species was identified. Dive Operations Manager/Biologist.

PPL Resources, Inc. (2006) – Assessment of fly ash spill impacts to the mussel and periphyton communities in the Delaware River at Martins Creek Generating Station. The survey included search for mussels in shallow wadeable habitats and in deep pools with SCUBA at locations upstream and downstream of the fly ash entry point. Dive Operation Manager/Biologist.

Hunt Engineers, Architects, & Land Surveyors, Inc. (2006) – Survey of freshwater mussels present in the Susquehanna River at Oneonta, NY. This survey was conducted on short notice in order to support NYSDOT's emergency stabilization of a riverbank below NYS Route 23. Water depth required use of SCUBA. Dive Operation Manager/Biologist.

Enercon: Fitzpatrick Nuclear Plant, Oswego, NY (2006) – Installation and dismantling of hydro-acoustics around intakes of the plant to monitor fish movements. Dive Operation Manager.

FPL Wyman Station, Cousin's Island, ME (2006) – Pre-construction dredge permitting. Videotaping transect of proposed dredge site using SCUBA. Dive Operation Manager.

Rowe Nuclear Plant, Rowe, MA (2006) - Decommission of power plant. SCUBA diving to collect sediment samples to be tested for PCB's and radiological contamination. Depths of 10-70 ft. Dive Operation Manager.

Quoddy Bay, Eastport ME (2006) - Eelgrass survey for proposed LNG terminal located in Quoddy Bay. Mapping of eelgrass beds using SCUBA. Benthic grab sample for polychaetes. Dive Operation Manager/Field Technician.

Haley and Aldrich Engineering, Laconia NH (2006) – Post construction monitoring of coal tar dredging and removal. Sediment samples were collected for fauna analysis. Samples were located by GPS and collected by SCUBA. Dive Operation Manager/Field Technician.

STV, Inc. (2004-2010) – Survey of freshwater mussels and characterization of the fish community present in the Delaware River at the I-95 Bridge, West Trenton, NJ. Water depth required use of SCUBA. In addition, Section 7 Consultation on the federally-listed shortnose sturgeon. Dive Operation Manager/Biologist.

Skelly and Loy, Inc. (2003-2005) – Survey of freshwater mussels in the Susquehanna River in the vicinity of planned construction of a sewer force main river crossing. The effort was focused on search for two state species of concern, the green floater (*Lasmigona subviridis*) and the yellow lampmussel (*Lampsilis cariosa*) and, subsequently, relocation of these species from the project area. Because of waters in excess of 5 feet depth, SCUBA was required. Dive Operation Manager/Biologist.

McFarland-Johnson, Inc. (2003) – Survey of freshwater mussels in the Chenango River in the vicinity of the I-81/NYS Route 17 interchange project in Binghamton, NY. The effort was focused on search for the NYS threatened species, the green floater (*Lasmigona subviridis*), and one federal species of concern, the yellow lampmussel (*Lampsilis cariosa*). Because of varied physical conditions, SCUBA as well as snorkeling was required. Dive Operation Manager/Biologist.

Nantucket Electric, Cape Cod/Nantucket, MA (2003/2006) - Impact study of the installation of an underwater power cable from Cape Cod to Nantucket. Transects of eelgrass beds and videotaping performed. Field Technician/ Diver.

Hubline. Duke Energy, Massachusetts Bay, MA (2003-2006) – Monitoring post-construction of Hubline pipeline from Salem Harbor to Weymouth Harbor. Annual analysis of scallop beds, juvenile lobsters (via suction sampling), flora and fauna development (via underwater photography) and rugosity. Dive Operation Manager/Field Biologist.

D.A. Collins, Bass River, Beverly, MA (2005) – Underwater videotaping of impacted dredge area, presence of undredged coal tar, and inspection of cloth sediment cover. Dive Operation Manager/Field Biologist.

Haley and Aldrich, Ferry Landing, Tarrytown, NY (2004-2005) – Dredging site used barrier net to exclude sturgeon and other fish from area. SCUBA was used to inspect net for proper deployment and damage. Dive Operation Manager/Field Biologist.

Merrimack River (NH) Brook Floater Survey (2003) - Surveyed 24 river miles using SCUBA divers, to search for populations of Brook Floater mussels (*Alasmidonta varicosa*), a NH state-listed endangered species. This study was conducted to evaluate the susceptibility of this species to impacts associated with hydroelectric generation and was the most extensive survey ever conducted for this species in the New Hampshire portion of the Merrimack River. This survey established several new records on the extent and location of brook floater populations in the Merrimack River. Responsible for leading the field crew and preparing the final report. Field Technician/ Diver.

Missisquoi Bay Bridge Project, Lake Champlain (VT) Freshwater Mussel Survey and Relocation (2003) - Surveyed and relocated Vermont state-listed threatened and endangered freshwater mussels that would potentially be impacted during construction of a bridge to replace the Route 78 causeway/bridge. A total of 418 mussels, including two Vermont state-listed endangered species, the Fragile Papershell (*Leptodea fragilis*) and the Pink Heelsplitter (*Potamilus alatus*), and one state-listed threatened species, the Giant Floater (*Pyganodon grandis*), were relocated using SCUBA divers to areas outside of the influence of construction activities. Field Technician/Diver.

United States Navy, McAllister Point, RI (2003) Set transects on artificial reefs to determine percent cover of flora and fauna. Took pictures of reefs. Set fish traps to get measurements of fish living on reef. Outlined eelgrass bed to determine how far the bed had moved over time. Field Technician/Diver

Duke Energy, Boston Harbor, MA (2002-2003) - Collected core samples from contaminated sediments near the Hubline pipeline. Field Technician/Diver.

Massachusetts Central Artery, Boston Harbor, MA (2002) - Monitoring of artificial reef including transects, underwater videotaping, and general visual assessments. Field Technician/Diver.

C&S Engineers, Inc. (2001) – Survey of a marina and the nearby Niagara River for three Federally-listed endangered mussel species – the clubshell (*Pleurobema clava*), the pink mucket (*Lampsilis abrupta*), and the fat pocketbook (*Potamilus capax*). The effort involved search by SCUBA divers as well as wading. Dive Operation Manager/Biologist.

Bath Iron Works, Bath (ME) (1997-2000) - Environmental studies conducted prior to and during shipyard expansion. A primary dive survey was done for subtidal sediments and identification of the flora and fauna. Monthly/Bimonthly finfish collections using various methods (trawl, beach seine, Fyke nets) targeting endangered species shortnose sturgeon (*Acipenser brevirostrum*). Dive Operation Manager/Field Biologist.

Massachusetts Coastal Zone Management (1998-1999) - Monthly/bimonthly finfish collection using trawls and beach seines in New Bedford and Gloucester Harbors. Field Leader.

Massachusetts Coastal Zone Management (1998-1999) - Quahog population study of New Bedford and Fall River Harbors. Hydraulic dredging of varied substrate to assess population. Efficiency of dredge checked by divers. Dive Operation Manager/Diver.

Quonset Point Associates, Quonset Point (RI) (1998) - Impact study of the development of Quonset Point. Visual identification and videotaping of benthic organisms and quahog population study by one meter quadrant extraction. Dive Operation Manager/Diver.

Portland (ME) Water District, Water Supply of Sebago Lake (1998) - Impact study on the effects of lowering water levels and beach erosion. Collection of sediment cores at varying depths by divers. Field Leader/Dive Operations Manager/Diver.

Johns River Dwarf Wedge Mussel Survey (NH) (1997) - Conducted a dive survey in a section of the Johns River crossed by a bridge proposed for reconstruction, to look for dwarf wedge mussels (*Alasmidonta heterodon*). *A. heterodon* is a federally listed endangered species which would have been adversely affected by construction activities. Responsible for conducting the search and locating previously identified dwarf wedge mussel beds. Dive Operation Manager/Diver.

Brocton (MA) Water Supply of Silver Lake, Pembroke (MA) (1997) - A dive survey in search of two freshwater mussel species, eastern pond mussel (*Ligumia nasuta*) and tidewater mucket (*Leptodea ochracea*) which are included in MA Natural Heritage Program's list of Species of Special Concern. Dive Operation Manager/Diver.

Northeast Maritime (ME) (1997) - Conducted a freshwater mussel search and evaluated mussel habitats in streams in central Maine, where a gas pipeline would be crossing. The study was to identify habitats and populations of all mussel, with concerns of rare, threatened, and endangered mussel species, primarily dwarf wedge mussel (*Alasmidonta heterodon*), brookfloater mussel (*A. varicosa*), tidewater mucket (*Leptodea ochracea*), and yellow lampmussel (*Lampsilis cariosa*). Field biologist.

Ransom Environmental, Troy (NH) (1997) - Quarry dive to locate and photograph submerged paint drums. Dive Operation Manager/Diver.

Coastal Water of Searsport, ME - Zostera bed location. Field Manager and Dive Operation Manager.

Boston Harbor Navigation Improvement Project - Environmental assessment for U.S. Army Corps of Engineers dredging project. Crew Leader.

Boston Harbor - Site assessment in placement of artificial reef. Dive Operation Manager.

Cogeneration Plant on Penobscot River, Bucksport, ME - Environmental assessment of a proposed cogeneration plant. Crew Leader.

Wisconsin Public Service - IFIM studies on Peshtigo River. Field Technician.

Fitzpatrick Nuclear Generating Station, Oswego, NY - Fish telemetry studies. Project Dive Supervisor.

Yankee Rowe Nuclear Generating Plant, Rowe, MA - Environmental studies. Water quality data and fisheries. Field Leader.

New York Power Authority, Verplank, NY - Fish survival studies. Field Technician/Diver.

Seabrook Station Offsite Chlorine Minimization Study, Hampton, NH - Construction and laboratory assessment. Crew Leader.

SPECIAL TRAINING

1983 – NAUI Open Water SCUBA Diver

1984 – NAUI Sport Diver

1996 - Present – Red Cross CPR certification

1987 - Present – NSC First Aid certification

1991 - Present – DAN Oxygen First Aid

2004 – Nitrox certification

ERIK FEL'DOTTO
Field Operations Manager

Mr. Fel'Dotto is a Field Operations Manager, with over 25 years experience in environmental consulting. He oversees all aspects of the Seabrook Environmental Monitoring Project as well as other large field projects. He coordinates field efforts for collections of finfish, benthos, plankton, sediments and physical data in marine, estuarine and freshwater habitats, including hazardous waste sites.

EDUCATION

B.S. 1983, Marine Biology, University of New England

PROFESSIONAL EXPERIENCE

1983-Present Normandeau Associates

Mr. Fel'Dotto has been a professional scientific diver since 1984, logging over 5,000 dives, with extensive experience in black water and high current conditions. An experienced boat operator, he captains vessels up to 42 feet. He has extensive experience in instrument navigation, precision sample location, and all types of sampling equipment deployment. He also has conducted surveys for endangered freshwater mussels.

SELECTED PROJECT EXPERIENCE

Exelon Energy, Inc. (2010-Present) – Survey of freshwater mussels in the Susquehanna River downstream of Conowingo Dam in Maryland in support of hydroelectric relicensing. This effort included semi-quantitative survey in a 4.5-mile river reach, followed by quantitative sampling in five selected areas within that reach. Search methodology included use of SCUBA in deeper water. Biologist.

Delaware River Joint Toll Bridge Commission (2010-Present) – SCUBA survey for mussels near the piers of multiple bridges in support of environmental permitting for river scour remediation measures. Biologist.

Northeast Gateway LNG (2006-Present) - Deep water port operational monitoring. Twice monthly day and night plankton sampling in Massachusetts Bay in vicinity of Stellwagen Bank. Field Operations Manager.

Seabrook Nuclear Generating Station (NH) (1999-Present) – Underwater video Inspection and Cleaning of Intake Structures. On-line biofouling removal. Field Manager.

Seabrook Nuclear Generating Station (NH) (1991-Present) – Multi-disciplinary Environmental Monitoring, including fisheries, benthos, plankton, shellfish, inter-tidal, sub-tidal, and radiological studies. Field Manager.

Calais LNG (2008-2009) - Calais ME. Subtidal surveys for shellfish included underwater video, transect surveys, and airlift suction sampling for early benthic phase lobster. Field Operations Manager.

Nine Mile Point Nuclear Generating station. Oswego, NY (2008) - Ecological survey for intake siting in Lake Ontario, underwater survey of habitat and biota. Field Operations Manager.

Massena Electric Department (2007-2009) – Grasse River Benthic Macroinvertebrate and Mussel Survey (NY); SCUBA survey of the mussels in the Grasse River from Louisville to Massena, NY. A total of 9 mussel species was identified. Biologist.

PPL Resources, Inc. (2006) – Assessment of fly ash spill impacts to the mussel and periphyton communities in the Delaware River at Martins Creek Generating Station. The survey included search for mussels in shallow wadeable habitats and in deep pools with SCUBA at locations upstream and downstream of the fly ash entry point. Biologist.

Hunt Engineers, Architects, & Land Surveyors, Inc. (2006) – Survey of freshwater mussels present in the Susquehanna River at Oneonta, NY. This survey was conducted on short notice in order to support NYSDOT's emergency stabilization of a riverbank below NYS Route 23. Water depth required use of SCUBA. Biologist.

Haley and Aldrich Engineering, Laconia NH (2006) – Post construction monitoring of coal tar dredging and removal. Sediment samples were collected for fauna analysis. Samples were located by GPS and collected by SCUBA. Field Operation Manager.

Enercon: Fitzpatrick Nuclear Plant, Oswego, NY (2006) – Installation and maintenance of hydro-acoustics arrays around intakes of the plant in Lake Ontario to monitor fish movements. Field Operations Manager.

Skelly and Loy, Inc. (2003-2005) – Survey of freshwater mussels in the Susquehanna River in the vicinity of planned construction of a sewer force main river crossing. The effort was focused on search for two state species of concern, the green floater (*Lasmigona subviridis*) and the yellow lampmussel (*Lampsilis cariosa*) and, subsequently, relocation of these species from the project area. Because of waters in excess of 5 feet depth, SCUBA was required. Biologist.

Hubline Gas Pipeline Construction (MA) (2001-2006) – Baseline and post-construction sub-tidal surveys of pipeline impact area in Massachusetts Bay. Included early benthic phase lobster, adult lobster, scallop surveys, hard substrate u/w photography, eelgrass and quahog surveys. Field Manager/Diving Supervisor.

Nantucket Electric, Cape Cod/Nantucket, MA (2003/2006) - Impact study of the installation of an underwater power cable from Cape Cod to Nantucket. Transects of eelgrass beds and videotaping performed. Dive Operations Manager.

Cook Nuclear Generating Station (Bridgman, MI) (2005) – Planned and mobilized startup of 2-year 316(b) environmental program, including in-plant impingement/entrainment studies and nearfield trawling, gillnetting, seining and plankton surveys on Lake Michigan. Field Manager.

STV, Inc. (2004-2010) – Survey of freshwater mussels and characterization of the fish community present in the Delaware River at the I-95 Bridge, West Trenton, NJ. Water depth required use of SCUBA. In addition, Section 7 Consultation on the federally-listed shortnose sturgeon. Biologist.

Tarrytown Barrier Net (Tarrytown, NY) (2004) – Designed, installed and maintained 1200'x30' barrier net to exclude sturgeon from remediation dredge area on Hudson River shoreline. Field Manager/Dive Supervisor.

McFarland-Johnson, Inc. (2003) – Survey of freshwater mussels in the Chenango River in the vicinity of the I-81/NYS Route 17 interchange project in Binghamton, NY. The effort was focused on search for the NYS threatened species, the green floater (*Lasmigona subviridis*), and one federal species of concern, the yellow lampmussel (*Lampsilis cariosa*). Because of varied physical conditions, SCUBA as well as snorkeling was required. Biologist.

Merrimack River (NH) Brook Floater Survey (2003) - Surveyed 24 river miles using SCUBA divers, to search for populations of Brook Floater mussels (*Alasmidonta varicosa*), a NH state-listed endangered species. This study was conducted to evaluate the susceptibility of this species to impacts associated with hydroelectric generation and was the most extensive survey ever conducted for this species in the New Hampshire portion of the Merrimack River. This survey established several new records on the extent and location of brook floater populations in the Merrimack River.

Nantucket Electric Eelgrass Survey (MA) (2003) – Underwater survey including video of eelgrass beds on Cape Cod and Nantucket for electric cable crossing. Field Manager.

Missiquoi Bay Endangered Species Mussel Relocation (VT) (2003) – Removal and relocation of mussels from causeway construction area. Diving Supervisor.

Hubline Gas Pipeline Construction Monitoring (MA) (2002-2003) – Water quality monitoring during pipeline construction. Day and night monitoring of multiple WQ parameters. Field Manager.

Portsmouth Naval Shipyard Interim Monitoring (ME) (2002, 2003) – Subtidal and intertidal collections of sediments and mussels for bulk chemistry analyses for monitoring remediation of hazardous waste sites. Field Supervisor.

C&S Engineers, Inc. (2001) – Survey of a marina and the nearby Niagara River for three Federally-listed endangered mussel species – the clubshell (*Pleurobema clava*), the pink mucket (*Lampsilis abrupta*), and the fat pocketbook (*Potamilus capax*). The effort involved search by SCUBA divers as well as wading. Biologist.

McAllister Point, Newport RI (2000) - Ichthyoplankton and fisheries characterization in subtidal and intertidal areas surrounding shoreline landfill. Field Manager.

Missisquoi Bay Turtle Habitat Evaluation (VT) (2000) - Under-water video survey of endangered softshell turtle habitat. Field Manager.

Seabrook Nuclear Generating Station (NH) (1999) – Offshore Intake Seal Barrier Installation. Quality control and u/w video. Field Manager.

Dworshak Reservoir Temperature Monitoring, US Army Corps of Engineers, Walla Walla District (ID) (1999) – Designed and installed static monitoring systems to hold termistor strings in position in reservoir with up to 180' water level fluctuations. Moorings remain in continuous use as of 2005. Installation Supervisor.

Massachusetts Coast Zone Management (MA) (1998-1999) – Dredged Material Management Plan. Fisheries resource characterization in MA harbors. Included finfish, quahog, and early benthic phase lobster surveys. Field Manager.

Bath Iron Works (ME) (1997-1998) - Shipyard Expansion. Environmental Impact Studies. Benthic and fisheries resource characterizations including radio-tagging and tracking of sturgeon. Field Manager.

NOAA (MA) (1997) - Eelgrass survey. Underwater video survey of eelgrass beds, coast of MA from NH to RI. Field Manager.

Boston Harbor Navigation Improvement Project (MA) (1994-1995) - Remote camera, sediment and fisheries sampling. Field Manager.

New Bedford Harbor (1994-1995) - PCB "Hot Spot" sediment sampling (MA). Field Manager.

New Bedford Harbor Long-Term Monitoring (MA) (1993-1995) - Sediment and benthos sampling. Field Manager.

Providence River Navigation Improvement Project (RI) (1994) - Remote camera and sediment sampling. Field Manager.

Boston Harbor Artificial Reef (MA) (1993-1994) - Benthic studies for placement of artificial reef. Field Manager.

Boston Harbor Vibracoring (MA) (1992) - Crew Leader.

Bucksport Baseline Environmental (1990-1991) - Survey for Cogeneration Plant (ME). Field Supervisor.

Indian Point Nuclear Generating Station (NY) (1989-1991) - Fish Return System Survival Studies. Project Dive Supervisor.

Fitzpatrick Nuclear Generating Station (NY) (1990) - Hydro-Acoustic Fish Deterrence Study. Dive Supervisor.

Hudson River Striped Bass Hatchery Evaluation (NY) (1986-1987) - Crew Leader.

Special Studies in Unsampled Areas of the Hudson River (NY) (1986-1987) - Crew Leader.

Striped Bass Gear Evaluation/Atlantic Tomcod Program (NY) (1985-1987) - Crew Leader.

Long River Ichthyoplankton and Fall Juvenile Surveys (NY) (1984-1987) - Vessel captain on night surveys Hudson River from Albany to NYC. Crew Leader.

Indian Point Nuclear Generating Station Impingement Monitoring (NY) (1985) - Crew Member.

Indian Point Nuclear Generating Station Entrainment Monitoring (NY) (1985) - Crew Member.

Seabrook Nuclear Generating Station Monitoring Studies (NH) (1984) - Crew Leader.

SPECIAL TRAINING

National Association of SCUBA Diving Schools; logged over 5,000 professional dives.

Personnel Protection and Safety Training for Hazardous Waste Site Activities (OSHA 40 hour course). 1990-Present

Red Cross Multimedia First Aid and CPR. 1983-Present

OSHA Hazardous Waste Site Supervisor Training. 1992-Present

Certified Professional Rescuer CPR, American Red Cross. 1996-Present

Certified in Oxygen First Aid in Dive Accidents, DAN. 1991-Present

CHRISTOPHER D. BAKER

Field Technician

Mr. Baker has been a professional scientific diver since 2000 and has logged over 1,000 dives. He has worked in various fisheries over the past eight years, and has spent the past five years working as a Biologist/Field Technician for Normandeau Associates. Mr. Baker has experience in the collection of finfish, benthic macroinvertebrates, plankton, and water quality data in marine, estuarine, and freshwater habitats; microscopic and gross identification of marine flora and fauna; and captaining up to 42-foot boats. He also has conducted surveys for endangered freshwater mussels.

EDUCATION

B.S.	1999, Marine and Freshwater Biology, University of New Hampshire

PROFESSIONAL EXPERIENCE

2002-Present	Normandeau Associates
2001-2002	New Hampshire Fish and Game
2000	The School for Field Studies
1999-2000	New Hampshire Fish and Game

SELECTED PROJECT EXPERIENCE

Exelon Energy, Inc. (2010-Present) – Survey of freshwater mussels in the Susquehanna River downstream of Conowingo Dam in Maryland in support of hydroelectric relicensing. This effort included semi-quantitative survey in a 4.5-mile river reach, followed by quantitative sampling in five selected areas within that reach. Search methodology included use of SCUBA in deeper water. Biologist.

Florida Power and Light, Wyman Station, Cousin's Island, ME (2006-Present) – Impingement and entrainment sampling. Field Technician.

Excelerate Energy, Northeast Gateway, Gloucester MA (2005-Present) - Ichthyoplankton collections and water quality monitoring at the proposed Northeast Gateway off-shore LNG terminal 15 miles off the coast of Gloucester, MA. Field Technician/Boat Captain.

Florida Power and Light, Seabrook Nuclear Generating Station, NH (2002-Present) - Environmental monitoring studies including off-shore and on-site samples; finfish collection using trawl, beach seine and impingement methods; ichthyoplankton collection with boat-towed hoop nets and entrainment sampling on-site; intertidal and subtidal studies of flora and fauna through non-destructive methods of transect and quadrant, destructive methods of air-lifting and artificial settling stones; *Mya* larvae collection with hoop nets; lobster larvae collection using Neuston nets and counting/identification of Stages I through V; water quality profile collections through YSI water temperature collection with onset probes and downloading information into computers; crustacean collection and measurement of green and Cancer crabs; *Mya arenaria* random plotting through aerial view of flats which are later sampled; underwater videotaping. Field Technician/Diver.

Seabrook Nuclear Generating Station, NH (2002-Present) - Underwater video inspection and cleaning of offshore intake structures. On-line biofouling removal. Field Technician/ Diver.

Bowline Generating Plant Hudson River, NY (1994-Present) - Barrier net placement around intake. Field Technician/ Diver.

Massena Electric Department (2007-2009) – Grasse River Benthic Macroinvertebrate and Mussel Survey (NY); SCUBA survey of the mussels in the Grasse River from Louisville to Massena, NY. A total of 9 mussel species was identified. Biologist.

PPL Resources, Inc. (2006) – Assessment of fly ash spill impacts to the mussel and periphyton communities in the Delaware River at Martins Creek Generating Station. The survey included search for mussels in shallow wadeable habitats and in deep pools with SCUBA at locations upstream and downstream of the fly ash entry point. Biologist.

Hunt Engineers, Architects, & Land Surveyors, Inc. (2006) – Survey of freshwater mussels present in the Susquehanna River at Oneonta, NY. This survey was conducted on short notice in order to support NYSDOT's emergency stabilization of a riverbank below NYS Route 23. Water depth required use of SCUBA. Biologist.

Massachusetts Water Resources Authority, Boston MA (2006) – Deployment of mussel cages at various depths in Massachusetts Bay, Cape Cod Bay, and Boston Harbor to assess the impacts of treatment plant effluent on shellfish. Field Technician/Boat Captain.

Enercon: Fitzpatrick Nuclear Plant, Oswego, NY (2006) – Installation and dismantling of hydro-acoustics around intakes of the plant to monitor fish movements. Field Technician/ Diver.

Florida Power and Light, Wyman Station, Cousin's Island, ME (2006) – Pre-construction dredge permitting. Videotaping transect of proposed dredge site using SCUBA. Field Technician/ Diver.

Florida Power and Light, Wyman Station, Cousin's Island, ME (2006) – Monitored water quality and turbidity levels during dredging activity. Field Technician/Boat Captain.

Entergy, Penobscot Estuary Mercury Study, ME (2006) - Collected Scallops in the Penobscot estuary to be tested for mercury levels. Field Technician/Diver.

Rowe Nuclear Plant, Rowe, MA (2006) - Decommission of power plant. SCUBA diving to collect sediment samples to be tested for PCB's and radiological contamination. Depths of 10-70 ft. Field Technician/ Diver.

Quoddy Bay, Eastport ME (2006) - Eelgrass survey for proposed LNG terminal located in Quoddy Bay. Mapping of eelgrass beds using SCUBA. Benthic grab sample for polychaetes. Used remote camera to photograph substrate in selected areas to identify the benthic community. Field Technician/ Diver.

Haley and Aldrich Engineering, Laconia NH (2006) - Post construction monitoring of coal tar dredging and removal. Sediment samples were collected for fauna analysis. Samples were located by GPS and collected by SCUBA. Field Technician/ Diver.

Duke Energy, Massachusetts Bay, MA (2003-2006) – Monitoring post-construction of Hubline pipeline from Salem Harbor to Weymouth Harbor. Annual analysis of scallop beds, juvenile lobsters (via suction sampling), flora and fauna development (via underwater photography) and rugosity. Field Technician/ Diver.

Nantucket Electric, Cape Cod/Nantucket, MA (2003/2006) - Impact study of the installation of an underwater power cable from Cape Cod to Nantucket. Transects of eelgrass beds and videotaping performed. Field Technician/ Diver.

Entergy (2005) – Hudson River Ichthyoplankton/Fall Juvenile Survey, NY; Collected juvenile fish using otter trawls and collected ichthyoplankton using tucker trawls along the Hudson River at night. Field Technician.

D.A. Collins, Bass River, Beverly, MA (2005) – Underwater videotaping of impacted dredge area, presence of undredged coal tar, and inspection of cloth sediment cover. Field Technician/ Diver.

Haley and Aldrich (2004-2005) – Ferry Landing, Tarrytown, NY; Dredging site used barrier net to exclude sturgeon and other fish from area. SCUBA was used to inspect net for proper deployment and damage. Field Technician/Diver.

Skelly and Loy, Inc. (2003-2005) – Survey of freshwater mussels in the Susquehanna River in the vicinity of planned construction of a sewer force main river crossing. The effort was focused on search for two state species of concern, the green floater (*Lasmigona subviridis*) and the yellow lampmussel (*Lampsilis cariosa*) and, subsequently, relocation of these species from the project area. Because of waters in excess of 5 feet depth, SCUBA was required. Biologist.

STV, Inc. (2004-2010) – Survey of freshwater mussels and characterization of the fish community present in the Delaware River at the I-95 Bridge, West Trenton, NJ. Water depth required use of SCUBA. In addition, Section 7 Consultation on the federally-listed shortnose sturgeon. Biologist.

Upper Peninsula Power Company, Marquette MI (2004) – Assessed damage to mussel populations after the Dead River Basin flooded in 2004. Field Technician/Diver.

Yankee Rowe, Rowe MA. (2004) - Collected core samples for the decommissioned Yankee Rowe nuclear power plant using a Geoprobe. Soils were tested for PCB's, coal tar, and radiological materials. Field Technician.

Gillette World Headquarters, Boston, MA (2004) – Conducted Ichthyoplankton entrainment surveys using intake water being drawn into the plant. Field Technician.

Quonset Point Associates, Quonset Point, RI (2002-2003) - Impact study of the development of Quonset Point. Ichthyoplankton sampling, otter trawl, beam trawl, and beach seines performed. Field Technician.

McFarland-Johnson, Inc. (2003) – Survey of freshwater mussels in the Chenango River in the vicinity of the I-81/NYS Route 17 interchange project in Binghamton, NY. The effort was focused on search for the NYS threatened species, the green floater (*Lasmigona subviridis*), and one federal species of concern, the yellow lampmussel (*Lampsilis cariosa*). Because of varied physical conditions, SCUBA as well as snorkeling was required. Biologist.

CDM, Merrimack Water Quality (2003) - Captained vessel to monitor various water quality parameters in the lower reaches of the Merrimack River. Boat Captain.

Bath Iron Works, Bath, ME (2003) – Observation of dredging activities monitoring for Atlantic and Shortnose Sturgeon taken during relief of dredged material. Field Technician.

Public Service of New Hampshire, Manchester, NH (2003) - Determined locations of threatened freshwater mussels along the shoreline of the Merrimack River in southern New Hampshire. Field Technician/Diver.

HubLine sediment core sampling (2003) - Took core samples from contaminated sediments. Field Technician/Diver

Duke Energy, Boston Harbor, MA (2003) - Monitored counts and behaviors of American lobster along the Hubline pipeline at night. Field Technician/Diver.

Vermont DOT, Swanton, VT (2003) - Collection and relocation of threatened mussels for the removal of a causeway. Field Technician/ Diver.

United States Navy, McAllister Point, RI (2003) - Set transects on artificial reefs to determine percent cover of flora and fauna. Took pictures of reefs. Set fish traps to get measurements of fish living on reef. Outlined eelgrass bed to determine how far the bed had moved over time. Field Technician/Diver.

Duke Energy, Boston Harbor, MA (2002-2003) - Captained vessels to monitor turbidity levels in water during dredging of HubLine pipeline. Boat Captain.

Quonset Point Associates, Quonset Point (RI) (2002) - Collected sediments to assess quahog populations in selected areas. Field Technician/Diver.

Duke Energy, Boston Harbor, MA (2002) Used hydraulic dredge in various substrates to assess quahog population. Efficiency of dredge checked by divers. Field Technician/ Diver.

Massachusetts Central Artery, Boston Harbor, MA (2002) - Monitoring of artificial reef including transects, underwater videotaping, and general visual assessments. Field Technician/Diver.

New Hampshire Fish and Game, Marine Fisheries Division (1999-2000, 2001-2002) - Collected data and performed computer analyses of Striped Bass and juvenile finfish populations in the coastal waters of New

Hampshire (including local rivers and bays). Maintained fish ladders in 6 local New Hampshire coastal rivers. Field Instructor.

The School for Field Studies (2000) - Facilitated a research project designed to determine the population of Bonefish on the Caicos Bank in the British West Indies. Field Instructor/Divemaster/Boat Captain.

SPECIAL TRAINING

2006-DAN oxygen first aid

2006-NSC First Aid

2006-NSC CPR

2004-Nitrox

2004-40 hour OSHA HAZWOPER

2003-New Hampshire Safe Boating Card

2000-PADI - Divemaster

1999-NAUI - Rescue diver

BRYAN W. LEES

Aquatic Ecologist

Mr. Lees has over 10 years experience in a wide array of aquatic ecological studies including fisheries, macroinvertebrates, and water quality. Mr. Lees' duties include sampling fish and macroinvertebrates, providing fish and macroinvertebrate identification in the field, and identification of macroinvertebrates in the laboratory. His other responsibilities include data compilation and analysis and report preparation.

EDUCATION

M.S.	2005, Wildlife and Fisheries Science, The Pennsylvania State University
B.S.	1999, Wildlife and Fisheries Science, The Pennsylvania State University
B.S.	1999, Environmental Resource Management, The Pennsylvania State University

PROFESSIONAL EXPERIENCE

2005-Present	Normandeau Associates
2003-2005	The Pennsylvania State University
2000-2003	Stroud Water Research Center
2000	Pennfield Farms Inc.
1999	Pennsylvania Fish and Boat Commission
1999	The Pennsylvania State University
1998	Envircon Associates Inc.
1997	The Pennsylvania State University

PROFESSIONAL AFFILIATIONS

American Fisheries Society
North American Benthological Society

SELECTED PROJECT EXPERIENCE

Exelon Energy, Inc. (2010-Present) – Survey of freshwater mussels in the Susquehanna River downstream of Conowingo Dam in Maryland in support of hydroelectric relicensing. This effort included semi-quantitative survey in a 4.5-mile river reach, followed by quantitative sampling in five selected areas within that reach. Search methodology included use of SCUBA in deeper water. Biologist.

AREVA NP (2008-Present) – BBNPP ER and Studies Project. Wrote Aquatic Ecological Source Reports to support the COLA Environmental Report. Authored Chapters 4, 5, and 6 of the COLA Environmental Report for Bell Bend Nuclear Power Plant, Salem Township, Luzerne County, PA. Also was lead biologist for aquatic ecological field studies required under NRC and other regulatory guidance from July 2007 through September 2010. Supported NRC site meetings, responses to NRC requests for additional information, and revisions of the COLA Environmental Report.

AREVA/UniStar Bell Bend Nuclear Power Plant (2008) - Project manager for Impingement and Entrainment Studies at PPL's Susquehanna Steam Electric Station. Wrote Impingement and Entrainment Sampling Report.

Pulte Homes of PA, LLC (2007-Present) – Assessment of construction impacts on a stream macroinvertebrate community near a large golf course/housing development in Chester County, PA. This work is a PA Department of Environmental Protection permitting requirement.

Woodard & Curran (2006–Present) - Aquatic benthic macroinvertebrate sample analysis for Pound Ridge Golf Club, Stamford (CT).

Mactec Engineering and Consulting (2006-Present) – Aquatic benthic macroinvertebrate sample analysis for Honeywell-Ironton (OH) Wetlands Assessment Study.

Exelon Power (2006-Present) – Assisted with the monitoring of aquatic conditions during reactor outages at Oyster Creek Nuclear Generating Station. During the events, field teams of biologists monitored the facilities discharge canal looking for any stressed or dying fish or marine organisms, conducted water temperature surveys, and collected target fish species for analytical and beneficial use purposes.

SAIC, William Dick Lagoon Project (2006-Present) - Assessed the benthic macroinvertebrate communities and habitat of two streams, one of which will receive discharge of treated effluent from a Superfund site.

Exelon Power (2005-Present) - The Limerick Generating Station Water Supply Modification Demonstration Project and Wadesville Mine Pool Withdrawal and Stream Flow Augmentation Demonstration Project – Data analysis, report writing, and fish and macroinvertebrate sampling.

Exelon Energy (2005-Present) – Fish and macroinvertebrate sampling in the East Branch Perkiomen Creek, part of the Point Pleasant Water Diversion Project, Bucks and Montgomery Counties, PA.

Sanofi Pasteur (2005-Present) – Ecological studies of impact of discharge from a pharmaceutical plant on Swiftwater Creek in the Pocono Mountains in northeast Pennsylvania.

Drumore Crossing, LP (2009) – Assessment of macroinvertebrate community structure in Fishing Creek in Lancaster County, PA. This effort was conducted to determine if an upgrade to Exceptional Value stream status was warranted.

Waste Management, Inc. (2009) – Assessment of macroinvertebrate community structure to determine impact of landfill leachate treatment plant discharge to the Delaware River. This effort was a Delaware River Basin Commission permitting requirement.

Independence Construction Materials, Inc. (2007-2009) – Assessment of quarry discharge impacts on the macroinvertebrate community in Octoraro Creek, Lancaster County, PA. This work was a PA Department of Environmental Protection NPDES permitting requirement.

Reliant Energy (2005-2009) – Seward Station 316(a) Study; Conducted ecological fieldwork for a thermal variance study on the Conemaugh River, PA.

Exelon Power/BBL (2005-2008) – Aquatic ecologist on a team of economists, engineers and biologists to provide 316(b) Phase II compliance services at seven fossil-fuel generating stations in PA, TX, and MA. The team provided Phase II applicability analysis, strategy recommendations, PIC documents and Compliance Demonstration Studies (CDS).

NJ Dept. of Environmental Protection (2005-2008) – Water quality and biological productivity studies in Round Valley Reservoir, Hunterdon County, NJ. Studies focused on improving the forage fishery supporting black bass and trout fisheries.

Exelon Power (2007) – Conducted fisheries studies on the Schuylkill River in support of a 316(a) thermal variance renewal for Cromby Generating Station. This work included fish collection, data analysis, and report preparation.

Mactec Engineering and Consultants (2007) – Aquatic benthic macroinvertebrate sample analysis for Nuclear Metals Superfund Site, Concord (MA) Aquatic

Geryville Materials, Inc. (2006) - Assisted in macroinvertebrate assessment related to a proposed rock quarry discharge into Hosensack Creek.

Merrill Creek Reservoir (2006) – Assisted in fisheries studies for a pumped-storage reservoir in New Jersey.

Exelon Power (2005-2006) – Impingement and entrainment sampling at four fossil-fuel generating stations in Pennsylvania.

New York City Department of Environmental Protection (2005) – Fish and macroinvertebrate survey in Schoharie Creek downstream of Gilboa Dam (NY).

Reading Site Contractors (2005) – Age and growth analysis of largemouth bass and bluegills in two ponds in Chester County, PA.

School of Forest Resources at The Pennsylvania State University (2003-2005) – Graduate Research/Teaching Assistant.

- Designed and conducted study of the relationship of macroinvertebrate and fish assemblages to watershed and riparian condition measures
- Collected, processed, and identified macroinvertebrates
- Surveyed fish communities using backpack, towboat, and boat electrofishing gear
- Used ArcGIS to determine watershed land cover, watershed area, and attributes of streams
- Instructed in Fisheries Science class highlighting collection of fish and macroinvertebrates, fish identification, fish aging using scales and otoliths, using gastric lavage to collect stomach contents, water chemistry analysis, Index of Biotic Integrity, and Rapid Bioassessment Protocol
- Supervised three undergraduate research assistants in completion of laboratory projects

Stroud Water Research Center (2000-2003) – Aquatic Entomology Staff Scientist.

- Collected aquatic macroinvertebrates from a variety of watersheds in PA, DE, NY, NC, and GA
- Processed and identified macroinvertebrates to genus and species levels, including Chironomidae
- Analyzed biological data and calculated metrics and water quality indices
- Selected stream sampling locations and coordinated field sampling activities
- Additional duties included: a) training student interns; b) leading field crews; c)conducting field and laboratory chemistry and, d) surveying larval and adult stream salamanders

Pennfield Farms Inc. (2000) – Wastewater Treatment Technician.

- Managed wastewater treatment facility
- Monitored treatment plant function and performed tasks vital to daily operations

Pennsylvania Fish and Boat Commission (1999) – Fisheries Biologist Aide.

- Collected and identified macroinvertebrates and fishes
- Participated in acid mine drainage biomonitoring, wetlands delineation, and highway construction permitting

School of Forest Resources at The Pennsylvania State University (1999) – Research Assistant.

- Sorted benthic macroinvertebrate samples
- Identified benthic macroinvertebrates

Envircon Associates Incorporated (1998) – Environmental Assistant.

- Sampled wastewater and completed water quality analysis for various constituents
- Administered mechanical and biological controls to treatment systems

School of Forest Resources at The Pennsylvania State University (1997) – Research Assistant.

- Studied the preferred substrate of darters in an artificial stream

SPECIAL TRAINING

EPT2 Taxonomic Certification

FWS-FIS2C01 Principles & Techniques of Electrofishing

OSHA 40-Hour Safety Certification

OSHA 8-Hour Safety Certification Refresher (Current)

Pennsylvania Chapter of the American Fisheries Society's Cyprinidae and Catostomidae Identification Workshop

Pennsylvania Department of Environmental Protection's Fish of the French Creek Drainage Identification Course

PA/WV Chapter of AFS Continuing Education Workshop for Mid-Atlantic Fish Identification

AMAAB Decapoda, Oligochaeta, and Plecoptera Identification Workshops

SELECTED PRESENTATIONS

Blye, R.W., P.L. Harmon, and B.W. Lees, Normandeau Associates and Kinnel, J., Veritas Economic Consulting, Matty, R., Exelon Power. 2006. Comparison of Entrainment at Adjacent Intakes on a Tidal river With and Without Large Slot-width Wedge-wire Screens: A Case for Partial Compliance with 316(b) Phase II Performance Standards for Reduction in Entrainment. UWAG EPRI meeting: Atlanta, September 6-7, 2006.

Whaley, J., J. Kinnel, and M. Bingham, Veritas Economic Consulting, R.W. R.W. Blye and B.W. Lees, Normandeau Associates. 2006. Approaches for Estimating Annual Impingement from Sample Counts. UWAG EPRI meeting: Atlanta, September 6-7, 2006.

Comparison of GIS and "on the ground" Assessments of Riparian Area Condition. Presented at North East Fish and Wildlife Conference. April 2005.

Linking riparian area condition and characteristics of fish and benthic macroinvertebrate assemblages. 135th Meeting of the American Fisheries Society, Anchorage, AK. September 2005.

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

Project No. 405-087- Maryland/Pennsylvania
Conowingo Hydroelectric Project
Exelon Generation Company, LLC

June 24, 2011
Ms. Colleen Hicks
Exelon Power
300 Exelon Way
Kennett Square, PA 19348

Reference: Determination on Requested Modifications to Study Plan for the Conowingo Hydroelectric Project

Dear Ms. Hicks:

Pursuant to 18 CFR § 5.13(c)(6) of the Commission regulations, this letter contains my determination on requests for modifications to existing studies for Exelon Generation Company, LLC's (Exelon) Conowingo Hydroelectric Project. In addition to requiring additional information and analysis on existing studies, this determination modifies the study plan approved February 4, 2010, by adding additional mussel sampling if the data to be analyzed in the January 2012 updated study report is insufficient to provide adequate coverage of the designated study area. My determination is based on staff's review of the Initial Study Report, the Initial Study Report meeting and summary, and written comments concerning existing studies and new study requests. The bases for my findings are discussed in Appendix A.

Background

On February 21, 2011, Exelon filed its Initial Study Report. As required by the regulations, the report describes the progress in implementing the study plan, and includes an explanation of variances from the study plan and schedule. On March 9, 10, and 11, 2011, Exelon held Initial Study Report meetings in Darlington, Maryland. Representatives from Exelon, the Commission, Maryland Department of Natural Resources (Maryland DNR), the Pennsylvania Fish & Boat Commission, the Susquehanna River Basin Commission (SRBC), the Pennsylvania Department of Environmental Protection (Pennsylvania DEP), American Rivers, Coastal Conservation

Association, the Lower Susquehanna Riverkeeper, Maryland Saltwater Sportsfishermans Association, Pennsylvania Game Commission, The Nature Conservancy, U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration (NOAA), U.S. Fish and Wildlife Service (FWS), National Park Service (Park Service), U.S. Department of the Interior- Solicitors Office, and local citizens attended the meetings. Exelon filed a summary of the meeting on March 28, 2011. Comments on the meeting summary and Initial Study Report were filed by the Commission, Maryland DNR, Pennsylvania Fish & Boat Commission, SRBC, the Park Service, FWS, the Nature Conservancy, Pennsylvania DEP, Lower Susquehanna Riverkeeper, American Rivers, the Mason-Dixon Trail System, Inc., and the Susquehanna Gateway Heritage Area.[1] Generally, the comments addressed the quality of the study reports and made specific recommendations for additional data collection and analysis, including requests for new studies.

On May 27, 2011, Exelon filed a letter with the Commission responding to the issues raised at the meeting and in the comment letters. Several disagreements regarding the ongoing studies remain and are discussed in Appendix A.

This determination only addresses specific recommendations to modify the approved study plan or, where needed, provides guidance on how to proceed. Where

[1] On June 23, 2011, Water and Power Law Group PC, on behalf of the Maryland Chapter of the Nature Conservancy, filed comments requesting Commission staff take into consideration the delays in study conduct and reporting by (1) not issuing a determination letter until Exelon files a supplemental Initial Study Report that contains the results of all studies completed since February 2011, or (2) only making a determination at this time on those studies contained within the February 2011 Initial Study Report and requiring Exelon to file a supplemental Initial Study Report in August 2011, that contains the remaining studies and allows for additional stakeholder comment.

Exelon’s February 21, 2011 Initial Study Report filing considered the following studies complete: 3.5, 3.6, 3.7, 3.8, 3.10, 3.13, 3.14, 3.18, 3.19, 3.20, 3.21, 3.22, 3.23, 3.24, 3.26, 3.27, 3.29, 3.30, 3.31, and 3.32. Since that filing, Exelon has provided or plans to provide study reports for several of the remaining studies. As stated at the Initial Study Report meeting, however, this determination will only address those studies considered complete and contained within the February 2011 Initial Study Report. All other studies filed since that date will be addressed after Exelon files its January 2012 updated study report, which should be a comprehensive document that includes the results of all studies completed through January 2012. Participants are able to file comments on any study reports filed after the Initial Study Report at any time but recommended modifications to those studies will not be addressed until the filing of the January 2012 updated study report. This process will allow for the efficiency and effectiveness envisioned by the Integrated Licensing Process, without compromising the scientific record for the Conowingo Project.

staff is in general agreement with Exelon's May 27, 2011, responses to comments not specifically requesting modifications to the study plan, the determination defers to those responses.

Pursuant to CFR 18 §5.15(d), any proposal to modify an ongoing study must be accompanied by a showing of good cause why the proposal should be approved, and must include a demonstration that: (1) the approved studies were not conducted as provided for in the approved study plan, or (2) the study was conducted under anomalous environmental conditions or that environmental conditions have changed in a material way. As specified in §5.15(e), new study requests must also show good cause and a statement explaining: (1) any material changes in the law or regulations applicable to the information request, (2) why the goals and objectives of any approved study could not be met with the approved study methodology, (3) why the request was not made earlier, (4) significant changes in the project proposal or that significant new information material to the study objectives has become available, and (5) why the new study request satisfies the study criteria in §5.9(b).

Study Plan Determination

The following study plan amendments only apply to the existing studies that require modification or where the need for a new study is justified. The bases for not adopting specific requests for additional study modifications or new studies are included in Appendix A.

Conowingo 3.19: Freshwater Mussel Characterization Study below Conowingo dam

Exelon's Initial Study Report for Conowingo study 3.19 indicates that the completed study did not provide adequate sampling coverage within the entire study area. Exelon states in its May 27, 2011 response to Initial Study Report comments that it will provide an updated study report with an analysis of data obtained from Maryland DNR (e.g., Ashton and Devers, unpublished data), along with additional information from Conowingo studies 3.15 and 3.16, and numerous edits described in Appendix C of its response. If, however, these data do not adequately cover the unsampled reaches described in Appendix A of this letter or if the data are provided in a format that does not allow for meaningful comparison with Exelon's study, then additional sampling will be required in the next feasible sampling season. The additional sampling would include: (1) additional semi-quantitative samples at both wading and diving stations, to occur in the areas described in Appendix A; (2) additional quantitative samples at randomly selected areas representing no, low, moderate, and high mussel catch per unit effort (CPUE); and (3) consultation with Maryland DNR, the FWS, and the Commission for input on site selection, the number of samples required, and the appropriate time of season for data collection.

Additional Information

Appendix A includes additional information requested by staff which addresses studies considered complete as of Exelon's February 21, 2011 Initial Study Report. These information needs are based on staff's review of the Initial Study Report, the Initial Study Report meeting and summary, and written comments on the Initial Study Report.

If you have any questions, please contact Emily Carter at (202) 502-6512.

Sincerely,

Jeff C. Wright
Director
Office of Energy Projects

Enclosures: Appendix A, Study Request Issues

cc: Mailing List
Public File

APPENDIX A – STUDY REQUEST ISSUES
Staff's Findings/Response to Comments on the Study Plan

Below we discuss comments and recommendations on the revised study plan made at the Initial Study Report meeting and written comments filed by the Commission, Maryland Department of Natural Resources (Maryland DNR), the Pennsylvania Fish & Boat Commission, the Susquehanna River Basin Commission (SRBC), the Pennsylvania Department of Environmental Protection (Pennsylvania DEP), American Rivers, Coastal Conservation Association, the Lower Susquehanna Riverkeeper, U.S. Fish and Wildlife Service (FWS), the Nature Conservancy, the Mason-Dixon Trail System, Inc., and the Susquehanna Gateway Heritage Area.

Conowingo 3.3: Biological and Engineering Studies of American Eel at the Conowingo Project (as modified)

The Director's February 4, 2010 Study Plan Determination required Exelon to conduct biological and engineering studies related to American eel. The objectives of this study are to: (1) summarize available scientific and commercial information regarding the American eel, (2) identify suspected factors affecting American eel abundance, (3) describe the spatial distribution and size characteristics of American eels in the Conowingo tailrace, (4) examine the engineering feasibility and costs of upstream and downstream passage options, including consideration of potential fallback of eels after exiting an upstream passage device, (5) examine the potential impact of upstream and downstream passage of American eels on the Susquehanna River, (6) assess the cumulative impacts to the biodiversity of the Susquehanna River ecosystem of upstream and downstream passage of American eel, and (7) if deemed beneficial to American eel abundance, identify potential locations for an upstream eel passage facility at Conowingo dam.

Exelon states that this report is an interim draft that covers study objective 3, and that a complete report will be prepared and issued at a later date to address the remaining study objectives 1, 2, and 4 through 7.

Maryland DNR, Pennsylvania Fish & Boat Commission, and the Lower Susquehanna Riverkeeper comment that the FWS collection effort in the tailrace yielded about 24,000 elvers, compared to the 258 elvers captured by Exelon in the spillway area, and suggest that Exelon would have captured more elvers had it started more than two weeks earlier, when the FWS did. Exelon responds that the study was performed according to the approved study plan, which states that sampling would start once spillage had stopped. Exelon further states that because of the low numbers of elvers collected, it increased sampling frequency from weekly to three times per week. Inasmuch as sampling in the spillway area cannot be safely accomplished until spillage stops, and based on the language in the approved study plan, we find that the study was conducted in accordance with the plan, and appreciate Exelon's additional sampling efforts to increase the number of elvers collected.

Based on our review of the Initial Study Report, and Exelon's proposal to continue the study in 2011, we do not recommend any modifications or additional studies on American eel at this time.

Conowingo 3.5: Upstream Fish Passage Effectiveness Study

The Director's February 4, 2010 Study Plan Determination requires Exelon to conduct an upstream fish passage effectiveness study. The objectives of the study are: (1) to determine the fish passage efficiency of the Conowingo East Fish Lift; and (2) to identify factors, if any, that may influence efficiency on a daily or seasonal basis. The Study Plan Determination also clarified that additional fieldwork may be required in 2011.

A radio telemetry study was conducted in the spring of 2010 to evaluate upstream passage effectiveness of migratory adult American shad at the East Fish Lift. Fish used for the study were collected by either angling in the Conowingo tailrace or trapping in the Conowingo West Fish Lift. A total of 151 radio tagged shad were released for the study: 102 were released in the Conowingo Tailrace and 49 were transported 5 miles downstream to Lapidum, Maryland and released. Three metrics were calculated: fishway attraction effectiveness, upstream fish passage efficiency, and upstream fish passage effectiveness.

The Pennsylvania Fish & Boat Commission, Maryland DNR, and American Rivers comment that Exelon changed the definition of the tailrace from "the area from the dam to the lower end of Rowland Island" (Revised Study Plan) to "the area from the dam to the upper tip of Rowland Island" (Initial Study Report). The Pennsylvania Fish & Boat Commission states that this change made the upstream passage efficiency 33 percent, as opposed to the 44 percent reported in the Initial Study Report. Exelon responds that, after accounting for other ramifications of changing the tailrace definition, upstream fish passage effectiveness were similar (44.9 percent versus 44.4 percent). Nonetheless, Exelon agrees to use the original definition when it files the updated study report in January 2012.

Exelon proposed an American shad radio telemetry field study for 2011 to test the effectiveness of agency-recommended changes to project operation to improve adult shad passage through the East Fish Lift and to gather additional information on shad movement and behavior at the project. This study has been postponed to 2012, due to prolonged excessive river flows. Based on our review of the Initial Study Report, comments on the Initial Study Report, and the updated shad radio telemetry study plan, we do not recommend any modifications or additional studies, other than those already contemplated, on upstream fish passage effectiveness at this time.

Conowingo 3.6: Conowingo East Fish Lift Attraction Flows

The Director's February 4, 2010 Study Plan Determination requires Exelon to conduct a Conowingo East Fish Lift attraction flow study. The objectives of this study are to: (1) review and analyze applicable data from 2000 through 2009 under the designation of historical data (if available), as it relates to Conowingo turbine and East Fish Lift operation data; (2) analyze and report turbine on/off times, duration of turbine operation, and water temperature, in conjunction with attraction flow velocity data and hourly fish passage data (American and gizzard shad) for 2010; and (3) analyze and report 2010 Conowingo station operation and fish passage data in conjunction with the passage of radio-telemetered American shad from Conowingo 3.5: *Upstream Fish Passage Effectiveness Study*.

Exelon did not identify any operational variables that would consistently provide the best fish passage conditions or guarantee higher rates of successful upstream passage. Exelon states that, based on the analyses of the 2010 data, it appears that the attempts to improve the upstream passage of American shad should focus on the East Fish Lift rather than instituting specific flow regimes or operational schemes that may affect tailrace conditions near and outside of the East Fish Lift. Exelon states that addressing the issue of American shad that enter the East Fish Lift but fail to pass upstream may yield far better passage results and is not dependant upon natural conditions (e.g., river flows or water temperatures) that are beyond the project's control.

Maryland DNR, Pennsylvania Fish & Boat Commission, and FWS comments on this study focused on the appropriateness of the statistical analysis of the data. In addition to the suitability of the statistical tests, commenters identified a number of variables that they assert could influence fish passage (e.g., day, year, day of year, and hour of day, to name several). Exelon proposes a meeting with agency staff to discuss acceptable statistical methods and to identify variables of importance and to incorporate a portrayal of the relationships among fish passage, station operation, and environmental conditions into the January 2012 updated study report.

Based upon our review of the study, comments thereon, and Exelon's commitment to revisit the statistical analyses in the January 2012 updated study report, we do not recommend any study modifications or additional studies at this time.

Conowingo 3.7: Fish Passage Impediments Study below Conowingo Dam

The Director's February 4, 2010 Study Plan Determination requires Exelon to conduct a fish passage impediments study below Conowingo Dam. Study objectives are to: (1) determine whether project operations adversely impact upstream migrations of American shad, river herring (blueback herring and alewife), and hickory shad; and (2) utilize the River2D model (see Conowingo 3.16: *Instream Flow Habitat Assessment*) to ascertain if areas in the tailrace and other portions of the river below Conowingo dam could present adverse velocity barriers under typical operating regimes.

Exelon used the data provided by the 2010 shad telemetry study to determine passage routes and related information used by shad to access the Conowingo tailrace. Exelon also used acoustic Doppler velocity sensors to characterize flow velocity below the dam. Exelon concluded that there were no extreme water velocity barriers, and that the percentage of tagged fish reaching the fish lift supports this conclusion.

Maryland DNR and the Pennsylvania Fish & Boat Commission comment that at some high plant flow discharges, water velocities were in excess of the swimming capabilities of shad and river herring. Exelon agrees that the highest discharges were near or exceed the limit of swimming ability, particularly for river herring. Exelon suggests that there are several strategies that the fish can use (e.g., seeking areas of lower velocities to reach the dam), and the numbers of shad and river herring reaching the fish lift shows that there are no substantial barriers downstream of the dam.

We reviewed the study report and comments thereon. While there may be some disagreement as to whether or not there are significant velocity barriers at high discharges, the study was conducted in a manner consistent with the approved study plan and we do not recommend any modifications or additional studies on fish passage impediments at this time. We note that the additional telemetry studies, which are now planned for 2012, will provide additional information and expect that any pertinent information obtained concerning barriers will be provided in the January 2012 updated study report.

Conowingo 3.8: Downstream Flow Ramping and Fish Stranding Study

The Director's February 4, 2010 Study Plan Determination requires Exelon to conduct a flow ramping and fish stranding study. The objectives of this study are to: (1) evaluate specific locations/habitats below Conowingo dam where stranding potential exists, catalog the sites evaluated, and document the numbers, species affected, and their condition; (2) describe project operations during the survey periods and the effects on water levels both near-field (i.e., tailrace-spillway) and far-field (i.e., flow attenuation);

and (3) relate stranding to seasonal variability and other characteristics of impacted species and populations.

Exelon reports in the Initial Study Report that twelve stranding surveys were conducted. The four stranding surveys conducted during the summer of 2010 documented the most stranded fish (10,308) in the spillway study reach. Exelon reports that fewer than 1 percent of the observed stranded fish in the summer were dead; the remainder survived in the numerous small pools in that reach. In each season, non-migratory resident fish species, such as gizzard shad and common carp, formed 90 percent or more of the stranded fish. Anadromous fish (American shad and river herring) accounted for about 3 percent of the fishes observed to be stranded during the spring sampling, while the semi-anadromous white perch constituted about 7 percent.

The FWS and Maryland DNR comments include concerns on the adequacy of the site visits, the failure to adjust estimates for predation by birds, and the failure of the applicant to quantify the total seasonal impacts of peaking and minimum flows on fish populations. Exelon responds that the study was conducted in accordance with the approved study plan.

The Pennsylvania Fish & Boat Commission and the Nature Conservancy recommend that Exelon perform a study to determine the potential for stranding of American shad and river herring due to rapid flow decreases at the project and identify any operational changes or structural modifications that could be made to allow a path of egress for fish that would otherwise be trapped in pools. Exelon responds that the stranding study conducted in 2010 was sufficient to determine the scope of project impacts on stranding. Exelon further states that the existing River2D hydraulic model would be a better tool to delineate the area and locations dewatered under various flow scenarios than the bathymetric, aerial, or photographic methods recommended by the Pennsylvania Fish & Boat Commission.

The Pennsylvania Fish and Boat Commission's requested study would be largely duplicative of the 2010 study, which documented the magnitude, and seasonal and species specific differences, of stranding at the project. Other components of the requested study (determining points of entry and exit to the spill pool and generation conditions under which shad enter, exit, and remain in the spillway) can be determined through analysis of the 2010 and 2012 radio telemetry data. The identification of potential operational and/or structural modifications also can be accomplished using existing information. Consequently we conclude that the requested study does not meet study criteria 4 [section 5.9(b)(4)] of the Commission's regulations; there is adequate existing information and the asserted need for additional field study is not convincing.

Based on our review of the Initial Study Report and comments on the Initial Study Report, we agree that the stranding study conducted during 2010 was performed in accordance with the approved study plan and the information provided is suitable for the Commission's environmental analysis. At this time, we recommend no modifications or additional studies.

Conowingo 3.10: Maryland Darter Surveys

The purpose of this study is to determine whether the federally endangered Maryland darter is present in the Susquehanna River below Conowingo dam and/or the lower riffles of Deer Creek and Octoraro Creek. There is some debate as to whether the Maryland darter has been extirpated and should be delisted. Conversely, if Maryland darters are found, the recovery plan may be revisited and likely implemented.

No Maryland darters were collected in the study to date, however five of the six darter species that have been recorded in the lower Susquehanna River Basin were collected.

The FWS comments that because sampling was not conducted in some months, additional sampling should be conducted. Exelon responds that spring sampling is anticipated for May – June, summer sampling is planned for the period July – August, and additional fall sampling may occur in September 2011.

Although sampling was not conducted in some months, due to ice and high flows, by the time Exelon completes field sampling, all seasons will have been sampled. Based on our review, the study was conducted in accordance with the approved study plan and do not recommend any modifications or additional studies.

Conowingo 3.13: Study to Assess Tributary Access to Conowingo Pond

The purpose of this study is to: (1) identify potential blockages associated with project operations to fish and recreational boating access into Conowingo pond tributaries at the reservoir confluence under several commonly encountered water levels; (2) if access to fish is denied at water levels due to project operations, identify those fish species most affected, when it occurs, and at what water levels; and (3) develop potential mitigation options to enhance fish or recreational access if problems are encountered.

Maryland DNR comments that Goal #2 of the study (Access) is limited to only a general discussion of previous studies, which were focused on anadromous species, which means other species may not be fully considered. Maryland DNR also states that Goal #3 (Mitigation) was not addressed at all. The agency requests that Exelon determine if restricted boating access to backwater tributaries is due to permanent features (i.e., bedrock or riffles) or if channels and ramp approaches are restricted due to excessive sedimentation.

Exelon responds that Goal #2 of the study is addressed in sections 3.3 and 3.4 of the study report, with section 3.3 addressing non-anadromous fish access. In terms of Goal #3 (Mitigation), Exelon responds that a discussion of mitigation was not included because no problems were encountered and any impediments to recreational boating will be addressed in the Recreation Management Plan. We find that the study was conducted in accordance with the approved study plan and do not recommend any modifications.

In response to Maryland DNR's request for information on the reason for restricted boating access, Exelon responds that the shoaling observed at ramp approaches in Peter Creek, Conowingo Creek, and Muddy Creek is primarily due to excessive sedimentation and refers Maryland DNR to another study, *Conowingo 3.26: Recreational Inventory and Needs Assessment*, for further information. This response appears to address Maryland DNR's concerns and indicates that the requested information regarding the causes of restricted access to backwater tributaries is available.

Conowingo 3.14: Debris Management Study

In the study report, Exelon identifies debris management practices currently utilized at three upstream dam facilities, including the York Haven Hydroelectric Project (FERC No. 1888), the Safe Harbor Hydroelectric Project (FERC No. 1025), and the Holtwood Hydroelectric Project (FERC No. 1881). Exelon also identifies debris management at two FERC-licensed projects in Virginia (Claytor Lake Hydroelectric Project, FERC No. 739 and Smith Mountain Hydroelectric Project, FERC No. 2210) in order to determine if the current debris management practices at Conowingo are consistent with other facilities. Maryland DNR comments that Exelon only identifies various practices but does not evaluate whether or not these practices could improve debris management at the project. Exelon responds that it fulfilled the purpose of the study as outlined in the approved study plan, which required evaluation of such practices only if the current practices at Conowingo were found to be inconsistent with best management practices typically utilized in other hydroelectric facilities. We have reviewed the study report and conclude that it provides information in a manner consistent with the approved study plan and suitable for the Commission's environmental analysis; therefore, we do not recommend any modifications or additional studies on debris management at this time.

Conowingo 3.18: Characterization of Downstream Aquatic Communities

The Director's February 4, 2010 Study Plan Determination requires Exelon to conduct a literature-based study to provide a characterization of the current aquatic community below Conowingo dam. The objectives of this study are to utilize existing data to: (1) characterize resident fish abundance, size structure, condition, and reproductive success below Conowingo dam, (2) describe the benthic macroinvertebrate communities below Conowingo dam collected by various common collection gears, and (3) provide updated information on these communities available through some of the other relicensing studies being conducted.

Maryland DNR and the Pennsylvania Fish & Boat Commission comment that the studies reviewed were too old to reliably characterize the existing downstream aquatic communities, particularly since some of the studies were conducted prior to the implementation of the existing minimum flow regime. They also express concerns with some of the benthic macroinvertebrate results, particularly with respect to some of the metrics used to assess community health. The Pennsylvania Fish & Boat Commission also comments that a reference reach located above the Susquehanna River dams should be sampled.

Maryland DNR requests that this study be modified to include additional sampling of fish and macroinvertebrates during 2011, stating that the historical data is over 20 years old and does not accurately depict the current status of fish and macroinvertebrate populations below the dam. In respect to additional fish sampling, other relicensing studies and ongoing monitoring (e.g., the stranding study and fish lift operation) have provided information on the existing fish community. With respect to macroinvertebrates, it is unclear how more current data would be used to develop license conditions.

Our review of the Initial Study Report indicates that this study was conducted in accordance with the approved study plan. While some of the studies may have been conducted before implementation of the existing minimum flow regime, they document the condition of the benthic community at the time sampling was conducted, and may be considered as conservative estimates of existing conditions, assuming the implementation of the minimum flow regime has, in fact, improved the macroinvertebrate community. With respect to the benthic macroinvertebrate metrics, caution is needed when interpreting data among studies, given that in many cases, organisms are identified to varying taxonomic levels. With respect to sampling an upstream reference reach, the Director's February 4, 2010 Study Plan Determination does not require upstream reference sites. Based on our review of the Initial Study Report and Initial Study Report comments, we do not recommend any modifications or additional studies at this time.

Conowingo 3.19: Freshwater Mussel Characterization Study below Conowingo dam

The Director's February 4, 2010 Study Plan Determination requires Exelon to conduct a literature-based study to provide a characterization of freshwater mussel communities below Conowingo dam. The objectives of this study are to: 1) characterize the freshwater mussel community below Conowingo dam, and 2) determine if plant operations at Conowingo dam affect the mussel community in this reach.

Maryland DNR, the FWS, Pennsylvania Fish & Boat Commission, American Rivers, and the Commission filed comments on the Initial Study Report related this study. After reviewing these comments, we identified five common elements under dispute, which we discuss in detail below. We also address Maryland DNR's request for modification of the approved study under §5.15(d).

Variance from the approved study plan

In our comments on the Initial Study Report, we requested additional information regarding the location of voucher specimens. In its response to Initial Study Report comments, Exelon indicates that voucher specimens will be permanently deposited at the Delaware Museum of Natural History. While this meets the requirements of the approved study plan, the catalog numbers for voucher specimens should be included in the January 2012 updated study report if available at the time of filing, or in a later filing if not. This level of detail is helpful to inform future freshwater mussel studies in this vicinity and is a common practice when citing voucher specimens.

Maryland DNR states that the investigators only partially completed the first study purpose (i.e., to characterize the freshwater mussel community in the Susquehanna River below Conowingo dam) and did not complete the second study purpose (i.e., determine if plant operations at Conowingo dam affect the mussel community in this river reach). Maryland DNR's dispute with the first study purpose relates to Exelon's study methodology and sampling effort, and its dispute with the second study purpose relates to Exelon's conclusions; these elements are discussed in detail below.

Exelon states in its May 27, 2011 response to Initial Study Report comments that it will provide an updated study report with an analysis of data obtained from Maryland DNR (e.g., Ashton and Devers, unpublished data), along with additional information from Conowingo studies 3.15 and 3.16, and numerous edits described in Appendix C of its response. Therefore, we conclude that it is premature to assess Exelon's completion of the above study purposes until we have reviewed the updated study report. However, as discussed below, we recommend that Exelon review the additional data to be analyzed in the January 2012 updated study report to insure they provide adequate coverage of the designated study area. If not, we recommend further semi-quantitative and quantitative sampling be conducted in unsampled reaches, as described below.

Researcher Experience

Maryland DNR expressed serious concerns on the experience of investigators conducting the freshwater mussel study, including: (1) concern over the principal investigator's prior experience in conducting a complicated study using the recommended methods, (2) the experience level of the dive crew in identifying mussel species likely to occur in the study area, and (3) potential bias resulting from misidentification of specimens. Exelon responded by providing resumes for the principal investigator and other researchers involved in the sampling and identification of freshwater mussel species for this study.

Our review concludes that the experience level of the investigators appears sufficient to conduct this study, and the report indicates that investigators consulted with resource agencies on mussel identification and methodology. We note that the investigators obtained a Maryland DNR scientific collection permit to conduct the study. Further, Maryland DNR, in its request for modification of the approved study, did not state that another research team should be selected to conduct additional sampling. We also conclude that any concerns over misidentification should be addressed, in part, by the inclusion of diagnostic photographs in the January 2012 updated study report and the deposit of voucher specimens collected during the survey efforts.

Methodology

Maryland DNR states that Exelon's methods for the semi-quantitative and quantitative surveys were flawed in terms of effort (number of person hours), sample size, and sampling technique, and request a two-phase with double sampling study design.[2] The FWS states that Exelon's semi-quantitative surveys appear to use informal sampling methods,[3] and offer double sampling for stratification with plots selected at random from a grid or transects laid over the entire study area as a more appropriate method. Both Maryland DNR and the FWS comment that the use of multiple search patterns does not conform to standardized sampling practices. Exelon responds that the analysis to be presented in the January 2012 updated study report will be adequate to meet the stated study purposes, and that it is unclear how additional data collected would be used to achieve the study purposes.

There are various approaches and methods used to characterize freshwater mussel communities. We reviewed various methodologies employed for freshwater mussel

---

[2] Following Smith et al. (2001) and Villella and Smith (2005). See Maryland DNR's Initial Study Report comments filed on April 27, 2011, for full citations.

[3] As described in Smith and Strayer (2003).

studies in peer-reviewed literature, ongoing freshwater mussel monitoring projects, and licensing proceedings where freshwater mussel studies have been conducted. The concerns expressed by the resource agencies over the selected study design and variation in adherence to it (e.g., use of multiple search patterns, reliance on informal sampling) are duly noted. A main purpose of this study, however, was to characterize freshwater mussel communities within the study area and inherent in the approved study plan was that the study would be conducted within a single season. While the comparative power of a single-year study increases when it employs a rigorous and repeatable methodology used in comparable efforts, variation in sampling effort and methodology is not unusual among studies conducted by different investigators, and does not preclude meaningful comparison. Lastly, altering the 2010 sampling methodology would create an issue with pooling data collected under two different sampling designs.

The methodology employed within the current study is consistent with the methods approved in the Director's February 4, 2010 Study Plan Determination, and is suitable to meet the needs of the Commission's environmental analysis when considered in context with other recent studies in the study area. While the methodology employed in the current study varies from the rigorous sampling design preferred by the agencies, it does provide information consistent with other recent efforts. In its comments, Maryland DNR agrees that the species identified in the study report are similar to comparable and recent efforts,[4] although it states that the other studies (including its own recent efforts) are more representative of species richness, relative abundance, and overall population size and demographics. We agree with this assessment; however, as Exelon will include an analysis of additional data in the January 2012 updated study report, we expect that a reasonable and representative characterization of freshwater mussel communities downstream from Conowingo dam is possible. Exelon also should analyze additional and existing data for the January 2012 updated study report in a manner consistent with recommendations from Maryland DNR and the FWS.

Sampling

Semi-quantitative

Maryland DNR and FWS comment on the lack of clarity in semi-quantitative sampling site selection. Maryland DNR states that suitable habitat exists for freshwater mussels within the study area, including "patchy, ubiquitous" areas of fine substrate in areas interspersed within habitat dominated by cobble, boulder, and bedrock. The agency identified a lack of semi-quantitative sampling in lower portions of the study area, from

---

[4] Ashton 2009, Ashton 2010, Ashton and Devers unpublished data. See Maryland DNR's Initial Study Report comments filed on April 27, 2011, for full citations.

Robert Island downstream to Spencer Island and around mid-channel islands. Maryland DNR also identified an apparent bias toward sampling along the "descending left half of the channel." Maryland DNR states that 1.2 to 2.5 person-hours per sampling location would be needed to characterize freshwater mussel populations in unsampled areas. Based on figure 4.2-1: Mussel Study Stations (Sheets 1-3) in the Initial Study Report, we agree that there appear to be gaps in semi-quantitative sampling effort, specifically: (1) surrounding Rowland Island, (2) west of Bird Island, (3) between Bird and Mud islands, (4) surrounding Reuben Island and west of Sterret Island, (5) between Robert and Wood islands, and (6) east of Spencer Island.

Quantitative

Maryland DNR and FWS also comment on the lack of clarity in quantitative sampling site selection. Maryland DNR notes that only four (rather than five) independent quantitative survey areas were sampled: three occurred clustered around McGibney Island and none within the western channel. The Revised Study Plan stated that quantitative sampling would *"…be conducted in parts of the study area where concentrations of mussels are discovered (mussel beds) in Task 2 Semi-quantitative survey efforts…"* but did not specify how these sites would be selected.

We agree with the Maryland DNR and FWS assessments that the study did not provide semi-quantitative and quantitative sampling coverage within the entire study area. As discussed above, Exelon has stated that additional data will be analyzed in the January 2012 updated study report. We therefore recommend that Exelon assess the spatial extent of the additional data; if the additional data includes adequate sampling effort in the unsampled reaches (as described above) in Exelon's study, and has been supplied in a format that can be meaningfully compared with Exelon's study, then we do not recommend that additional sampling effort be required prior to the submission of the January 2012 updated study report. If, however, these data do not adequately cover the unsampled reaches described above, or if the data have been provided in a format that does not allow for meaningful comparison with Exelon's study, then we recommend that additional semi-quantitative and quantitative sampling effort be required in the next feasible sampling season, which would include: (1) additional semi-quantitative samples at both wading and diving stations, to occur in the areas described above; (2) additional quantitative samples at randomly selected areas representing no, low, moderate, and high mussel catch per unit effort (CPUE); and (3) consultation with Maryland DNR, the FWS, and the Commission for input on site selection, the number of samples required, and the appropriate time of season for data collection. If additional surveys are required, we acknowledge that legitimate safety concerns may preclude sampling activity and such instances should be detailed in the January 2012 updated study report.

Conclusions

During a March 25, 2011 teleconference regarding this study, it was generally agreed that conclusions did not merit further discussion until concerns about methodology and sampling areas had been addressed. Exelon states that its January 2012 updated study report would include analysis of additional data, and "…*that a substantive discussion of conclusions is not warranted until all of the pertinent information has been provided in the revised study report, and after all mussel-related analyses have been reviewed by the stakeholders*." We agree with this approach.

Maryland DNR's request for modification of the approved study under section 5.15(d)

Maryland DNR requests a modification of the approved study, which would include a 2011 sampling effort and analysis that: (1) is conducted within reaches unsampled in 2010, (2) uses a single sampling method and pattern, (3) is consistent with methods described in Smith et al. (2001) and Villella and Smith (2005), (4) uses a two-phase with double sampling design (semi-quantitative), (5) uses Smith's Mussel Estimation Program to determine appropriate sampling parameters (quantitative),[5] (6) uses 2010 data to guide surveys and pools both years of data into a single analysis, and (7) is "…*planned and conducted with substantial input and oversight by resource agencies….*"

Generally, Exelon's study approach is sufficient to meet the stated information needs as required under section 5.9(b)(7). We do not agree that a revised methodology, as requested by Maryland DNR, is warranted and do not recommend additional sampling if the January 2012 updated study report will include a reasonable assessment of additional data that cover the unsampled reaches described above. As discussed above, the most significant gap in Exelon's study is the spatial extent of sampling effort and recommend that Exelon evaluate whether the additional data will provide a reasonable assessment of freshwater mussel communities for the entire study area. If significant gaps in the sampling area remain, then we recommend additional semi-quantitative and quantitative sampling be required, as described above.

Conowingo 3.21: Impact of Plant Operations on Migratory Fish Reproduction

The Director's February 4, 2010 Study Plan Determination requires Exelon to conduct a study to examine the impact of project operation on reproduction of the target anadromous fishes: American shad, hickory shad, river herring (blueback herring and alewife), striped bass, and white perch above and below Conowingo dam by reviewing

---

[5] http://www.lsc.usgs.gov/aeb/2068/

existing information. This study complements: (1) an instream flow habitat assessment study (study 3.16), (2) a fish passage impediment study (study 3.7), and (3) existing fish early life stage data for the lower Susquehanna River reviewed in the characterization of downstream aquatic communities study (Conowingo 3.18: *Characterization of Downstream Aquatic Species*). The Director's February 4, 2010 Study Plan Determination also required Exelon to conduct ichthyoplankton surveys during 2011, at locations identified following review of shad telemetry study results (study 3.5).

Maryland DNR and the Pennsylvania Fish & Boat Commission comment that Exelon needs to examine the relationship between fluctuating river flows and ichthyoplankton density. Exelon responds that the ichthyoplankton study contemplated for 2011 (now 2012, due to high river flows) will address this concern.

Maryland DNR comments that no analyses are presented to determine whether project operations impact migratory fish spawning upstream and downstream of the dam. Exelon responds that the requested analysis will be included in the study report for Conowingo 3.16: *Instream Flow Habitat Assessment below Conowingo dam*, which was filed with the Commission on April 29, 2011.

The Pennsylvania Fish & Boat Commission comments that Exelon needs to consider station generation data and relate it to the ichthyoplankton sampling results. Exelon responds that the ichthyoplankton study contemplated for 2011 (now 2012) will provide this analysis.

Exelon's responses appear to address Maryland DNR and the Pennsylvania Fish & Boat Commission's concerns. The study was conducted in general accordance with the approved study plan and the ichthyoplankton sampling to be conducted in 2012 will provide the updated ichthyoplankton information required by the Director's Study Plan Determination. As such, we do not recommend any modifications or additions to this study.

Conowingo 3.22: Shortnose and Atlantic Sturgeon Life History Studies (as modified)

Exelon conducted studies regarding shortnose and Atlantic sturgeon in the Susquehanna River during 2010. Life history studies were conducted by: reviewing regionally pertinent information for sturgeon in the context of historical and contemporary presence and habitat requirements, reviewing East Coast fish passage facilities known to pass sturgeons in comparison with the Conowingo east fish lift, conducting an analysis of suitable habitat below Conowingo dam, assessing sturgeon stranding below Conowingo dam, and monitoring the Susquehanna River with field deployed, data-logging sonic telemetry receivers to determine the presence of tagged fish from other systems.

Exelon reports that two shortnose sturgeon were recorded from angler catches in the Conowingo dam tailrace in 1986 and that no collections of shortnose sturgeon have been reported in the river since 2004. Additionally, Exelon states there are no confirmed reports of Atlantic sturgeon from the Susquehanna River. Exelon's field sampling efforts at the project, including the stranding survey and fish lift operation, did not identify any shortnose or Atlantic sturgeon.

Maryland DNR requests an analysis of habitat types below the dam with respect to suitability of habitat for sturgeon. Exelon responds that this information is a component of Conowingo 3.16: *Instream Flow Habitat Assessment below Conowingo Dam*. Exelon also states, however, that it will conduct informal consultation with the National Marine Fisheries Service (NMFS) to determine whether any additional studies are needed for 2011.

We find that the study was conducted in accordance with the study plan determination and do not recommend any modifications to the study plan. We also request that any additional information that may be developed on sturgeon as a result of informal consultation with NMFS be filed with the Commission.

Conowingo 3.26: Recreational Inventory and Needs Assessment

Susquehanna River Water Trail

The Susquehanna Gateway Heritage Area comments that the study report lacks reference to the Susquehanna River Water Trail. Exelon responds that the Susquehanna River Water Trail and all other designated water trails in the project area will be included in the January 2012 updated study report. Inclusion of this information in the updated study report should address the Gateway Heritage Area's concerns and we do not recommend any modifications to the study based on this comment.

Flawed Methodology

Maryland DNR, the Pennsylvania Fish & Boat Commission, and Park Service comment that the methodology for identifying recreational use and adequacy of existing facilities was considerably flawed because Exelon did not: (1) consider nearby facilities located outside the project boundary, (2) survey potential users or contact local and regional user groups, (3) collect zip code data on the survey forms, and (4) utilize the mailed survey approach. Exelon responds that its process to collect recreational use and capacity data for project facilities is a standard method. Exelon also states that it conducted a literature review to identify recreational organizations interested in the project and consultation with those organizations will be conducted in 2011. The results of this consultation will provide data on user opinions of existing facilities, access, opportunities, and the need for enhancements, improvements, and additional facilities, access, and opportunities at the project and will be included in the Recreation Management Plan. Additionally, Exelon agrees to include general information on other near-by, non-project, public recreation facilities within the Recreation Management Plan.

Exelon's intention to include information on nearby recreation areas in the Recreation Management Plan and consult with identified recreation groups throughout 2011 should address the concerns raised by the Maryland DNR, Pennsylvania Fish & Boat Commission, and Park Service. In regards to the collection of zip codes, while it can be beneficial for determining how far users are willing to travel, it is not necessary information for the relicensing of the project and to collect zip code data only in the second year of study would not provide beneficial results. Regarding the issue of mailed surveys, we note that while the information from surveys mailed to individuals not recreating at the project can provide some beneficial information, it is a costly approach that does not always warrant the cost due to typically low participation rates. Based on the study report, the Initial Study Report meeting summary, the Initial Study Report comments, and Exelon's intention to conduct consultation with recreational user groups, as required by the Director's February 4, 2010 Study Plan Determination letter, the study is being completed in a manner consistent with the approved study plan. As such, and pending the completion of the recreation user focus groups, we do not recommend any modifications to this study.

Requests for Additional Information

The Maryland DNR, Pennsylvania Fish & Boat Commission, and Park Service also request additional information on several topics, including: parking at Muddy Creek, Rock Run landing, the hours and operation of all recreation facilities, pond levels that restrict use of boat ramps, the identification of all formal and informal recreation sites, and any updates to the field site inventory. Exelon responds that this information will be provided in the January 2012 updated report and will further be addressed in the Recreation Management Plan. We agree that this information is necessary and request that Exelon ensure it is provided in both the January 2012 updated study report and the Recreation Management Plan. As Exelon agrees to provide this information, we do not recommend any study modifications based on these requests.

Mason-Dixon Trail

The Mason-Dixon Trail System and Park Service comment on the relocation of the Mason-Dixon Trail because of security concerns at the project, stating that the Mason-Dixon Trail System identified an alternate route but it was dismissed due to security concerns. Mason-Dixon Trail System states that Exelon's relocated trail route currently traverses unsafe roads and this poses a safety concern to trail users. Exelon states that it will consult with the Mason-Dixon Trail System regarding the potential relocation of the trail. We agree that this consultation is necessary and recommend that Exelon include the results of this consultation in the Recreation Management Plan.

Project Enhancements

The Pennsylvania Fish & Boat Commission comments that there is a need for additional parking and trails to provide access to the project. Maryland DNR also recommends measures for additional study; however, this request only includes a list of possible enhancement measures that could be addressed at the project. Exelon responds that it currently is conducting a recreation user preference survey and will use this information to develop the Recreation Management Plan, which will include any recommendations for project enhancements. As these requests address enhancement measures, they do not require a modification to the study plan and we do not recommend any modifications to the study based on these recommendations. We note, however, that Exelon should ensure that these specific enhancements identified by the commenters are addressed when it completes its recreation user preference study and compiles information for the Recreation Management Plan.

Conowingo 3.27: Shoreline Management

The purpose of this study is to: (1) conduct an inventory of Exelon real estate assets in the vicinity of the project and identify and classify current uses, (2) identify issues and constraints that affect land management and land use, (3) review/revise current corporate land use guidelines and policies, and (4) identify lands potentially needed (or not needed) for current and potential future project purposes. The Park Service comments that the study only identified land uses within 500 feet of the project boundary, which is inadequate because it does not take visual and auditory impacts into account. The Park Service also comments that Exelon’s method of using the U.S. Forest Service’s 50-year growth projections to estimate future recreational needs and trends is too broad. Exelon responds that visual and auditory reviews would be conducted if it is determined during continued consultation that there is an impact to areas adjacent to the project.

The Park Service and Maryland DNR also comment that the study did not identify unique, sensitive, and/or critical fish and wildlife habitat on the project shoreline, as required in the Director’s February 4, 2010 Study Plan Determination letter. Exelon responds that information regarding sensitive resources is dependent upon data from other, ongoing studies which were not available in time to include in the Initial Study Report summary. Exelon states that this information will be included in the Shoreline Management Plan. Based on the Initial Study Report and comments on the Initial Study Report, the study was conducted in accordance with the approved study plan. Pending the addition of information on sensitive areas to be provided within the Shoreline Management Plan, we do not recommend any modifications to the study at this time.

Conowingo 3.29: Effect of Project Operation on Downstream Flooding

The study purpose is to: (1) use an hydraulic analysis to predict water surface elevations for a full-range of flood events at Port Deposit, Maryland; (2) document the flow conditions during which flooding of the Port Deposit area has occurred; (3) document the areas of inundation and flooding depths during these events; (4) identify the impact of the project on downstream water surface elevations; (5) determine the operational feasibility, effects on generation, and cost of implementing any procedures that might attenuate flooding conditions.

Use a Hydraulic Model to Estimate Water Surface Elevation for a Full-range of Flood Events at Port Deposit

In our comments on the Initial Study Report, we state that there was no explanation of the cross sections, model input parameters, or model calibration in the report and we request that Exelon provide figures for the 28 cross sections, a table for the HEC-RAS model parameters, and figures and/or tables relating to the model calibration. Maryland DNR recommends that additional modeling alternatives be evaluated, such as pool drawdown to the absolute minimum FERC elevation, in order to provide the maximum range of change that would be possible for the 3 management alternatives evaluated in the report.

Exelon responds that it will provide the requested cross sections, model parameters, and model calibration data in the January 2012 updated study report; however, Exelon questions the necessity of conducting an additional model run evaluating the maximum drawdown allowed by the current FERC license (101.2 feet National Geodetic Vertical Datum (NGVD) 1929). Exelon states that the Peach Bottom Atomic Power Station begins experiencing cooling problems when the elevation of Conowingo pond drops below elevation 104.2 feet NGVD 1929; therefore, Conowingo pond is never drawn down below this level.

Given this constraint, analyzing an alternative that entails a drawdown to the minimum FERC license elevation seems unnecessary. As such, and pending the information to be provided in the January 2012 updated study report, we do not recommend any modifications to this study.

Document the Areas of Inundation and Flooding Depths during these Events

Maryland DNR requests further details on the hydraulic model, specifically how HEC-RAS was calibrated and confirmed with measured flood levels and whether a steady or unsteady flow model was used. Maryland DNR specifically wants to know the range of uncertainty in flood levels expected for each of the event return intervals.

Exelon responds that further details on the hydraulic model calibration will be provided in accordance with FERC and Maryland DNR comments. To provide an estimate of model uncertainty, comparisons between modeled stages and USGS gage rating curve elevations will be provided in the January 2012 updated study report. Based on our review of the study report and comments on the Initial Study Report, we do not recommend any modifications to the study at this time.

Document the Flow Conditions during which Flooding of the Port Deposit Area has Occurred

Maryland DNR requests that Exelon elaborate for alternative 2 how and when the various stated pond levels were targeted within the model. Exelon responds that the pond elevations are targeted by opening or closing crest gates based on pond inflows. Since all non-regulator gates are identical, this is done by calculating crest gate capacity based on pond elevation (e.g. 10,000 cfs at a given elevation) and determining how many gates need to be open to pass the current inflow. Exelon also states that the intent of alternative 2 is to see if simply maintaining the pond at lower levels throughout a storm event would reduce peak outflows by reducing pond elevation at peak flows. Thus, the targeted pond level is held constant throughout the entire model run. The results indicate this does not work as well as intended because targeting a specific elevation simply leads to more gates opening and passing the same amount of flow. Based on the Initial Study Report and Initial Study Report comments, Exelon's response addresses Maryland DNR's request and we do not recommend any modifications to the study.

As required by the Revised Study Plan, Exelon studied three alternative operation scenarios using the HEC-RAS model to study the project's potential to reduce downstream flooding. As indicated by the model runs, none of the alternatives investigated had a substantial impact on flooding magnitude or duration. In order to further address this issue, we recommend that Exelon show inflow - outflow hydrographs for alternatives 1, 2, and 3 and the no-dam scenario for the 10, 50, 100, and 500-year storm events or actual storm events to compare the attenuation of flood peaks. We also recommend that Exelon show a stage-storage curve, which defines the relationship between the depth of water and storage volume for Conowingo dam to calculate the volume of the Conowingo Pond. This information should be provided in the January 2012 updated study report.

Conowingo 3.30: Osprey Nesting Survey

Maryland DNR notes that "…*proposed survey methods were followed more closely in the upper Pennsylvania portion of the study area*…" and that "…*surveys in the lower part of the study area into Maryland were surveyed outside of prescribed survey period on 5 dates*…." Maryland DNR ultimately determined, however, that "…*the nest surveys likely adequately characterized osprey nesting in the vicinity of Conowingo Dam*…," although it is unsure if Exelon planned a second season of nesting surveys. In response, Exelon states that it is conducting a second field survey in 2011, the results of which will be issued along with the 2010 results in the January 2012 updated study report. Based on our review of the study report and comments provided during the Initial Study Report meeting, and pending the 2011 results to be provided in the January 2012 updated study report, we do not recommend any modifications to the existing study regarding nesting osprey.

Conowingo 3.31: Black-crowned Night-Heron Nesting Survey

In comments on Exelon's study report, Maryland DNR noted that "…*more attention should be paid to potential nesting in the lower portion of the study area that includes Maryland*." In response, Exelon stated that it is conducting a second field season in 2011, the results of which will be issued along with the 2010 results in the January 2012 updated study report. Exelon also states that "…*more effort will be given to indentifying* [sic] *potential nesting locations in the lower portion of the study area*." Based on our review of the study report and comments provided during the Initial Study Report meeting, and pending the 2011 results to be provided in the January 2012 updated study report, we do not recommend any modifications to the existing study regarding nesting black-crowned night-herons.

Conowingo 3.32: Re-evaluate the Closing of the Catwalk to Recreational Fishing

The Director's February 4, 2010 Study Plan Determination required Exelon to complete a feasibility analysis to evaluate re-opening the Conowingo Project catwalk for recreational fishing. As noted by FERC, Maryland DNR, and the Lower Susquehanna Riverkeeper, as well as multiple stakeholders at the Initial Study Report meeting, the study completed by Exelon only addressed security at the catwalk, but did not address the actual feasibility of reopening the catwalk. Exelon responds that it will conduct a feasibility assessment to analyze the reopening of the catwalk. Exelon also explains that the recreation needs assessment study (Conowingo 3.26: *Recreational Inventory and Needs Assessment)*, will also factor into this assessment because it will, among other things (1) describe recreation facilities associated with the Conowingo Project and (2) ascertain whether fishing access at the project is adequate to meet demand.

As specified in the approved study plan, Exelon was required to specifically address the propriety of reopening the catwalk to the general public. Based on the Initial Study Report and comments on the Initial Study Report, Exelon only undertook an assessment of threat potentials to, and vulnerabilities of, the Conowingo Project, but did not address the actual feasibility of re-opening the catwalk to the general public. Exelon states that it will conduct this feasibility assessment and we agree that it needs to be completed, as required by the Director's Study Plan Determination. We also recommend that the catwalk re-opening feasibility assessment address, at a minimum: (1) the physical feasibility of re-opening the catwalk, (2) the security measures that would be required if the catwalk was opened to the public, (3) the costs associated with the different measures necessary to re-open the catwalk, (4) the results of the needs assessment study (Conowingo 3.26) at they relate to the Conowingo catwalk, and (5) the benefits obtained by re-opening the catwalk. This information should be provided in the January 2012 updated study report.

Based on our review of the study report and comments provided during the Initial Study Report meeting, and pending the results of the feasibility assessment to be provided in the January 2012 updated study report, we do not recommend any modifications to the existing study at this time.

Maryland DNR also requests that FERC require Exelon to file the vulnerability and threat assessment report with FERC so that it can be independently evaluated by authorized agencies. The vulnerability and threat assessment report is not required to be filed with the Commission, but a copy of the report is retained at the project site for Commission review; therefore, if Maryland DNR is interested in viewing the document, the agency should inquire directly with Exelon.

From:	fredp.smith@exeloncorp.com
To:	Andrea.Danucalov@exeloncorp.com; Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject:	FW: Peach Bottom Marina
Date:	Friday, July 01, 2011 8:01:02 AM

This was a comment I received during my Customer Appreciation Day, lease add it to the SMP comment cards.

From: Fred Slifer [mailto:fredslifer@gmail.com]
Sent: Monday, June 27, 2011 10:14 PM
To: Smith, Fred P.:(GenCo-Pwr)
Cc: stoudtpbm@fronteir.net; 'LEW STRETCH'; jack.thomas@comcast.net; jim.kush@verizon.net; 'marty pell'; 'Don Fatzinger'
Subject: Peach Bottom Marina

Dear Fred Smith:

It was a pleasure to meet and talk with you at the Peach Bottom Marina last Saturday, and especially to have an Exelon Representative who asked and actually seemed to listen to what the Peach Bottom locals had to say.

I understand that Exelon has engaged a Planning Consultant (TCR from Connecticut) to prepare proposals for recreation facilities on the Conowingo Pond, and I understand that there may actually be two plans under consideration for the Peach Bottom area.

As an Architect involved in planning and design for nearly 40 years, I find it very unusual that there has been no opportunity for input by community / users in advance of the planning process.
You noted there were to be three community meetings at various locations this week, but no one in the Peach Bottom area seems to have known of these meetings. Were they advertised somewhere in advance? Your office has email & mailing addresses for the Tenants around the Pond, but I know of no one who received any announcement. Unfortunately there is no way for me (& probably many others) to attend the meetings on such short, verbal notice.

Clearly this does not speak well of Exelon's planning process.

As I see the situation at the Peach Bottom Marina, the major issues are:
* The harbor and river just outside of the railroad bridge are so badly silted in that boats cannot access the marina at normal low or even medium water levels.
* The harbor has only limited turn around space and very limited dock space for overnight or summer storage.
* Numerous other, mostly minor, issues addressed in the petition I trust you will receive soon.

I understand the two plans being explored are :
A) Constructing a new recreation area & marina on the river side of the railroad.
B) Dredging and making improvements to the existing harbor and marina.

Regarding plan A, I offer the following:
* Space availability for parking and boat trailer access seems extremely limited.
* Encouraging vehicular traffic over the railroad seems dangerous.
* Protection from sudden, violent storms would require substantial construction extending into the river.
* Eliminating the need for boats to pass under the railroad bridge would be a benefit only to a few of the higher boats, and then only at times of abnormally high water.

Regarding plan B, I offer the following:

*   Dredging of the existing harbor to restore it to adequate depth for boat access during periods of very low water levels would stimulate more recreational activity and business for the marina.
*   Enlarging the marina to its former, 1960's size, would allow for more dock access & boat storage and therefore stimulate more recreational activity and business for the marina.
*   Concerns about what chemicals (if any) are in the silt materials needing to be dredged can be addressed when actual tests are performed. The fear of pcb's & other chemicals in the sediment may or may not be an issue. Considering the sediment is primarily runoff from farms and roadside drainage work, it would seem appropriate to deposit the dredged material back onto the farm(s). There is, in fact, a farmer who is faming Exelon property nearby and who claims he would greatly welcome more soil.

I would greatly appreciate your reading this into the record of each of your planned community meetings over the next few days, and would be most pleased to have the opportunity to explore these matters with your planning team.

Thank you,

Fred Slifer
707 Harston Lane,
Erdenheim, Pa 19038
Phone 215-840-8189
Peach Bottom Cottage 220713

I'.

Relicensing Comment Card

Date: 6/28/11

Name: ______ (Optional)

Address: ______ (Optional)

Tel. #/E-Mail Address: ______ (Optional)

Locations/Issues of Interest: Paper Mill Road at Muddy Creek Bridge (Name or Reference)

Comments or Questions:
This area is a problem* now on weekends. Don't even think about making it more of a problem by building recreational facilities here unless you provide 24-7 policing of the area.

*Parking
Trash
Alcohol Abuse
Etc.

Forward Letter or E-mail Comments to **Bud Newell by July 27, 2011**

TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

I'.

Relicensing Comment Card

Date: ______

Name: ______ (Optional)

Address: ______ (Optional)

Tel. #/E-M (Optional)

Locations (Name or Reference)

Comments or Questions:
Don't allow "public access" and "recreation" pressures to trump cottages when push comes to shove in the licensing process. If cottage use is not currently regulated as it should be, then deal with that but don't eliminate the cottages.

Forward Letter or E-mail Comments to **Bud Newell by July 27, 2011**

TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

E::lon.

Relicensing Comment Card LOWER CHANCEFORD TWP. Date: 6/28/11

Name: DAVID GLENN CHM. BOARD OF SUPERVISORS (Optional)

Address: 295 SLAB ROAD DELTA, PA 17314 (Optional)

Tel. #/E-Mail Address: (717) 862-3538 (Optional)

Locations/Issues of Interest: PAPER MILL BRIDGE AREA (Name or Reference)

PROPOSED(?) DEVELOPMENT (PARKING LOT + PAVILLION) ALONG MUDDY CREEK

Comments or Questions:

THE TOWNSHIP IS OPPOSED TO ENCOURAGING PUBLIC ACCESS TO THIS AREA. WE ARE CONCERNED THAT ANY DEVELOPMENT THERE WOULD INCREASE THE PROBLEMS WE ALREADY HAVE — CRIME DRUGS NOISE TRASH TRESPASSING ON ADJACENT PRIVATE PROPERTY

Forward Letter or E-mail Comments to **Bud Newell** by July 27, 2011

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

---

el .

Relicensing Comment Card Date: 6-28-1

Name: MICHELE ANDERSON (Optional)

Address: 180 GRANE RD RED LION, PA 17356 (Optional)

Tel. #/E-Mail Address: taffy3@mac.com (Optional)

Locations/Issues of Interest: CABIN OWNER (Name or Reference)

Comments or Questions:

NO ANSWER WHEN CALLING - ONLY VOICE MAIL. CONCERN - STILL DO NOT HAVE RETURNED CHECK FOR LAND LEASE RENT

Forward Letter or E-mail Comments to **Bud Newell** by July 27, 2011

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

Relicensing Comment Card

Date: ____________

Name: Sue Wiley (Optional)

Address: 5043 Delta RD Delta PA 17314 (Optional)

Tel. #/E-Mail Address: 717-456-7380 (Optional)

Locations/Issues of Interest: Papermill Rd Bridge (Name or Reference)

Comments or Questions:

see attachments

Forward Letter or E-mail Comments to **Bud Newell** by **July 27, 2011**

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

To the Management Staff of Exelon:

I am aware that Exelon is being pressured by the Mason Dixon Trail Association and others to put a parking lot/pavilion along Papermill Road. If this trail is so popular, then why during the winter months are there only 3-4 cars a month and some months none. But when the warm weather hits there are numerous cars, and trespassers. My husband has lived here all his life and I've been here for the past 32 years. There was never much of a problem until the Funkhouser Quarry was closed and trespassers were being fined. The Papermill Rd area is very isolated with no houses in the area with only State Police Coverage.

I ask Exelon, do you permit overnight camping, underage drinking, drug use and legal age drinking, etc. because this is what is happening. Approximately 5 years ago the State Police had a "Drug Sting". They informed my husband and me because they wanted us to be aware of what was happening. A girl was raped before the drug sting was set up.

I ask that this team, (Bob, Fred, Andrea, Colleen) and other Exelon employees/representatives associated with this project take a Friday night, Saturday and or Sunday and walk the path. The majority of the users are not Mason Dixon Trail people. You will find beer bottles, condoms, fireworks, drug paraphernalia, syringes, camp fires, trash, etc. I believe that if you take this walk, you will agree that this is not what Exelon is in favor of.

I have a letter from the State Police referring to some of the activity in the past 3 years. Due to reporting, it was unclear about the wear bouts along Papermill. I've been told that if you want to request further information, you would need to do request thru the "Right to Know Law".

I also have a letter from the Delta Cardiff Ambulance President, explaining the challenge of rescue in the area.

As an adjourning property owner it has been a challenge to maintain the beauty of the area. I ask; before you pursue this further, take the walk.

Sue and Todd Wiley

Sue Wiley

DELTA-   RDIFF
Volunteer Fire Co.

Serving Since 1898

June 28, 2011

Susan Wiley
5043 Delta Road
Delta, PA. 17314

Dear Sue,

As President of the Delta Cardiff Volunteer Fire Company I write this letter concerning medical events along the Muddy Creek access at Paper Mill Road. It is difficult to track medical events at this location because we do not use an exact address for these injuries.

The Delta Cardiff Volunteer Fire Company provides Fire, Rescue and Medical response to both areas of Lower Chanceford and Peach Bottom Township in this area. Over the past 10 years numerous medical and trauma events located along the trail have occurred. These events are at times challenging due to the terrain. This causes extended periods of extrication for the sick and injured. We have used the Maryland State Police helicopter rescue basket at least once for extrication of the sick and injured.

Sincerely,

Rick Farrington
President
Delta Cardiff VFC

Box 15, Delta, Pennsylvania 17314   717-456-7133   FAX 717-456-7958

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA STATE POLICE
Troop H, York
110 Trooper Court
York, Pa. 17403
(717) 428-1011

June 23, 2011

Mrs.Sue Wiley
5043 Delta Road
Delta, Pa. 17314

Dear Mrs. Wiley:

The Pennsylvania State Police, York Station investigated the following Incidents at the location you requested in the past three years:

Referred to Other Agency	2
Other-Debris on Roadway	3
Vehicle Towed	9
Theft from Motor Vehicle	2
Other-See Officer	1
Assault-Harassment	1
Liquor Law-Underage Consumption	1
Traffic Accident	1

Sincerely,

Lt. Barry E. Staub

Lieutenant Barry E. Staub
Station Commander
Troop H, York

2011-05-18 01:23:29 (40 days ago)
onewetdog (152744)
as far as i know parking is ok but please be respectful that it is
private property try to park all
cars at the take out to keep the number of cars down at put in
also a lot of local kids party back
there and leave a lot of trash so if you can pick up a coup e
pieces it is a beautiful river if we
keep it that way we should not have problems

Re: Muddy Creek near Paper Mill Rd (Close to Susquehanna) #

Moderator

Joined:
2006/9/9 19:16

From **Dallastown, PA**

Posts: **4233**

OFFLINE

I think you can still get two cars parked at the trailhead on Papermill within the Excelon property. The private property posted will have your car towed for upwards of $250 empoundment fees. It sucks. But I guess people still use the area. Its been a point of contention for a few years. I have fished it a few time and have seen trout and heard of some big ones caught but have personally only caught smallies there and some large chubs.

Its not so much a "rapids for kayaks" area as it is "wilder" than the rest. There is a falls that drops about 12-15" that is a landmark and above and below it is a bedrock derived series of "steps" with small falls typical of lower susquehanna larger creek systems. Still, there are fish and extremely clear water so be careful for yourhealth and stealthy in your approach.

We had a fellow TU memeber shatter an ankle there and it took him four hours to be found and another two to get air lifted out Its a very rugged area to fis alone. BE CAREFUL!

Posted on: 2009/7/20 0:58

2011-06-15 12:47:05 (11 days ago)

| is ok?

:ent

ile

h

ave been down there at least 5 times this year so far.
Camping over e weekend as well as fishing
and boating. have not been towed. I'm not saying anything
as stopped, just saying it hasn't
happened. Brad will run shuttle for you so you dont have to
leave a car at the put in. Go to starrk
Moon Kayaks and ask him on your way to the takeout

Exelon.

Relicensing Comment Card Date: ______

Name: George W. Johnson (Optional)

Address: 67 Buck heights Rd (Optional)

Tel. #/E-Mail Address: 717 244 2051 mo709@yahoo.com (Optional)

Locations/Issues of Interest: ______ (Name or Reference)

Comments or Questions:

Need Parking at Muddy Creek, Papermill Rd.

Forward Letter or E-mail Comments to **Bud Newell** by **July 27, 2011**

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card Date: 6/28/11

Name: (Optional)

Address: ______ (Optional)

Tel. #/E-Mail Address: (Optional)

Locations/Issues of Interest: LOCK 1 (Name or Reference)

Comments or Questions:

ROAD ACCESS * EROSION OF BANKS IN AREA OF LOCK #-15

Forward Letter or E-mail Comments to **Bud Newell** by **July 27, 2011**.

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

elon.

Relicensing Comment Card Date:

Name: (Optional)

Address: (Optional)

Tel. #/E-Mail Address: (Optional)

Locations/Issues of Interest: (Name or Reference)

Comments or Questions:

Open Area For Fishing around Pumped Storage Area

tter or E-mail Comments to **Bud Newell by July 27, 2011**

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

I n.

Relicensing Comment Card Date:

Name: (Optional)

Address: (Optional)

Tel. #/E-Mail Address: (Optional)

Locations/Issues of Interest: (Name or Reference)

Comments or Ques io s:

Lock 15 Road Way Busted Up + Needs Repair

Forward Letter or E-mail Comments to **Bud Newell by July 27, 2011**

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card Date: ______

Name: ______ (Optional)

Address: ______ (Optional)

Tel. #/E-Mail Address: ______ (Optional)

Locations/Issues of Interest: ______ (Name or Reference)

Comments or Questions:

Lock 15 Erosion

Forward Letter or E-mail Comments to **Bud Newell by July 27, 2011**
TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

---

n.

Relicensing Comment Card Date: June 28, 1

Name: MARY BOOMSMA Lancaster side (Optional)

Address: 144 Stubbs Mill Rd. Peach Bottom PA 17563 (Optional)

Tel. #/~~E-mail~~ Address: 717-548-2836 (Optional)

Locations/Issues of Interest: Historic - Old (1876) Rail Road Station of the Lancaster, Oxford and Southern Rd. on Peach Bottom Rd. (Fulton Township) (Name or Reference)

Comments or Questions:

This SPM meeting was very preliminary - I would like to hear more when you and FERC make more headway with the licensing. You also must protect the vultures nesting on the cliffs near Johnson Island. We all have our little agendas.

Forward Letter or E-mail Comments to **Bud Newell by July 27, 2011**
TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card Date: 6/28, 2011

Name: Kate Gonick, Lancaster County Conservancy (Optional)

Address: 1175 West End Ave LANC. PA 17603 (Optional)

Tel. #/E-Mail Address: kgonick@lancasterconservancy (Optional)

Locations/Issues of Interest: land and cultural resource preservation (Name or Reference)

Comments or Questions:
Please send me information on Section 106 process consulting party status, and please contact me regarding land protection

Forward Letter or E-mail Comments to **Bud Newell by July 27, 2011**
TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

---

elon.

Relicensing Comment Card Date: 6-28-11

Name: CHARLES J. TREES III (Optional)

Address: 57 CEDAR ACRES DR LANC (Optional) PA 17602

Tel. #/E-Mail Address: (Optional)

Locations/Issues of Interest: MUDDY RUN DRAW DOWN LAKE (Name or Reference)

Comments or Questions:
ARE WE EVER GOING TO BE ABLE TO FISH IN THE DRW DOWN LAKE

Forward Letter or E-mail Comments to **Bud Newell by July 27, 2011**.
TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

x ()

Relicensing Comment Card Date: 06/28/11

Name: Susquehanna Gateway Heritage Area (Optional)

Address: 1706 LONG LEVEL RD. WRIGHTSVILLE PA 17368 (Optional)

Tel. #/E-Mail Address: 717-252-0229 jpinkerton@susquehannaheritage.org (Optional)

Locations/Issues of Interest: SUSQUEHAN(N)A (Name or Reference)

W R

Comments or Questions:

THE SUSQUEHANNA RIVER WATER TR IL-LOWER SECTION (PE NSYLVANIA), A DESIGNATED NATIONAL RE REA ION TRAI , SHOULD BE INCORPORATED INTO THE STUDIES AND INVENTORIES FOR THE CONOWINGO/MUDDY RUN RE ICENSING PROJECT.

Forward Letter or E-mail Comments to **Bud Newell by July 27, 2011**

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card Date: 6/29/2011

Name: NORMAN P STINCHCOMB (Optional)

Address: 3605 ADY ROAD STRE T MD (Optional)

Tel. #/E-Mail Address: Bonnie Stinchcomb HotMail Dot Com (Optional)

Locations/Issues of Interest: Conowingo Dam (Name or Reference)

Comments or Questions:

Water flow what gates will be run if let us know what gate will be run.

Forward Letter or E-mail Comments to **Bud Newell** by July 27, 2011

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicen: rd 6 29-11

Name: William tes Sr.

Address: 3586 Day Rd Darlington Md 21034

Tel. #/E-N

Locations, adding # of Generator To Hotline between # 2 + # 5

Comments or Questions:

Forward Letter or E-mail Comments to **Bud Newell** by July 27, 2011

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card

Name: Peter Collins (Cabin Tenant 852 Cold Cabin) (Optional)

Date: /29

Address: 1745 Jumpers Ct Jarrettsville MD 21084 (Optional)

Tel. #/E-Mail Address: 410-382-2820 collinsp@zoominternet.net (Optional)

Locations/Issues of Interest: Cold Cabin Park (Name or Reference)

Comments or Questions:

Could use improvement to increase access and use. Swimmers vs. kayakers vs. boaters. Sometimes boat ramp is clogged. Increase open area by boat ramp for kayakers to put in/out. Create area in upstream end of path for swimmers. Improve parking. More picnic tables? Maybe another Eagle Scout project to improve).

Forward Letter or E-mail Comments to Bud Newell by July 27, 2011

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

Ex lon.

Relicens'ng Comment Card

Name: [redacted] Paul Magness Harford County Park & Rec (Optional)

Date: 6/29/2011

Address: 1809 Fallston Rd Fallston 21047 (Optional)

Tel. #/E-Mail A pmagness@harfordcountymd.gov (Optional)

Locations/Issues of Interest: (Name or Reference)

Please add me to stakeholder list

Comments or Questions:

Harford County Parks and Recreation is currently work on a County Land Preservation, Parks and Recreation Plan that will be complete in the first half of 2012

Forward Letter or E-mail Comments to Bud Newell by July 27, 2011

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card Date: 6/29/11

Name: Ben Cox - Harford County Dept. of P&R (Optional)

Address: (Optional)

Tel. #/E-Mail Address: bpcox@harfordcountymd.gov (Optional)

Locations/Issues of Interest: Will you be working with Harford + Cecil County Parks & Rec's? (Name or Reference)

Comments or Questions:

If yes to the above question; what are your plans?

Forward Letter or E-mail Comments to **Bud Newell by July 27, 2011**

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment C[ard] JERE Hess Date:

Name: (Optional)

Address: 2507 Shures landing Road (Optional)

Tel. #/E-Mail Address: 410-457-5277 Darlington, Md 21034

Locations/Issues of Interest: Catwalk on Dam (Na[me or Reference])

[Comm]ents or Questions:

Its over 10 yrs since you closed Catwalk Please Open

Put me on list, Please

Mailing list.

Anna Hart

Forward Letter or E-ma[i]l [C]ommen[ts] [to] **Bud Newell by July 27, 2011**

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

Comments from SMP meetings (some may have filed comment cards on same issues)

Muddy Run Visitors Center 6-28-11

DCNR – Is Exelon willing to discuss conservation easements and transfer of land?

Anonymous – Will MR generating reservoir be re-opened for fishing?

Lower Chanceford 6-28-11

Anonymous (2) – inappropriate/uncontrolled use occurring at Muddy Creek/Papermill Road site. Do not improve access/parking

M-D Trail – Muddy Creek trail used by others (kayaker, anglers). M-D Trail and other users pick up trash.

Port Deposit 6-29-11

Robert Hodge, County Commissioner – need development funds for expansion of park at Octoraro Creek – will Exelon assist?

Conowingo Visitors Center 6-29-11

Anonymous – can information be added to the flow phone indicating which units are generating?

Danielle Haslup, Cecil County Parks & Rec – same comment as Robert Hodge above

Anonymous – Peach Bottom Marina silting in – dredge or move marina to other side to railroad tracks

Anonymous – Will Exelon have to take back any cabins for any of their recreation plans?

From: Ray Dewar
To: Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject: RE: parking at Pappermill road bridge
Date: Tuesday, July 05, 2011 3:20:05 PM

Bud,

Thank you for your quick response.

Ray

From: anewell@trcsolutions.com
To: raydewar60@hotmail.com
Date: Tue, 5 Jul 2011 15:12:45 -0400
Subject: RE: parking at Pappermill road bridge

Ray,

This issue has not been resolved to date. Ownership of the land is in dispute and Exelon is attempting to clear this up with the other party.

We are aware of the issue at this site regarding parking and vehicles being towed in the past. Exelon hopes this will be resolved in the near future.

Bud Newell
Environmental Specialist
TRC
14 Gabriel Drive
Augusta, Maine 04330

From: Ray Dewar [mailto:raydewar60@hotmail.com]
Sent: Tuesday, July 05, 2011 3:06 PM
To: Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject: parking at Pappermill road bridge

Mr Newell,

Are you able to inform me if parking for Muddy creek canoers is allowed at roadside at the Pappermill road bridge?

Thank you,
Ray Dewar

July 12, 2011

Ms. Colleen Hicks
Exelon
300 Exelon Way
Kennett Square, PA 19348

Dear Ms. Hicks:

On behalf of the Cecil Bird Club, I am responding to your request for public comment on the relicensing of Conowingo Dam. We are pleased that Exelon has done so many environmental studies to show the impact of the dam on the Susquehanna River, especially the shoreline and waters south of the dam. You have ample evidence of the importance of this habitat on wildlife. For example, the reports Exelon commissioned document the success of the breeding Bald Eagle and heron populations near the dam.

You may not be aware that the dam is also an area where Bald Eagles congregate in the fall. In fact, this is the second largest concentration of Bald Eagles in the state of Maryland, with more than 150 eagles of various ages there in November-December. Birders come from all over the Mid-Atlantic region to view these eagles, and two local clubs, the Cecil Bird Club and the Delmarva Ornithological Society, regularly schedule well-attended field trips there every year. In addition, the dam is home to a pair of Peregrine Falcons, a species that is still recovering from pesticide use in the 1960s.

Birders also frequent the Shures Landing Wildflower Walk that leads from Fisherman's Park toward Susquehanna State Park. This site has breeding Prothonotary Warblers, and the shores of the river in the state park grounds are one of the few places locally where Cerulean Warblers are regularly seen during spring migration. An abundance of other songbirds may be seen downstream of the dam in all seasons, with

Maryanne Dolan
104 Milestone Road
Elkton, Maryland 21921
(410) 398-7567
Maryanne.dolan@gmail.com

waterfowl and gulls prominent during the winter. There is excellent birding on the Cecil County side as well, with Little Gulls, Bonaparte's Gulls, and Black-headed Gulls among the uncommon species that may be seen from Port Deposit.

We are fortunate to have such a fine birding site in our area, and we are grateful for the access provided by Exelon.

If you have any questions about recreational birding downstream of the dam, please call me at 410-398-7567. I invite you to attend our next Bald Eagle count on the Saturday after Thanksgiving. For more information about our field trips, please see our website: http://www.cecilbirds.org/calendar.html.

Sincerely,

Maryanne Dolan
President, Cecil Bird Club

Maryanne Dolan
104 Milestone Road
Elkton, Maryland 21921
(410) 398-7567
Maryanne.dolan@gmail.com

The Mason Dixon Trail System, Inc. has several comments about recreational access to the Exelon properties. I will comment North to South:

1. We would very much like to get the trail along the North Side of Muddy Creek and have parking access at Paper Mill road. We realize that the Wileys are contesting the ownership of the property at Paper Mill Road. We also are aware that the recent survey shows the property to belong to Exelon. This would eliminate several miles of road walking for hikers and the dangerous walk along route 74.

2. Along Muddy Creek the Kayakers could use a launch site at Paper Mill Road and a take out at the mouth of Muddy Creek. They currently have to go downriver to the lower end of Coal Cabin.

3. South of Peach Bottom to Broad Creek we are again walking on roads with increasing traffic. Any portion of that area that could be gotten into the woods would be a great recreational opportunity for the hikers. Michaels Run to Broad Creek looks on paper as though it is an area that could be very doable.

4. We are still trying to resolve a route across the property just below Conowingo Dam. This area again has the trail along Shures Landing Road which is a very unsafe road to walk along.

5. I would remind you that a meeting in August was suggested by Bud Newell so that we could take a serious look at our requests.

Ron Gray
Vice President, Mason Dixon Trail System, Inc.

From:	Andrea.Danucalov@exeloncorp.com
To:	Colleen.Hicks@exeloncorp.com; Newell, Arthur (Bud) E. (Augusta,ME-US); Campbell, William B. (Augusta,ME-US); fredp.smith@exeloncorp.com; tsullivan@gomezandsullivan.com
Subject:	FW: Shoreline Management
Date:	Thursday, July 21, 2011 8:47:41 AM

Please see email below about a request for information about the Shoreline Management Plan.

Please advise on a response.

From: Matt & Kerri Kneisley [mailto:dakota.phd@verizon.net]
Sent: Thursday, July 21, 2011 6:02 AM
To: Danucalov, Andrea H.:(GenCo-Pwr)
Subject: Fw: Shoreline Management

----- Original Message -----
From: Matt & Kerri Kneisley
To: andrea.danucaov@exeloncorp.com
Sent: Wednesday, July 20, 2011 9:43 PM
Subject: Shoreline Management

Hello my name is Matthew D. Kneisley and I would like more info on the shoreline mang. program. I have gone out on the river from Peachbottom inlet Since I was four years old and now I am fourty. I have spent alot of time hunting ducks and fishing in the river in that area. I want the chance to see what it is that your company is proposing.
Thank you
Matthew D. Kneisley

From:	Matt & Kerri Kneisley
To:	Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject:	Re: Shoreline access
Date:	Tuesday, July 26, 2011 6:05:52 PM

Bud,
Thank you for updating me with the info. It was nice to see someone still cares in a big compant to respond to a average person.
Thanks
Matthew Kneisley

----- Original Message -----
From: Newell, Arthur (Bud) E. (Augusta,ME-US)
To: Matt & Kerri Kneisley
Sent: Monday, July 25, 2011 9:31 AM
Subject: RE: Shoreline access

Hi Matt,

The meetings on June 28th and 29th were to meet with interested parties to discuss Shoreline Management Plans (SMP) for the Conowingo Project and Muddy Run Project. The SMP will provide guidance to Exelon for the management of Project lands for the term of a new Federal Energy Regulatory Commission (FERC) license for the projects. The meetings primary purpose was to update people on the process and plan and to receive public input into the SMP.

Over the course of the four meetings, we received comments from individuals on a number of non-SMP issues including recreation and public access. All comments were noted regardless of subject matter.

We are familiar with the recreation access to the Project and the Peach Bottom Marina. We are working on various recreation reports that will be filed with the FERC application sometime next year, but to date no decisions regarding changes at any of the recreation sites or facilities have been made.

Please let me know if you have any questions or need more information.

Bud

A.E. Newell III
Environmental Specialist

TRC Results you can rely on

14 Gabriel Drive, Augusta, Me. 04330
T: 207.620.3831 | F: 207.621.8226 | C: 207.592.3958

Follow us on LinkedIn or Twitter | www.trcsolutions.com

From: Matt & Kerri Kneisley [mailto:dakota.phd@verizon.net]
Sent: Thursday, July 21, 2011 11:19 PM
To: Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject: Shoreline access

Bud,
My name is Matthew Kneisley and I have spent Thirty six years of my fourty year life on the Susquehanna river with my family. Please send me info. from the June 28-29 2011 meeting about what you are going to plan for river access and the Peachbottom marina. I have gone out to the river under those tunnels since I was a little boy. I even dragged my boat threw the mud and outside the tunnels to go duck hunting and fishing many times just to spend time on the river. We need more public access to the lower part of the river and the marina could be dregged alittle to help us get out.
I would like to know what the Exelon Corp. has in store for the up coming years.
If you have any questions please call me or e-mail me.
(717) 666-4595 anytime.
Thanks Matt

From:	Erik
To:	Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject:	Re: River access
Date:	Monday, July 25, 2011 9:40:33 AM

Peachbottom marina

Sent from my iPhone

On Jul 25, 2011, at 6:33 AM, "Newell, Arthur (Bud) E. (Augusta,ME-US)" <anewell@trcsolutions.com> wrote:

Erik,

Do you have a specific site(s) or area you are concerned with?

Bud Newell

A.E. Newell III
Environmental Specialist

<image001.jpg> 14 Gabriel Drive, Augusta, Me. 04330

T: 207.620.3831 | F: 207.621.8226 | C: 207.592.3958

Follow us on LinkedIn or Twitter | www.trcsolutions.com

From: Erik Putt [mailto:esputt@gmail.com]
Sent: Friday, July 22, 2011 11:21 PM
To: Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject: River access

please do not take away our river access!

From:	Andrea.Danucalov@exeloncorp.com
To:	Campbell, William B. (Augusta,ME-US); Newell, Arthur (Bud) E. (Augusta,ME-US); Colleen.Hicks@exeloncorp.com; fredp.smith@exeloncorp.com; Robert.Judge2@exeloncorp.com; tsullivan@gomezandsullivan.com; lkhitrik@gomezandsullivan.com
Subject:	FW: River Acess
Date:	Wednesday, July 27, 2011 2:44:10 PM

Comments on SMP.

From: tsbenner92@gmail.com [mailto:tsbenner92@gmail.com]
Sent: Saturday, July 23, 2011 4:44 AM
To: Danucalov, Andrea H.:(GenCo-Pwr)
Subject: River Acess

To whom it may concern:

Please do not shut down the Peach Bottom marina. The susquehanna river is such an important part of life for many Lancaster Countians whether they are fisherman, hunters or recreational boaters. Local access is crucial to our way of life. I know how important public opinion is to Exelon and the entire nuclear world. I don't think this will sit well with the any of the community!!

Thankyou
Shawn Benner
Avid hunter, fisherman,
and recreations boater

From:	robeng@comcast.net
To:	Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject:	Re: gate at rock
Date:	Monday, July 25, 2011 11:31:15 AM

---

http://www.tidalfish.com/forums/showthread.php/305003-townsends-rock-run-landing-Port-Deposit?s=74699d848afebdb26c64ff611e2d80f6

From: "Arthur Newell (Bud) E. (Augusta,ME-US)" <anewell@trcsolutions.com>
To: robeng@comcast.net
Sent: Monday, July 25, 2011 10:17:55 AM
Subject: RE: gate at rock

Bob,

I am not aware of a gate being proposed at Rock Run and am forwarding your e-mail to someone at Exelon to respond to.

Bud

A.E. Newell III
Environmental Specialist

14 Gabriel Drive, Augusta, Me. 04330
T: 207.620.3831 | F: 207.621.8226 | C: 207.592.3958

Follow us on LinkedIn or Twitter | www.trcsolutions.com

From: robeng@comcast.net [mailto:robeng@comcast.net]
Sent: Monday, July 25, 2011 10:15 AM
To: Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject: gate at rock

Dear Mr. Newell I am writing this to convey my concern about the "Improvements" at rock run landing. I read an article saying a gate would be put up thereby denying us (fisherman) access to night time fishing. The best striper fishing occurs during low light conditions. i.e. just before dawn and during and after dusk. I feel a better idea would be to allow fisherman access till 2400 hrs as striper possesion is illegal between midnight and 0500.. I"m also going to call bob judge and discuss this with him. Any help in this matter would be greatly appreciated. Sincerely, bob engle.

P-405

ORIGINAL

FILED
SECRETARY OF THE COMMISSION
2011 JUL 25 A 10: 36
FEDERAL ENERGY REGULATORY COMMISSION

PEACH BOTTOM MARINA
1798 SLATE HILL ROAD
PEACH BOTTOM, PA 17563
PHONE # 717-548-2330
***Email** - stoudtpbm@frontiernet.net*

Federal Energy Regulatory Commission
888 First St, NE
Washington, DC 20426

To whom it may concern,

With Exelon's 2014 re-license coming due, we would like to petition for changes at the Peach Bottom marina area.

The following is a list of changes that the petitioners would like to see take place. Please feel free to call or come to the marina to discuss any request that has been submitted.

Attached is a signature list for the petition.

Requested Changes:
Dredge at the marina
Resurface and re-line parking lot
Replace walkway at boat house (cement is breaking apart)
Replace docks at the marina, add more docking if possible
Markings on the bridges and perhaps lighting (solar powered) for nighttime navigation
More permanent bathroom facilities(as stated in the original plans)
Paint stripes on ramp to designate two lanes
New picnic tables
Channel markers
Replace trash receptacles

Thank you for your time

Kerry & Donna Stoudt

Kerry & Donna Stoudt
Owner

NAME	ADDRESS (OPTIONAL)
BALLY BLOCH	P.O BOX 191 EMMAUS PA 18049
LAN STRETCH	631 ALLENTOWN RD - TELFORD, PA 18969
Barb Bitts	224 Spring Lane Peach Bottom, PA 17563
Jeff Bees	12 Orchard Lane Conestoga Pa. 17516
Fred Oxenreider	479A Peach Btm Rd Peach Bottom PA 17563
Nancy Oxenreider	↓ ↓
ED DAVIDSON	PO BOX 221 PEACH BOTTOM PA 17563
Lisa Harris	37 Roberts Rd Nottingham PA 19362
MARK HARRIS	27 ROBERTS RD NOTTINGHAM PA 19362
MARY E DAVIDSON	P.O. BOX 221 PEACH BOTTOM PA 17563
DAVID L. WHEATLEY	471 PEACH BOTTOM RD PEACH BOTTOM PA 17563
Linda Stretch	631 Allentown Rd., Telford, PA 18969
RANDY ROBERTS	912 ALLENTOWN RD, TYLERS PORT PA
DEAN MANNA	3121 SUMMIT AVE. BALT MD.
Nicholas Giammona	626 Prestwick Trail Bel Air MD 21014
DEBORAH PANNELL	459 PEACH BOTTOM RD PEACH BOTTOM PA
[illegible]	2216 Peach Bottom 17563
Brett Long	587 Oregon Road Holtwood PA 17532
Gene Spence	630 Timber Wood B. Newark, De. 19702
Dylan Spence	" "
TERRY ETZWEILER	310 MOUNTVILLE DR LEBANON PA 17042
[illegible]	310 Mountville Dr. Lebanon PA 17042
Christopher P. Brown	3 Barrow Ct. Towson, Md 21204
Bonnie C Brown	3 Barrow Ct, Towson, MD 21204
Kim Cole	1259 W Princess York PA 17404
Zachary Cole	1259 West Princess St York Pa 17404
Adrienne Bening	343 Parkside Dr Macungie PA 18062
Janee Jacoby	4561 E Texas Rd Allentown PA 18103
Martha Pelo	482 Peach Bottom PA
Michael A. Pell	419 Circle Drive Peach Bottom
Susan King	20 Park Rd Nottingham PA 19362
Jeff King	20 Park Rd Nottingham PA 19362
Dennis J. Haddock	1314 Nth 14th St. Rdg PA 19604
[illegible] Rafael Suarez	907 Tuckerton Rd Rdg PA 19605
Chris Abbott	1239 Perry St. Rdg PA 19604

Keith Loerch	4453 Delmar Dr Rdg. PA 19606
[illegible] R. Loerch	
Susan [illegible]	503 HARDING AVE Rdg PA 19607
DANNA SPENCE	907 TUCKERTON RD RDG, PA 19605
Nick Peltzer	864 PENNSY RD 17584
Jason Bloch	1277 Oak Drive Macungie, PA 18062
Todd McDonald	12-A St Andrews Cir Reading PA 19607
Christine Abbott	1239 Perry St Reading PA 19604
[illegible] Danielle Miller	286 Hess Rd Quarryville PA 17566
[illegible]	53 Blackburn road Quarryville PA 17566
Megan Peltzer	864 Pennsy Rd. Willow St. PA. 17584
[illegible]	213 Crozerville rd Aston PA 19014
[illegible]	2535 W Colonial Dr. Boothwyn PA [illegible]
[illegible] Peri	3665 market St Aston PA 19014
[illegible]	108 Autumn Dr, Lititz PA 17543
[illegible] Yoder	341 W Lemon St, Lancaster PA 17603
Lori Uhrig	1746 State St. E. Petersburg PA 17520
Tim King	155 [illegible] Road [illegible] PA
[illegible] BEERS	466 Scotland Rd Quarryville PA
Tyler Arkatin	622 Center Rd. Quarryville, PA
Tom Flynn	62 [illegible] Rd Voorhees, NJ 08043
Karen Flynn	12 [illegible] Rd Voorhees NJ 08043
[illegible]	143 East State St. 'Quille Pa.
[illegible]	466 Scotland Rd Quarryville PA
Keith Willis	140 Scotts LN OXFORD PA. 19363
Christine Turner	130 Scotts Ln Oxford, PA 19363
[illegible] Stea[illegible]	5630 Chestnut St. Old Zionsville PA
[illegible]	5630 Chestnut St Old Zionsville Pa.
Gary Kilbourne	116 GLENMANN DR. LANDENBERG, PA 19350
[illegible] Grumbein	1864 Riverview N. Drumore, PA 17518
Pat McCabe	660 Hawthorne Ln Mt Joy PA 17552
[illegible]	660 HAWTHORNE LN MT JOY PA. 17552
[illegible]	1864 RIVERVIEW N. DRUMORE PA 17518

Randall Lehman	1109 Matamoras Rd.
Megan Lehman	1109 Matamoras Rd.
Leslie Hart	11 BeBee Lane Quarryville PA
Les Hart	" " "
[illegible]	2465 Lemon Rd Reeks Pa
Debbie R Long	" " " " "
Darryle Hudson	1579 Slate Hill Rd Peach Bottom Pa
[illegible]	1718 State Hill Rd Peach Bottom
Tom Kreider	1055 Stoney Hill Rd Quarryville
Joe Dynda	1 Lisd [illegible] Rd Rdg Pa 19606
Chuck Roesler	628 Poplar Lane, Peach Bottom, PA
B.J. Sweeney	481 Peach Bottom Rd
Deb Roesler	622 Poplar Lane, Peach Bottom, PA
Brian Myers	2592 Robert Fulton Hwy, Peach Bottom, PA
Scott Jenkins	2588 Robert Fulton Hwy Peach Bottom PA
Ernie Miller	1239 Tanning Yard Hollow Rd Peach Bottom
Andrew Musselman	172 Good Rd New Providence PA 17560
Marty Child	525 School Lane Telford PA 18969
Jeff Child	525 School Lane, Telford, PA 18969
Scott L. Leich	4453 Delmar Drive Reading, PA 19606
[illegible]	1297 Foerviss Rd Peach Bottom PA 17563
[illegible]	220713 Peach Bottom
[illegible]	272 Pine Bridge Ln, Lancaster, PA
[illegible]	275 Hillside Ave. Demarest, NJ
[illegible] Koch	500 Forest Ln Pottsville PA
Tamera R. Koch	500 Forest Lane Pottsville Pa.
Doug Finkbiner	22 Farmington Way New Providence PA
Diane Finkbiner	22 Farmington Way New Providence PA
Sherie Lefty	1653 Slate Hill Rd Drumore
Ron & Denny Cutler	1331 Harmony Ridge Rd. Peachbottom
[illegible] Thomas	560 Old Market St. Mount Joy PA 17552
Bobbi Thomas	560 Old Market St. Mt. Joy PA
Randy Hodson	1653 Slate Hill Rd Drumore
[illegible]	302 Ketch Ln. Peach Bottom 17563

DELTA WATERFOWL FOUNDATION

The future of waterfowl and waterfowl hunting

Transmitted Electronically

July 26, 2011

Mr. Robert Judge
Manager, External Affairs
Exelon
300 Exelon Way
Kennett Square, PA 19348-2473

Dear Robert,

On behalf of the Delta Waterfowl Foundation, our Lancaster, Pennsylvania Chapter and our members, we are writing to express our concerns over the potential reduced access to the Susquehanna River especially that reach of river served by the Peach Bottom Marina. Delta Waterfowl is an international 501 (c)(3) non profit waterfowl conservation organization which serves the twin mandates of securing the future of waterfowl through a variety of conservation initiatives as well as representing waterfowl hunters.

It has come to our attention that there have been discussions to close the Peach Bottom Marina as siltation has made access to the river from this site increasingly difficult. While we acknowledge the cost and difficulty of silt removal, we urge you to find a means of preserving the existing access or find another suitable site to serve this stretch of river. This area is an important recreational resource, providing a host of opportunities to enjoy hunting, fishing, boating and the like. The loss of the Peach Bottom Marina would force many who enjoy the river to travel long distances for river access.

Mr. Judge, we would very much appreciate the opportunity to work with you and your colleagues at Exelon to discuss a means of enhancing the existing access or to evaluate other sites that could serve as feasible alternatives to provide access to this reach of river. Please let us know how we may be engaged to look for creative solutions.

Thank you for taking the time to address this issue.

Robert-
Thank you for taking the time to consider our perspective on this issue!

Sincerely,

John L. Devney
Senior Vice President

C: Matt Kneisley, Chair, Lancaster Chapter of Delta Waterfowl

Conowingo Shoreline Management Plan

Comments of the Harford County Chapter of the Maryland Ornithological Society

July 2011

The Harford County Chapter of the Maryland Ornithological Society, known locally as the Harford Bird Club, has approximately 150 members and is vitally interested in enhancing the bird habitat along the Susquehanna River. Therefore we ask that our viewpoint be included as Exelon develops its Conowingo Shoreline Management Plan in preparation for relicensing.

The Conowingo Dam is one of the Harford Bird Club's premiere birdwatching sites. It attracts birdwatchers from throughout the Mid-Atlantic region for its bald eagle population and for many other birds who feed on fish and other aquatic life. We offer regular birdwatching trips to Conowingo not only for the bald eagles and water-habitat birds but for scores of species of woodland birds that use the river as a migratory route. Springtime along the shores of the Susquehanna is a major attraction in the region for birdwatching, which, itself, is a significant economic attribute for Harford and Cecil Counties.

The Harford Bird Club's Conservation Committee requests that the Conowingo Management Plan include, wherever possible, the conversion of impervious surfaces to pervious and to plant only indigenous (native) species of trees and shrubs. Indigenous species provide food and nesting sites for birds as well as host species for butterflies to deposit their eggs. Some indigenous species that are particularly helpful to bird and butterfly species that are decorative for public areas as well include:

Trees	**Shrubs**
Red, white and pin Oaks	Spicebush
Red maple (acer rubrum)	Elderberry
Poplar	Winged and smooth sumac (not poison sumac)
Hemlock	Sweetspire (itea virginica)
Native dogwood (pink or white)	Highbush or lowbush blueberry
Hawthorne	Golden St. John's Wort
Shubert's red Chokecherry (Prunus virginiana)	Sweet pepperbush (clethra)
American elm (Ulmus Americana – now available)	Bottlebrush buckeye (Aesculus parviflora)

We would be happy to consult further on indigenous species for our area. Feel free to contact our Conservation Chair, Deborah Bowers, at 410 692-2708 or by email at farmlandpres@gmail.com.

Thank you.

Shoreline Management Plan Consultation Meetings

Muddy Run Visitors Center, July 26 – PA Agencies

Attendees: A.Danucalov, A.Ryan, C.Hicks, F.Smith, V.McClure, T.Sullivan, L.Khitrik, D.Gonzalez, J.George, B. Campbell, B.Newell, A.Whepley, Jim Spontak (PaDEP), Andy St. John (PaDCNR), Nick Ebersole (Lancaster Conservancy), Mike Hendricks (PaFBC), Josh Tryninewsig (PaFBC), Mike Domin (Lancaster County Planning), Jonathan Pinkerton (Susquehanna Gateway Heritage Area), Linda Swank (PaGC), Lori Yeich (Pa DCNR), Kate Gonick (Lancaster Conservancy), Pam Shellenberger (York County Planning), Kevin Mendik (NPS)

Review Power Point presentation: C.Hicks

Review ISMP, Draft TOC, Constraints Maps: B.Newell

Schedule/timing: T.Sullivan

Comments/Discussions:

Andy – Is Exelon willing to discuss/consider land protection? Who is the contact person for Exelon for these discussions? Stakeholders will need deed tract information to develop "ask list".

> Colleen Hicks to be contact. Are there land conservation areas agencies are interested in?

Kate - Two approaches to determine protected lands: Exelon to determine what they are willing to consider or Exelon provide deed tract information for stakeholders to determine parcels of interest. What is project and non-project acreage?

> Maps of project and non-project lands to be developed and provided to stakeholders. Actively managed areas will be identified on maps. Approx. 2,500 acres of project land (above normal pond elevation). Do not have a figure for non-project acreage.

Kevin – Was railroad trail use (Conowingo Dam to Havre de Grace) included in recreation survey? Unimproved portion (Deer Creek to North Park) has potential for trail expansion/linkage.

> Trail from Fishermans Park to Deer Creek and McLhinney/North Park was included in survey. Data for use between Deer Creek and Lapidum provided by Susquehana State Park.

Mike – Interested in access for anglers and boaters and conservation of species, including reptiles and amphibs.

Constraint map data can be provided to interested agencies. Contact Lana, copy Bud, and indicate format needed.

Written comments to Bud by August 15th.

<u>Conowingo Visitors Center, July 27 – MD Agencies</u>

<u>Attendees:</u> A.Danucalov, A.Ryan, C.Hicks, F.Smith, T.Sullivan (by phone), D.Gonzalez, J.George, B. Campbell, B.Newell, A.Whepley, Matt Kropp (Harford County Planning), Bill Richkus (Versar/MdDNR), Kevin Mendik (NPS), Larry Miller (USFWS), Eric Sennstrom (Cecil County Planning),

<u>Review Power Point presentation</u>: C.Hicks

<u>Review ISMP, Draft TOC, Constraints Maps</u>: B.Newell

<u>Schedule/timing</u>: T.Sullivan

<u>Comments/Discussions:</u>

Kevin – Unimproved portion (Deer Creek to North Park) has potential for trail expansion/linkage.

Bill – are there any scenic/wild waters within this project?

> Bud - Deer Creek is listed in Md. and upper portion of Octoraro Creek (outside Project boundary) in Pa.

Kevin – Poor signage directing users to Rock Run Marina and boat launch is in poor condition.

Matt – Many sensitive areas noted on constraints maps from Havre De Grace to Deer Creek. Were any RTE plant surveys done?

> Tom – will look into this and provide response

Larry – USFWS requests a 100 meter vegetated buffer along entire Project boundary. This provides a sedimentation and run-off buffer. USFWS is aware that FERC's area of interest is typically 200' back from NHW.

Eric – Access to bay and tributaries are an interest to Cecil County. Also, additional development of recreation area at Octoraro Creek and extension of trail from Octoraro Creek to VFW hall on Rt. 222

> Bud – Received same comments regarding recreation area from Commissioner Hodge and Danielle Haslup (Parks & Rec) at June public meetings.

Larry – Cottage leases – how is wastewater treatment and water withdrawals addressed? Are docks part of cottage lease agreement?

> Fred – Standards developed to address size, materials, floatation for docks and uniform set of standards for cottages

Larry - MDE permitting requirements to assist with standards. Cottage standards should be addressed in SMP. Does Exelon have an enforcement/surveillance program?

Fred – inspection program from land side for land, need a coordinated effort for inspection from water.

Bill – Will recreation information included in SMP and Recreation Plan?

Bud - Will be a brief description of recreation in the SMP

Larry – Are there provisions for a water trail? Overnight campsites?

Bud - Will be addressed in the Recreation Plan.

Larry - How are people made aware of the process to portage Conwoingo Dam?

Fred – Holtwood gives Exelon contact information to paddlers, also on paddling websites. Exelon receives approx. 8-9 portages requests per year.

Larry - Add future use areas in both SMP and Recreation Plan

Constraint map data can be provided to interested agencies. Contact Lana, copy Bud, and indicate format needed.

Written comments to Bud by August 15^{th}.

pennsylvania
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

BUREAU OF STATE PARKS

August 11, 2011

Ms. Colleen Hicks
Exelon Power
300 Exelon Way
Kennett Square, PA 19348

Dear Ms. Hicks:

On behalf of the Pennsylvania Department of Conservation and Natural Resources, Bureau of State Parks; the Pennsylvania Game Commission; Lancaster County Planning Commission; York County Planning Commission; Susquehanna Gateway Heritage Area; York County Farm and Natural Lands Trust; and the Lancaster County Conservancy, we wish to thank you for the opportunity to comment on the Conowingo and Muddy Run Shoreline Management Plans and explore opportunities for expanded protections of Exelon lands. Recently our respective public agencies and private non-profit organizations collectively met and identified an interest in the following lands inside and outside the FERC project boundary for expanded protection and conservation management:

Lancaster County:

- Muddy Run Recreation Park area
- Wissler Run Park area (including parcels abutting Susquehannock State Park)
- Fishing Creek area
- Peters Creek area
- Haines Creek area
- Peach Bottom Marina
- River Islands

York County:

- Peach Bottom parcels south of facility outside project boundary
- Dorsey Park Launch and day use area
- Muddy Creek area
- Lock 15 area
- Lock 13 area
- Lock 12 area

In order to further refine our interest, please forward a copy of the parcel deed book and page data, including specific tracts identified, to the above noted mailing address. We look forward to working with you in your efforts to expand land protection and public access to the Lower Susquehanna River Conservation Landscape.

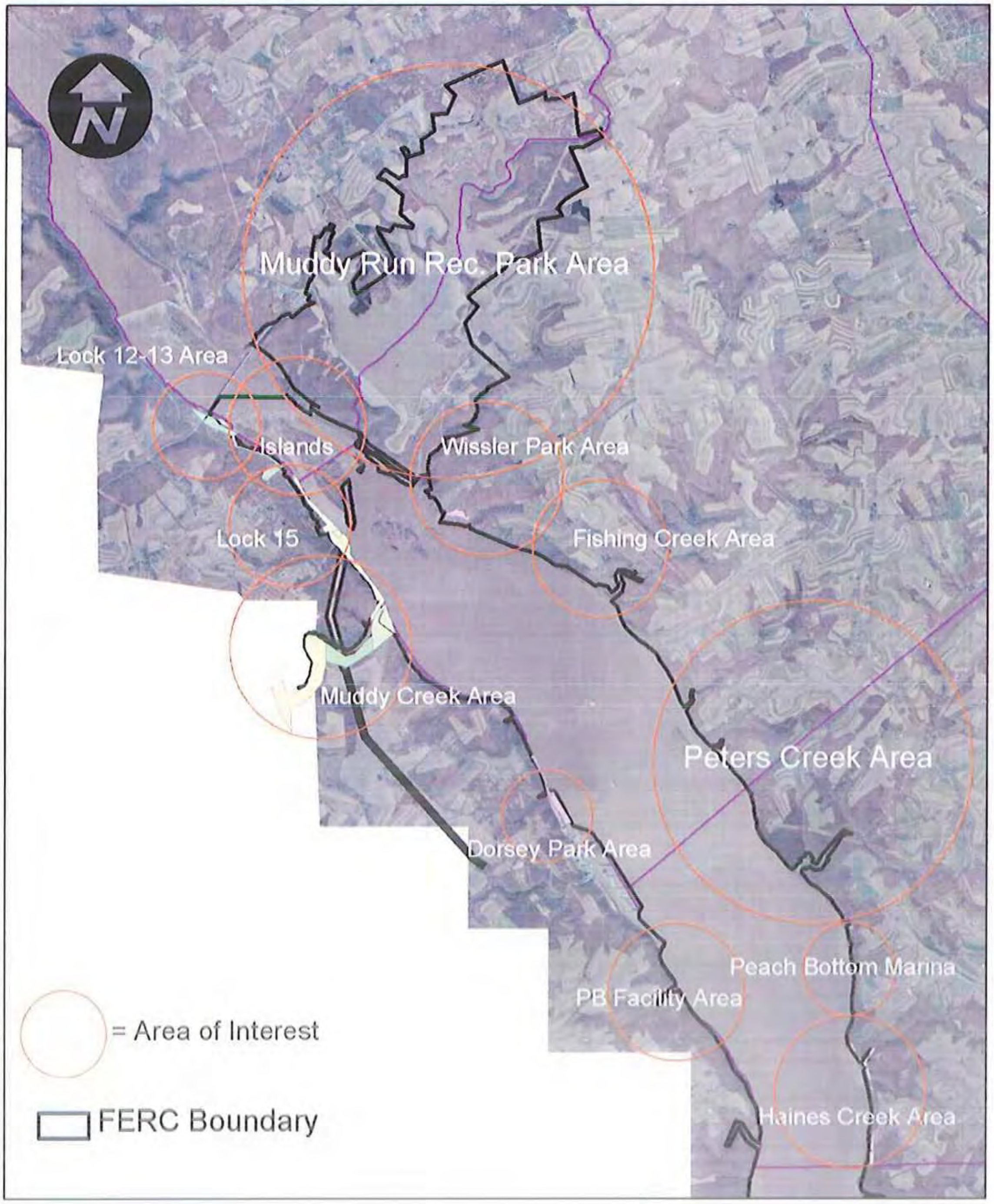
Sincerely,

John W. Norbeck
Director
Bureau of State Parks
Department of Conservation and
Natural Resources

Enclosure

cc: Bill Capouillez – Pa Game Commission
Kate Shirk-Gonick – Lancaster County Conservancy
Mark Platts - Susquehanna Gateway Heritage Area
Lori Yeich – DCNR, BRC
Andy St. John – DCNR, BSP
Pam Shellenberger – York County Planning Commission
Mike Domin – Lancaster County Planning Commission
Sean Kenny – York Co. Farm & Natural Lands Trust
Tom Sullivan – Gomez & Sullivan Engineers
Kevin Mendik - National Park Service

Exelon Lands: Areas of Interest



From:	Lower Susquehanna Riverkeeper
To:	Newell, Arthur (Bud) E. (Augusta,ME-US); Guy Alsentzer; ksmith@gomezandsullivan.com; al.blott@verizon.net; alexbalboa_us@yahoo.com; alex_hoar@fws.gov; Andrew Dehoff; Andy Shiels; brichkus@versar.com; bsadzinski@dnr.state.md.us; dpoe@dl.com; donnac@havredegracemd.com; Duke Pepper; esennstrom@ccgov.org; Gary Petrewski; jkludwig@harfordcountymd.gov; janet_norman@fws.gov; jrichenderfer@srbc.net; jspontak@state.pa.us; jseebach@americanrivers.org; John Seitz; jwhittak@winston.com; jkimble@shwpc.com; julie_thompson@fws.gov; julie.crocker@noaa.gov; jgantenbein@n-h-i.org; jzimmerman@tnc.org; franklin1@aol.com; mayor@portdeposit.org; kmckinne@lancasterconservancy.org; larry_m_miller@fws.gov; mbryer@tnc.org; mdephilip@tnc.org; mihendrick@state.pa.us; Paula Ballaron; pniland@harfordlandtrust.org; phil.cwiek@usace.army.mil; rbc1@psu.edu; Shawn Seaman; sschreiner@versar.com; tlibrandi@state.pa.us; mashton@dnr.state.md.us; kwhiteford@dnr.state.md.us; elynam@srbc.net; jbalay@srbc.net; don.pugh@yahoo.com; sheila_eyler@fws.gov; ian_park@fws.gov; steve_minkkinen@fws.gov; wcope@srbc.net; Tom Beauduy; rcairo@srbc.net; dladd@srbc.net; lynn.lankshear@noaa.gov; jeremmille@state.pa.us; jzhang@srbc.net; rgoodno@lancasterconservancy.org; bhare@energy.state.md.us; nprimrose@dnr.state.md.us; jessica.pruden@noaa.gov; hsachs@mde.state.md.us; deweaver@olympuspower.com; woohee.choi@ferc.gov; andrew.bernick@ferc.gov; monir.chowdhury@ferc.gov; andrew.tittler@sol.doi.gov; emily.carter@ferc.gov; john.mudre@ferc.gov; ahenning@srbc.net; agavin@srbc.net; john.smith@ferc.gov; obraun@state.pa.us; tmoberg@tnc.org; kevin_mendik@nps.gov; rockdfish@aol.com; dublinlaundry1@aol.com; bonniestinchcomb@hotmail.com; geofsmith@state.pa.us; wmelnick@state.pa.us; contact@allianceforthebay.org; cheslock@usa.net
Cc:	colleen.hicks@exeloncorp.com; jtr@vnf.com; tsullivan@gomezandsullivan.com; halfred.ryan@exeloncorp.com; kimberly.long@exeloncorp.com; robert.matty@exeloncorp.com; jhc@vnf.com; rbleistine@normandeau.com; sleach@normandeau.com; sadams@normandeau.com; dmathur@normandeau.com; tbrush@normandeau.com; johnmrinehart@verizon.net; ewhite@normandeau.com; mmartinek@normandeau.com; jgriffin@normandeau.com; bryan_strawn@urscorp.com; droyer@normandeau.com
Subject:	Preliminary Comments to Exelon Recreation Plan as per Public Meeting Presentation and Request for Comment Sept 15, 2011
Date:	Friday, October 07, 2011 1:11:27 PM

At the recent Exelon FERC Recreation Plan Meetings, Exelon consultant Bud Newell said he had not received my comments regarding the Shoreline Management Plan that I had sent on July 27, 2011. Those comments are repeated here, with slight modification, as they also pertain to the Recreation Plan. In addition, I am submitting comments on behalf of a former Conowingo Dam employee and long-time recreational user of the Susquehanna River and Conowingo facilities who wishes to remain anonymous.

October 7, 2011

Bud Newell
TRC Solutions

RE: Exelon Corporation Conowingo Dam Relicensing
Preliminary Comments to Shoreline Management Plan as per Public Meeting Presentation

To Whom It May Concern,

The Conowingo Dam Recreation Plan, a plan to fulfill Conowingo Dam owners' obligation to provide recreation to the public in exchange for the loss of their natural right to use the public resource of the free-flowing Susquehanna River, must consider the following public concerns.

Public Access for Recreation: Dozens of citizens have been in contact with Stewards of the Lower Susquehanna staff regarding access to the Susquehanna River for fishing. Striper fishing, possibly the highest recreational use in and directly below the Project, has been impeded by two actions taken by Exelon.

The first is the reduction of access to fishing facilities and boat launches to periods between sunrise and sunset. Every fisherman knows that the best fishing occurs in early morning, as the sky lightens before sunrise, and around and after dusk, when the light changes again. These are the times when Striped Bass feed closest to the surface and shoreline. This is particularly important for fishing the Susquehanna. Restricting access to dawn to dusk does not allow for traditional fishing schedules. Fishermen want to be out on the water before dawn, which means preparations for launch must be made prior to dawn, between 4 and 6 am. In addition, fishermen have contacted us regarding fishing after dusk. Most striper-fishing websites point to two factors that create optimum fishing: change of light (either from darkness toward day, or light into the night), and change of tides. Because the change of tides does not have a major effect in this area, the change of light is THE factor for optimum fishing. Striper fishing traditionally goes into the night. Many hard-working citizens of Maryland and Pennsylvania have to work in the mornings, and that leaves evenings and night for their recreational fishing. We request that all facilities be open from 4 a.m. until Midnight. This would still allow for "down time" to eliminate non-fishermen from abusing the areas, but would grant the needed access to optimize recreation.

As no surprise to you, the second impediment is the lack of access to the "catwalk". In 1928 this catwalk was designed and offered in exchange for the loss of traditional fishing, which impact occurs to this day as a result of Conowingo Dam. At the time of the building of the dam access was allowed 24-hours a day, and was promised for the life of the project. We believe this agreement should be honored, although we are willing to accept the "down time" of Midnight to 4 a.m., as stated above. One improvement to the catwalk can be made to reduce any negative impacts on the striped bass caught there. Ramps that would allow fishermen to slide the stripers more gently back into the river would reduce injury and mortality to the fish. Regarding Exelon's concern for broken windows due to renegade sinkers, alternatives to glass such as plexiglass could be installed.

There seems to be some idea that the new fishing pier has replaced the need for fishing from the catwalk. While no creel surveys were done by Exelon to compare catches at the new pier to historic catches at the catwalk, our anecdotal "surveys" of fishermen reveal that the species most frequently caught at the new pier is catfish. This is no substitute for striper fishing. If Exelon does not believe these anecdotes are representative of the facts, I would suggest that proper creel surveys be done by opening the catwalk for two weeks during striper season and compare catches between the pier and catwalk.

Sediment buildup behind Conowingo Dam affecting marinas: Although sediment buildup will be addressed in future comments to Exelon studies, there is a recreational component that came out of the public meetings that needs to be addressed here. During the meeting at Muddy Creek, Exelon's representative stated that it would not be logical for Exelon to be responsible for sediment buildup around marinas and the mouths of Conowingo Pool's tributaries. In fact, Exelon's Sediment Study, submitted to FERC on May 6, 2011, clearly states that prior to the building of Conowingo Dam there was enough force in the Susquehanna River that sediment was passed through directly to the Susquehanna Flats and Chesapeake Bay. This indicates that the project *is* responsible for the buildup of sediment in the above mentioned areas. To prove this fact, one needs to look no further than the tributaries above the fall line at Wrightsville into Lake Clarke. The confluences of the tributaries, above this line and below York Haven Dam, with the Susquehanna River are relatively free of sediment. Thus sediment buildup is a direct result of the Conowingo Dam and sediment removal is the responsibility of Exelon.

Letter from a Long-Time Fisherman

Dear Sir:

This letter concerns a small marina on the Susquehanna River in Port Deposit, Maryland, called Rock Run Landing.

Exelon owns the land at this location as well as most or all of the land on both sides of the river from Conowingo Hydroelectric Station down to Port Deposit (about 4 ¼ miles).

I have lived in Darlington, Maryland (about 2 miles from the dam) since the mid 1950's. I was employed by Philadelphia Electric Company (now Exelon) at Conowingo Dam for 27 years. I have rented a slip and kept a boat in the water at Rock Run Landing from 1977 through 2009 for hunting and fishing.

When I was a young man there were 5 landings on the river between the dam and Port Deposit where private boats could be kept in the water and on the shore, with boat rentals available. Four of these facilities no longer exist, mostly because Exelon has not renewed their leases, even though Exelon is obliged, because of its operating license from FERC, to allow a certain amount of access to the river for recreational use.

Exelon notified the lease holder at Rock Run Landing that their lease, which expired August 31, 2010, will not be renewed. This action has resulted in the curtailment of in-the-water slip rentals, land storage of boats and trailers, and boat rentals.

I believe that the curtailment of these recreational services at Rock Run Landing constitutes a denial of access to the river. Rock Run Landing is the last facility left that offers such services between Conowingo Dam and Havre de Grace, which is about 12 miles down river from the dam. The following are the main services that cease to exist at Rock Run Landing:

<!--[if !supportLists]-->• <!--[endif]-->Boat rentals – this location is a small natural harbor with an island nearby for protection;
<!--[if !supportLists]-->• <!--[endif]-->In-the-water slip rentals;
<!--[if !supportLists]-->• <!--[endif]-->On-land boat and trailer storage. Many boat owners prefer to leave their boats at the landing rather than tow them back and forth during the season;
<!--[if !supportLists]-->• <!--[endif]-->Tackle shop and engine repair;
<!--[if !supportLists]-->• <!--[endif]-->Launching ramp which is open 24 hours a day, 365 days a year, with no locked gate.

The state operated ramp across the river at Lapidum has 2 launching ramps and parking for about 100 trailers and vehicles. However, it is a gated facility and was recently locked for several months, including the entire spring fishing season. There was no access to the river at Lapidum during this period. There was no place to launch a boat on the west side of the river from the dam to Havre de Grace.

Until a few years ago, a guide with the appropriate license took customers fishing on the Susquehanna River from Rock Run Landing. His customers included former State Comptroller Louis Goldstein, Brooks Robinson, several Maryland DNR officials, several outdoor writers, and world-renowned anglers. I believe that Rock Run Landing and its variety of services should be allowed to remain open to people who want to enjoy the river. It is the last location left where traditional access is available.

Please inform FERC of this situation. I appreciate your consideration of this matter and look forward to hearing from you.

Thank you very much, ____________

From the Mighty Susquehanna, Michael R Helfrich
Lower Susquehanna RIVERKEEPER®

Stewards of the Lower Susquehanna, Inc.
324 W Market St
York, PA 17401
717.779.7915 (cell)
lowsusriver@hotmail.com
www.LowerSusquehannaRiverkeeper.org

is licensed for use herein.

From: lowsusriver@hotmail.com
To: anewell@trcsolutions.com; guy@lowsusriverkeeper.org; ksmith@gomezandsullivan.com; al.blott@verizon.net; alexbalboa_us@yahoo.com; alex_hoar@fws.gov; adehoff@srbc.net; ashiels@state.pa.us; brichkus@versar.com; bsadzinski@dnr.state.md.us; dpoe@dl.com; donnac@havredegracemd.com; mpepper@state.pa.us; esennstrom@ccgov.org; gpetrewski@pplweb.com; jkludwig@harfordcountymd.gov; janet_norman@fws.gov; jrichenderfer@srbc.net; jspontak@state.pa.us; jseebach@americanrivers.org; jseitz@ycpc.org; jwhittak@winston.com; jkimble@shwpc.com; julie_thompson@fws.gov; julie.crocker@noaa.gov; jgantenbein@n-h-i.org; jzimmerman@tnc.org; franklin1@aol.com; mayor@portdeposit.org; kmckinne@lancasterconservancy.org; larry_m_miller@fws.gov; mbryer@tnc.org; mdephilip@tnc.org; mihendrick@state.pa.us; pballaron@srbc.net; pniland@harfordlandtrust.org; phil.cwiek@usace.army.mil; rbc1@psu.edu; sseaman@dnr.state.md.us; sschreiner@versar.com; tlibrandi@state.pa.us; mashton@dnr.state.md.us; kwhiteford@dnr.state.md.us; elynam@srbc.net; jbalay@srbc.net; don.pugh@yahoo.com; sheila_eyler@fws.gov; ian_park@fws.gov; steve_minkkinen@fws.gov; wcope@srbc.net; tbeauduy@srbc.net; rcairo@srbc.net; dladd@srbc.net; lynn.lankshear@noaa.gov; jeremmille@state.pa.us; jzhang@srbc.net; rgoodno@lancasterconservancy.org; bhare@energy.state.md.us; nprimrose@dnr.state.md.us; jessica.pruden@noaa.gov; hsachs@mde.state.md.us; deweaver@olympuspower.com; woohee.choi@ferc.gov; andrew.bernick@ferc.gov; monir.chowdhury@ferc.gov; andrew.tittler@sol.doi.gov; emily.carter@ferc.gov; john.mudre@ferc.gov; ahenning@srbc.net; agavin@srbc.net; john.smith@ferc.gov; obraun@state.pa.us; tmoberg@tnc.org; kevin_mendik@nps.gov; rockdfish@aol.com; dublinlaundry1@aol.com; bonniestinchcomb@hotmail.com; geofsmith@state.pa.us; wmelnick@state.pa.us; contact@allianceforthebay.org; cheslock@usa.net
CC: colleen.hicks@exeloncorp.com; jtr@vnf.com; tsullivan@gomezandsullivan.com; halfred.ryan@exeloncorp.com; kimberly.long@exeloncorp.com; robert.matty@exeloncorp.com; jhc@vnf.com; rbleistine@normandeau.com; sleach@normandeau.com; sadams@normandeau.com; dmathur@normandeau.com; tbrush@normandeau.com; johnmrinehart@verizon.net; ewhite@normandeau.com; mmartinek@normandeau.com; jgriffin@normandeau.com; marjorie_zeff@urscorp.com; bryan_strawn@urscorp.com; droyer@normandeau.com
Subject: Preliminary Comments to Shoreline Management Plan as per Public Meeting Presentation Request
Date: Wed, 27 Jul 2011 13:24:03 -0400

July 27, 2011

Bud Newell
TRC Solutions

RE: Exelon Corporation Conowingo Dam Relicensing
Preliminary Comments to Shoreline Management Plan as per Public Meeting Presentation

To Whom It May Concern,

The Shoreline Management Plan, which appears to include aspects of Exelon's requirement to provide adequate recreation to the public in exchange for the use of the public's resource, as well as Exelon's requirement to maintain water quality within and downstream of the Project area, must consider the following public concerns.

<u>Public Access for Recreation</u>: Dozens of citizens have been in contact with Stewards of the Lower Susquehanna staff regarding access to the Susquehanna River for fishing. Striper fishing, possibly the highest recreational use in and directly below the Project, has been impeded by two actions taken by Exelon.

The first is the reduction of access to fishing facilities and boat launches to periods between sunrise and sunset. Every fisherman knows that the best fishing occurs in early morning, as the sky lightens before sunrise, and around and after dusk, when the light changes again. These are the times when Striped Bass feed closest to the surface and shoreline. This is particularly important for fishing the Susquehanna, most of which is relatively shallow. Restricting access to dawn to dusk does not allow for traditional fishing schedules. Fishermen want to be out on the water before dawn, which means preparations for launch must be made prior to dawn, between 4 and 6 am. In addition, fishermen have contacted us regarding fishing after dusk. Most striper-fishing websites point to two factors that create optimum fishing: change of light (either from darkness toward day, or light into the night), and change of tides. Because the change of tides does not have a major effect in this area, the change of light is THE factor for optimum fishing. Striper fishing traditionally goes into the night. We request that all facilities be open from 4 a.m. until Midnight. This would still allow for "down time" to eliminate non-fishermen from abusing the areas, but would grant the needed access to optimize recreation.

As no surprise to you, the second impediment is the lack of access to the "catwalk". In 1928 this catwalk was designed and offered in exchange for the loss of traditional fishing, which impact occurs to this day as a result of Conowingo Dam. At the time of the building of the dam access was allowed 24-hours a day, and was promised for the life of the project. We believe this agreement should be honored, although we are willing to accept the "down time" of Midnight to 4 a.m., as stated above. One improvement to the catwalk can be made to reduce any negative impacts on the striped bass caught there. Ramps that would allow fishermen to slide the stripers more gently back into the river would reduce injury and mortality to the fish.

Sediment buildup behind Conowingo Dam: Although sediment buildup will be addressed in future comments to Exelon studies, there is a recreational component that came out of the public meetings that needs to be addressed here. During the meeting at Muddy Creek, Exelon's representative stated that it would not be logical for Exelon to be responsible for sediment buildup around marinas and the mouths of Conowingo Pool's tributaries. In fact, Exelon's Sediment Study, submitted to FERC on May 6, 2011, clearly states that prior to the building of Conowingo Dam there was enough force in the Susquehanna River that sediment was passed through directly to the Susquehanna Flats and Chesapeake Bay. This indicates that the project *is* responsible for the buildup of sediment in the above mentioned areas. To prove this fact, one needs to look no further than the tributaries above the fall line at Wrightsville into Lake Clarke. The confluences of the tributaries, above this line and below York Haven Dam, with the Susquehanna River are free of sediment. Thus sediment buildup is a direct result of the Conowingo Dam and sediment removal is the responsibility of Exelon.

From the Mighty Susquehanna, Michael R Helfrich
Lower Susquehanna RIVERKEEPER®

Stewards of the Lower Susquehanna, Inc.
324 W Market St
York, PA 17401
717.779.7915 (cell)
lowsusriver@hotmail.com
www.LowerSusquehannaRiverkeeper.org

From:	Newell, Arthur (Bud) E. (Augusta,ME-US)
To:	Andrea.Danucalov@exeloncorp.com
Subject:	FW: Conowingo and Muddy Run Project - Recreation consultation meetings
Date:	Thursday, September 08, 2011 1:54:00 PM

From: CVanDyke@ccgov.org [mailto:CVanDyke@ccgov.org]
Sent: Wednesday, September 07, 2011 12:06 PM
To: Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject: RE: Conowingo and Muddy Run Project - Recreation consultation meetings

Bud,

We have stamped, approved, engineered drawings proposing two baseball fields with all the amenities and an additional parking lot. We currently have some permits in place, some need renewed, and others will need to be applied for. Our development schedule revolves around funding.

I appreciate your support and look forward to our continued partnership.

From: "Newell, Arthur (Bud) E. (Augusta,ME-US)" <anewell@trcsolutions.com>
To: "CVanDyke@ccgov.org" <CVanDyke@ccgov.org>
Date: 09/07/2011 11:46 AM
Subject: RE: Conowingo and Muddy Run Project - Recreation consultation meetings

---

Clyde,

Exelon has not begun to formulate any specific proposals regarding recreation enhancements for the Conowingo Project. Tha is something that will occur once we get through the upcoming consultation meetings and comment filing period.

I am going to forward your e-mail to Exelon so that they have record of it.

Do you have concept plans and a schedule for your proposed Phase II, or at least describe what improvements/expansions are being proposed?

Thanks, let me know if you have other questions or need more information.

Bud

A.E. Newell III
Environmental Specialist

14 Gabriel Drive, Augusta, Me. 04330
T: 207.620.3831 | F: 207.621.8226 | C: 207.716.6115

Follow us on LinkedIn or Twitter | www.trcsolutions.com

From: CVanDyke@ccgov.org [mailto:CVanDyke@ccgov.org]
Sent: Wednesday, September 07, 2011 11:38 AM
To: Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject: RE: Conowingo and Muddy Run Project - Recreation consultation meetings

Thanks for getting back to me. I guess we can save each other some time and discuss the park via email. Commissioner Hodge specifically requested I discuss what, if any, monetary support Exelon may be willing to afford the county for phase two development of the park. The county is utilizing $59,239 of P.O.S. grant funding and $311,500 in County money to complete phase 1. It is estimated it will costs approximately $500,000 to complete phase two. With dwindling grant funds it may be difficult for the County to find matching money to complete phase two any time in the near future.

If you could educate me on Exelons stance with phase two development of the Conowingo Community Park I can inform Commissioner Hodge where we stand.

Thank you very much for your time and input, Clyde

From: "Newell, Arthur (Bud) E. (Augusta,ME-US)" <anewell@trcsolutions.com>
To: "CVanDyke@ccgov.org" <CVanDyke@ccgov.org>
Date: 09/07/2011 10:58 AM
Subject: RE: Conowingo and Muddy Run Project - Recreation consultation meetings

---

Hi Clyde,

While the primary purpose of the meeting is to discuss recreation within the Project boundary, I expect we will also get comments on areas and facilities outside the Project boundary. While the original small parking area and trail along Octoraro Creek developed by Exelon are within the Project boundary, the remaining area, including the parking and athletic field developed by Cecil County is outside the Project.

However, we are aware of the County's interest in the property and potential expansion of the park and trail system. This was mentioned to me by Commissioner Hodge at our June 29th Shoreline Management Plan (SMP) meeting in Port Deposit and by Danielle Haslup at the June 29th SMP meeting at the Conowingo Visitors Center.

We can either schedule a telephone call to discuss the park or you can file written or e-mail comments with me by October 7, 2011.

The purpose of the meetings on the 14th and 15th is to gather information from stakeholders, agencies, and other interested parties on the status of recreation access, opportunities, and facilities associated with the Muddy Run and Conowingo Projects, and to get input on what enhancements and/or new facilities, if any, may be needed to meet user needs and expectation.

Let me know if you want to set up a time to talk, and if so, when would be a good time to call you.

Bud

A.E. Newell III
Environmental Specialist

14 Gabriel Drive, Augusta, Me. 04330
T: 207.620.3831 | F: 207.621.8226 | C: 207.716.6115

Follow us on LinkedIn or Twitter | www.trcsolutions.com

From: CVanDyke@ccgov.org [mailto:CVanDyke@ccgov.org]
Sent: Wednesday, September 07, 2011 10:22 AM
To: Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject: RE: Conowingo and Muddy Run Project - Recreation consultation meetings

Mr. Newell,

Can you tell me if the Conowingo site that Cecil County Parks and Recreation is currently developing will be discussed at the 14th meeting in PA? It is imperative that I have an opportunity to discuss this site with you and the 15th meeting times do not work with my schedule.

Thanks, Clyde

From: "Newell, Arthur (Bud) E. (Augusta,ME-US)" <anewell@trcsolutions.com>
To: "starrkmoon@yahoo.com" <starrkmoon@yahoo.com>, "ocimike@comcast.net" <ocimike@comcast.net>,

"tjkuehl@comcast.net" <tjkuehl@comcast.net>, "trbrant@york-county.org" <trbrant@york-county.org>, "tls35@psu.edu" <tls35@psu.edu>, "hackettj@co.lancaster.pa.us" <hackettj@co.lancaster.pa.us>, "hughesgw@msn.com" <hughesgw@msn.com>, "James Hooper (james.hooper@att.net)" <james.hooper@att.net>, "info@pfsc.org" <info@pfsc.org>, "bigbassguy1@aol.com" <bigbassguy1@aol.com>, "lyeich@state.pa.us" <lyeich@state.pa.us>, "ashiels@state.pa.us" <ashiels@state.pa.us>, "mihendrick@state.pa.us" <mihendrick@state.pa.us>, "obraun@state.pa.us" <obraun@state.pa.us>, "Spontak, James (jspontak@pa.gov)" <jspontak@pa.gov>, "larry_m_miller@fws.gov" <larry_m_miller@fws.gov>, "'kevin_mendik@nps.gov' (kevin_mendik@nps.gov)" <kevin_mendik@nps.gov>, "lowsusriver@hotmail.com" <lowsusriver@hotmail.com>, "mplatts@susquehannaheritage.org" <mplatts@susquehannaheritage.org>, "stoudtpbm@frontiernet.net" <stoudtpbm@frontiernet.net>, "drumoretwp@epix.net" <drumoretwp@epix.net>, "martictwp@comcast.net" <martictwp@comcast.net>, "GeneralInfo@LowerWindsor.com" <GeneralInfo@LowerWindsor.com>, "astjohn@state.pa.us" <astjohn@state.pa.us>, "nealm@havredegracemd.com" <nealm@havredegracemd.com>, "acmcclune@harfordcountymd.gov" <acmcclune@harfordcountymd.gov>, "info@ccamd.org" <info@ccamd.org>, "President@mdbirds.org" <President@mdbirds.org>, "cvandyke@ccgov.org" <cvandyke@ccgov.org>, "dhaslup@ccgov.org" <dhaslup@ccgov.org>, "farmlandpres@gmail.com" <farmlandpres@gmail.com>, "maryanne.dolan@gmail.com" <maryanne.dolan@gmail.com>, "kensimmers@comcast.net" <kensimmers@comcast.net>, "sseaman@dnr.state.md.us" <sseaman@dnr.state.md.us>, "bonniestinchfield@hotmail.com" <bonniestinchfield@hotmail.com>, "mayor@portdeposit.org" <mayor@portdeposit.org>

Date: 09/01/2011 11:44 AM
Subject: RE: Conowingo and Muddy Run Project - Recreation consultation meetings

---

As a follow up to my e-mail of August 24th, dates, times and locations of the recreation consultation meetings for the Conowingo and Muddy Run Projects have been set and will be published in the local newspapers shortly. Mailed notices should be going out to you as well.

There will be two meetings each day at different times to attempt accommodate your schedules and availability to attend. Dates, times and locations of the meetings are as follows:

Wednesday, September 14, 2011, Muddy Run Visitors Center, 172 Bethesda Church Road, Holtwood Pa.

- Afternoon meeting beginning at 2:00 p.m.
- Evening meeting beginning at 6:00

Thursday, September 15, 2011, Conowingo Visitors Center, 4948 Conowingo Road, Conowingo Md.

- Afternoon meeting beginning at 2:00 p.m.
- Evening meeting beginning at 6:00

I am also attaching links for the Initial Recreation Study Reports that were filed with FERC in February of this year.

http://www.exeloncorp.com/assets/energy/powerplants/docs/MuddyRun/ISRS_RSP_M03.11.pdf

http://www.exeloncorp.com/assets/energy/powerplants/docs/Conowingo/ISRS_RSP_C03.26.pdf

Please contact me if you have any questions.

Bud Newell

A.E. Newell III
Environmental Specialist

14 Gabriel Drive, Augusta, Me. 04330
T: 207.620.3831 | F: 207.621.8226 | C: 207.592.3958
Follow us on LinkedIn or Twitter | www.trcsolutions.com

The Information contained in this communication may be confidential, is intended only for the use of the recipient named above and may be legally privileged.
If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this communication, or any of its contents, is strictly prohibited.
If you have received this communication in error, please re-send this communication to the sender and delete the original message and any copy of it from your computer system. Thank you.

The Information contained in this communication may be confidential, is intended only for the use of

Exelon.

Relicensing Comment Card Date: 9/15/11

Name: LISA GUTIERREZ (Optional)

Address: MARYLAND DNR BOATING / 580 TAYLOR AVE. E-4 ANNAPOLIS, MD. 21401 (Optional)

Tel. #/E-Mail Address: 410-260-8778 / lgutierrez@dnr.state.md.us (Optional)

Locations/Issues of Interest: WATER ACCESS/WATER TRAILS (Name or Reference)

Comments or Questions:

DNR is working on development of additional public boating access sites and a Water Trail along the Susquehanna River. Interested in Exelon shoreline properties for non-motorized access.

Forward Letter or E-mail Comments to **Bud Newell** [redacted]

TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card Date: 9-15-11

Name: Jere Ross (Optional)

Address: 2507 Shures Landing Rd (Optional)

Tel. #/E-Mail Address: 410-457-5277 (Optional)

Locations/Issues of Interest: Opening the catwalk (Name or Reference)

Comments or Questions:

Open Our Catwalk. Closed for ten years much to long.

Forward Letter or E-mail Comments to **Bud Newell** [redacted]

TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card Date: ______

Name: Jane Trout (Optional)

Address: 2344 Beaver Valley (Optional)

Tel. #/E-Mail Address: JMam320 @ epix.net (Optional)

Locations/Issues of Interest: ______ (Name or Reference)

Comments or Questions:
Would like to see Muddy Run with more for Family rent Bickels - swimming, Miniture Golf
Horse trails & Capabily to camp at boat site.
Volley Ball Court

Forward Letter or E-mail Comments to **Bud Newell** [redacted]
TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card Date: 9/14/11

Name: Pat Hill (Optional)

Address: 3106 River Rd Conestoga PA 17516 (Optional)

Tel. #/E-Mail Address: pat.hill@millersville.edu (Optional)

Locations/Issues of Interest: ______ (Name or Reference)

Comments or Questions:
Provide horse riding trails + camping areas for equestrian activities

Forward Letter or E-mail Comments to **Bud Newell** [redacted]
TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card Date: 9-14-2011

Name: LARRY C. WALTER (Optional)

Address: 17 DOGWOOD DRIVE CONESTOGA 17516 PA (Optional)

Tel. #/E-Mail Address: 717-368-9155 (Optional)

Locations/Issues of Interest: (Name or Reference)

ANNA. ROAD

Comments or Questions:

OPEN A GATE DURING ~~DAYLIGHTS~~ DAYTIME UPPER END OF MUDDY RUN LAKE - MORE CONVIENENT FOR HIKING & FISHING

T MUDDY RUN PUMPING STATION - FISHING FROM BEHIND ENCE AROUND 15 FT TO WATER

Forward Letter or E-mail Comments to **Bud Newell** [redacted]
TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card Date: 9/14/11

Name: John G Parson (Optional)

Address: 167 Bethesda Ch rd West Holtwood PA 17532 (Optional)

Tel. #/E-Mail Address: (Optional)

Locations/Issues of Interest: (Name or Reference)

Comments or Questions:

Allow fishing in muddy Run Res

Forward Letter or E-mail Comments to **Bud Newell** [redacted]
TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card

Date: 9-10-11

Name: Christine C. Brubaker (Optional)

Address: 22 Birch Ct, Lancaster PA 17603 (Optional)

Tel. #/E-Mail Address: 717-872-8971 (Optional)

Locations/Issues of Interest: ccbsailw@aol.com (Name or Reference)

Comments or Questions:

1. Susquehanna River Boat Access – Wissler Park – Muddy Run add boating put-in for kayaks & canoes
2. add – Conestoga Trail – linkage at Holtwood Bridge, Ave Mason Dixon
3. add – Lancaster Co Conservancy – Reed Run Nature Preserve – Wissler Run Nature Preserve

Forward Letter or E-mail Comments to **Bud Newell** [redacted]

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card

Date: 9/14/11

Name: MARY BOOMSMA (Optional)

Address: 144 Stubbs Mill Road ~ PEACH BOTTOM PA 17563 (Optional)

Tel. #/E-Mail Address: — (Optional)

Locations/Issues of Interest: (Name or Reference)

Comments or Questions:

Very interesting meeting – Looking forward to the next.

Forward Letter or E-mail Comments to **Bud Newell** [redacted]
TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card

Date: SEPT 14-2011

Name: JOE G. RUDY (Optional)

Address: 107 ARROWHEAD CIRCLE CONESTOGA, PA. 17516 (Optional)

Tel. #/E-Mail Address: 717-872-9444 (Optional)

Locations/Issues of Interest: PEACH BOTTOM MARINA (Name or Reference)

POSSIBILITY OF RELOCATION TO RIVER SIDE OF R.R. TRACKS

Comments or Questions:

ALSO I'M CONCERNED ABOUT ACCESS TO PUMPED STORAGE AREA FOR FISHING

Forward Letter or E-mail Comments to **Bud Newell** [redacted]
TRC
14 Gabriel Drive
Augusta, ME 04330
anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card

Date: 9-15-11

Name: HERMAN HOPMAN (Optional)

Address: 207 DAKOTA AVE WILMINGTON DE 19803 (Optional)

Tel. #/E-Mail Address: 302-762-0514 HHOPMAN@TRIP.NET (Optional)

Locations/Issues of Interest: PEACH BOTTOM MARINA (Name or Reference)

TENANT # LEASE 489

Comments or Questions:

DREDGING

WE KEEP OUR BOAT THERE ALL SUMMER.

'43 A CONSERN ABOUT LOW WATER AND OBSTACLES ON

RIVER SIDE IN WATER

Forward Letter or E-mail Comments to **Bud Newell** [redacted]

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

Exelon.

Relicensing Comment Card

Date: 9/14/2011

Name: Kate Gonick P.O. Box 716 (Optional)

Address: 117 S. West End Ave. Lancaster, PA 17608-716 (Optional)

Tel. #/E-Mail Address: kgonick@lancasterconservancy.org (Optional)

Locations/Issues of Interest: habitat, wildlife, cultural (Name or Reference)

archaeological • shore guard, land protection

Comments or Questions:

We never received parcel data on Exelon lands w/in and adjacent to FERC Boundary - Final LSMP should include land issues as required. Timing??

Forward Letter or E-mail Comments to **Bud Newell** [redacted]

TRC

14 Gabriel Drive

Augusta, ME 04330

anewell@trcsolutions.com

Continue Comments on Reverse Side

9-14-11 2pm Meeting at Muddy Run Visitor's Center

General Comments:

Michael Helfrich asked why the comment period is so brief for the reports? When is the last chance to comment of the draft reports?

Andy St. John: has DCNR letter been received? Can Exelon provide partial parcel information? Will this information be made for both inside and outside of the Project Boundary?

Havre de Grace has a new boat ramp that is perfect. It is easy in/out. If redoing the ramps this would be a good example. It is located on the south side of town. The docks are a good size.

Will the draft plan address things outside of the FERC boundary? It was explained that the FERC jurisdiction is only within the Project Boundary, though lands outside of the Project Boundary will be looked at if they provide access to the Project Boundary.

Michael Helfrich asked if there had been any thought to invasive species and boat access. Any efforts regarding the zebra mussels such as saltwater bath facilities to keep down the spread of invasives?

Muddy Creek Boat Launch:

Mike Hendricks asked who takes care of general maintenance in a lease situation. What about major versus routine maintenance? This appeared to be in reference to the Muddy Creek Boat Launch.

Michael Helfrich – Major damage to Muddy Creek boat launch, not accessible, needs major fix.

Michael Helfrich -Additional parking needed at the mouth of Muddy Creek for take-out for users paddle from upstream.

The ramp is not long enough at low water. Longer docks would be helpful. Kayakers need more room on the north side maybe a separate launch area. Possible that additional water from upstream may be an issue at the site.

Cold Cabin:

It was stated that no maintenance over the last couple of years has occurred. They have asked the town for a bathroom. It was noted that there may be 50-60 people swimming at the site in the summer. The site has an issue with people who go to party. This issue has been brought up to the town. The road into the site is in poor condition.

Township is not maintaining the facility. An individual is voluntarily maintaining. Road is bad, also asked town to install bathrooms.

Muddy Creek Paper Mill Road:

Parking should be made available. Is there any update on the land survey?

Dorsey Park:

The launch is too steep.

Peach Bottom Marina:

Who is the contact for the ongoing issues at the Marina? Would like to see foot access to the other side of the railroad bridge in this area.

Any dredging plans?

Muddy Run Park:

Will the plan include any changes to the park?

Rock Run:

Michael Helfrich asked if the gate is open. "*It was noted during the meeting that the gate has been open 24/7 until the storm damage occurred. Exelon will be posting signs and going to a one hour before dawn and one hour after dusk policy and closing the gate during remaining hours.*"

Michale Helfrich indicates striper fisherman want to fish at night. Best time to fish for striper fish is during light change. It was asked how this gives pre-dam access to the river. Operating hours at other locations was not an issue that had been brought to his attention.

Generating Pool:

PFBC Conservation Office asked if Exelon will reopen fishing access to the pump storage reservoir?

Why was it closed in the Fall '08? "*Safety reason*" What changed in 2008 to make fishing in the reservoir a safety concern?

Was there a scientific reasons for closing. Any thoughts to signage or mitigation?

Historically people have shore fished at the Muddy Run generating reservoir. Could Exelon place signage stating no wading and have people fish from shoreline only?

9-14-11 6pm Meeting at Muddy Run Visitor's Center

<u>General Comments:</u>

Exelon doesn't understand fisherman or how to manage fish.

How will we know that the plans are ready? *Stakeholders will be notified by email. If you need notification by different format let Exelon know.*

What is Exelon thinking of for improvements?

Would like to see additional camping at boat launches for out of state users.

Lancaster County, Norfolk Southern could hinder access, is Exelon currently negotiating with them?

Equestrian Use – need information about available trails and camping with horses. This would include multiple use trails and hitching areas. Camping facilities for equestrian users.

Weekend recreation minimum lake level, can Exelon extend the water levels into the week?

Post Conowingo Pond elevation during flood events.

<u>Muddy Run Generating Reservoir:</u>

Any plans to reopen the generating reservoir? Feels there has to be a way to open, understand there is a safety issue. *Exelon will look at and will address in the recreation plan.*

<u>Wissler's Park:</u>

Why is the kayak launch not labeled as a recreation site? *Access to the area has to cross land that doesn't belong to Exelon. Exelon can look into an agreement with the railroad.*

There is superior boating scenery, Exelon isn't helping people get to it.

Can you link your land to the Conestoga trail at Holtwood? Can you create an easement? Wissler's Park to Conestoga trail should be signed and promoted.

Lancaster County Conservancy has plans to tie into Wissler Run Nature Preserve. Exelon should promote and advertise links with the group. Group received land from PPL and will be developing a trail at Turkey Hill. They are very interested in trails and trail linkages.

<u>Muddy Run Park:</u>

Open the gate off Bethesda Church Road East for access to Muddy Run recreation reservoir (so users don't have to walk to area on trail) during the day time hours and provide porta-potties.

Muddy Run is lacking in family and scout activities. Possibly provide bicycles to rent particularly children's size. Like to see swimming pool at the park. Older kids are bored with the slides. Small miniature golf course at the park.

Any problem with horses on the mowed area around the perimeter of the fence? *No* This area is also good for cross country skiing.

PFBC - Reconsider opening the interpretation center that PECO had to educate about the four districts. Also commended the Byers for the care of the park. People often mistake the park as a State Park.

<u>Susquehanna State Park:</u>

Why doesn't Susquehanna State Park offer seasonal camping?

<u>Peach Bottom:</u>

Has the sediment been tested?

9-15-11 Meeting with Mason-Dixon Trail

General Comments:

Would like to review digitized maps to make sure the trail is correct.

Manager for York is Tammy Clunk, Tom Brandt is retired (York County Parks & Rec).

Will post a sign at trail head at the radio tower.

Peavine Island:

The southerly end of the island there is a big boulder where the trail comes off the island. Any ideas on how to traverse the boulder? *Suggested an iron rung ladder in boulder.*

Muddy Creek:

The trail down the north side of the creek needs a parking lot on Paper Mill Road. The kayakers would like a take out before entering the river (in Cold Cabin cottage cluster). Need better property line information along the creek. Property is in question where it crosses the creek.

Cold Cabin:

Town is not taking care of the area. No local police force, becoming a teen party spot. Would like to see parking dawn to dusk to keep the party kids out. If decide to allow camping, it should be one night only. Would like carry-in/carry-out signs.

Michael's Run through Bird Creek:

Would like to relocate the trail off the road. Would like to be closer to the water.

There is a wilderness Boy Scout site that in this area that they received permission from Exelon to use the site, should check with Rodney. *Fred thought that the site is below Peach Bottom and it is a cottage owner that allows the scouts to use the site.*

East Coast Greenway:

How does this relate to the project, where does it go?

Bird Creek to Churchville:

Do you own the power line corridor?

Conowingo Dam:

Would like to move the trail, would consider a side trail if the overlook was reopened.

<u>Below the Park:</u>

DCNR has approval to take a trail around the north side of the quarry. Does Exelon have any rights with the quarry? *Don't think so.*

9-15-11 2pm Meeting at Conowingo Visitor's Center

General Comments:

Kevin Mendik would like copies of the signup sheets. *Lana will send.*

Lisa Gutierrez -There is a book being developed with concepts and plans for ADA standards for within Maryland for launches. They will share this when it is complete.

Canoe Portage Shuttle:

Are there many calls for the shuttle? *5 to 6 calls a year*

Bob Sadzinski - Are there signs posted stating canoe shuttle is available? *No, it is currently word of mouth.*

Shure's Landing:

The landing is pretty dangerous for bigger boats. Can you put signs in about moderate flows and dangerous flows? *Site was originally constructed as a carry-in.*

Mary Anne Dolan - Important Eagle congregation area, "most important" in lower 48. Birders would be upset to see change in Shure's Landing area. Oct – Dec is the time of year that the birds congregate. Falcons use the dam. The entire greenway is an important bird area and high numbers of people disturb the birds.

Does Exelon allow people to walk below the dam. *Yes for fishing.*

Bob Sadzinski - Shoreline is rough walking down by Shure's Landing. Shure's Landing can be slippery at the end of the season. Angler's would like better foot access to the shoreline.

Conowingo Headpond:

Mary Anne Dolan suggested that birder's would like quiet access above the dam. Facilities specific for birders such as small observation platforms.

Below Conowingo Dam:

Lisa Gutierrez – development of a water trail for the river. Agreements with the MD counties. Currently there are informal pull offs. Would like more parking for kayak access on Cecil County side along Route 222, south of Octoraro to Port Deposit. Also looking for stopping points for lunch and emergency access.

Deer Creek to Lower Susquehanna Heritage Trail:

Will Exelon be formalizing the trail? Expand the trail from Deer Creek down to Lapidum? There is a need for equestrian trails and mountain biking and hiking trails.

McLhinney Park/North Park:

Joe Kochenderfer – There is a 1995 plan to place an elevated walkway in the wetland. There is a problem with drainage off of Route 40 bridge.

Conowingo Catwalk:

Does Exelon intend to open the catwalk? *This is currently under assessment and will the assessment will be available in January of 2012.*

Octoraro Creek:

Cindy Cantor- Cecil County will be asking for assistance with the fields. They are looking to keep moving forward with their plans. They may offer water access for kayakers.

Mason-Dixon Trail:

Waiting for security approval to relocate trail near Conowingo Dam.

Additional Comments from Mary Anne Dolan (after public meeting):

Off road parking and simple trails to the shoreline for bird watching. The trail could be ½ to 1 mile in length. Will speak to the club and determine if there are specific areas that people are looking to access.

From:	Sara Kochenderfer
To:	Newell, Arthur (Bud) E. (Augusta,ME-US)
Cc:	charlie vasilakis; Bob Magee; LSHG; Wayne Dougherty; heather_bennett@nps.gov; Joe @ city hall
Subject:	Comments on Exelon/FERC Relicensing
Date:	Friday, September 16, 2011 3:08:14 PM

Mr Newell

Thanks for the opportunity to discuss this with you in person at the 15 Sep 11 at the Conowingo Visitor Center. This is a follow up as requested regarding potential improvements to the North Park Loop Trail in Havre de Grace. To improve this facility and to add to the educational and recreational values already existing, I believe that the following would be useful to enhance and protect that Trail.

1. Creation of a piling supported walkway into the middle of the tidal wetlands to provide access to wetland interpretation and bird watching. I think this can be done without adversely impacting this area. It is briefly described in the January 17, 1995 Plan of Action for the Future as prepared by the Susquehanna Museum at the Lock House. For the past several years, we have become a venue visited by elementary school students from Harford and surrounding counties, as well as some from Pennsylvania. Our average annual school visitation is approximately 1,000 children (mostly of the 3rd and 4th grade levels), teachers and parents.

2. In several places along the River leg of the Trail we suffer extensive erosion when the wind blows strongly from the east. For example, in March of 2011, erosion as much as four feet encroached on the Trail forcing us to do some relocation inland. Strategically placed rip rap at the vulnerable sites should reduce this erosive effect.

3. At a tidal inlet which feeds the wetlands mentioned in item 1 we often get large trees washed in which damage our wooden walkway. Last year we replaced an outdated crossing (homemade) constructed of old power poles planked with 2x4s with an engineered walkway constructed by a marine construction company. It has definitely improved the crossing and allows us to show how the ebb and flow of the tide feeds the wetlands. To protect this amenity, if some large boulders or other items could be placed at the point where this inlet meets the River, our investment in the walkway could be better protected by preventing these large trees from washing into the inlet and crashing into the walkway.

We hope that these suggestions will be considered as the FERC process continues. As before, if you desire, I will be pleased to accompany you or others on a site visit and try to explain further. The best way to contact me is by email but I may be reached at 410-939-4005 or joek@havredegracemd.com.

Thank you

Joe Kochenderfer Steward, North Park Loop Trail

From: jim.kush@verizon.net
To: Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject: FW: Conowingo Pond
Date: Tuesday, September 27, 2011 9:48:11 AM

Dear Bud Newell

I understand the you are gathering input as to the public use of Conowingo Pond.

I am an almost weekly recreational boater and cottage owner on the pond. I would like to voice my dissatisfaction with the condition of Peach Bottom Marina in Lancaster county PA. The silt accumulations in the Marina make its use very difficult. Being the only location to buy gas on the river in PA I need to access the marina almost weekly in the summer months. Often if the water level is low I must cruse eight miles to Glen Cove just to fill my boat with gas. I am requesting that the water ways entering and in the Marina be dredged and maintained. This Marina is an important part of the local community as well is used by boaters from as far away as Lancaster, Philadelphia and Allentown.

Jim Kushlan
405 Fairmont Rd
Havertown PA 19083

Cell 610 349 0289

The Cecil Bird Club
www.cecilbirds.org

September 29, 2011

Mr. Bud Newell
Environmental Specialist
Recreation Land Management
TRC
14 Gabriel Drive
Augusta, Maine 04330

Dear Bud:

I found the September 15th meeting at the Conowingo Visitors Center very informative and came away excited about Exelon's plans.

I've consulted with members of the Cecil Bird Club and on their behalf offer the following comments.

The area below the dam – Fishermen's Wharf – has the largest concentration of Bald Eagles during migration in the lower 48 states. Birders and photographers cram the parking lot. I am glad that area will remain open to the public. To expand access, bird watchers would find it very useful if there was an additional viewing platform on the Cecil side of the dam.

The trail leading from the parking lot through the Greenway (known locally as the Wildflower Walk) is also heavily used by bird watchers year round. There are a number of bird species nesting in that area. It also is an important rest area for migrating birds. We are pleased that this area, too, will remain open.

Exelon is to be commended for the work it has done in opening these areas to bird watchers and nature lovers. We urge you to take the next step in allowing citizens to access the Susquehanna River and offer the following suggestions:

Maryanne Dolan
104 Milestone Road
Elkton, Maryland 21921
(410) 398-7567

(I) Open a trail on the Cecil County side below the dam. Currently the only access to that area is the small area accessible from the Octoraro Creek area off of route 222. It would be nice if there were a foot trail – leading up to the dam and down river – which would allow bird watchers and nature lovers to observe ducks on the Susquehanna.

(2) Open a foot trail above the dam - on either side of the river – again to allow observers to view ducks and waterfowl.

One of the suggestions at the September 15th meeting was for more horse trails throughout the area owned or controlled by Exelon. We support this concept. Any non-motorized trail or path would be suitable for birdwatching. Impact on the birds would be minimal, and so long as the paths remained non-motorized, impact on the environment would also be minimal.

Again, Bud, thanks for taking the time to update local residents. We appreciate the courtesy.

Sincerely,

Maryanne

Maryanne Dolan
President

President James T. Mullin, District 1
Vice President Diana Broomell, District 4
Commissioner Tari Moore, District 2
Commissioner Michael W. Dunn, District 3
Commissioner Robert J. Hodge, District 5

Alfred C. Wein, Jr.
County Administrator

Clyde VanDyke, Director
410.996.8101

County Information
410.996.5200
410.658.4041

CECIL COUNTY GOVERNMENT

Department of Parks and Recreation
200 Chesapeake Boulevard, Suite 1200, Elkton, MD 21921

October 4, 2011

RE: Project #P-405

Tom Sullivan, PE
Principal, Henniker, NH Office
Gomez and Sullivan Engineers, PC
41 Liberty Hill Rd. Bldg 1
P.O. Box 2179
Henniker, NH 03242

RECEIVED
OCT 0 7 2011
BY:

Mr. Sullivan,

On August 24, 2011 the Cecil County Department of Parks and Recreation was notified via email that Exelon Corporation would be holding public meetings to discuss potential recreational pursuits within a defined area along the Susquehanna River basin (Conowingo and Muddy Run). It was disclosed that these meetings and proposed opportunities are directly linked to Exelon's relicensing requirements.

In response to these notifications members of the Cecil County Parks and Recreation staff and Parks Board attended meetings held on September 14, and September 15, 2011, to discuss potential recreational opportunities in the Conowingo service area, that may or may not fall within the defined footprint of the Exelon Corporation project area.

Members of the community who live in this westernmost part of the county have had very limited development in the area of Parks and Recreation. Representing these residents, and their children, the following requests reflect an immediate need for recreation resources to be dedicated to the communities of Conowingo, Port Deposit, Bainbridge and Perryville.

After extensive conversation with several stakeholders, the Board of Cecil County Commissioners the Cecil County Department of Parks and Recreation and the Cecil County Board of Parks and Recreation recommend the following enhancements be considered for the Exelon Corporation recreation improvement project;

1. Cecil County requests monetary assistance in Phase II development of Conowingo Park.
   a. Property owned by Exelon, improved by Cecil County Government
   b. Phase II to include two baseball fields, playground, pavilion and a parking lot.
   c. Approximate development costs $500,000.

2. Exelon lease an additional 20 +/- acres to Cecil County, for recreational purposes.
   a. Exelon develop the site with additional athletic fields, trails, water craft access points, fishing piers, parking lot etc.
   b. Develop a trail system around the current Conowingo Creek site.

c. Develop kayak launch at the Rocky Run site.
d. Cecil County Parks and Recreation maintain and manage requested improvements.

Note: To date Cecil County has invested $457,915.00 in Phase I of Conowingo Park.

The Cecil County Department of Parks Recreation appreciates the afforded involvement in this process and encourages any and all feedback to the above stated recommendations. We look forward to being an active member in this much needed enhancement project.

Sincerely,

James T. Mullin, President, Cecil County Commissioners

Cc: Kimberly D. Bose, Secretary Federal Energy Regulatory Commission
Colleen Hicks, Manager Regulatory and Licensing Exelon
Cecil County Board of Parks and Recreation

From:	Glen Cove Marina
To:	Newell, Arthur (Bud) E. (Augusta,ME-US)
Subject:	Glen Cove Marina
Date:	Friday, October 07, 2011 8:18:05 AM

Hi Bud,

Sorry I didn't get back to you sooner. I finally got the marina back together after the storms.
During our brief meeting on Wednesday, Sept.21st I mentioned the great need for parking at Glen Cove Marina for vehicles and vehicles with trailers. This has been a problem since we opened in 1984. With todays multi car families and growing popularity in fishing tournaments, and kayaking, many are turned away including boat slip renters. In June 2011, 14 slips were eliminated from the facility which is not the answer. When the public cannot launch their vessel then park the vehicle, river access is being denied. This is not the intentions of Exelon or F.E.R.C.
Being a life long resident of the river and familiar with the power company and government issues and policies it's possible my experience may be useful in some decision making in the "pond" area not only at Glen Cove Marina. Please do not hesitate to call on me.

Thank you,
"Butch"
Byron R Young

APPENDIX 2: USER PREFERENCE SURVEY FORM

Exelon User Preference Survey

Site name:____ **Date:**______________

Weather:____ **Time:**______________

1. Please rate the following amenities at this location:

	Poor		Fair		Excellent
Parking	1	2	3	4	5
Facility Maintenance	1	2	3	4	5
Fishing Access, if present	1	2	3	4	5
Overall Quality	1	2	3	4	5

Please explain any "poor" ratings.

____

____

____

2. List any specific improvements you would like to see at this location.

____

____

____

3. List any specific improvements you would like to see within the Conowingo Project.

____

____

____

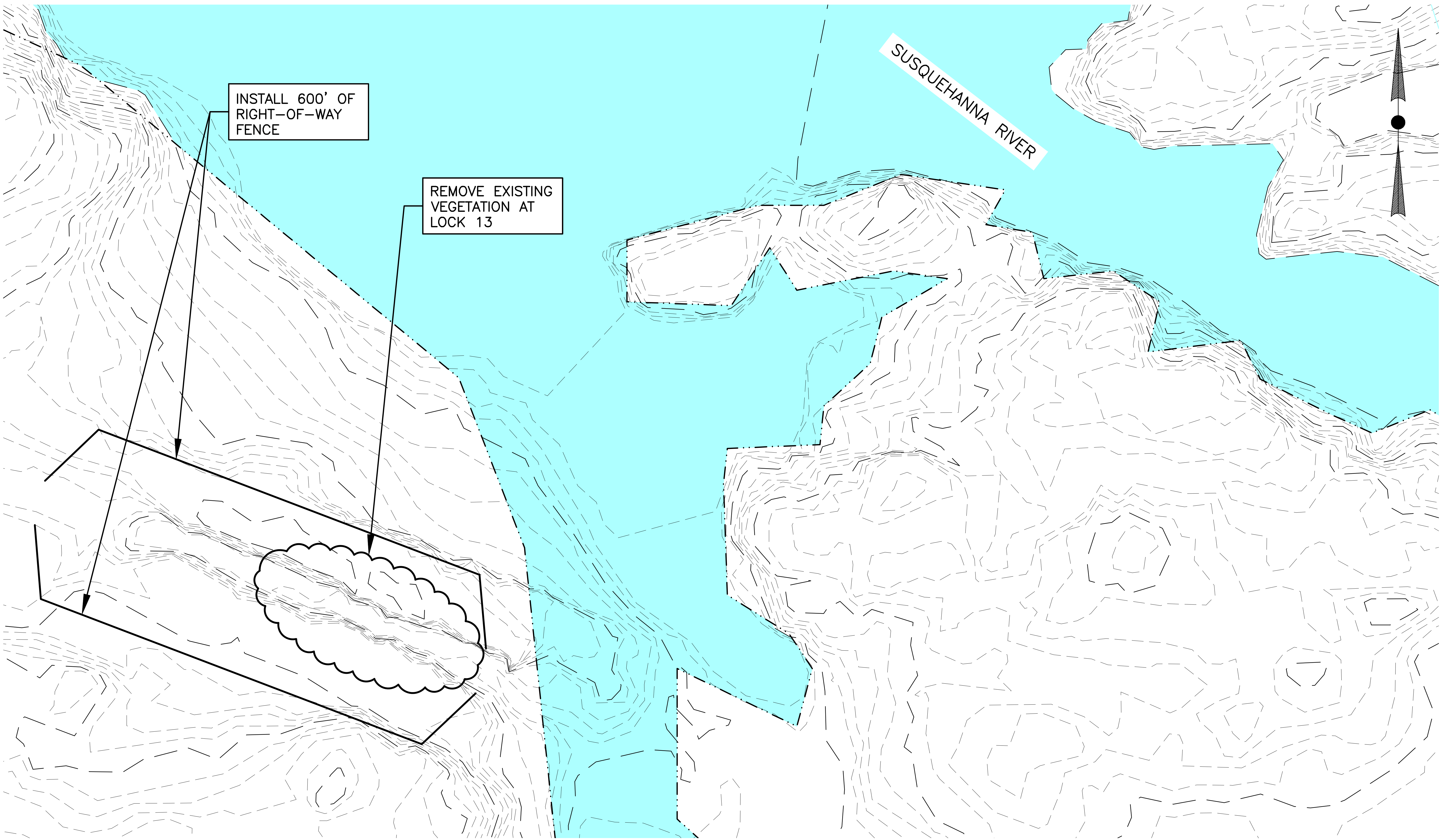
4. Additional comments or suggestions:

____

____

____

APPENDIX 3: RECREATION ENHANCEMENT CONCEPT PLANS



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

25' 0 25' 50'
SCALE: 1" = 50'

GOMEZ AND SULLIVAN Engineers, P.C.
288 Genesee Street, Utica, NY 13502, (315) 724-4860
41 Liberty Rd, Bldg 1, Henniker, NH 03242, (603) 428-4960
5820 Main Street, Williamsville, NY 14221, (716) 250 4960

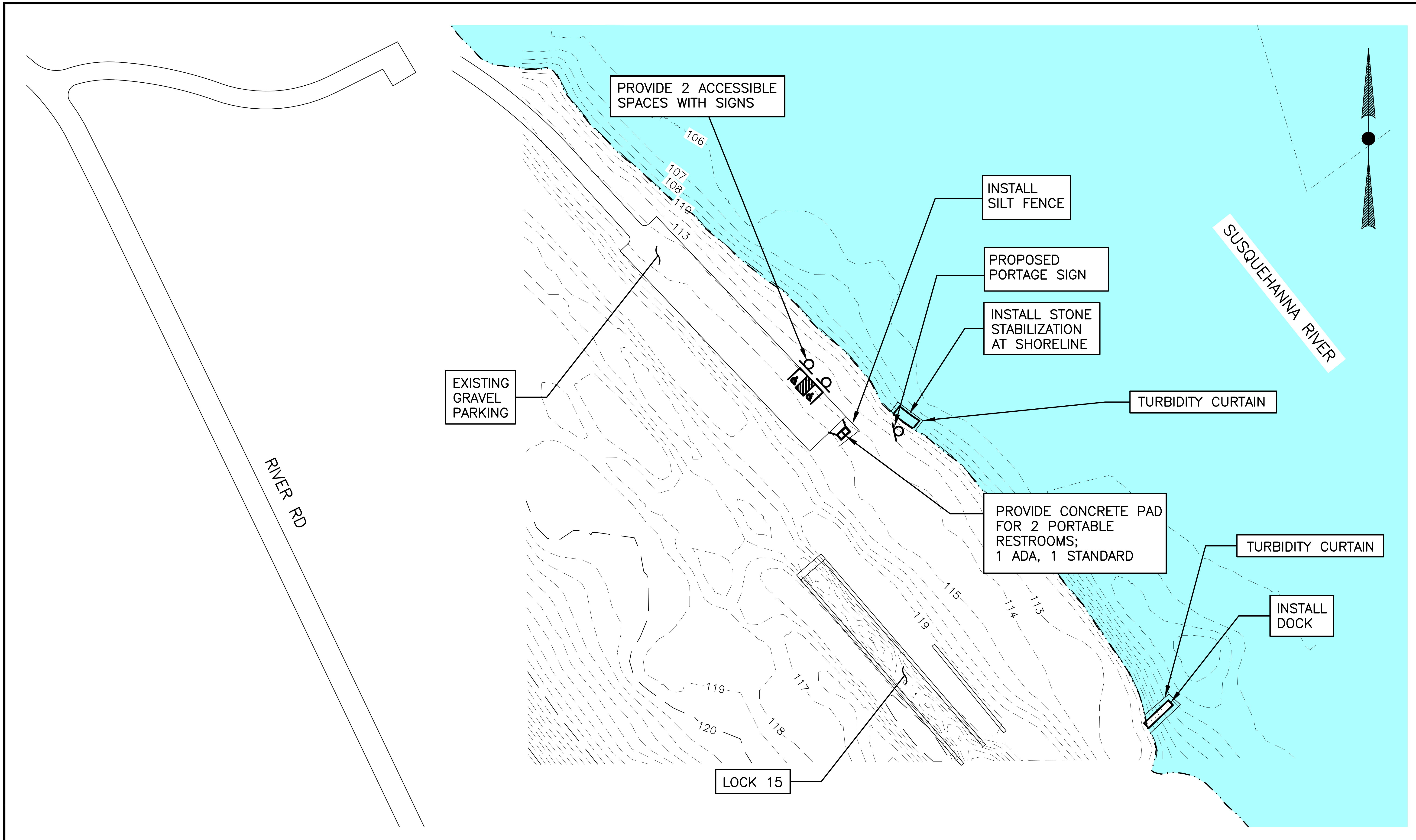
TRC

Exelon

RECREATION AREAS
LOCK 13
SITE PLAN

DATE MARCH 27, 2012

FIGURE NO: 8.17



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

40' 0 40' 80'
SCALE: 1" = 80'

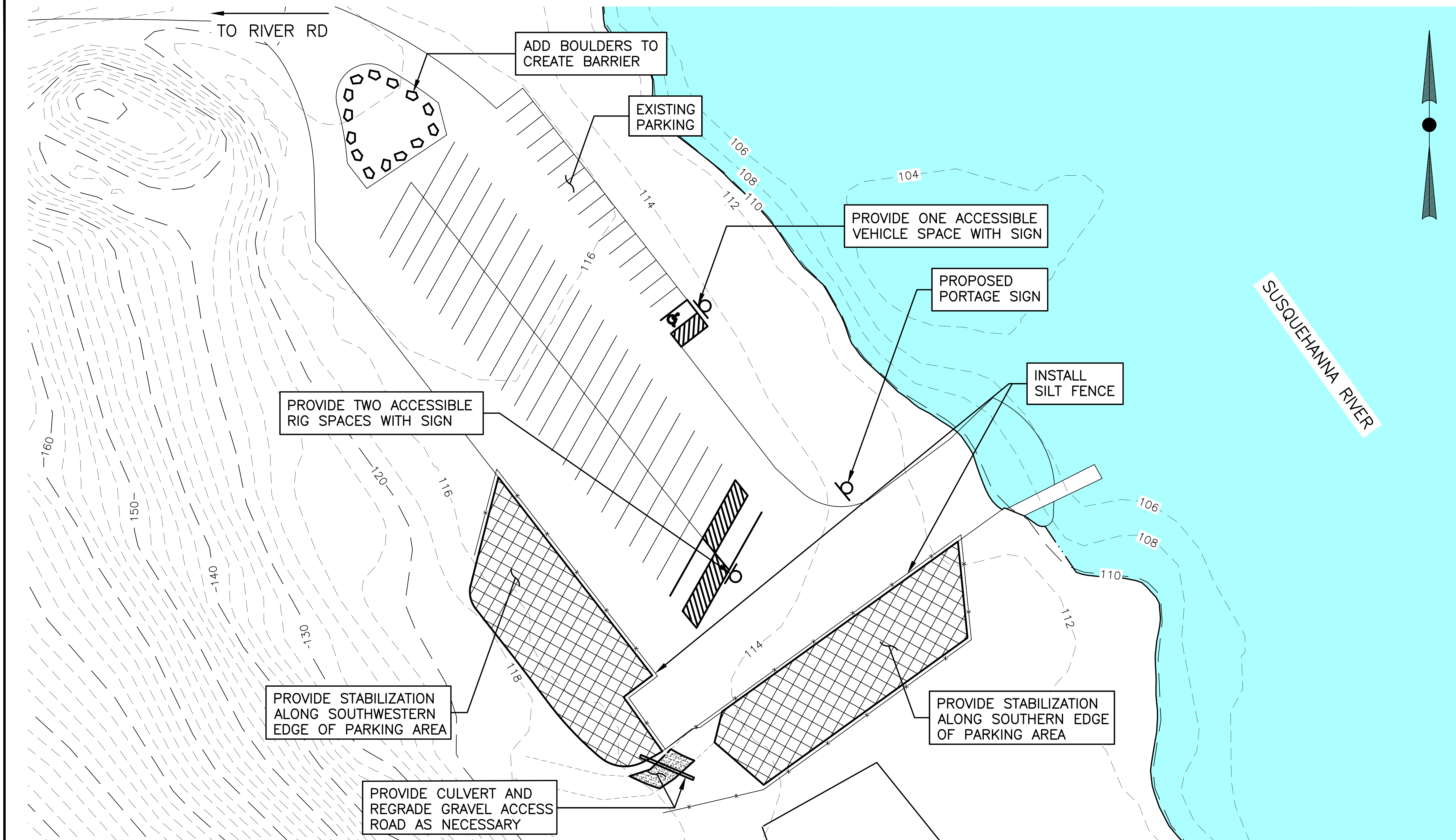
GOMEZ AND SULLIVAN Engineers, P.C.
288 Genesee Street Utica, NY 13502 (315) 724-4860
41 Liberty Rd, Bldg 1 Henniker, NH 03242 (603) 428-4960
5820 Main Street Williamsville, NY 14221 (716) 250 4960

TRC

Exelon

RECREATION AREAS
LOCK 15
SITE PLAN

DATE MARCH 27, 2012
FIGURE NO: 8.18



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

25' 0 25' 50'
SCALE: 1" = 50'

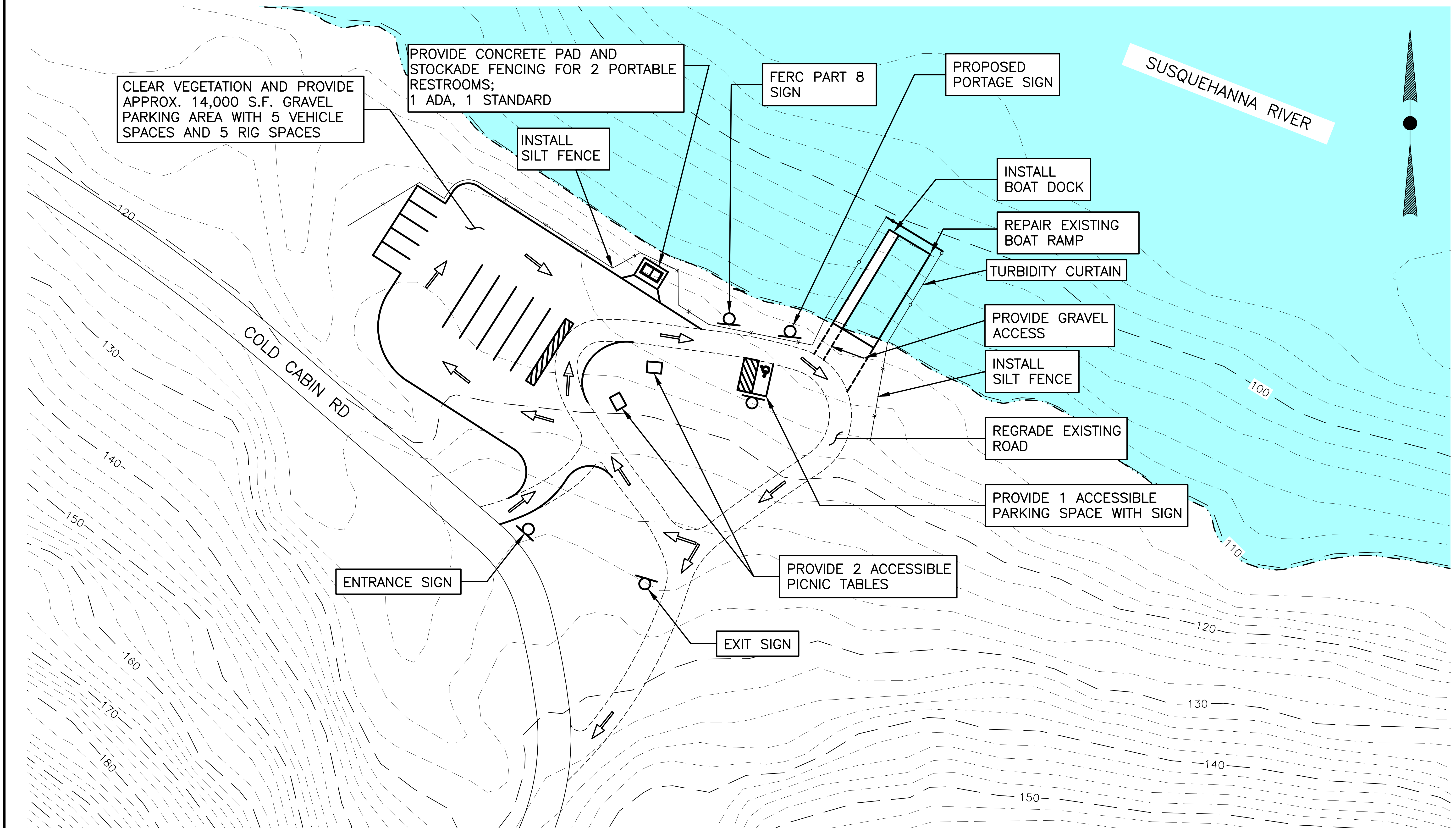
GOMEZ AND SULLIVAN Engineers, P.C.
288 Genesee Street, Utica, NY 13502, (315) 724-4860
41 Liberty Rd, Bldg 1, Henniker, NH 03242, (603) 428-4960
5820 Main Street, Williamsville, NY 14221, (716) 250 4960

TRC

Exelon

RECREATION AREAS
MUDDY CREEK BOAT LAUNCH
SITE PLAN

DATE MARCH 27, 2012
FIGURE NO: 8.19



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

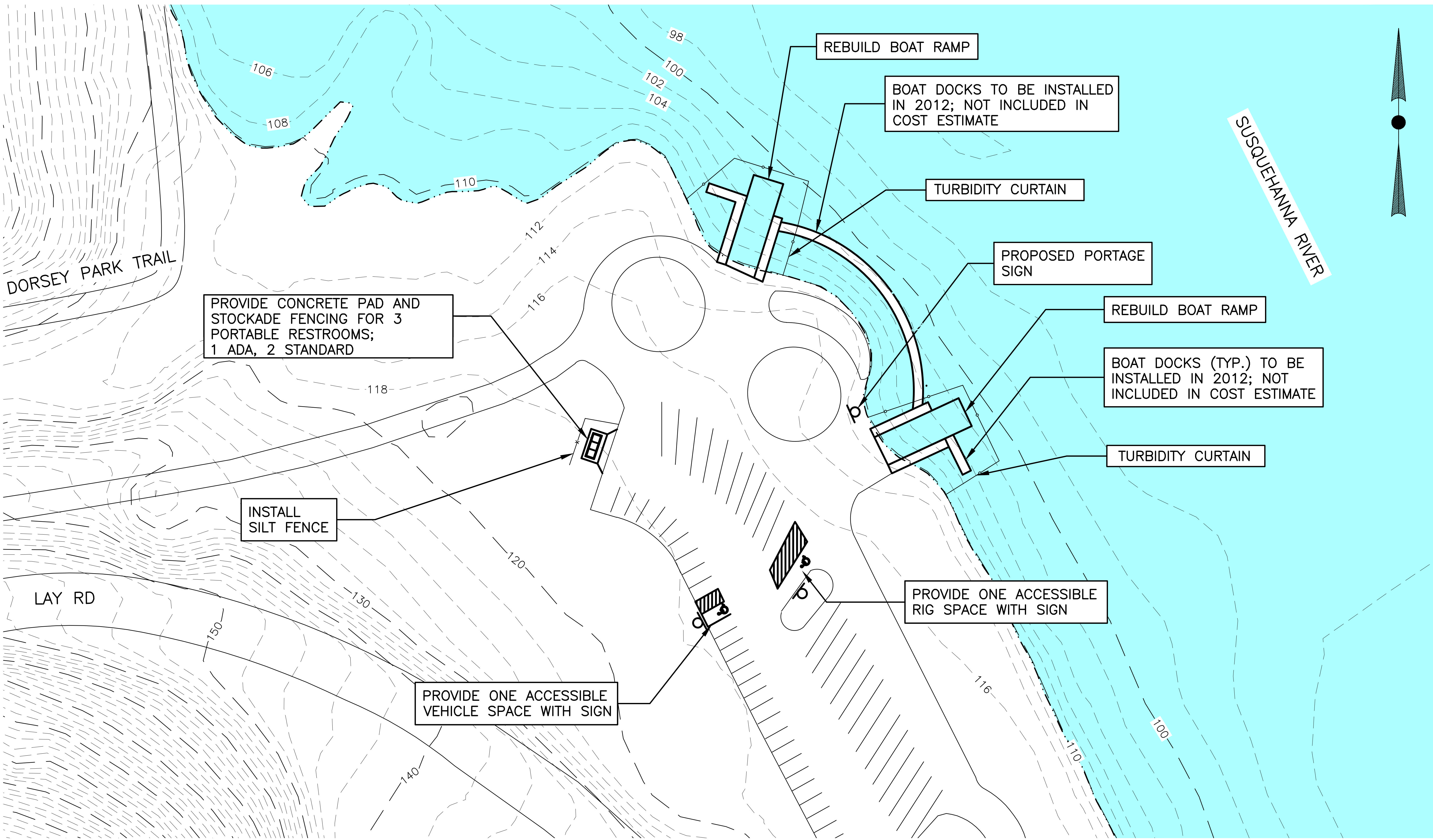
25' 0 25' 50'
SCALE: 1" = 50'

GOMEZ AND SULLIVAN Engineers, P.C.
288 Genesee Street, Utica, NY 13502, (315) 724-4860
41 Liberty Rd, Bldg 1, Henniker, NH 03242, (603) 428-4960
5820 Main Street, Williamsville, NY 14221, (716) 250 4960

TRC
Exelon

RECREATION AREAS
COLD CABIN
SITE PLAN

DATE MARCH 21, 2012
FIGURE NO: 8.20



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

30' 0 30' 60'
SCALE: 1" = 60'

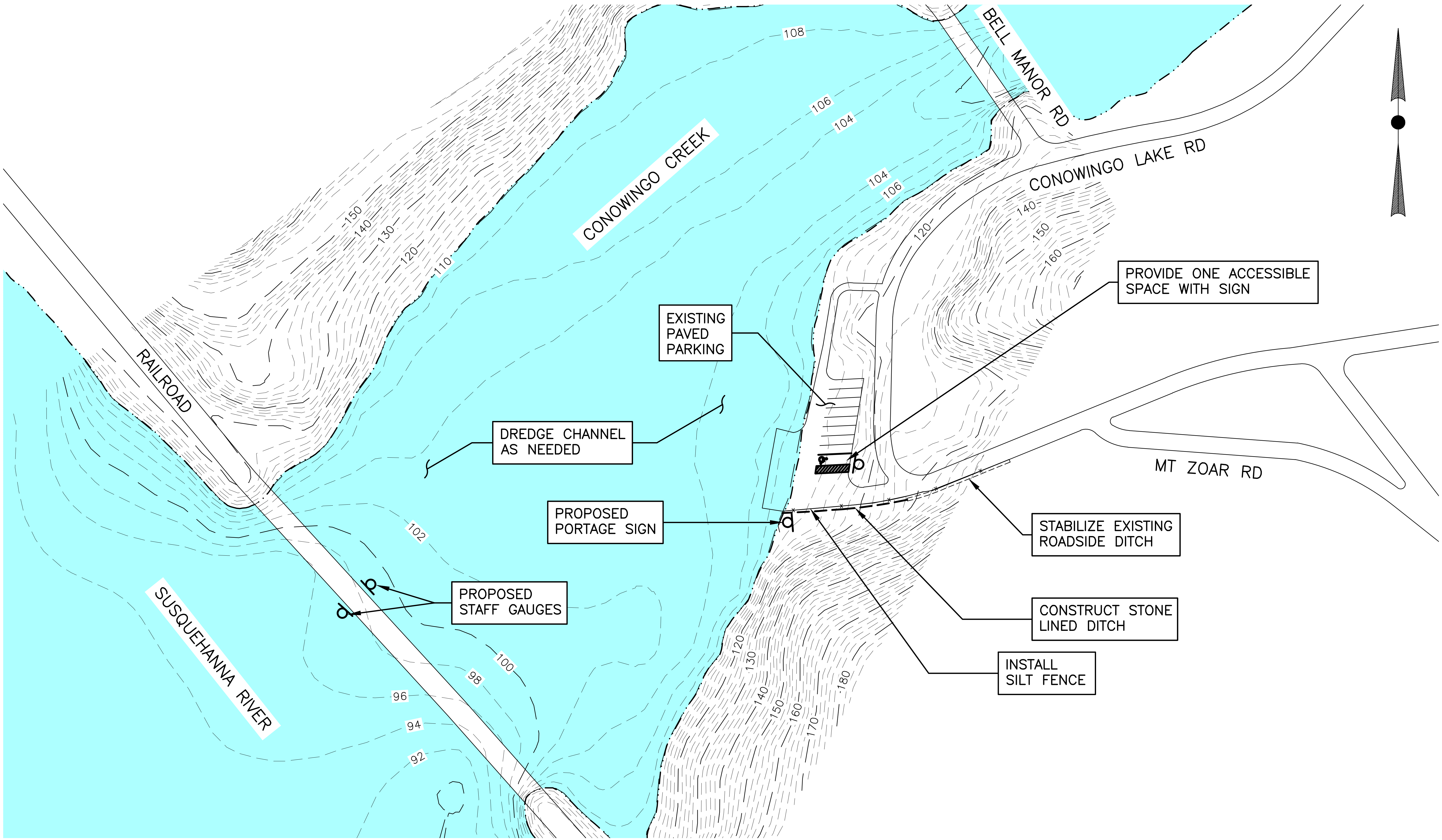
GOMEZ AND SULLIVAN
Engineers, P.C.
288 Genesee Street, Utica, NY 13502, (315) 724-4860
41 Liberty Rd, Bldg 1, Henniker, NH 03242, (603) 428-4960
5820 Main Street, Williamsville, NY 14221, (716) 250 4960

TRC

Exelon

RECREATION AREAS
DORSEY PARK
SITE PLAN

DATE MARCH 27, 2012
FIGURE NO: 8.21



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

50' 0 50' 100'
SCALE: 1" = 100'

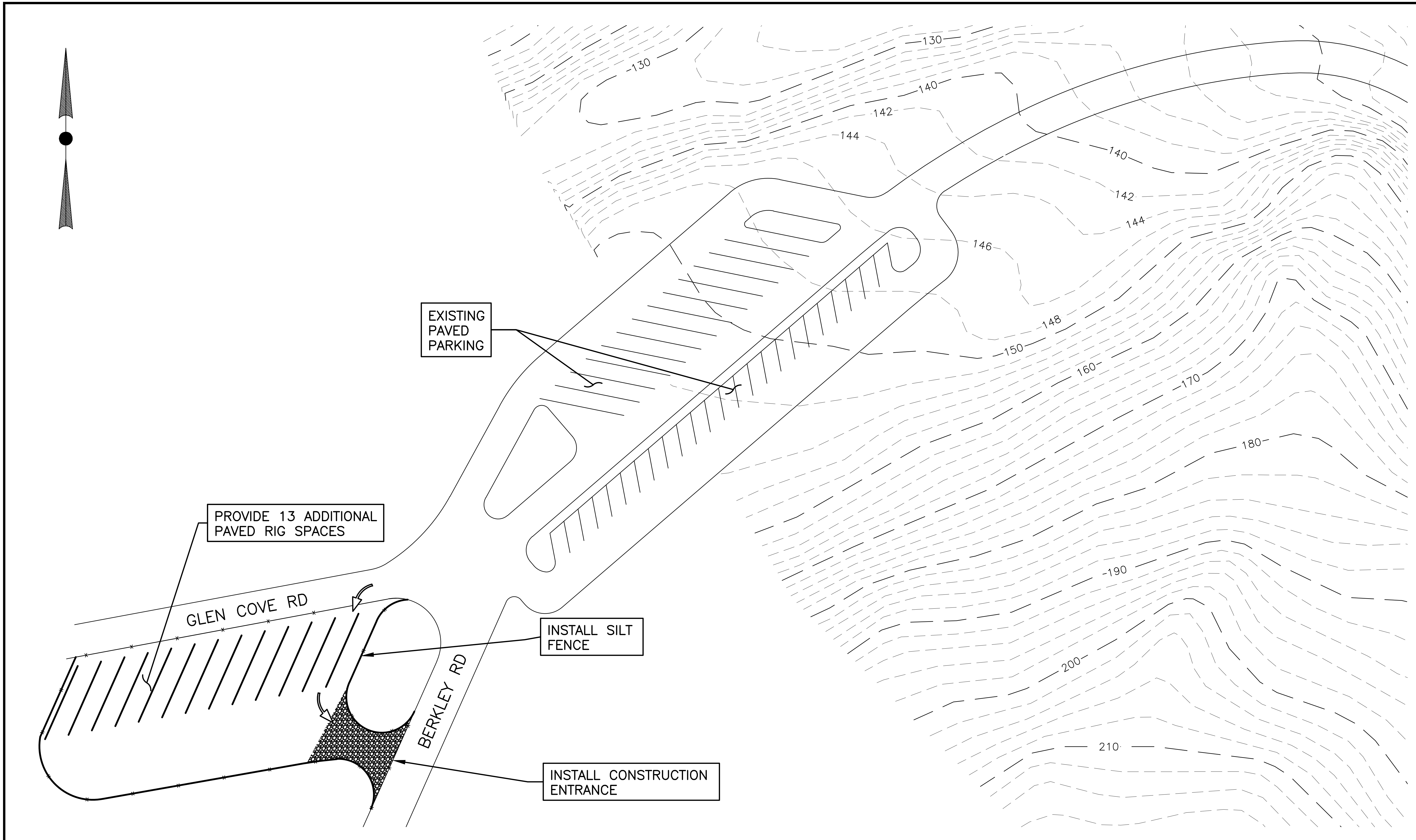
GOMEZ AND SULLIVAN Engineers, P.C.
288 Genesee Street Utica, NY 13502 (315) 724-4860
41 Liberty Rd, Bldg 1 Henniker, NH 03242 (603) 428-4960
5820 Main Street Williamsville, NY 14221 (716) 250 4960

TRC

Exelon

RECREATION AREAS
CONOWINGO CREEK
SITE PLAN

DATE MARCH 27, 2012
FIGURE NO: 8.24



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

25' 0 25' 50'
SCALE: 1" = 50'

GOMEZ AND SULLIVAN Engineers, P.C.
288 Genesee Street Utica, NY 13502 (315) 724-4860
41 Liberty Rd, Bldg 1 Henniker, NH 03242 (603) 428-4960
5820 Main Street Williamsville, NY 14221 (716) 250 4960

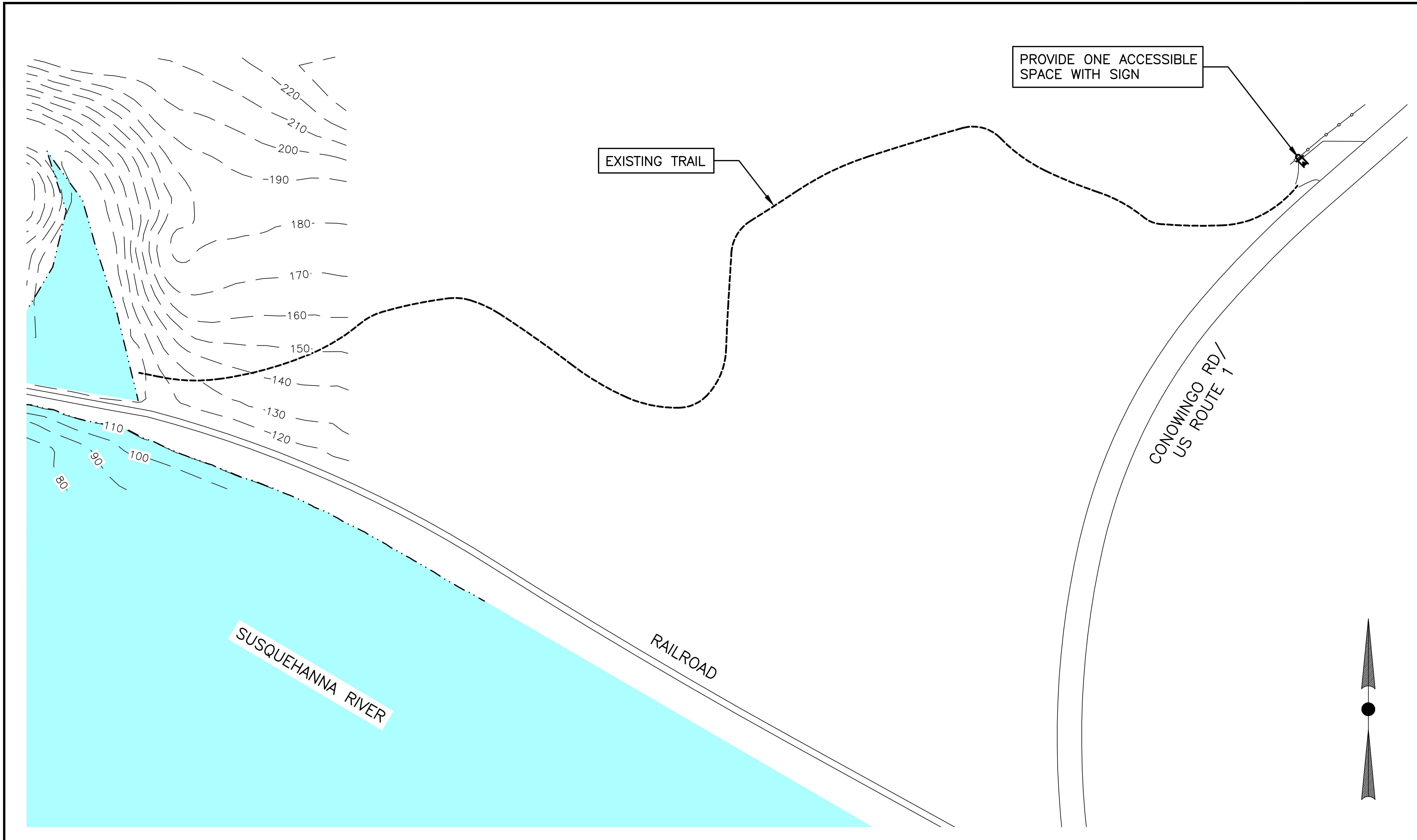
TRC

Exelon

RECREATION AREAS
GLEN COVE
SITE PLAN

DATE MARCH 27, 2012

FIGURE NO: 8.25A



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

100' 0 100' 200'
SCALE: 1" = 200'

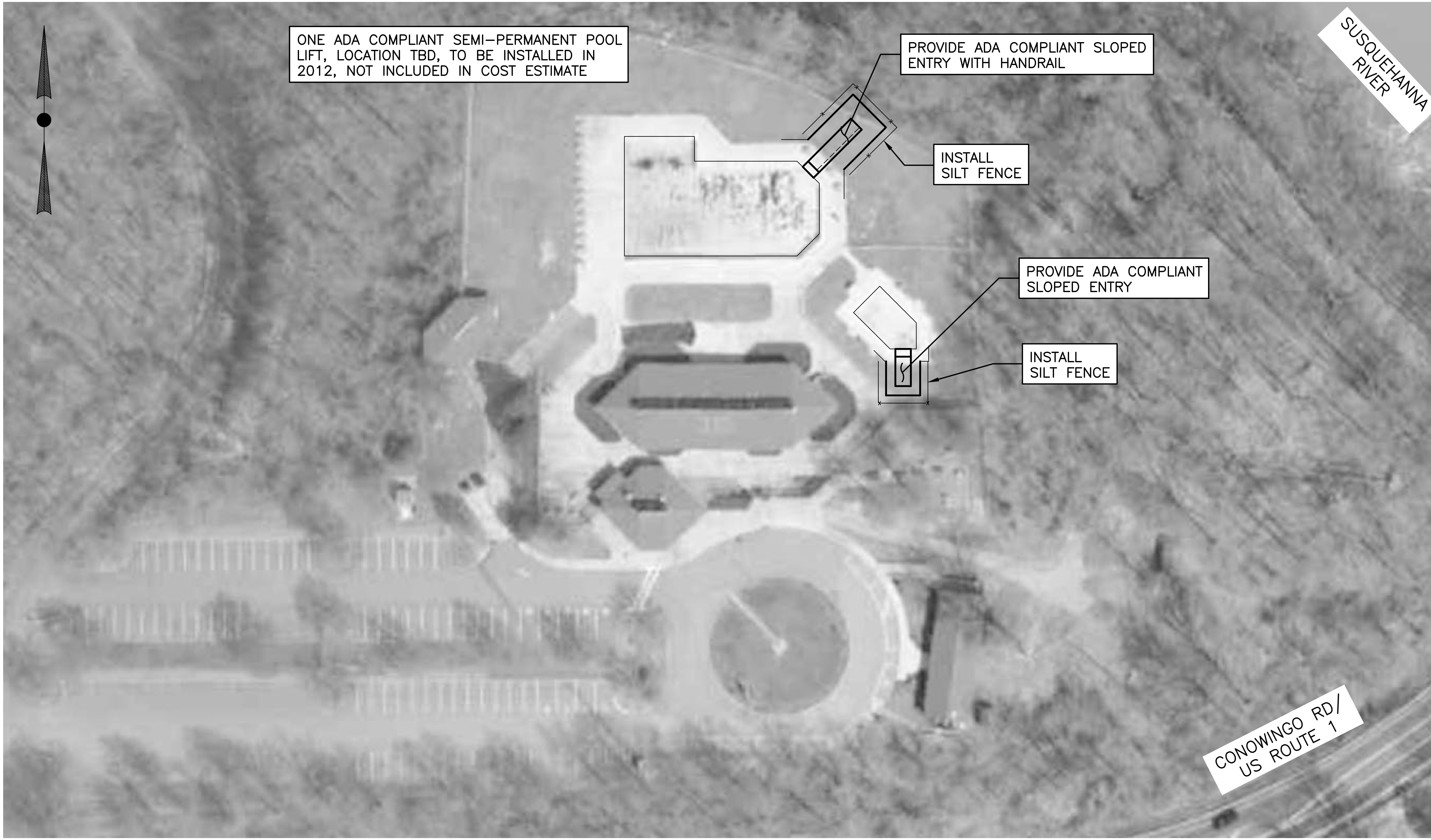
GOMEZ AND SULLIVAN Engineers, P.C.
288 Genesee Street Utica, NY 13502 (315) 724-4860
41 Liberty Rd, Bldg 1 Henniker, NH 03242 (603) 428-4960
5820 Main Street Williamsville, NY 14221 (716) 250 4960

TRC

Exelon

RECREATION AREAS
FUNKS POND
SITE PLAN

DATE FEBRUARY 3, 2012
FIGURE NO: 8.26



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

30' 0 30' 60'
SCALE: 1" = 60'

GOMEZ AND SULLIVAN Engineers, P.C.
288 Genesee Street Utica, NY 13502 (315) 724-4860
41 Liberty Rd, Bldg 1 Henniker, NH 03242 (603) 428-4960
5820 Main Street Williamsville, NY 14221 (716) 250 4960

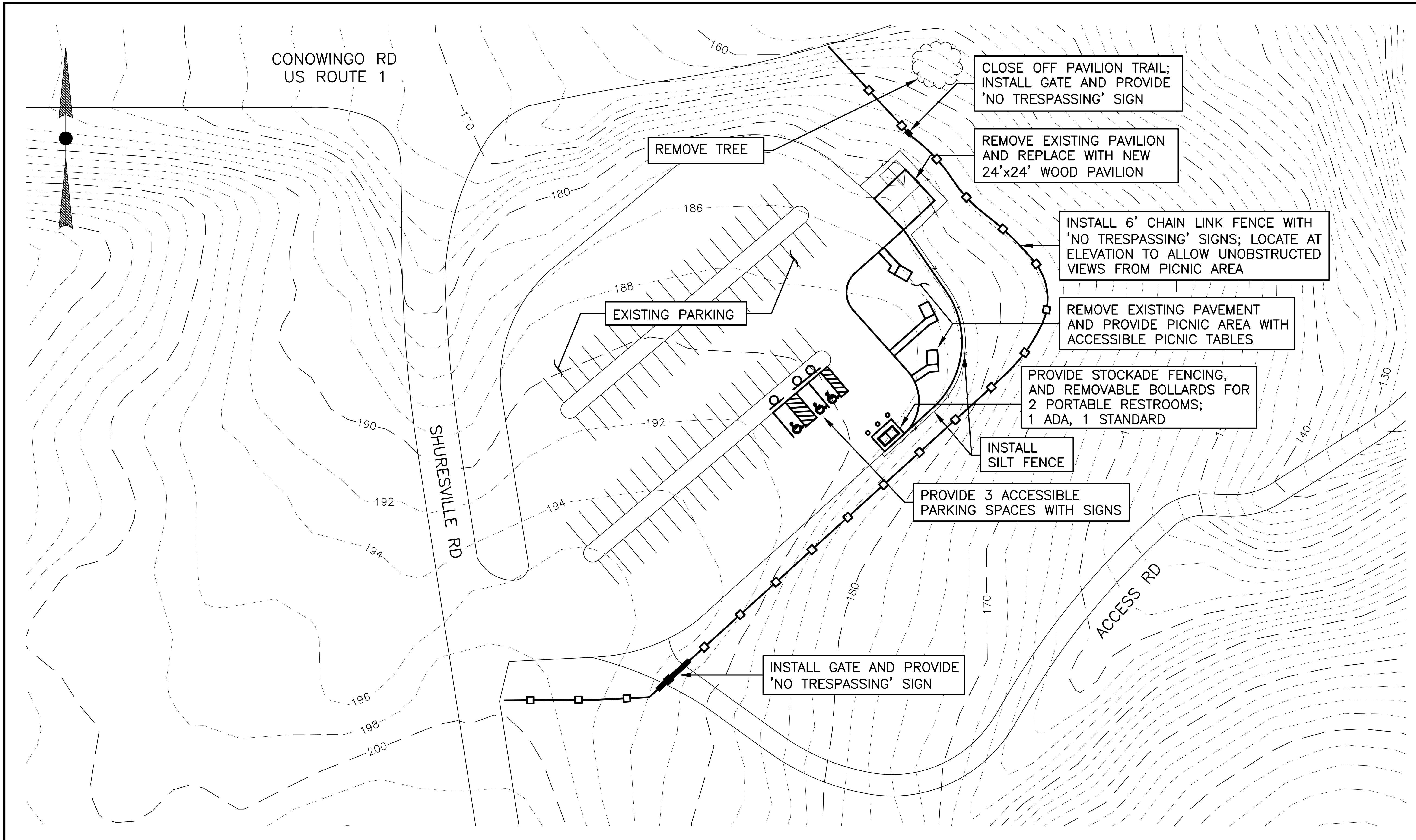
TRC

Exelon

RECREATION AREAS
VISITORS CENTER & POOL
SITE PLAN

DATE MARCH 27, 2012

FIGURE NO: 8.27–2



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

25' 0 25' 50'
SCALE: 1" = 50'

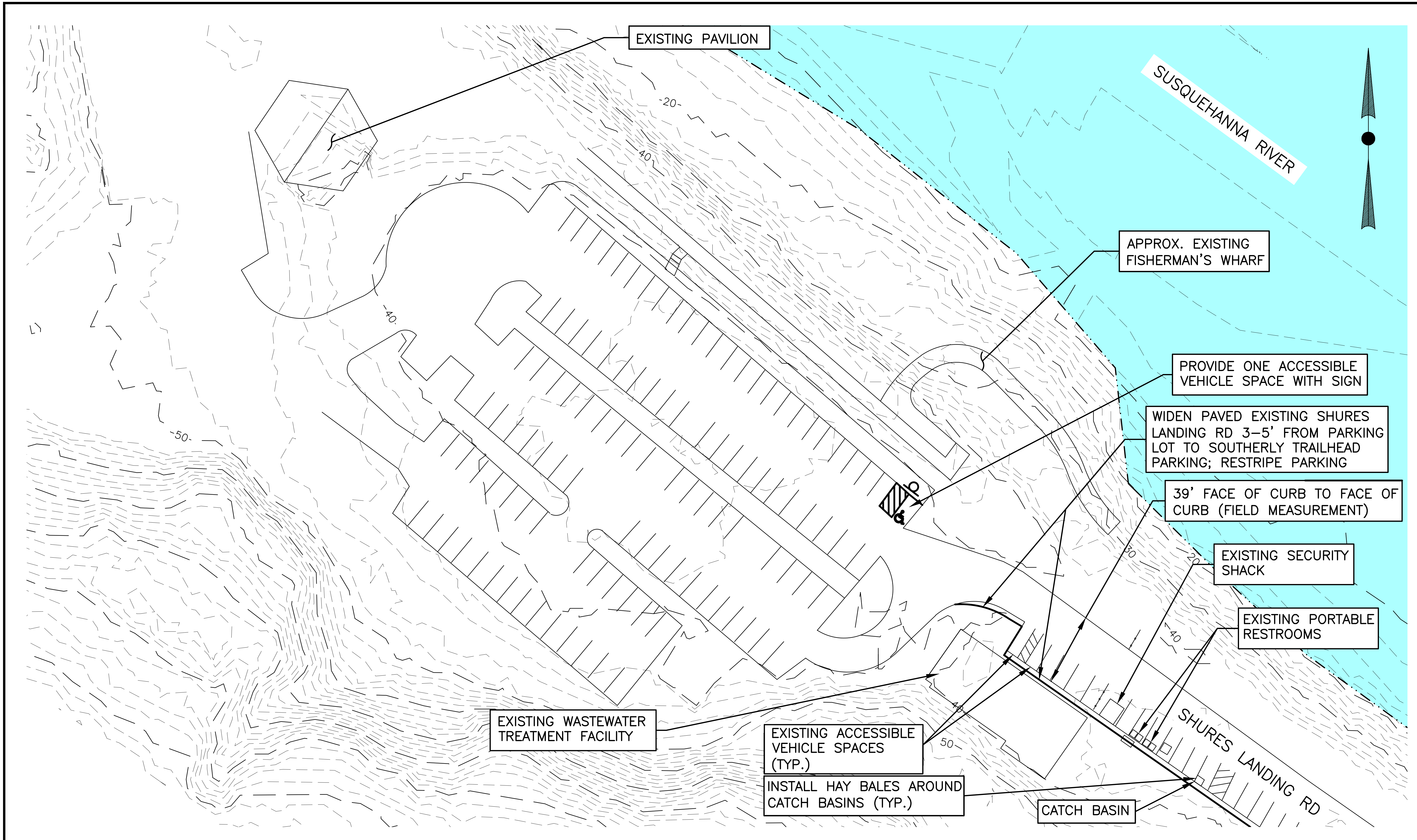
GOMEZ AND SULLIVAN Engineers, P.C.
288 Genesee Street, Utica, NY 13502, (315) 724-4860
41 Liberty Rd, Bldg 1, Henniker, NH 03242, (603) 428-4960
5820 Main Street, Williamsville, NY 14221, (716) 250 4960

TRC

Exelon

RECREATION AREAS
OVERLOOK PARK
SITE PLAN

DATE MARCH 27, 2012
FIGURE NO: 8.28



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

25' 0 25' 50'
SCALE: 1" = 50'

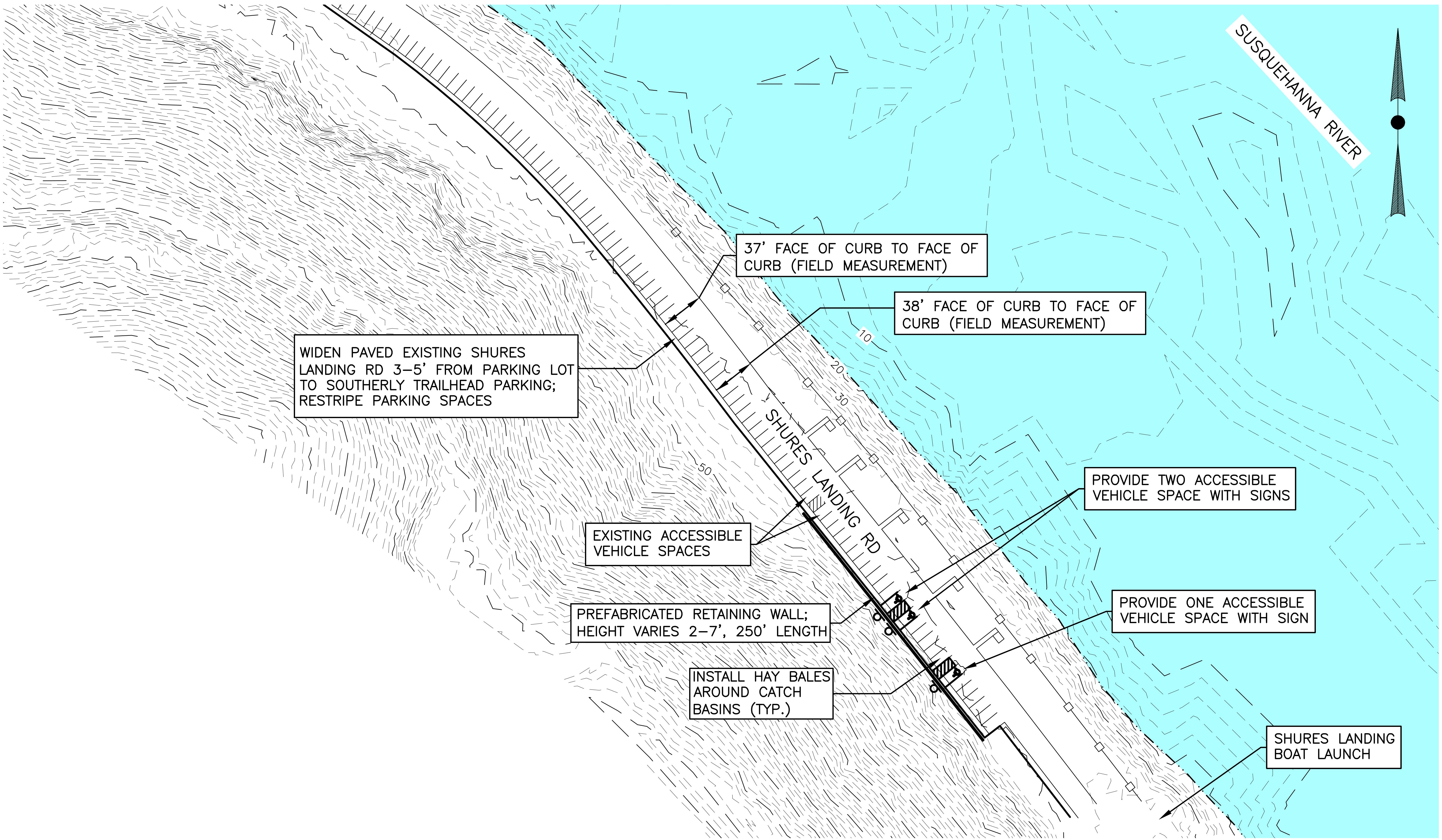
GOMEZ AND SULLIVAN Engineers, P.C.
288 Genesee Street, Utica, NY 13502, (315) 724-4860
41 Liberty Rd, Bldg 1, Henniker, NH 03242, (603) 428-4960
5820 Main Street, Williamsville, NY 14221, (716) 250 4960

TRC

Exelon

RECREATION AREAS
FISHERMANS PARK
SITE PLAN

DATE MARCH 27, 2012
FIGURE NO: 8.29A



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

40' 0 40' 80'
SCALE: 1" = 80'

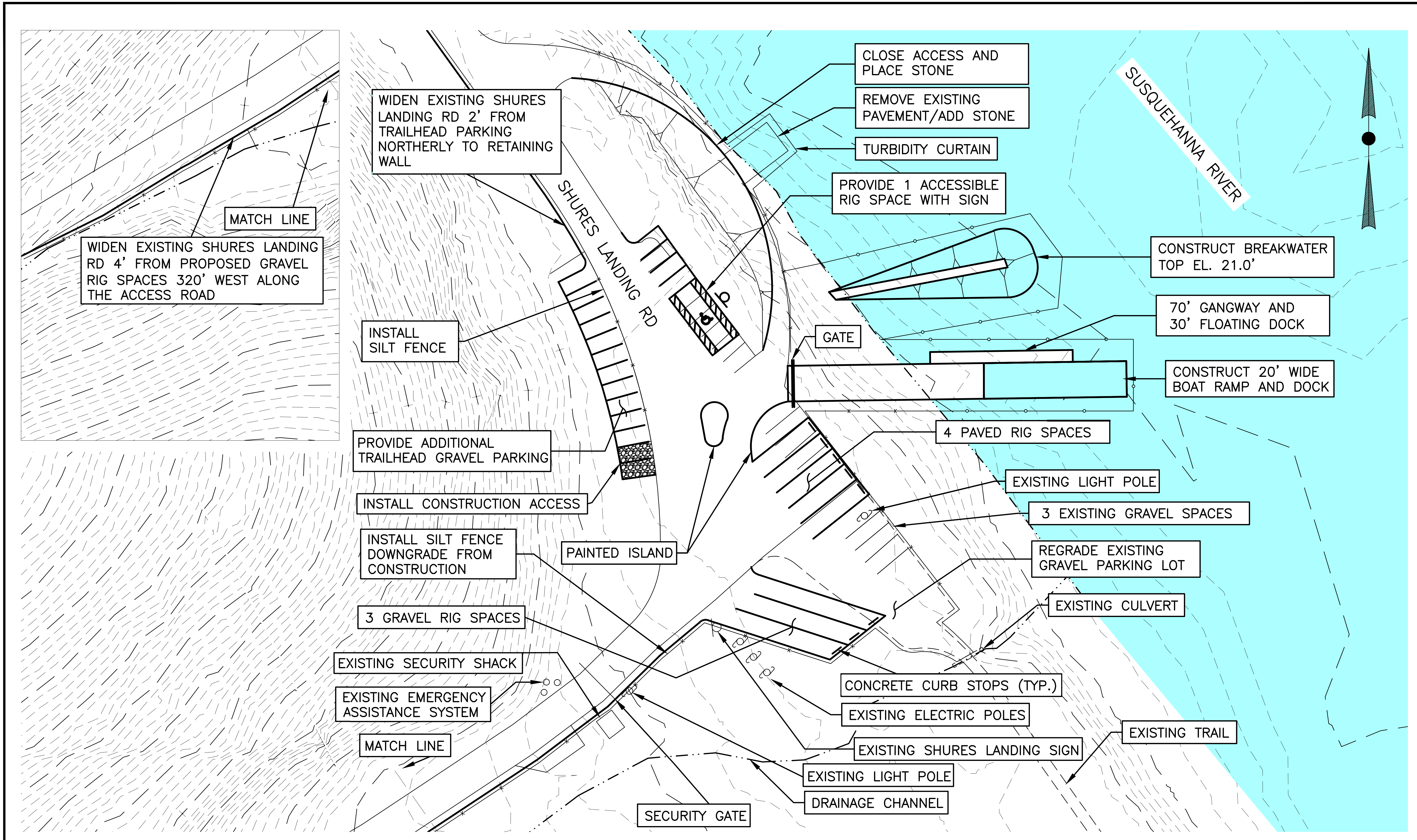
GOMEZ AND SULLIVAN Engineers, P.C.
288 Genesee Street Utica, NY 13502 (315) 724-4860
41 Liberty Rd, Bldg 1 Henniker, NH 03242 (603) 428-4960
5820 Main Street Williamsville, NY 14221 (716) 250 4960

TRC

Exelon

RECREATION AREAS
FISHERMANS PARK
FISHING ACCESS
SITE PLAN

DATE MARCH 27, 2012
FIGURE NO: 8.29B



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

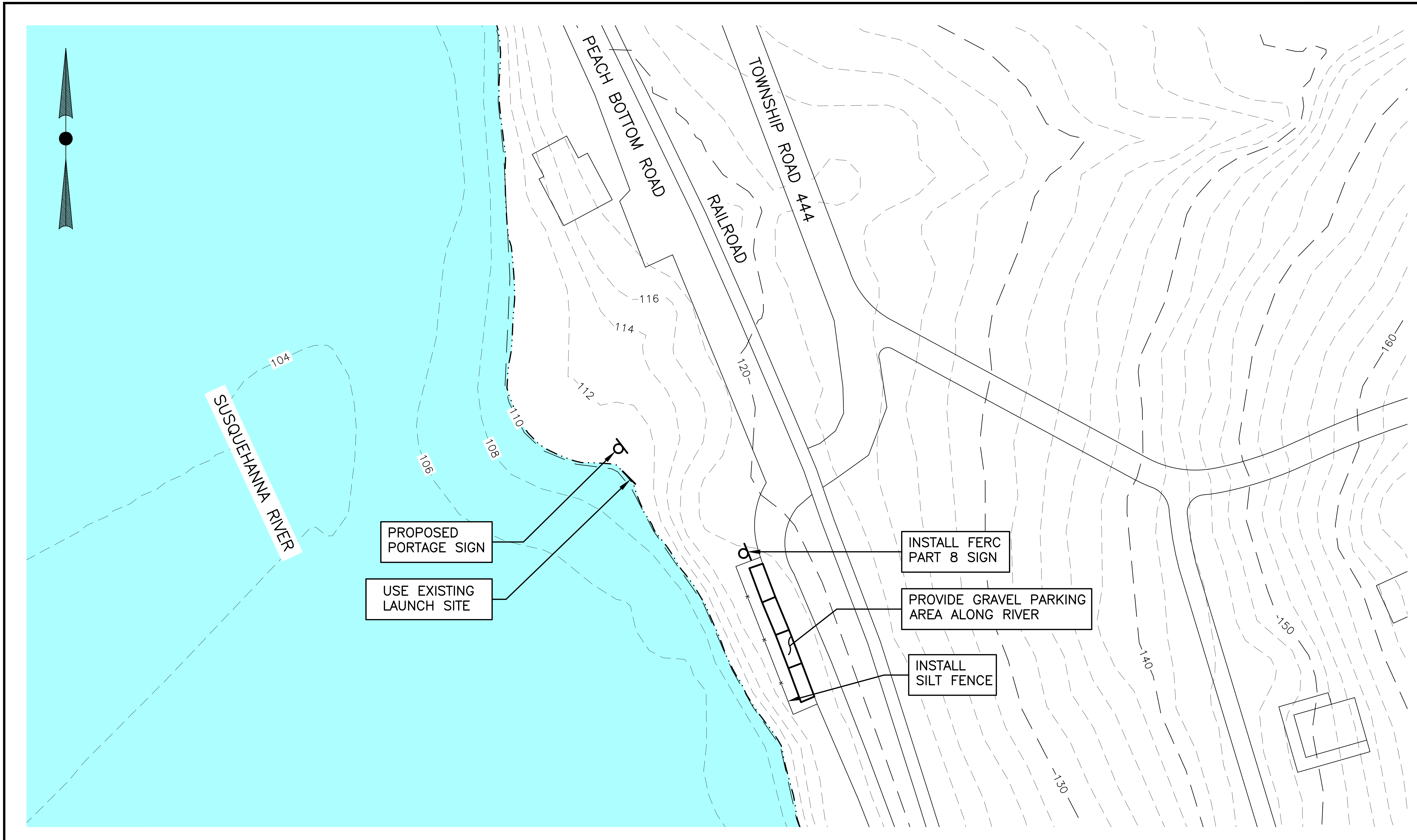
25' 0 25' 50'
SCALE: 1" = 50'

GOMEZ AND SULLIVAN Engineers, P.C.
288 Genesee Street Utica, NY 13502 (315) 724-4860
41 Liberty Rd, Bldg 1 Henniker, NH 03242 (603) 428-4960
5820 Main Street Williamsville, NY 14221 (716) 250 4960

TRC
Exelon

RECREATION AREAS
SHURES LANDING
SITE PLAN – OPTION 2

DATE MARCH 27, 2012
FIGURE NO: 8.29C-2



NO.	DATE	ISSUED FOR	BY

DESIGNED
DRAWN
CHECKED
SECT.CHIEF
PROJ.ENGR.

25' 0 25' 50'
SCALE: 1" = 50'

GOMEZ AND SULLIVAN Engineers, P.C.
288 Genesee Street Utica, NY 13502 (315) 724-4860
41 Liberty Rd, Bldg 1 Henniker, NH 03242 (603) 428-4960
5820 Main Street Williamsville, NY 14221 (716) 250 4960

TRC

Exelon

RECREATION AREAS
PEACH BOTTOM COTTAGE RAMP
SITE PLAN

DATE MARCH 27, 2012

FIGURE NO: 8.32

APPENDIX 4: CONOWINGO COST OPINION

Prepared by: KJC Checked: RLS

Gomez and Sullivan Engineers, P.C.

Project No: 1385

Prepared for:

Exelon

OPINION OF PROBABLE CONSTRUCTION COST

2/15/2012

Project: **Recreation Improvement Projects**

Estimate for: **Lock 13**

Item	Description	Quantity	Unit	Unit Price	Cost
Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)		10%	EA	$16,339.96	$1,634
Clearing	Erosion Control	1	LS	$1,000.00	$1,000
Clearing	Clear trees up to 24"	0.2	AC	$13,700.00	$2,740
Clearing	Grub and Remove Stumps up to 24"	0.2	AC	$7,050.00	$1,410
Clearing	Clearing and Grubbing	0.2	AC	$9,075.00	$1,815
Trail	Trailhead Sign at Lock 12 Parking Area	1	EA	$3,200.00	$3,200
Fence	Right-of-Way Fence	600	LF	$4.84	$2,904
Fence	Line Posts	34	EA	$73.18	$2,488
Fence	End Posts	4	EA	$73.18	$293
Fence	Corner Posts	4	EA	$122.53	$490

Subtotal Direct Cost	**$17,974**
Contingency Allowance (25%)[2]	$4,493
Total Direct Cost[3]	**$22,000**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$4,000
Total OPCC $2011	$26,000
Total OPCC $2014[4]	**$29,000**

Notes:

1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.
4. Rounded to the nearest $1,000. Escalated at 4.0%.

Prepared by: KJC Checked: RLS

Gomez and Sullivan Engineers, P.C. Project No: 1385

Prepared for:

Exelon

OPINION OF PROBABLE CONSTRUCTION COST 1/31/2012

Project: **Recreation Improvement Projects**

Estimate for: **Lock 15**

Item	Description	Quantity	Unit	Unit Price	Cost
Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)		10%	EA	$32,068.40	$3,207
Docks	Turbidity Curtain	85	LF	$70.00	$5,950
Docks	Concrete	6	CY	$250.00	$1,500
Docks	Floating Dock	200	SF	$40.00	$8,000
Docks	Excavation (Dry)	6	CY	$10.00	$60
Docks	Hauling	6	CY	$10.00	$60
Docks	Gangway	15	LF	$158.00	$2,370
Stabilization	Turbidity Curtain	85	LF	$70.00	$5,950
Stabilization	Excavation	22	CY	$10.00	$220
Stabilization	Hauling	22	CY	$10.00	$220
Stabilization	12"-24" Stone	22	CY	$115.00	$2,530
Stabilization	Geotextile Fabric	39	SY	$2.55	$99
Restrooms	Excavation (Dry)	6	CY	$10.00	$60
Restrooms	Hauling	6	CY	$10.00	$60
Restrooms	Pad Concrete	2	CY	$600.00	$1,200
Restrooms	3/4" crushed gravel base	4	CY	$56.50	$226
Restrooms	Stone Dust	1	CY	$60.00	$60
Restrooms	Geotextile Fabric	9	SY	$2.55	$23
Parking	Portage Sign	1	EA	$3,200.00	$3,200
Parking	Accessible Parking Sign	2	EA	$140.00	$280

Subtotal Direct Cost	**$35,275**
Contingency Allowance (25%)[2]	$8,819
Total Direct Cost[3]	**$44,000**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$9,000
Total OPCC $2011	$53,000
Total OPCC $2014[4]	**$60,000**

Notes:
1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.
4. Rounded to the nearest $1,000. Escalated at 4.0%.

Prepared by: KAM Checked: RLS

Gomez and Sullivan Engineers, P.C. Project No: 1385

Prepared for:

Exelon

CONCEPTUAL OPINION OF PROBABLE CONSTRUCTION COST 3/21/2012

Project: **Recreation Improvement Projects**

Estimate for: **Muddy Creek, Parking, Signage, and Stabilization**

Item	Description	Quantity	Unit	Unit Price	Cost
	Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)	1	LS	$3,846.18	$3,846
Parking	Accessible Stall Striping	1,035	LF	$0.55	$569
Parking	Accessible Parking Sign	3	EA	$140.00	$420
Stabilization	Erosion Control	1	LS	$2,000.00	$2,000
Stabilization	Clearing & Grubbing	0.32	AC	$9,075.00	$2,917
Stabilization	Fine Grading	1,556	SY	$4.00	$6,222
Stabilization	Geotextile Fabric	1,556	SY	$2.55	$3,967
Stabilization	Respread Topsoil	350	CY	$28.50	$9,975
Stabilization	Seed	14,000	SF	$0.06	$784
Stabilization	Blanket	1,556	SY	$1.80	$2,800
Stabilization	18"-diam. HDPE Culvert	30	LF	$20.50	$615
Stabilization	3/4" Crushed Gravel Base (dry)	22	CY	$56.50	$1,243
Portage Sign	Portage Sign	1	EA	$3,200.00	$3,200
Boulders	Boulder Barrier	15	EA	$250.00	$3,750

Subtotal Direct Cost	**$42,308**
Contingency Allowance (25%)[2]	$10,577
Total Direct Cost[3]	**$53,000**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$11,000
Total OPCC $2011	$64,000
Total OPCC $2014[4]	**$72,000**

Notes:
1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.
4. Rounded to the nearest $1,000. Escalated at 4.0%.

Prepared by: KJC Checked: RLS

Gomez and Sullivan Engineers, P.C. Project No: 1385

Prepared for:

Exelon

OPINION OF PROBABLE CONSTRUCTION COST 1/31/2012

Project: **Recreation Improvement Projects**

Estimate for: **Cold Cabin Boat Ramp Repair, Parking and Restroom Concrete Pad with Fence**

Item	Description	Quantity	Unit	Unit Price	Cost
Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)		10%	EA	$113,616.32	$11,362
Boat Launch	Erosion Control	1	LS	$2,000.00	$2,000
Boat Launch	Turbidity Curtain	175	LF	$70.00	$12,250
Boat Launch	Excavation (Dry)	36	CY	$10.00	$360
Boat Launch	Excavation (Wet)	36	CY	$20.00	$720
Boat Launch	Hauling	72	CY	$10.00	$720
Boat Launch	Boat Ramp Repair Labor and Equipment	1	LS	$9,000.00	$9,000
Boat Launch	3/4" crushed gravel base	15	CY	$56.50	$848
Boat Launch	3/4" crushed gravel base (Wet)	9	CY	$64.00	$576
Boat Launch	1-1/2" gravel	15	CY	$60.00	$900
Boat Launch	12"-24" Stone	36	CY	$115.00	$4,140
Boat Launch	Geotextile Fabric	107	SY	$2.55	$273
Boat Launch	Abutment Concrete	6	CY	$250.00	$1,500
Boat Launch	Floating Dock	400	SF	$40.00	$16,000
Boat Launch	Gangway	15	LF	$158.00	$2,370
Parking	Erosion Control	1	LS	$1,000.00	$1,000
Parking	Silt Fence	1000	LF	$1.34	$1,340
Parking	Clearing and Grubbing	0.5	ACRE	$9,075.00	$4,538
Parking	Excavation	533	CY	$10.00	$5,330
Parking	Hauling	533	CY	$10.00	$5,330
Parking	3/4" crushed gravel base	314	CY	$56.50	$17,741
Parking	1-1/2" gravel	267	CY	$60.00	$16,020
Parking	Accessible Parking Sign	1	EA	$140.00	$140
Parking	Enter/Exit Signs	2	EA	$140.00	$280
Parking	FERC Part 8 Sign	1	EA	$3,200.00	$3,200
Restrooms	Excavation (Dry)	11	CY	$10.00	$110
Restrooms	Hauling	11	CY	$10.00	$110
Restrooms	Pad Concrete	2	CY	$600.00	$1,200
Restrooms	3/4" crushed gravel base	8	CY	$56.50	$452
Restrooms	Stone Dust	4	CY	$60.00	$240
Restrooms	Gates (6' Wide)	2	EA	$280.50	$561
Restrooms	Stockade Fence Panel (Composite Material)	240	SF	$2.25	$540
Restrooms	Fence Posts	12	EA	$50.00	$600
Restrooms	Backer Rail	80	LF	$2.44	$195
Restrooms	Stockade Fence Installation (15% of Gate/Fencing Materials)	1	LS	$285.00	$285
Restrooms	Fencing Delivery (10% of Gate/Fencing Materials)	1	LS	$189.62	$190
Restrooms	Geotextile Fabric	23	SY	$2.55	$59
Picnic Area	Accessible Picnic Tables	2	EA	$1,250.00	$2,500

Subtotal Direct Cost	**$124,978**
Contingency Allowance (25%)[2]	$31,244
Total Direct Cost[3]	**$156,000**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$31,000
Total OPCC $2011	$187,000
Total OPCC $2014[4]	**$210,000**

Notes:

1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.
4. Rounded to the nearest $1,000. Escalated at 4.0%.

Prepared by: KAM Checked: RLS

Gomez and Sullivan Engineers, P.C. Project No: 1385

Prepared for:

Exelon

CONCEPTUAL OPINION OF PROBABLE CONSTRUCTION COST 3/21/2012

Project: **Recreation Improvement Projects**

Estimate for: **Dorsey Park**

Item	Description	Quantity	Unit	Unit Price	Cost
	Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)	1	LS	$14,737.62	$14,738
Access. Stall	Accessible Parking Sign	2	EA	$140.00	$280
Access. Stall	Accessible Stall Striping	630	LF	$0.55	$347
Boat Ramp	Demo Existing Concrete	61	CY	$220.00	$13,420
Boat Ramp	Excavation (Dry)	62	CY	$10.00	$620
Boat Ramp	Excavation (Wet)	121	CY	$20.00	$2,420
Boat Ramp	Geotextile Fabric	510	SY	$2.55	$1,301
Boat Ramp	3/4" Crushed Gravel Base (Dry)	50	CY	$56.50	$2,825
Boat Ramp	3/4" Crushed Gravel Base (Wet)	80	CY	$64.00	$5,120
Boat Ramp	W6 X 20 Steel Beam	232	LF	$37.50	$8,700
Boat Ramp	Concrete Planks	1,600	SF	$35.00	$56,000
Boat Ramp	Concrete	17	CY	$550.00	$9,350
Boat Ramp	12" - 24" Stone	170	CY	$115.00	$19,550
Boat Ramp	Turbidity Curtain	315	LF	$70.00	$22,050
Restrooms	Excavation (Dry)	19	CY	$10.00	$190
Restrooms	Hauling	19	CY	$10.00	$190
Restrooms	Pad Concrete	2	CY	$600.00	$1,200
Restrooms	3/4" crushed gravel base	10	CY	$56.50	$565
Restrooms	Stone Dust	4	CY	$60.00	$240
Restrooms	Stockade Fence Panel (Composite Material)	264	SF	$2.25	$594
Restrooms	Gates (6' Wide)	3	EA	$280.50	$842
Restrooms	Fence Posts	14	EA	$50.00	$700
Restrooms	Backer Rail	88	LF	$2.44	$215
Restrooms	Stockade Fence Installation (15% of Gate/Fencing Materials)	1	LS	$352.53	$353
Restrooms	Fencing Delivery (10% of Gate/Fencing Materials)	1	LS	$235.02	$235
Restrooms	Geotextile Fabric	28	SY	$2.55	$71

Subtotal Direct Cost	**$162,114**
Contingency Allowance (25%)[2]	$40,528
Total Direct Cost[3]	**$203,000**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$41,000
Total OPCC $2011	$244,000
Total OPCC $2014[4]	**$274,000**

Notes:

1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.
4. Rounded to the nearest $1,000. Escalated at 4.0%.

Prepared by: KJC Checked: RLS

Gomez and Sullivan Engineers, P.C. Project No: 1385

Prepared for:

Exelon

OPINION OF PROBABLE CONSTRUCTION COST 3/21/2012

Project: **Recreation Improvement Projects**

Estimate for: **Conowingo Creek**

Item	Description	Quantity	Unit	Unit Price	Cost
Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)		10%	EA	$29,296.00	$2,930
Stabilization	Erosion Control	1	LS	$1,000.00	$1,000
Stabilization	Excavation	190	CY	$10.00	$1,900
Stabilization	Hauling	190	CY	$10.00	$1,900
Stabilization	3"-12" Stone	140	CY	$115.00	$16,100
Stabilization	Geotextile Fabric	330	SY	$2.55	$842
Staff Gauges	Staff Gauges	2	LS	$2,500.00	$5,000
Parking	Striping	390	LF	$0.55	$215
Parking	Portage Sign	1	EA	$3,200.00	$3,200
Parking	Accessible Parking Sign	1	EA	$140.00	$140

Subtotal Direct Cost	**$33,226**
Contingency Allowance (25%)[2]	$8,306
Total Direct Cost[3]	**$42,000**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$8,000
Total OPCC $2011	$50,000
Total OPCC $2014[4]	**$56,000**

Notes:
1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.

Prepared by: KAM Checked: RLS

Gomez and Sullivan Engineers, P.C. Project No: 1385

Prepared for:

Exelon

OPINION OF PROBABLE CONSTRUCTION COST 2/29/2012

Project: **Recreation Improvement Projects**

Estimate for: **Glen Cove Marina - Additional 13 Rig Parking Spaces between Glen Cove Rd and Berkley Rd**

Item	Description	Quantity	Unit	Unit Price	Cost
Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)		10%	EA	$83,193.75	$8,319
Parking	Erosion Control	1	LS	$1,500.00	$1,500
Parking	Clearing and Grubbing	0.16	ACRE	$9,075.00	$1,452
Parking	Excavation	695	CY	$10.00	$6,950
Parking	Hauling	695	CY	$10.00	$6,950
Parking	3/4" crushed gravel base	280	CY	$56.50	$15,820
Parking	1-1/2" gravel	280	CY	$60.00	$16,800
Parking	Asphalt (3" thick)	1670	SY	$20.00	$33,400
Parking	Striping	585	LF	$0.55	$322

Subtotal Direct Cost	**$91,513**
Contingency Allowance (25%)[2]	$22,878
Total Direct Cost[3]	**$114,000**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$23,000
Total OPCC $2011	$137,000
Total OPCC $2014[4]	**$154,000**

Notes:

1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.
4. Rounded to the nearest $1,000. Escalated at 4.0%.

Prepared by: RLS Checked:

Gomez and Sullivan Engineers, P.C. Project No: 1385

Prepared for:

Exelon

OPINION OF PROBABLE CONSTRUCTION COST 8/22/2012

Project: **Recreation Improvement Projects**

Estimate for: **Glen Cove Marina Gabion Wall Repair**

Item	Description	Quantity	Unit	Unit Price	Cost
Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)		15%	EA	$11,288.00	$1,693
Gabion wall	Remove concrete sidewalk	340	SF	$5.00	$1,700
Gabion wall	Concrete sidewalk disposal	1	LS	$1,000.00	$1,000
Gabion wall	Add 1 ft high gabion	38	SY	$79.00	$3,002
Gabion wall	5 inch concrete sidewalk	340	SF	$5.05	$1,717
Gabion wall	Treated wood bumper on sidewalk	1	LS	$1,200.00	$1,200
Gabion wall	Remove 5 ft strip of pavement	60	SY	$5.65	$339
Gabion wall	3/4 crushed gravel	20	CY	$56.50	$1,130
Gabion wall	Asphalt (3" thick)	60	SY	$20.00	$1,200

Subtotal Direct Cost	**$12,981**
Contingency Allowance (25%)[2]	$3,245
Total Direct Cost[3]	**$16,000**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$3,000
Total OPCC $2011	$19,000
Total OPCC $2014[4]	**$21,000**

Notes:

1. Contractor General Requirements taken as 15% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.

Prepared by: KJC Checked: RLS

Gomez and Sullivan Engineers, P.C. Project No: 1385

Prepared for:

Exelon

OPINION OF PROBABLE CONSTRUCTION COST 12/2/2011

Project: **Recreation Improvement Projects**

Estimate for: **Funk's Pond**

Item	Description	Quantity	Unit	Unit Price	Cost
Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)		10%	EA	$140.00	$14
Parking	Accessible Parking Sign	1	EA	$140.00	$140

Subtotal Direct Cost	**$154**
Contingency Allowance (25%)[2]	$39
Total Direct Cost[3]	**$190**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$40
Total OPCC $2011	$230
Total OPCC $2014[4]	**$300**

Notes:

1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.

Prepared by: KAM Checked: RLS

Gomez and Sullivan Engineers, P.C. Project No: 1385

Prepared for:

Exelon

CONCEPTUAL OPINION OF PROBABLE CONSTRUCTION COST 2/28/2012

Project: **Recreation Improvement Projects**

Estimate for: **Visitor's Center, Pool Improvements**

Item	Description	Quantity	Unit	Unit Price	Cost
	Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)	1	LS	$9,293.36	$9,293.36
Wading Pool	Concrete Removal/Excavation Crew	1	DAY	$3,080.00	$3,080.00
Wading Pool	Relocate Existing Infrastructure (Bench, Drainage)	1	LS	$3,000.00	$3,000.00
Wading Pool	3/4" Crushed Gravel Base for Ramp	3.5	CY	$56.50	$197.75
Wading Pool	Concrete Pool	4	CY	$550.00	$2,200.00
Wading Pool	Sealing/Waterproofing	1	DAY	$544.80	$544.80
Wading Pool	Concrete Patio	6.5	CY	$550.00	$3,575.00
Wading Pool	3/4" Crushed Gravel Base for Patio	6.5	CY	$56.50	$367.25
Wading Pool	Concrete/Gravel Placement Crew	3	DAY	$2,215.54	$6,646.62
Wading Pool	Trench Drain	60	LF	$84.00	$5,040.00
Pool	Concrete Removal/Excavation Crew	2	DAY	$3,080.00	$6,160.00
Pool	Relocate Existing Infrastructure (Drainage)	1	LS	$6,000.00	$6,000.00
Pool	3/4" Crushed Gravel Base for Ramp	10.0	CY	$56.50	$565.00
Pool	Concrete for Ramp	13.5	CY	$550.00	$7,425.00
Pool	Sealing/Waterproofing	3	DAY	$544.80	$1,634.40
Pool	Wall Mounted Handrail	45	LF	$120.00	$5,400.00
Pool	Freestanding Handrail	45	LF	$200.00	$9,000.00
Pool	Concrete Patio	13.0	CY	$550.00	$7,150.00
Pool	3/4" Crushed Gravel Base	13.0	CY	$56.50	$734.50
Pool	Concrete/Gravel Placement Crew	6	DAY	$2,215.54	$13,293.24
Pool	Trench Drain	130	LF	$84.00	$10,920.00

Subtotal Direct Cost	**$102,227**
Contingency Allowance (25%)[2]	$25,557
Total Direct Cost[3]	**$128,000**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$26,000
Total OPCC $2011	$154,000
Total OPCC $2014[4]	**$173,000**

Notes:

1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.
4. Rounded to the nearest $1,000. Escalated at 4.0%.

Prepared by: KAM Checked: RLS

Gomez and Sullivan Engineers, P.C. Project No: 1385

Prepared for:

Exelon

CONCEPTUAL OPINION OF PROBABLE CONSTRUCTION COST 2/3/2012

Project: **Recreation Improvement Projects**

Estimate for: **Overlook Park, Fence & Parking**

Item	Description	Quantity	Unit	Unit Price	Cost
	Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)	1	LS	$12,488.86	$12,489
Fence	Chain Link Fence, 6-ft high	600	LF	$31.00	$18,600
Fence	No Trespassing Signage	12	EA	$140.00	$1,680
Fence	Vehicle Gate	1	EA	$2,000.00	$2,000
Fence	Pedestrian Gate	1	EA	$1,000.00	$1,000
Parking	Accessible Stall Striping	675	LF	$0.55	$371
Parking	Accessible Parking Sign	3	EA	$140.00	$420
Pavilion	Demolish Existing Structure	7,000	CF	$0.35	$2,450
Pavilion	Demolish Existing Slab	600	SF	$8.00	$4,800
Pavilion	3/4" Crushed Gravel Base (dry)	35	CY	$56.50	$1,978
Pavilion	24-ft x 24-ft Wood Pavilion (materials)	1	EA	$30,000.00	$30,000
Pavilion	Footing and Slab	600	SF	$40.00	$24,000
Pavilion	Install (Assumed as 15%)	1	LS	$8,100.00	$8,100
Pavilion	Accessible Tables	4	EA	$1,250.00	$5,000
Restrooms	Gates (6' Wide)	2	EA	$280.50	$561
Restrooms	Stockade Fence Panel (Composite Material)	240	SF	$2.25	$540
Restrooms	Fence Posts	12	EA	$50.00	$600
Restrooms	Backer Rail	80	LF	$2.44	$195
Restrooms	Stockade Fence Installation (15% of Gate/Fencing Materials)	1	LS	$201.00	$201
Restrooms	Fencing Delivery (10% of Gate/Fencing Materials)	1	LS	$189.62	$190
Restrooms	Removable Bollard	3	EA	$1,300.00	$3,900
Restrooms	Geotextile Fabric	11	SY	$2.55	$28
Picnic Area	Demolish Existing Pavement	4,000	SF	$1.00	$4,000
Picnic Area	Concrete Pads for Tables	150	SF	$40.00	$6,000
Picnic Area	3/4" Crushed Gravel Base (dry)	10	CY	$56.50	$565
Picnic Area	Stone Dust	5	CY	$60.00	$300
Picnic Area	Accessible Tables	3	EA	$1,250.00	$3,750
Picnic Area	Topsoil (4" Depth)	450	SY	$5.00	$2,250
Picnic Area	Seed	4,000	SF	$0.06	$224
Picnic Area	Erosion Control Matting	250	SY	$1.80	$450
Tree Removal	Tree Removal with Chainsaw and Chipper	1	EA	$515.00	$515
Tree Removal	Stump Removal	1	EA	$221.00	$221

Subtotal Direct Cost	**$137,377**
Contingency Allowance (25%)[2]	$34,344
Total Direct Cost[3]	**$172,000**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$34,000
Total OPCC $2011	$206,000
Total OPCC $2014[4]	**$232,000**

Notes:
1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.
4. Rounded to the nearest $1,000. Escalated at 4.0%.

Prepared by: KJC Checked: RLS

Gomez and Sullivan Engineers, P.C. Project No: 1385

Prepared for:

Exelon

OPINION OF PROBABLE CONSTRUCTION COST 3/6/2012

Project: **Recreation Improvement Projects**

Estimate for: **Fisherman's Park, Parking, 5-FT Widening**

Item	Description	Quantity	Unit	Unit Price	Cost
Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)		10%	EA	$96,705.75	$9,671
Widening	Clearing and Grubbing	0.27	ACRE	$9,075.00	$2,450
Widening	Excavation (Dry)	325	CY	$10.00	$3,250
Widening	Hauling	325	CY	$10.00	$3,250
Widening	3/4" crushed gravel base	130	CY	$56.50	$7,345
Widening	1-1/2" gravel	130	CY	$60.00	$7,800
Widening	Asphalt (3" thick)	645	SY	$20.00	$12,900
Widening	New Concrete Curb (6" x 18", Straight)		LF	$11.35	$0
Widening	Remove and Reset Concrete Curb	1160	LF	$11.50	$13,340
Retaining Wall	Clearing and Grubbing	0.1	ACRE	$9,075.00	$908
Retaining Wall	Excavation (Dry)	430	CY	$10.00	$4,300
Retaining Wall	Backfill	27	CY	$10.00	$270
Retaining Wall	Hauling	403	CY	$10.00	$4,030
Retaining Wall	3/4" crushed gravel base	54	CY	$56.50	$3,051
Retaining Wall	PVC Subdrainage Pipe (6" Diameter)	250	LF	$8.10	$2,025
Retaining Wall	Large Unit, Straight Split Segmented Retaining Wall (8" H x 18" W x 20" D)	1740	SF	$16.20	$28,188
Retaining Wall	Geotextile Fabric	524	SY	$2.55	$1,336
Parking	Accessible Parking Sign	4	EA	$140.00	$560
Parking	Striping	3096	LF	$0.55	$1,703

Subtotal Direct Cost	**$106,376**
Contingency Allowance (25%)[2]	$26,594
Total Direct Cost[3]	**$133,000**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$27,000
Total OPCC $2011	$160,000
Total OPCC $2014[4]	**$180,000**

Notes:

1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.

Prepared by: KJC Checked: RLS

Gomez and Sullivan Engineers, P.C. Project No: 1385

Prepared for:

Exelon

OPINION OF PROBABLE CONSTRUCTION COST 3/21/2012

Project: **Recreation Improvement Projects**

Estimate for: **Shures's Landing Boat Launch (20 ft wide) Option 2**

Item	Description	Quantity	Unit	Unit Price	Cost
Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)		10%	EA	$492,570.90	$49,257
Boat Launch	Erosion Control	1	LS	$2,000.00	$2,000
Boat Launch	Turbidity Curtain	290	LF	$70.00	$20,300
Boat Launch	Excavation (Dry)	209	CY	$10.00	$2,090
Boat Launch	Excavation (Wet)	405	CY	$20.00	$8,100
Boat Launch	Hauling	405	CY	$10.00	$4,050
Boat Launch	Concrete	24	CY	$550.00	$13,200
Boat Launch	Concrete Planks	2640	SF	$35.00	$92,400
Boat Launch	W6 x 20 Steel Beam	296	LF	$37.50	$11,100
Boat Launch	3/4" crushed gravel base (Dry)	342	CY	$56.50	$19,323
Boat Launch	3/4" crushed gravel base (Wet)	697	CY	$64.00	$44,608
Boat Launch	12"-24" Stone	270	CY	$115.00	$31,050
Boat Launch	Geotextile Fabric	397	SY	$2.55	$1,012
Boat Launch	Gates	1	EA	$1,325.00	$1,325
Boat Launch	Floating Dock	195	SF	$40.00	$7,800
Boat Launch	Gangway	70	LF	$158.00	$11,060
Boat Launch	Abutment Concrete	6	CY	$250.00	$1,500
Boat Launch	Abutment Railing	10	LF	$66.00	$660
Breakwater	Erosion Control	1	LS	$2,000.00	$2,000
Breakwater	Turbidity Curtain	280	LF	$70.00	$19,600
Breakwater	18"-30" Stone	554	CY	$115.00	$63,710
Breakwater	Geotextile Fabric	287	SY	$2.55	$732
Ex. Ramp Demo.	Turbidity Curtain	90	LF	$70.00	$6,300
Ex. Ramp Demo.	Demolition	20	CY	$220.00	$4,400
Ex. Ramp Demo.	Excavation (Wet)	93	CY	$20.00	$1,860
Ex. Ramp Demo.	Hauling	93	CY	$10.00	$930
Ex. Ramp Demo.	12"-24" Stone	113	CY	$115.00	$12,995
Close Access	Pavement Removal (4-6" Thick)	584	SY	$8.60	$5,022
Close Access	3/4" crushed gravel base (Dry)	276	CY	$56.50	$15,594
Close Access	12"-24" Stone	378	CY	$115.00	$43,470
2-FT Widening	Erosion Control	1	LS	$2,000.00	$2,000
2-FT Widening	Clearing and Grubbing	0.1	ACRE	$9,075.00	$908
2-FT Widening	Excavation	51	CY	$10.00	$510
2-FT Widening	Hauling	51	CY	$10.00	$510
2-FT Widening	3/4" crushed gravel base	21	CY	$56.50	$1,187
2-FT Widening	1-1/2" gravel	21	CY	$60.00	$1,260
2-FT Widening	Asphalt (3" thick)	81	SY	$20.00	$1,620
2-FT Widening	New Concrete Curb (6" x 18", Straight)	36	LF	$11.35	$409
4-FT Widening	Erosion Control	1	LS	$2,000.00	$2,000
4-FT Widening	Clearing and Grubbing	0.1	ACRE	$9,075.00	$908
4-FT Widening	Excavation	70	CY	$10.00	$700
4-FT Widening	Hauling	70	CY	$10.00	$700
4-FT Widening	3/4" crushed gravel base	30	CY	$56.50	$1,695
4-FT Widening	1-1/2" gravel	30	CY	$60.00	$1,800
4-FT Widening	Asphalt (3" thick)	165	SY	$20.00	$3,300
Parking	Erosion Control	1	LS	$2,000.00	$2,000
Parking	Clearing and Grubbing	0.13	ACRE	$9,075.00	$1,180
Parking	Excavation	191	CY	$10.00	$1,910
Parking	Hauling	191	CY	$10.00	$1,910
Parking	3/4" crushed gravel base	125	CY	$56.50	$7,063
Parking	1-1/2" gravel	96	CY	$60.00	$5,760
Parking	Precast Concrete Parking Bumpers	16	EA	$84.00	$1,344
Parking	Accessible Parking Sign	1	EA	$140.00	$140
Parking	Directional Sign	1	EA	$3,200.00	$3,200
Parking	Striping	669	LF	$0.55	$368

Subtotal Direct Cost	**$541,828**
Contingency Allowance (25%)[2]	$135,457
Total Direct Cost[3]	**$677,000**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$135,000
Total OPCC $2011	$812,000
Total OPCC $2014[4]	**$913,000**

Notes:
1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.
4. Rounded to the nearest $1,000. Escalated at 4.0%.

Prepared by: KJC Checked: RLS

Gomez and Sullivan Engineers, P.C. Project No: 1385

Prepared for:

Exelon

OPINION OF PROBABLE CONSTRUCTION COST

12/29/2011

Project: **Recreation Improvement Projects**

Estimate for: **Peach Bottom Cottage**

Item	Description	Quantity	Unit	Unit Price	Cost
Contractor Gen. Requirements[1] (mob/demob, on-site facilities, etc.)		10%	EA	$11,049.05	$1,105
Parking	Erosion Control	1	LS	$2,000.00	$2,000
Parking	Silt Fence	120	LF	$1.34	$161
Parking	Clearing and Grubbing	0.05	ACRE	$9,075.00	$454
Parking	Excavation	26	CY	$10.00	$260
Parking	Hauling	26	CY	$10.00	$260
Parking	3/4" crushed gravel base	13	CY	$56.50	$735
Parking	1-1/2" gravel	13	CY	$60.00	$780
Parking	Portage Sign	1	EA	$3,200.00	$3,200
Parking	FERC Part 8 Sign	1	EA	$3,200.00	$3,200

Subtotal Direct Cost	**$12,154**
Contingency Allowance (25%)[2]	$3,038
Total Direct Cost[3]	**$15,000**
Engineering, Administration, Permitting and Construction Management (20%)[3]	$3,000
Total OPCC $2011	$18,000
Total OPCC $2014[4]	**$20,000**

Notes:

1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled.
2. Contingency Allowance taken as 25%.
3. Rounded to the nearest $1,000.