RECREATION PLAN

RSP 3.26

CONOWINGO HYDROELECTRIC PROJECT

FERC PROJECT NUMBER 405

Prepared for:

Exelon.

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

1.0 INTRODUCTION 1-1

2.0 PURPOSE AND GOALS OF THE RECREATION PLAN 2-1

3.0 DESCRIPTION OF THE PROJECT 3-1

3.1 Project Location and Regional Setting 3-1
3.2 Existing Water Levels 3-3
3.3 Existing Shoreline and Land Use 3-4

4.0 FERC REQUIREMENTS 4-1

4.1 Recreational Development at Licensed Projects 4-1
4.2 FERC License Application Requirements 4-2

5.0 EXISTING PUBLIC RECREATION AND ACCESS 5-1

5.1 Conowingo Pond Project Recreation Facilities 5-7
5.1.1 Lock 13 – York County, Pennsylvania 5-7
5.1.2 Lock 15 - York County, Pennsylvania 5-9
5.1.3 Muddy Creek Boat Launch – York County, Pennsylvania 5-11
5.1.4 Cold Cabin – York County, Pennsylvania 5-13
5.1.5 Dorsey Park Boat Launch – York County, Pennsylvania 5-15
5.1.6 Peach Bottom Marina – Lancaster County, Pennsylvania 5-17
5.1.7 Line Bridge Access – Harford County, Maryland 5-19
5.1.8 Broad Creek Public Landing – Harford County, Maryland 5-21
5.1.9 Conowingo Creek Boat Launch – Cecil County, Maryland 5-23
5.1.10 Glen Cove Marina – Harford County, Maryland 5-25
5.1.11 Funk's Pond – Cecil County, Maryland 5-28
5.1.12 Conowingo Swimming Pool and Visitors Center – Harford County, Maryland 5-30
5.2 Downstream Project Recreation Facilities 5-34
5.2.1 Fisherman's Park – Harford County, Maryland 5-34
5.2.2 Octoraro Creek Access Trail – Cecil County, Maryland 5-37
5.3 Other Formal Recreational Facilities in the Project Vicinity 5-39
5.3.1 Holtwood Hydroelectric Project (FERC No. 1881) Facilities 5-39
5.3.2 Muddy Run Pumped Storage Project (FERC No. 2355) Facilities 5-39
5.3.3 Mason-Dixon Trail – York County, Pennsylvania 5-39
5.3.4 Susquehanna River Water Trail 5-40
5.3.5 Susquehannock State Park – Lancaster County, Pennsylvania 5-40
5.3.6 Ferncliff Wildflower and Wildlife Preserve – Lancaster County, Pennsylvania 5-40
5.3.7 Broad Creek Memorial Boy Scout Camp – Harford County, Maryland 5-40
5.3.8 Conowingo Community Park 5-41
5.3.9 Conestoga Trail 5-41
5.3.10 Wissler Run Nature Preserve 5-41
5.3.11 Susquehanna State Park – Harford County, Maryland 5-41
5.3.12 Rock Run 5-41
5.3.13 Port Deposit Carry-in 5-42

5.3.14 Port Deposit Marine Park 5-42
5.3.15 City of Havre de Grace Kayak Launch 5-42
5.3.16 City of Havre de Grace City Yacht Basin 5-42
5.3.17 Town of Perryville Boat Ramp 5-43
5.3.18 Perryville Community Park 5-43
5.3.19 Captain John Smith Chesapeake National Historic Water Trail 5-43
5.3.20 Lower Susquehanna Heritage Greenway Trail – Harford County, Maryland 5-43
5.3.21 Deer Creek Access – Harford County, Maryland 5-44
5.3.22 Lapidum Boat Launch – Harford County, Maryland 5-44
5.3.23 McLhinney Park – Harford County, Maryland 5-44
5.4 Informal Recreation Sites 5-44
5.5 Recreational Boating Access to Project Waters 5-45
5.5.1 Existing Boat Launch Facilities 5-45
5.5.2 Effect of Pond Elevation on Recreational Boating 5-46
6.0 ESTIMATE OF PROJECT RECREATIONAL USE 6-1
6.1 FERC Form 80 6-1
6.2 Methodology for Refining Estimated Project Recreational Use by Site 6-1
6.2.1 Spot Counts 6-2
6.2.2 Calibration Counts 6-2
6.2.3 Traffic Counters 6-3
6.2.4 Data Supplied by Facility Operator 6-3
6.3 Recreational Use of Conowingo Project Facilities 6-3
6.3.1 Lock 13 Day Use 6-4
6.3.2 Lock 15 Day Use 6-5
6.3.3 Muddy Creek Boat Launch 6-6
6.3.4 Cold Cabin Boat Launch 6-7
6.3.5 Dorsey Park Boat Launch 6-8
6.3.6 Peach Bottom Marina 6-9
6.3.7 Line Bridge Access 6-10
6.3.8 Broad Creek Public Landing 6-11
6.3.9 Conowingo Creek Boat Launch 6-12
6.3.10 Glen Cove Marina 6-13
6.3.11 Funk's Pond 6-14
6.3.12 Conowingo Swimming Pool 6-15
6.3.13 Fisherman's Park 6-16
6.4 Recreational Activities at Project Facilities 6-19
6.4.1 Lock 13 Day Use 6-20
6.4.2 Lock 15 Day Use 6-21
6.4.3 Muddy Creek Boat Launch 6-22
6.4.4 Cold Cabin Boat Launch 6-23
6.4.5 Dorsey Park Boat Launch 6-24
6.4.6 Peach Bottom Marina 6-25
6.4.7 Line Bridge Access 6-25
6.4.8 Broad Creek Public Landing 6-27
6.4.9 Conowingo Creek Boat Launch 6-27
6.5 Facility Capacity of Project Recreation Facilities 6-34

6.5.1 Lock 13 Day Use 6-34
6.5.2 Lock 15 Day Use 6-34
6.5.3 Muddy Creek Boat Launch 6-35
6.5.4 Cold Cabin Boat Launch 6-35
6.5.5 Dorsey Park Boat Launch 6-36
6.5.6 Peach Bottom Marina 6-36
6.5.7 Line Bridge Access 6-37
6.5.8 Broad Creek Public Landing 6-37
6.5.9 Conowingo Creek Boat Launch 6-38
6.5.10 Glen Cove Marina 6-38
6.5.11 Funk's Pond 6-38
6.5.12 Conowingo Swimming Pool 6-39
6.5.13 Fisherman's Park 6-39
6.5.14 Octoraro Creek Access 6-40
6.6 Summary of Facility Capacity at the Conowingo Project 6-40
7.0 PROJECTED RECREATION DEMANDS 7-1
7.1 Projection of Project Recreation Days 7-1
7.2 Projection of Facility Capacity 7-4
8.0 RECOMMENDATIONS AND PROPOSED ENHANCEMENTS 8-1
8.1 Agency Recommendations 8-1
8.2 User Preference Surveys 8-1
8.2.1 User Preference Survey Results 8-2
8.2.2 Summary of Conowingo Project Recreation User Perceptions 8-16
8.3 Proposed Recreation Enhancements 8-18
8.3.1 Lock 13 Enhancements 8-18
8.3.2 Lock 15 Enhancements 8-19
8.3.3 Muddy Creek Boat Launch Enhancements 8-19
8.3.4 Cold Cabin Enhancements 8-19
8.3.5 Dorsey Park Enhancements 8-19
8.3.6 Conowingo Creek Boat Launch Enhancements 8-20
8.3.7 Glen Cove Marina Enhancements 8-20
8.3.8 Funks Pond Enhancements 8-20
8.3.9 Conowingo Swimming Pool Enhancements 8-20
8.3.10 Conowingo Dam Overlook Enhancements 8-20
8.3.11 Fisherman's Park/Shures Landing Enhancements 8-20
8.3.12 Peach Bottom Access Development 8-21
8.3.13 Line Bridge Access Area 8-21
8.4 Costs and Scheduling 8-21
8.4.1 Agency Recommendations not Proposed 8-23
9.0 RECREATION MANAGEMENT 9-1
10.0 REFERENCES 10-1

LIST OF TABLES

TABLE ES-1- PROPOSED RECREATION ENHANCEMENT COSTS IV

TABLE 5.6.1-1 BOAT RAMP DIMENSIONS AND TOE OF RAMP WATER DEPTHS..... 5-46

TABLE 5.6.2-1 CONOWINGO POND TRIBUTARIES INCLUDED IN TRIBUTARY ACCESS STUDY 5-47

TABLE 6.3.15-1 RECREATION USAGE BY SEASON, CONOWINGO PROJECT SUMMARY, 2008-2009 6-19

TABLE 6.4.1-1 RECREATIONAL DAYS BY SITE, LOCK 13, 2008-2009 6-21

TABLE 6.4.2-1 RECREATIONAL DAYS BY SITE, LOCK 15, 2008-2009 6-22

TABLE 6.4.3-1 RECREATIONAL DAYS BY SEASON, MUDDY CREEK BOAT LAUNCH, 2008-2009 6-23

TABLE 6.4.4-1 RECREATIONAL DAYS BY SEASON, COLD CABIN BOAT LAUNCH, 2008-2009 6-24

TABLE 6.4.5-1 RECREATIONAL DAYS BY SEASON, DORSEY PARK BOAT LAUNCH, 2008-2009 6-25

TABLE 6.4.7-1 RECREATIONAL DAYS BY SEASON, LINE BRIDGE ACCESS, 2008-2009 6-26

TABLE 6.4.8-1 RECREATIONAL DAYS BY SEASON, BROAD CREEK PUBLIC LANDING, 2008-2009 6-27

TABLE 6.4.9-1 RECREATIONAL DAYS BY SEASON, CONOWINGO CREEK BOAT LAUNCH, 2008-2009 6-28

TABLE 6.4.9.2-1 RECREATIONAL DAYS BY SEASON, FUNK'S POND, 2008-2009 .. 6-29

TABLE 6.4.9.4-1 RECREATIONAL DAYS BY SEASON, FISHERMAN'S PARK, 2008-2009 6-30

TABLE 6.4.9.5-1 RECREATIONAL DAYS BY SEASON, OCTORARO CREEK ACCESS, 2008-2009 6-31

TABLE 6.4.9.6-1 RECREATION ACTIVITY IN TERMS OF RECREATION DAYS BY LOCATION, PROJECT SUMMARY, 2008-2009 6-32

TABLE 6.5.1-1 PARKING LOT CAPACITY AND USE, LOCK 13, 2008-2009 6-34

TABLE 6.5.2-1 PARKING LOT CAPACITY AND USE, LOCK 15, 2008-2009 6-34

TABLE 6.5.3-1 PARKING LOT CAPACITY AND USE, MUDDY CREEK BOAT LAUNCH, 2008-2009 6-35

TABLE 6.5.4-1 PARKING LOT CAPACITY AND USE, COLD CABIN BOAT LAUNCH, 2008-2009 6-35

TABLE 6.5.5-1 PARKING LOT CAPACITY AND USE, DORSEY PARK BOAT LAUNCH, 2008-2009 6-36

TABLE 6.5.6-1 PARKING LOT CAPACITY AND USE, PEACH BOTTOM MARINA, 2008-2009 6-36

TABLE 6.5.7-1 PARKING LOT CAPACITY AND USE, LINE BRIDGE ACCESS, 2008-2009 6-37

TABLE 6.5.8-1 PARKING LOT CAPACITY AND USE, BROAD CREEK PUBLIC LANDING, 2008-2009 6-37

TABLE 6.5.9-1 PARKING LOT CAPACITY AND USE, CONOWINGO CREEK BOAT LAUNCH, 2008-2009 6-38

TABLE 6.5.10-1 PARKING LOT CAPACITY AND USE, GLEN COVE MARINA, 2008-2009 6-38

TABLE 6.5-11 PARKING LOT CAPACITY AND USE, FUNK'S POND, 2008-2009 6-39

TABLE 6.5.12-1 PARKING LOT CAPACITY AND USE, CONOWINGO SWIMMING POOL, 2008-2009 6-39

TABLE 6.5.13-1 PARKING LOT CAPACITY AND USE, FISHERMAN'S PARK, 2008-2009 6-40

TABLE 6.5.14-1 PARKING LOT CAPACITY AND USE, OCTORARO CREEK ACCESS, 2008-2009 6-40

TABLE 6.6-1 FACILITY USE AND CAPACITY, SUMMARY, 2008-2009 6-41

TABLE 7.1-1 RECREATION PROJECTION INDEX, THROUGH 2050 (A) NORTHEAST REGION 7-1

TABLE 7.1-2 RECREATION ACTIVITY IN TERMS OF RECREATION DAYS BY LOCATION, SUMMARY, 2050 (A) 7-3

TABLE 7.2-1 POTENTIAL AVERAGE WEEKEND SUMMER PARKING LOT USE BY LOCATION, SUMMARY, 2050 7-5

TABLE 7.2-2 POTENTIAL FACILITY USE AND CAPACITY, SUMMARY, 2050 7-6

TABLE 8.3 RECREATIONAL USER PERCEPTIONS, CONOWINGO PROJECT SUMMARY, 2010-2011 8-17

TABLE 8.2 ENHANCEMENT COSTS 8-22

LIST OF FIGURES

FIGURE 2.1: PROPOSED AMENDED PROJECT BOUNDARY 2-2

FIGURE 3.1: PROJECT LOCATION MAP 3-2

FIGURE 5.1: EXISTING PROJECT AND OTHER RECREATION FACILITIES 5-2

FIGURE 5.1.1-1: LOCK 13 5-8

FIGURE 5.1.2-1: LOCK 15 5-10

FIGURE 5.1.3-1: MUDDY CREEK BOAT LAUNCH 5-12

FIGURE 5.1.4-1: COLD CABIN BOAT LAUNCH 5-14

FIGURE 5.1.5-1: BOAT RAMP AND DOCK 5-16

FIGURE 5.1.6-1: PEACH BOTTOM MARINA 5-18

FIGURE 5.1.7-1: LINE BRIDGE ACCESS 5-20

FIGURE 5.1.8-1: BROAD CREEK PUBLIC LANDING 5-22

FIGURE 5.1.9-1: CONOWINGO CREEK BOAT LAUNCH 5-24

FIGURE 5.1.10-1: GLEN COVE MARINA LAUNCH AND SLIPS 5-26

FIGURE 5.1.10-2: GLEN COVE MARINA PARKING LOT 5-27

FIGURE 5.1.11-1: FUNK'S POND TRAIL 5-29

FIGURE 5.1.12-1: CONOWINGO POOL 5-31

FIGURE 5.1.12-2: POOL AND VISITOR CENTER PARKING AREA 5-32

FIGURE 5.1.12-3: VISITORS CENTER 5-33

FIGURE 5.2.1-1: FISHING PLATFORM 5-35

FIGURE 5.2.1-2: CARRY-IN BOAT LAUNCH (SHURE'S LANDING) 5-36

FIGURE 5.2.2-1: OCTORARO CREEK TRAILHEAD 5-38

FIGURE 6.3.1-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT: LOCK 13, 2008-2009 6-4

FIGURE 6.3.2-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT: LOCK 15, 2008-2009 6-6

FIGURE 6.3.3-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT: MUDDY CREEK BOAT LAUNCH, 2008-2009 6-7

FIGURE 6.3.4-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT: COLD CABIN BOAT LAUNCH, 2008-2009 6-8

FIGURE 6.3.5-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT: DORSEY PARK BOAT LAUNCH, 2008-2009 6-9

FIGURE 6.3.6-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT: PEACH BOTTOM MARINA, 2008-2009 6-10

FIGURE 6.3.7-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT: LINE BRIDGE ACCESS, 2008-2009 6-11

FIGURE 6.3.8-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT: BROAD CREEK PUBLIC LANDING, 2008-2009 6-12

FIGURE 6.3.9-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT: CONOWINGO CREEK BOAT LAUNCH, 2008-2009 6-13

FIGURE 6.3.11-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT: FUNK'S POND, 2008-2009 6-14

FIGURE 6.3.12-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT: CONOWINGO SWIMMING POOL, 2008-2009 6-15

FIGURE 6.3.13-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT: FISHERMAN'S PARK, 2008-2009 6-16

FIGURE 6.3.14-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT: OCTORARO CREEK ACCESS, 2008-2009 6-17

FIGURE 6.3.15-1: RECREATION USAGE BY SEASON, CONOWINGO PROJECT, 2008-2009 6-18

FIGURE 6.4-1: PARTICIPATION RATES FOR RECREATION ACTIVITIES, PROJECT SUMMARY CONOWINGO PROJECT, 2008-2009 6-33

FIGURE 8.1: RECREATION USER FACILITY PERCEPTION, CONOWINGO PROJECT: LOCK 13, 2010-2011 8-3

FIGURE 8.2: RECREATION USER FACILITY PERCEPTION, CONOWINGO PROJECT: LOCK 15, 2010-2011 8-4

FIGURE 8.3: RECREATION USER FACILITY PERCEPTION, CONOWINGO PROJECT: MUDDY CREEK BOAT LAUNCH, 2010-2011 8-5

FIGURE 8.4: RECREATION USER FACILITY PERCEPTION, CONOWINGO PROJECT: COLD CABIN BOAT LAUNCH, 2010-2011 8-6

FIGURE 8.5: RECREATION USER FACILITY PERCEPTION, CONOWINGO PROJECT: DORSEY PARK BOAT LAUNCH, 2010-2011 8-8

FIGURE 8.6: RECREATION USER FACILITY PERCEPTION, CONOWINGO PROJECT: LINE BRIDGE ACCESS, 2010-2011..... 8-9

FIGURE 8.7: RECREATION USER FACILITY PERCEPTION, CONOWINGO PROJECT: BROAD CREEK PUBLIC LANDING, 2010-2011 8-10

FIGURE 8.8: RECREATION USER FACILITY PERCEPTION, CONOWINGO PROJECT: CONOWINGO CREEK BOAT LAUNCH, 2010-2011 8-11

FIGURE 8.9: RECREATION USER FACILITY PERCEPTION, CONOWINGO PROJECT: FUNK'S POND, 2010-2011..... 8-13

FIGURE 8.10: RECREATION USER FACILITY PERCEPTION, CONOWINGO PROJECT: FISHERMAN'S PARK, 2010-2011..... 8-14

FIGURE 8.11: RECREATION USER FACILITY PERCEPTION, CONOWINGO PROJECT: OCTORARO CREEK ACCESS, 2010-2011 8-15

FIGURE 8.16: RECREATION USER FACILITY PERCEPTION, CONOWINGO PROJECT, 2010-2011 8-16

LIST OF APPENDICES

APPENDIX 1: CONSULTATION RECORD

APPENDIX 2: USER PREFERENCE SURVEY FORM

APPENDIX 3: RECREATION ENHANCEMENT CONCEPT PLANS

APPENDIX 4: CONOWINGO COST OPINION

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.

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

Exelon

N

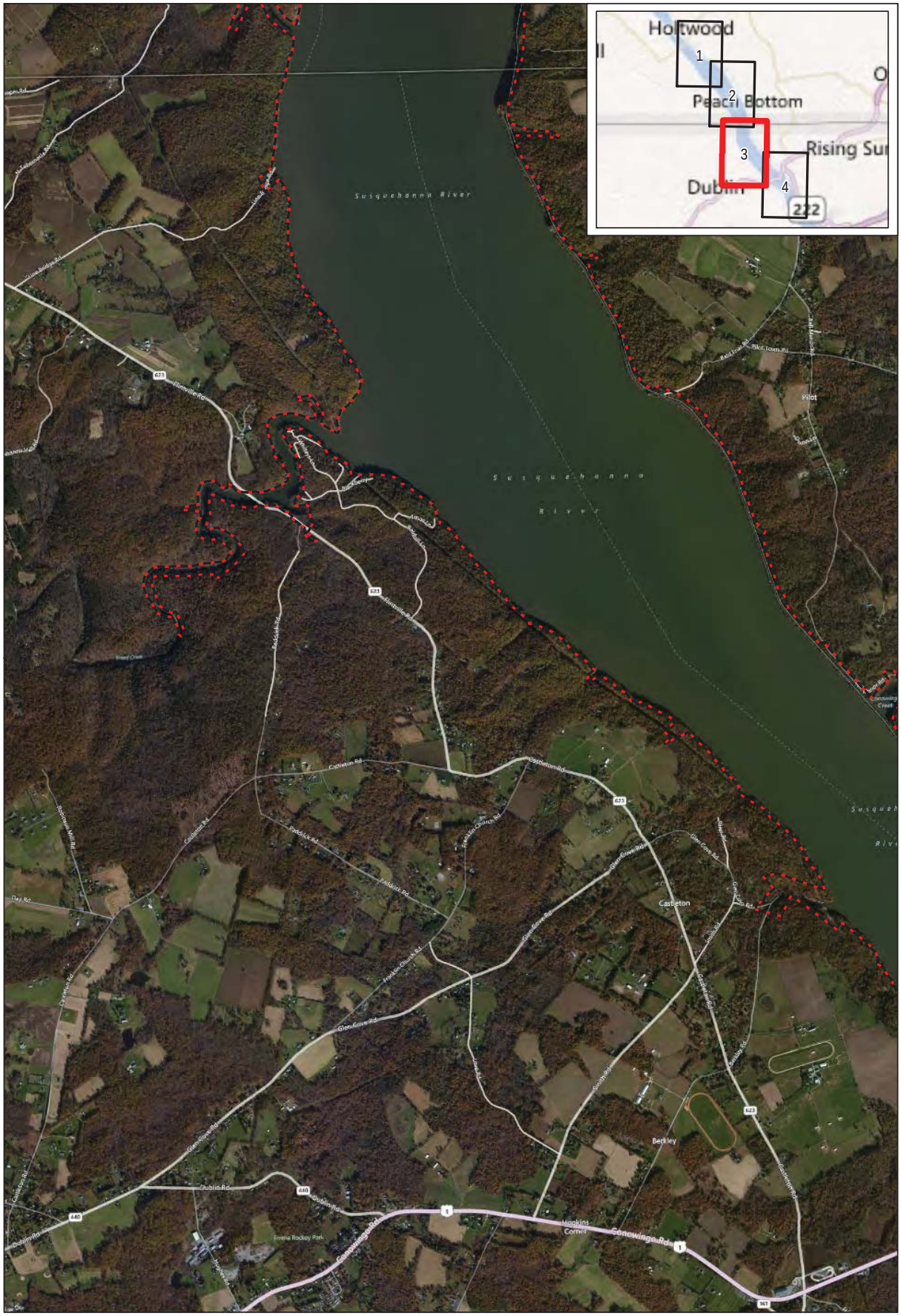
Legend
Project Boundary

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



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

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

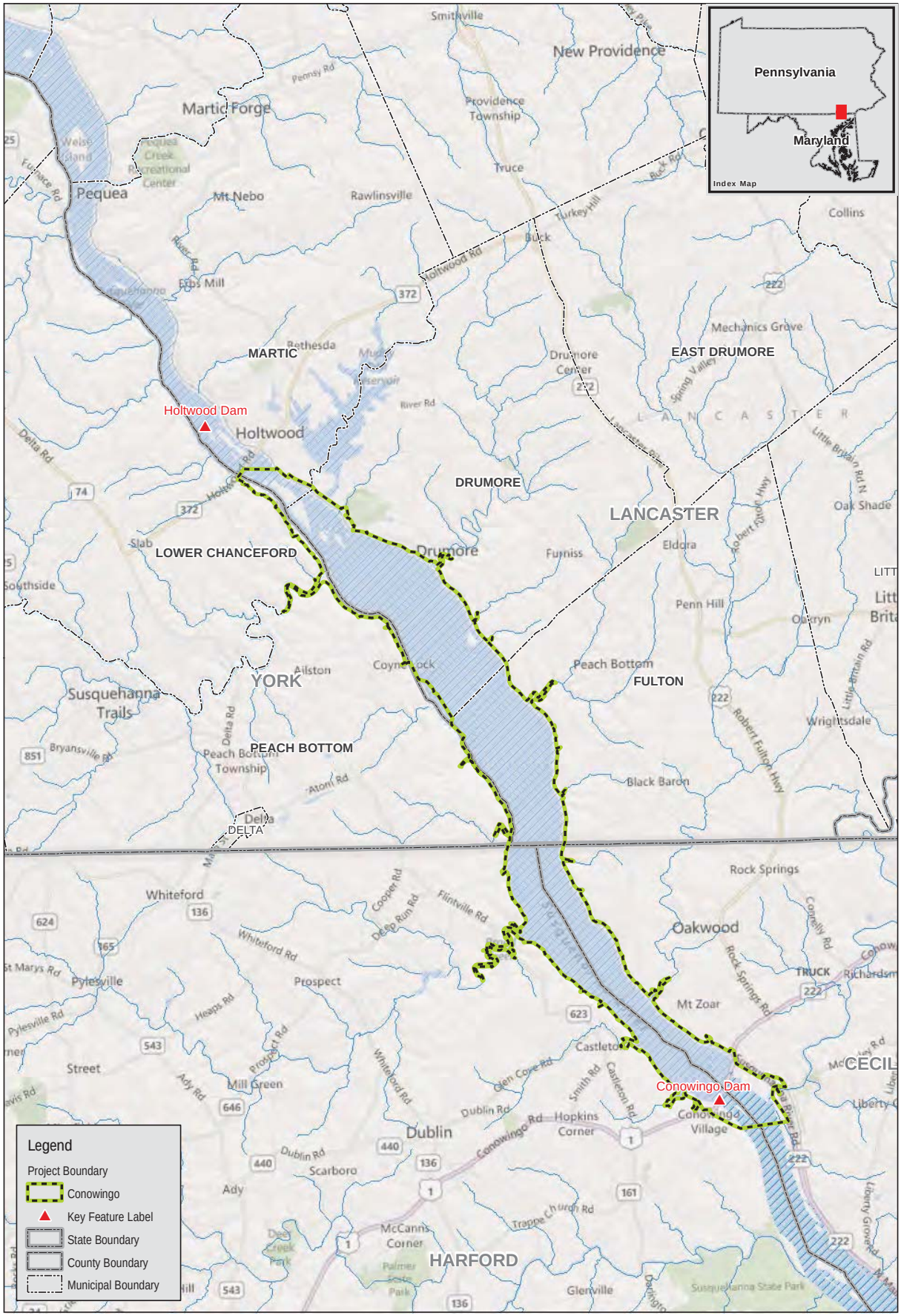
3.1 Project Location and Regional Setting

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

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).

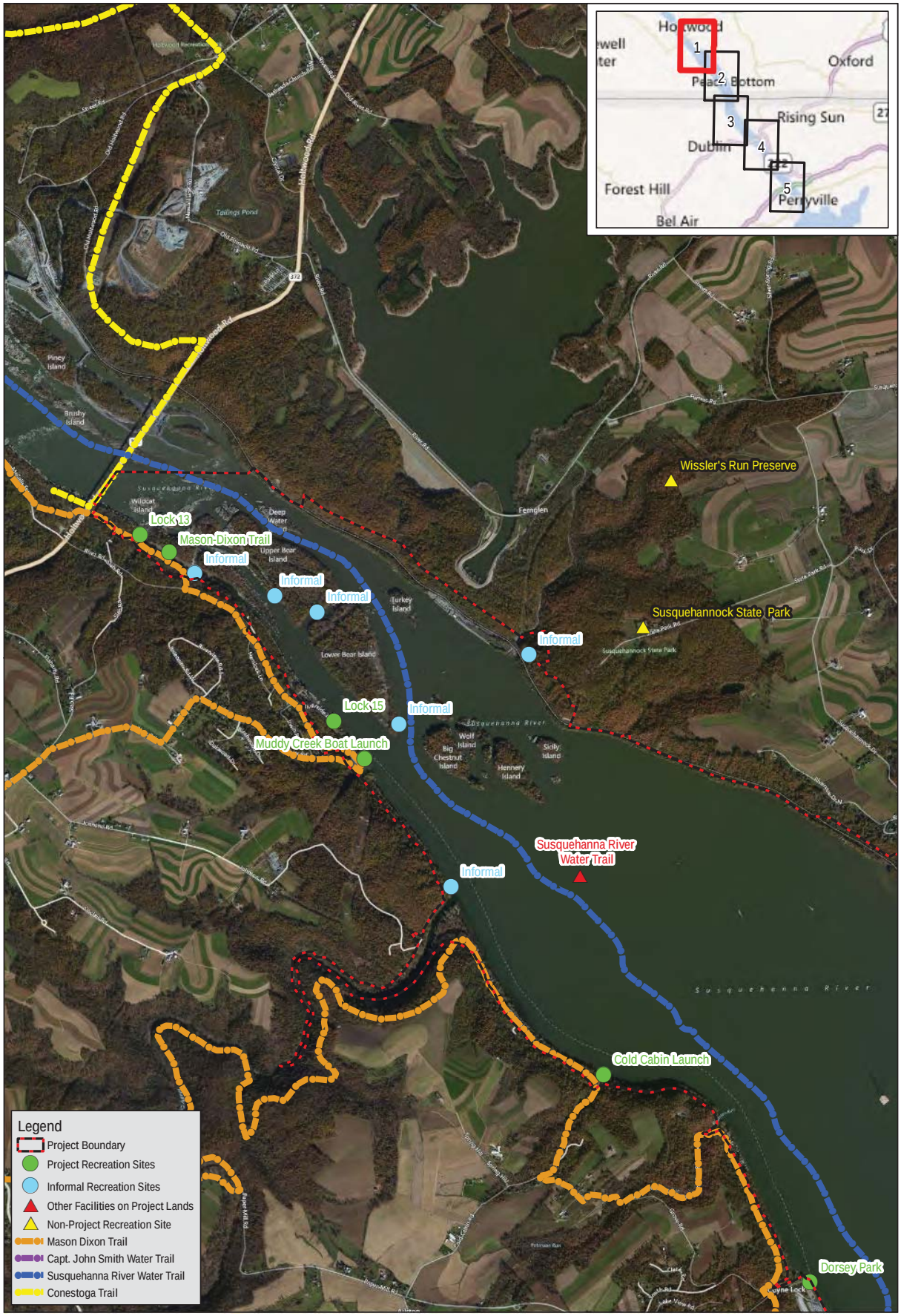
7. An estimate of the costs of construction, operation, and maintenance of any proposed facilities (see Section 8.4).

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 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 GENERATION COMPANY, LLC
SHORELINE MANAGEMENT PLAN DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

N

0 1,000 2,000 4,000 Feet

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

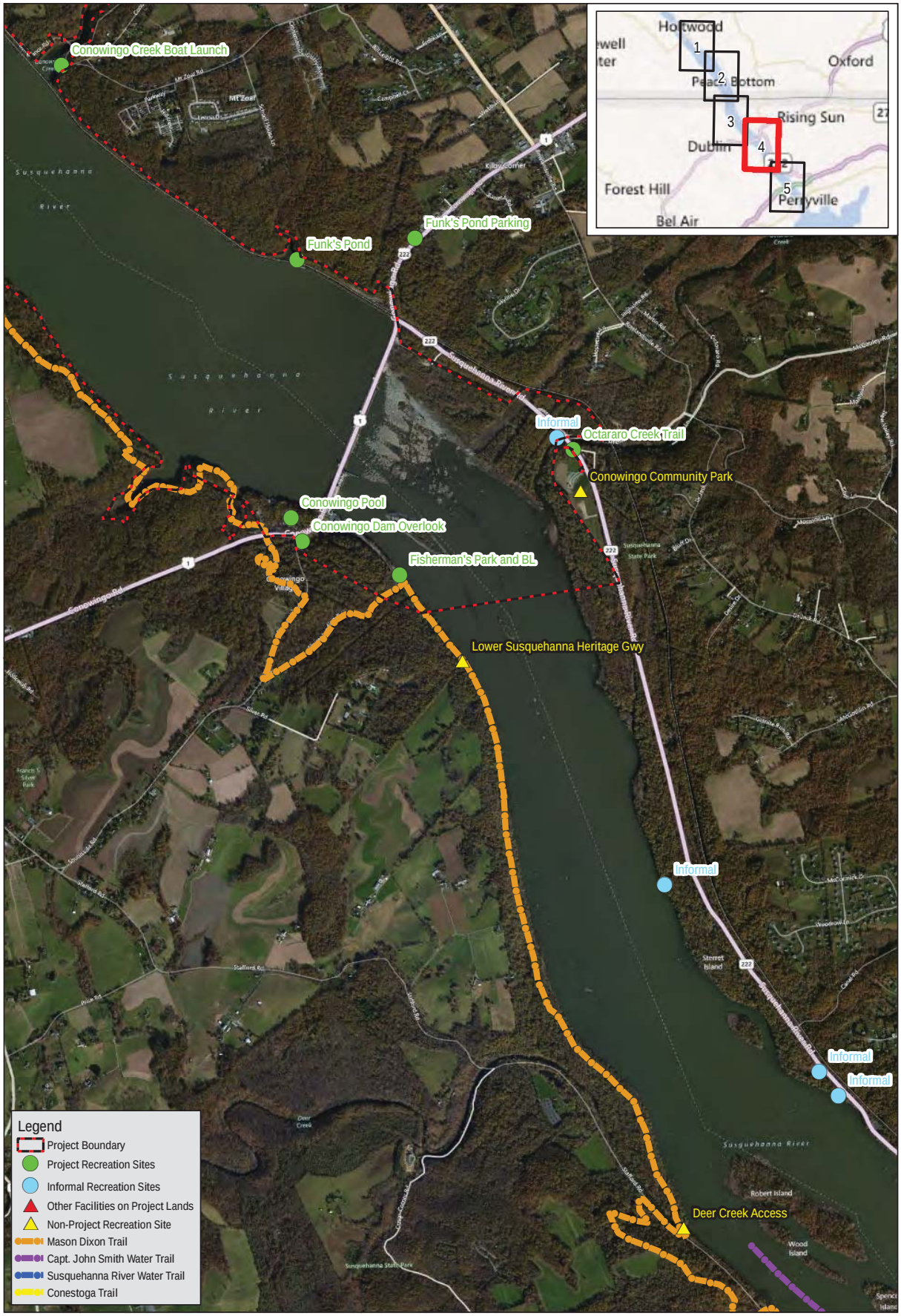
Path: X:\GISMaps\project_maps\study_plan\conowingo\Study_3.26\Fig5_1_Existing_Rec_Facilities.mxd

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

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



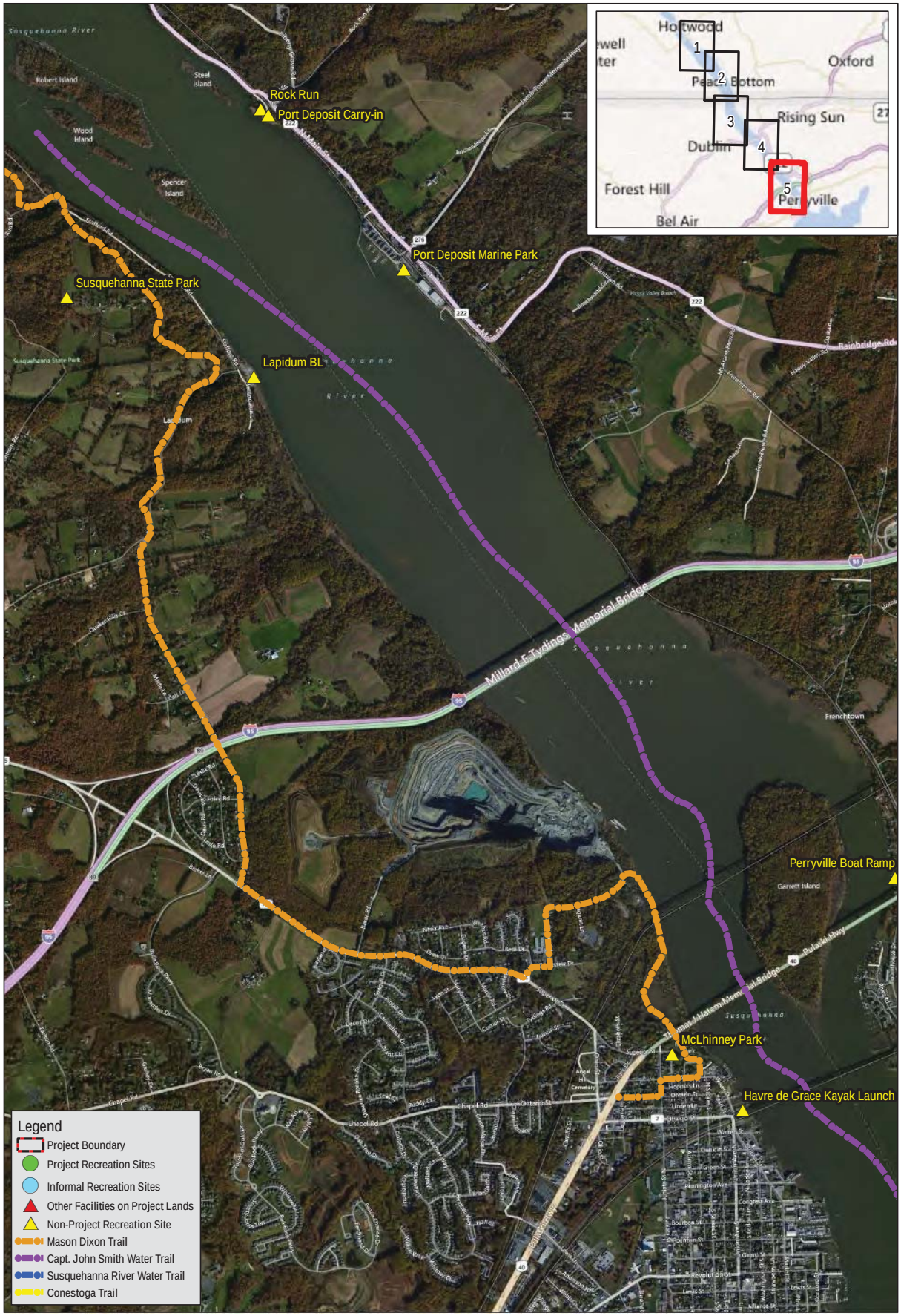
N

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 GENERATION COMPANY, LLC
SHORELINE MANAGEMENT PLAN DOCUMENT
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

N

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

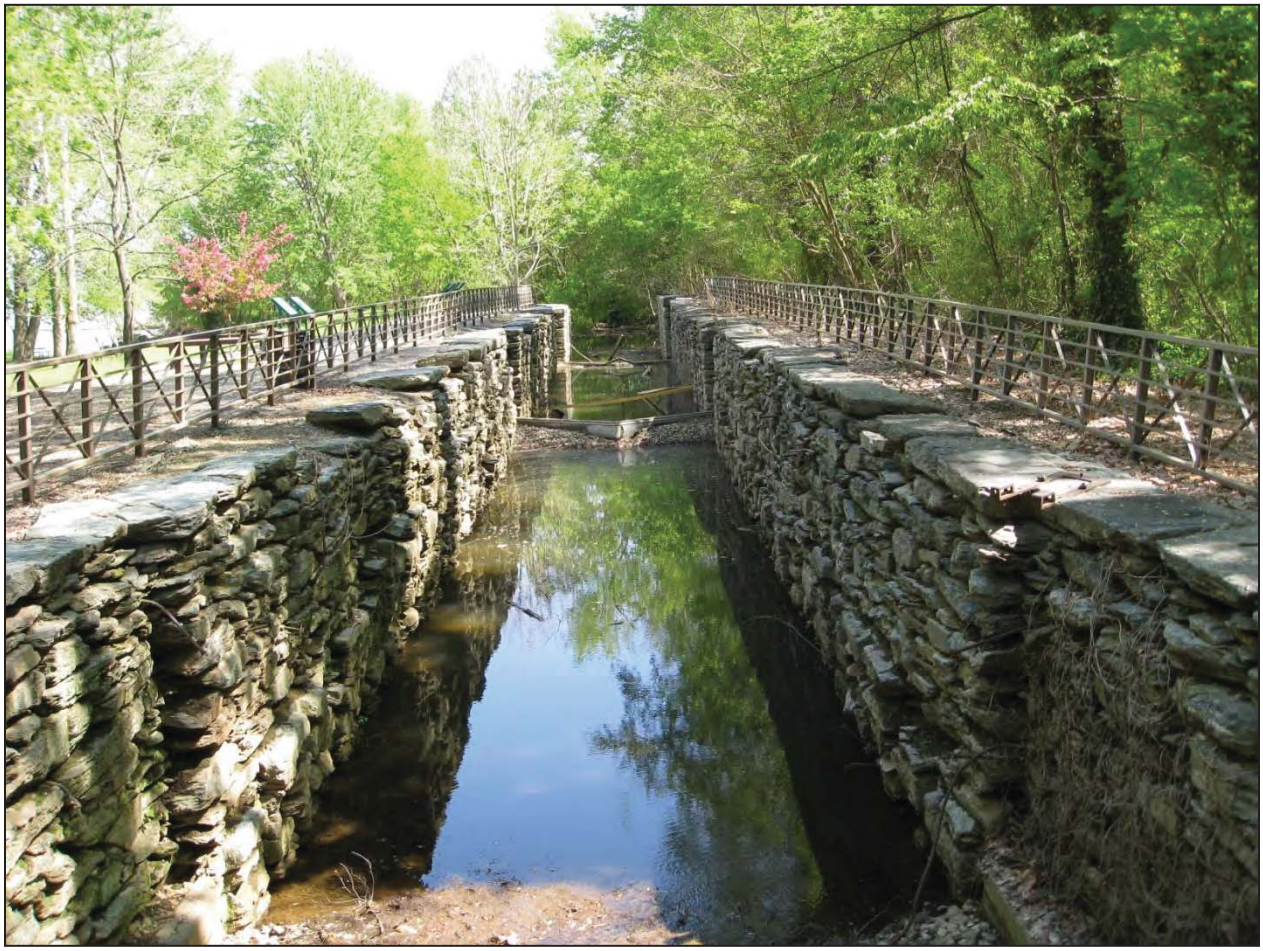
The facility is located at the site of the Susquehanna and Tidewater Canal Lock 13. The facility is maintained in a primitive state with no public amenities or interpretive improvements. Lock 13 is owned and managed by Exelon, but is accessed from the PPL Holtwood LLC Lock 12 parking lot (Holtwood Project, 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

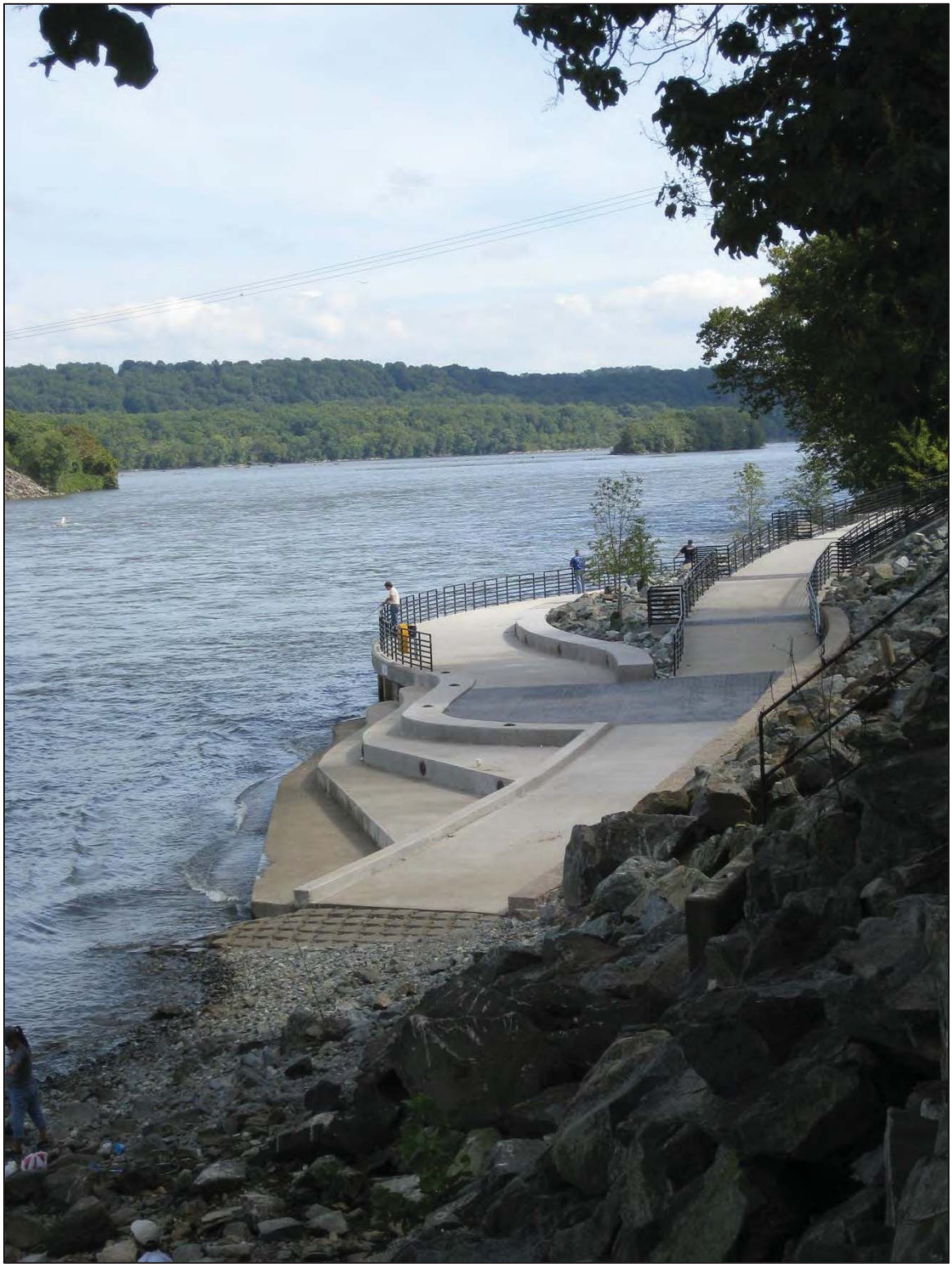


Figure 5.2.1-2: Carry-in Boat Launch (Shure's Landing)

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

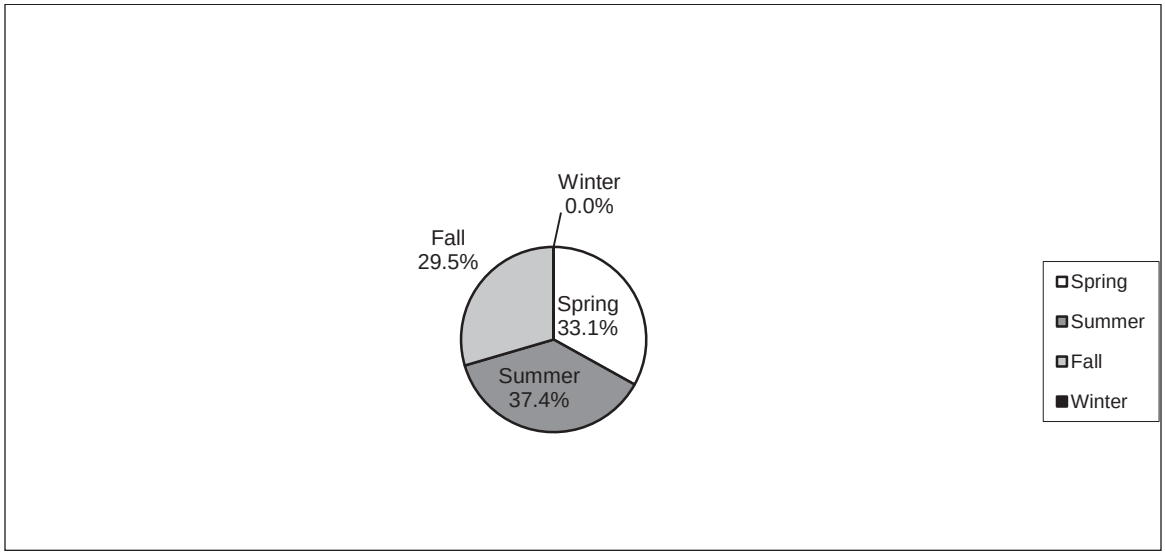
Fall – August 30 to November 30, 2008

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



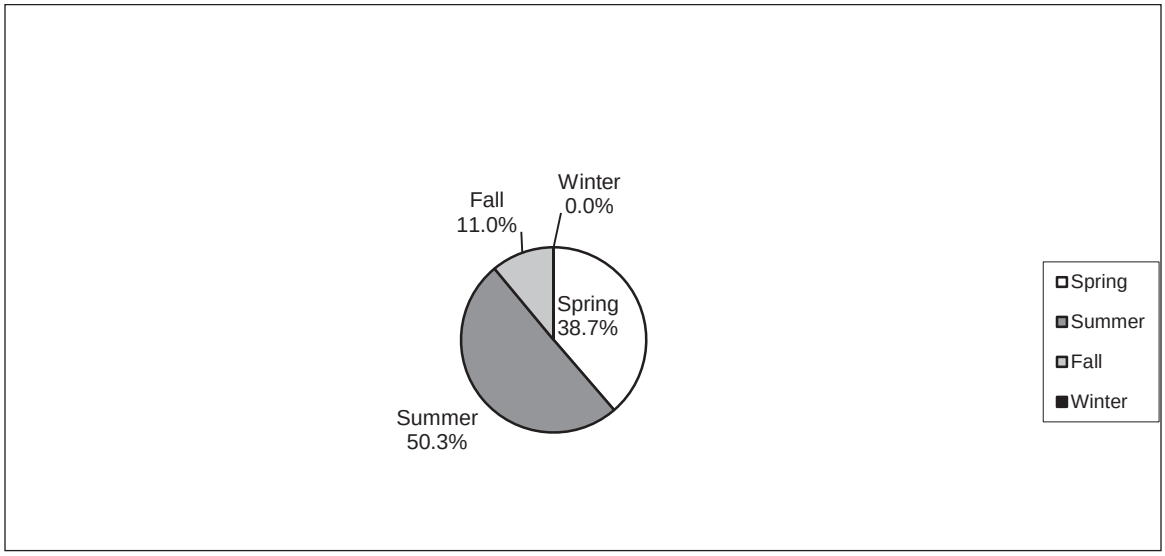
The FERC Form 80 requires estimates of the Peak Use Weekend. This is defined as the long weekend when recreation use is at its peak for the season. This is typically, the Fourth of July weekend, depending on the weather and the day of the week on which July 4th falls. It is estimated that a total of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

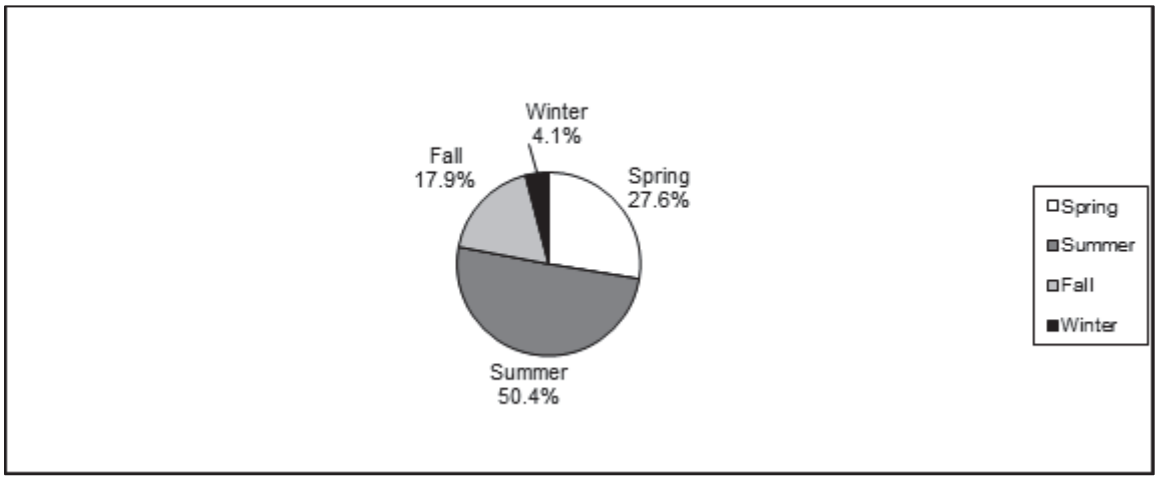
At Lock 15, surveyors also recorded the level of use observed on the headpond. Boaters on the headpond, excluding canoeists and kayakers, are presumed to have launched their boats from other recreation sites or private docks. Based on the use observed, an additional 4,462 annual recreation days were 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



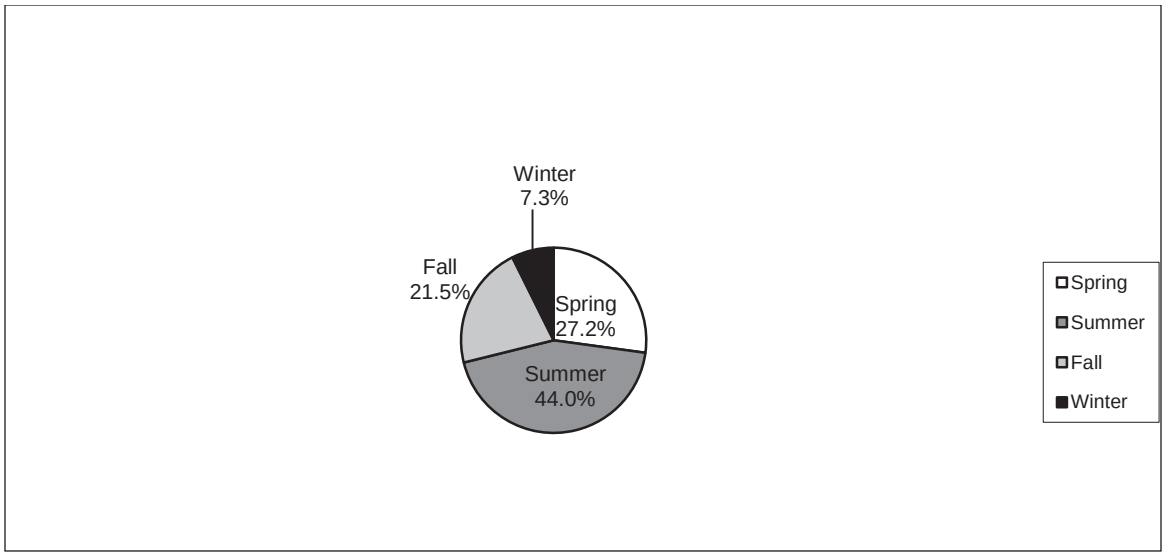
It is estimated that a total of 3,071 recreation days were spent at the Muddy Creek Boat Launch during the Peak Use Weekend in 2008. Average daily usage was greatest in the summer, with 205 visitors per day. The winter saw the lowest average daily use (15 recreationists per day) of the study period.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

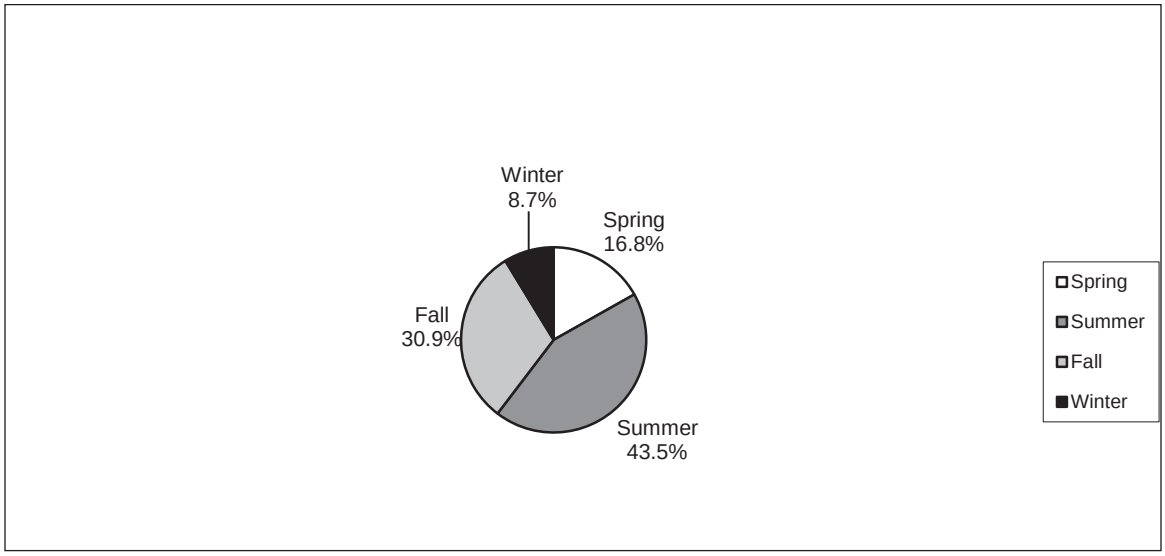


It is estimated that a total of 597 recreation days were spent at the Cold Cabin Boat Launch during the Peak Use Weekend in 2008. Average daily usage was greatest in the summer, with 55 visitors per day. The winter saw the lowest average daily use (8 recreationists per day) of the study period. Average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



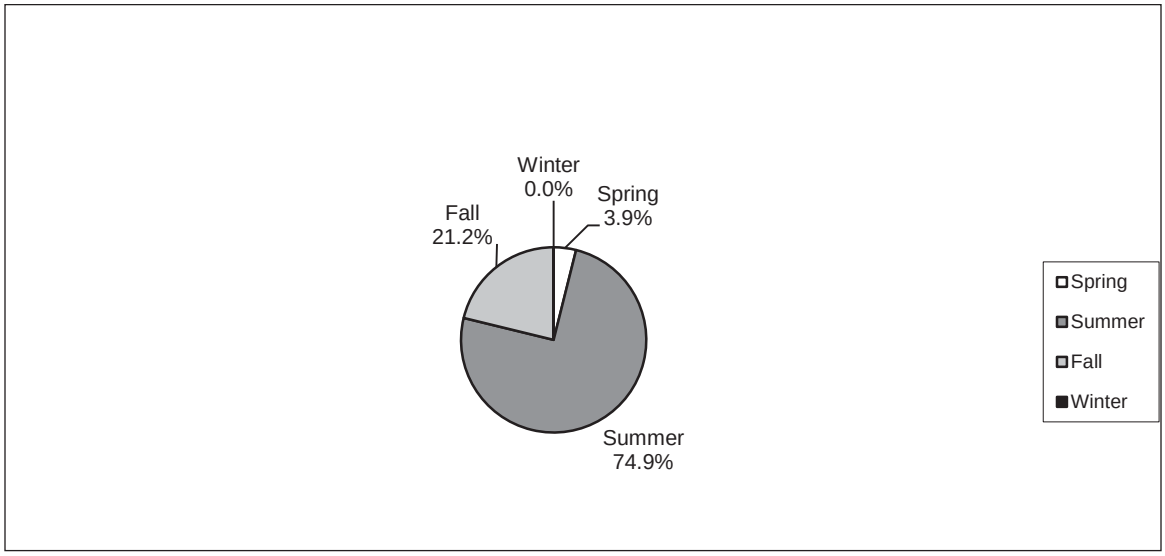
Note: Figures do not sum to 100 percent because of rounding.

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

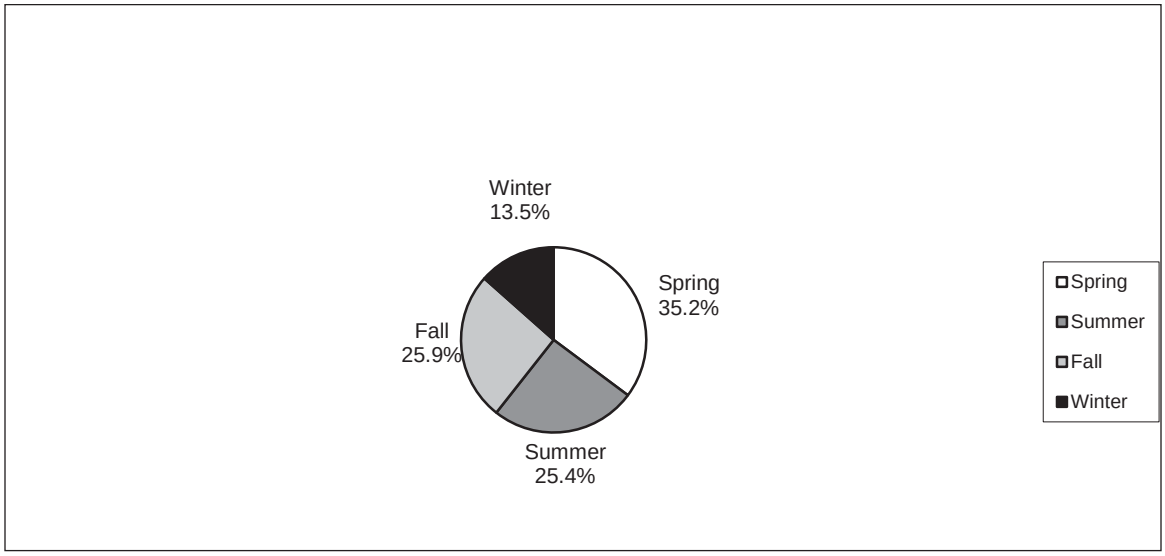


It is estimated that a total of 33 recreation days were spent at the Peach Bottom Marina during the Peak Use Weekend in 2008. Average daily usage was an estimated 5 visitors per day summer. During the period in 2008 when the facility was open, the Peach Bottom Marina averaged 3 visitors per day, based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

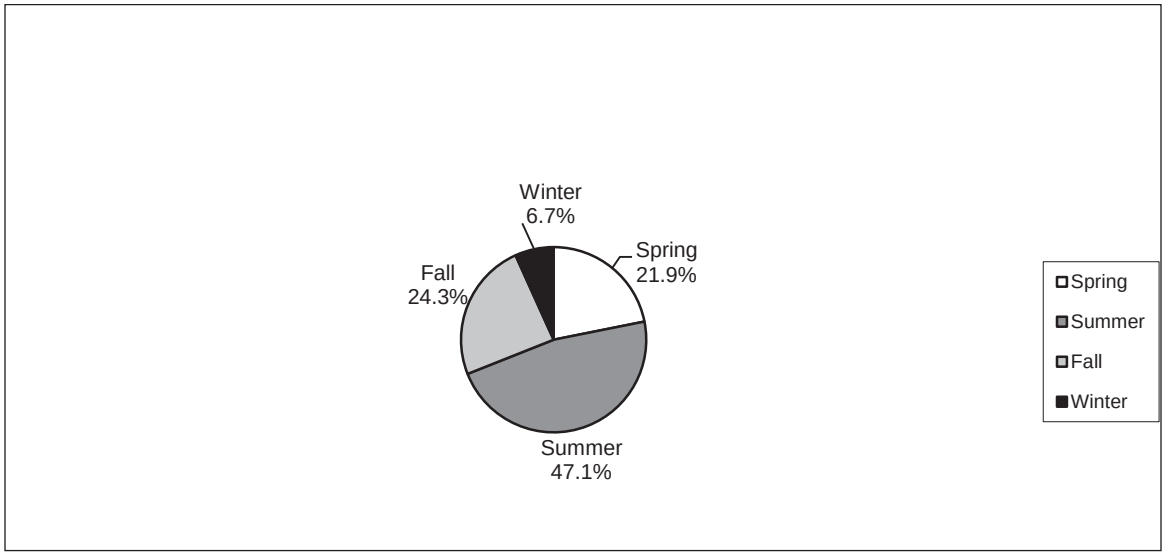
At the Line Bridge Access site, surveyors also recorded the level of use observed on the headpond. Boaters on the headpond, excluding canoeists and kayakers, are presumed to have launched their boats from other recreation sites or private docks. Based on the use observed, an additional 2,749 annual recreation 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



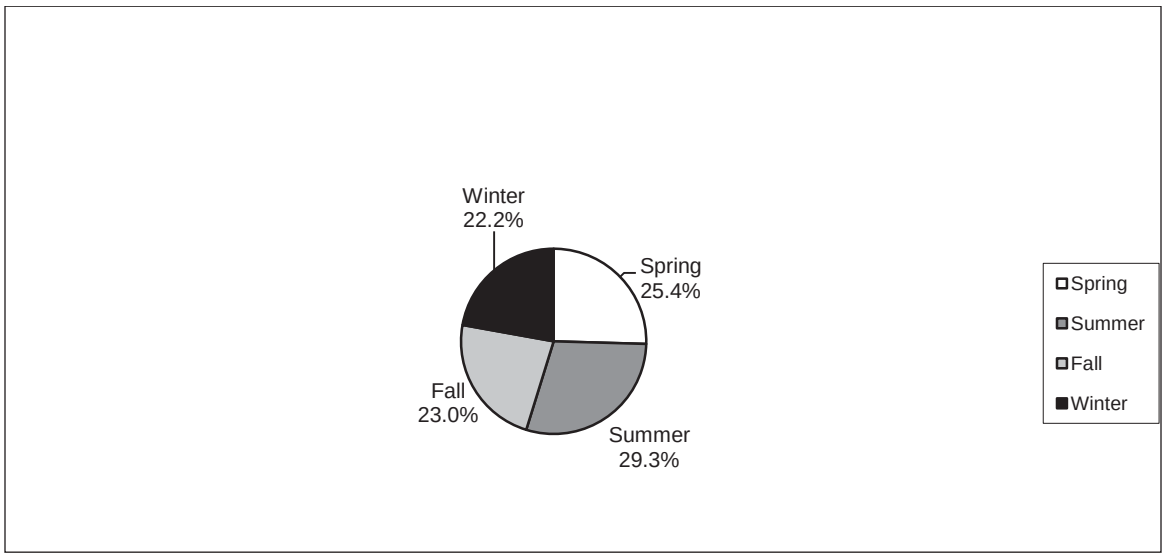
It is estimated that a total of 433 recreation days were spent at Broad Creek Public Landing during the Peak Use Weekend in 2008. Average daily usage was greatest in the summer, with 50 visitors per day. The winter saw the lowest average daily use (7 recreationists per day) of the study period. Average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

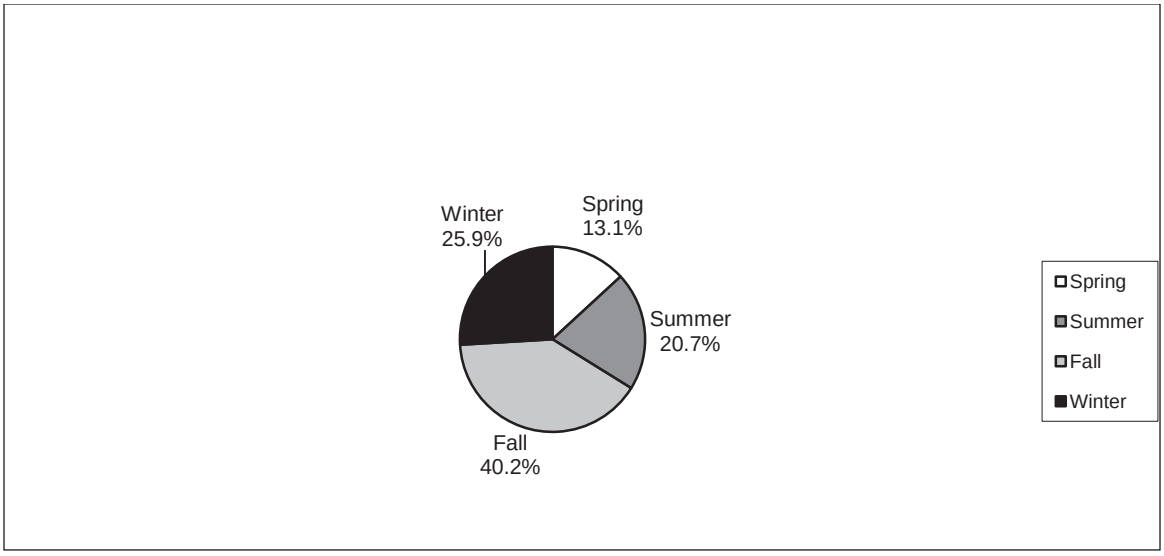
6.3.10 Glen Cove Marina

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

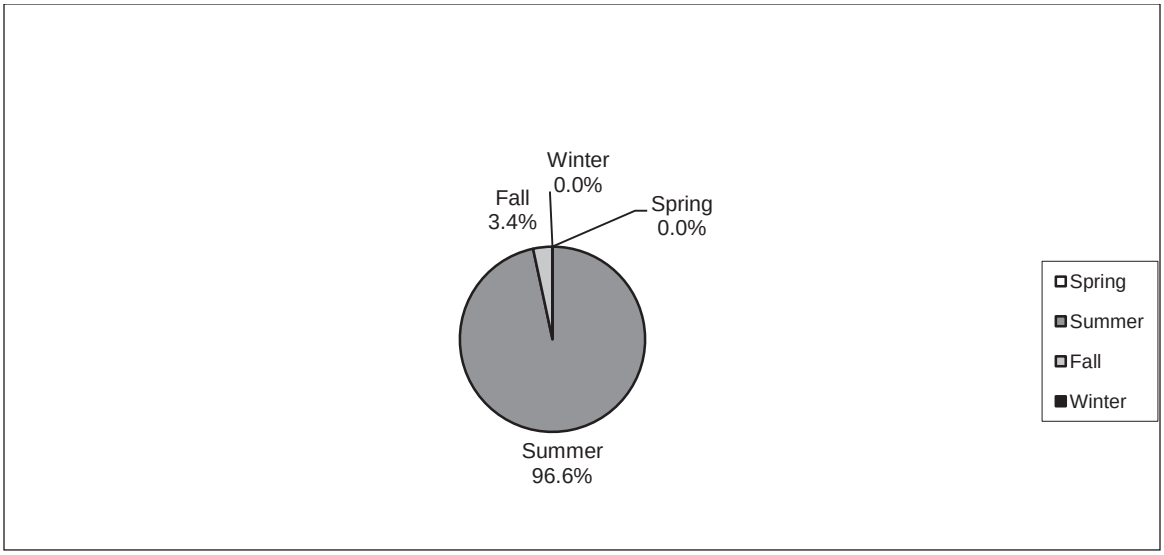


It is estimated that a total of 108 recreation days were spent at Funk's Pond during the Peak Use Weekend in 2008. Average daily usage was greatest in the fall, with 19 visitors per day. The spring saw the lowest average daily use (8 recreationists per day) of the study period. Average daily use in the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



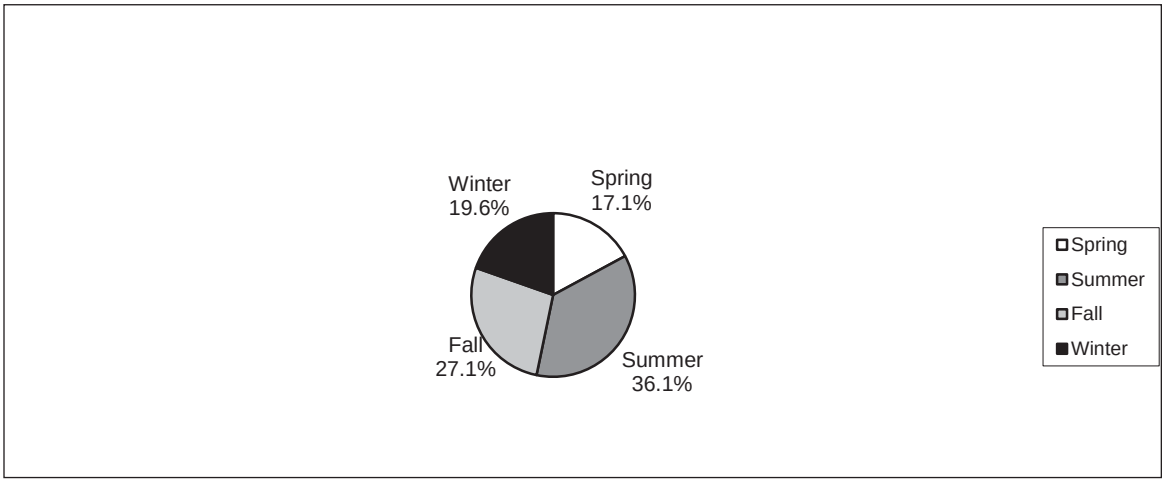
It is estimated that a total of 419 recreation days were spent at the Conowingo Swimming Pool during the Peak Use Weekend in 2008[4]. Average daily usage in the summer was 109 visitors per day. Average daily use over the Labor Day weekend at the beginning of fall was 95 persons per day.

[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.

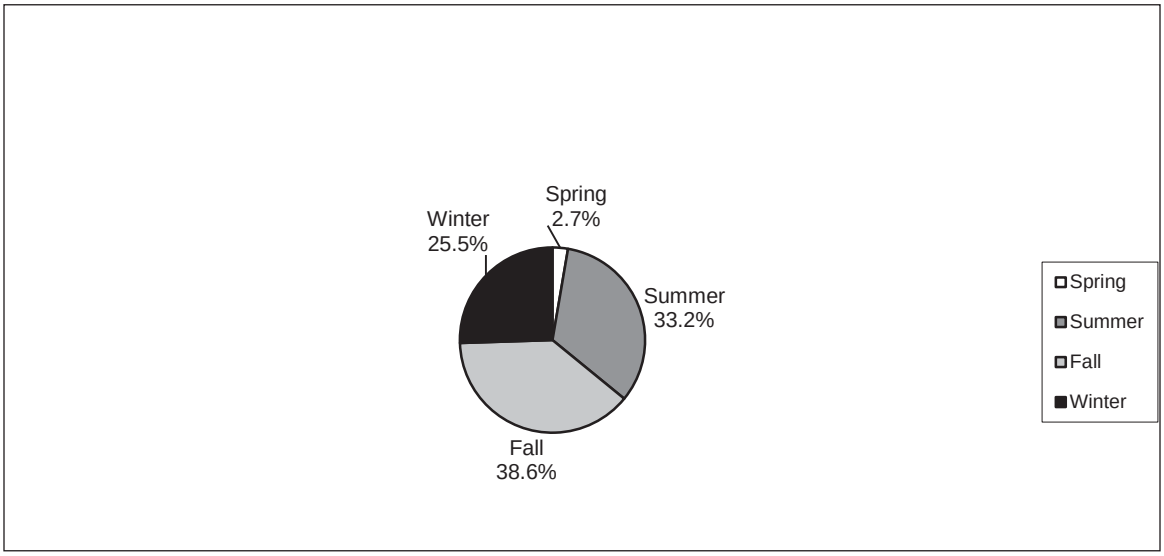
An estimated total of 2,124 recreation days were spent at Fisherman's Park over the peak weekend in 2008. At the park, average daily usage varied from a low of 267 persons per day in the winter to a high of 538 daily visitors in the summer. Average daily use in the fall was 413 visitors per day. An average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



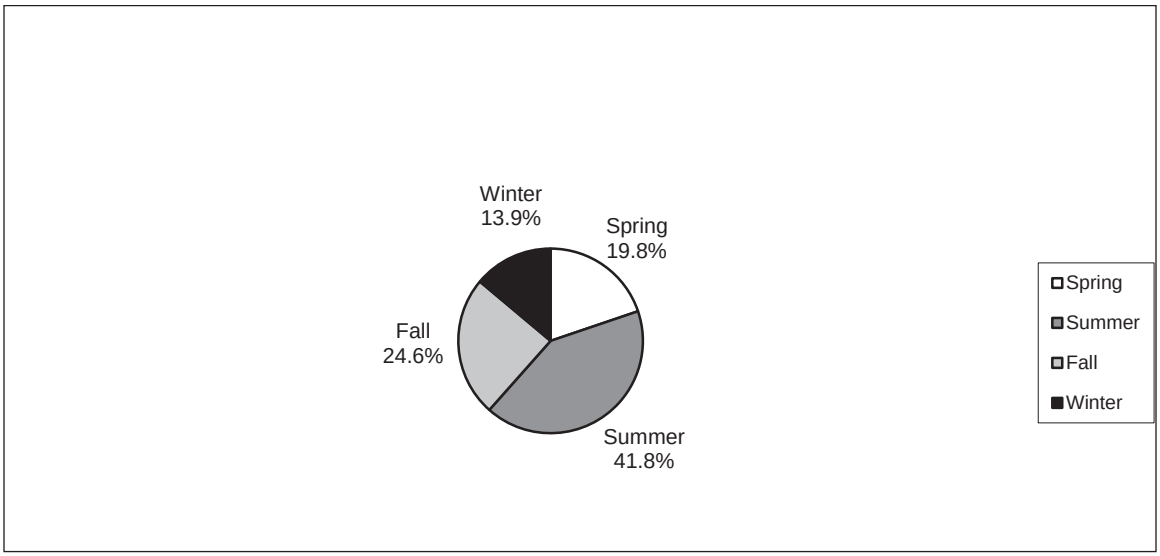
It is estimated that a total of 225 recreation days were spent at the Octoraro Creek Access site during the Peak Use Weekend in 2008. Average daily usage was greatest in the fall, with 31 visitors per day. The spring saw the lowest average daily use (3 recreationists per day) of the study period. Average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

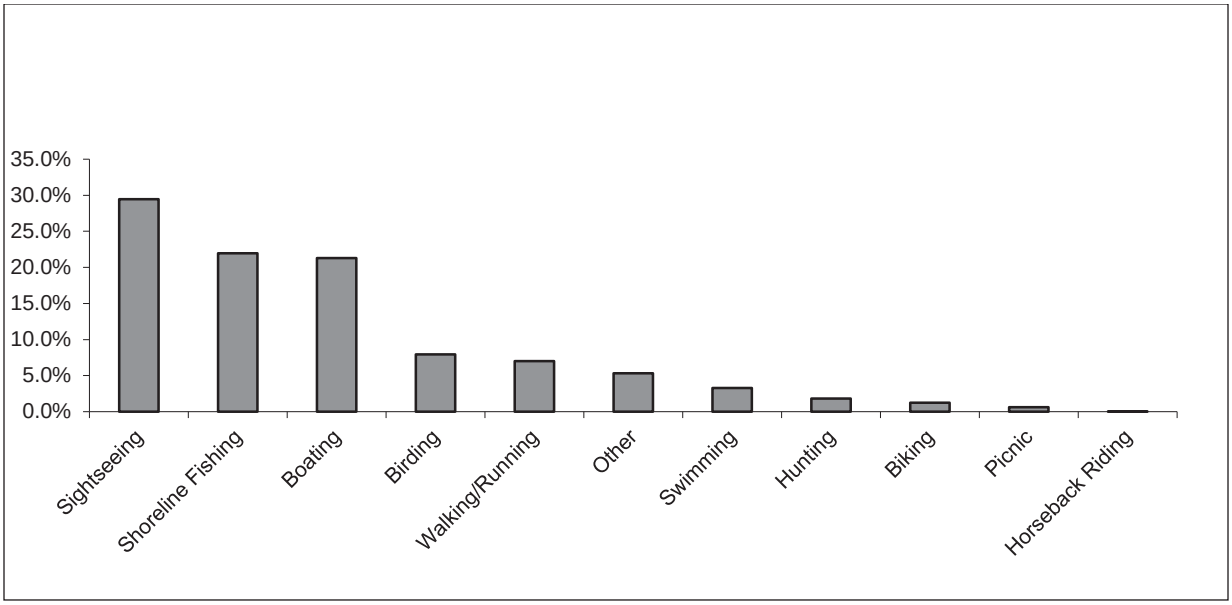
Table 6.4.9.6-1 (Continued)

	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.

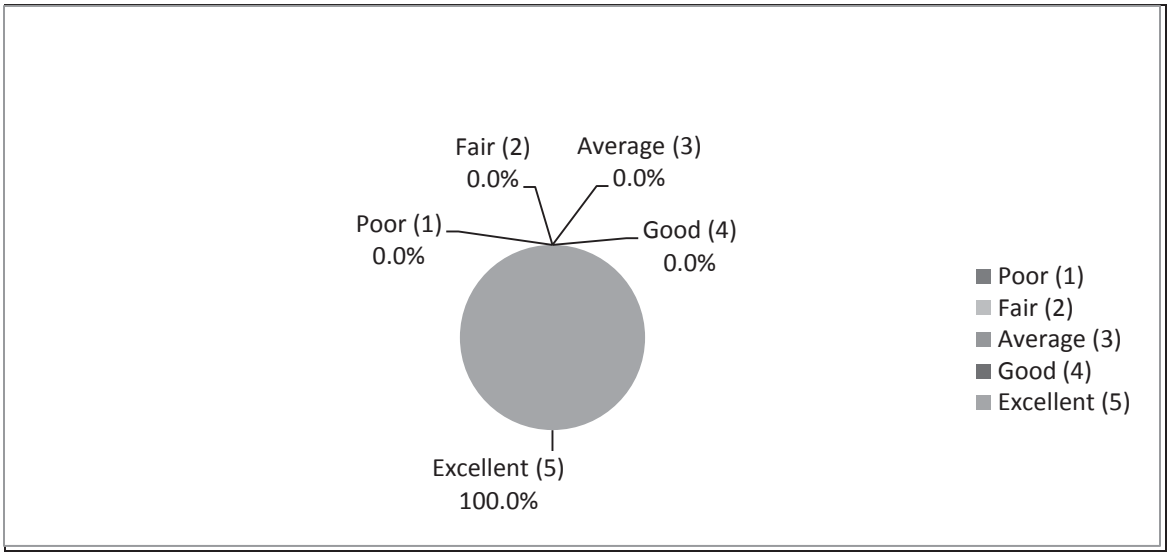
8.2.1 User Preference Survey Results

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.

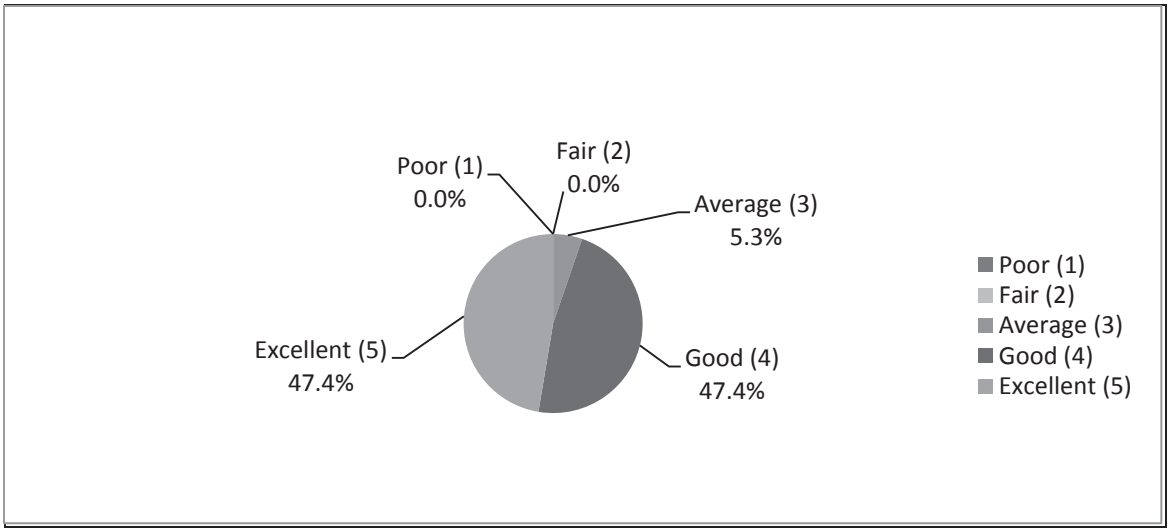
Figure 8.1: Recreation User Facility Perception, Conowingo Project: Lock 13, 2010-2011



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.

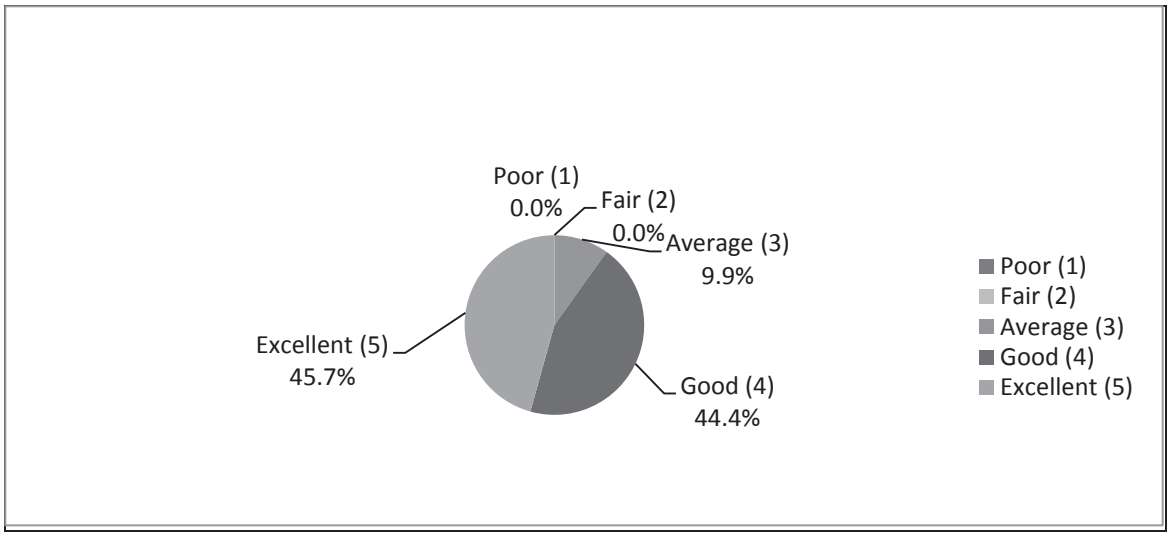
Fishing received the lowest average rating of 4.3, with the ratings being somewhat lower in the spring (4.2) than in the summer (4.5). Maintenance and parking received similar scores from recreationists, averaging 4.4 across the recreational period surveyed. Roughly 90 percent of interviewed visitors 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).

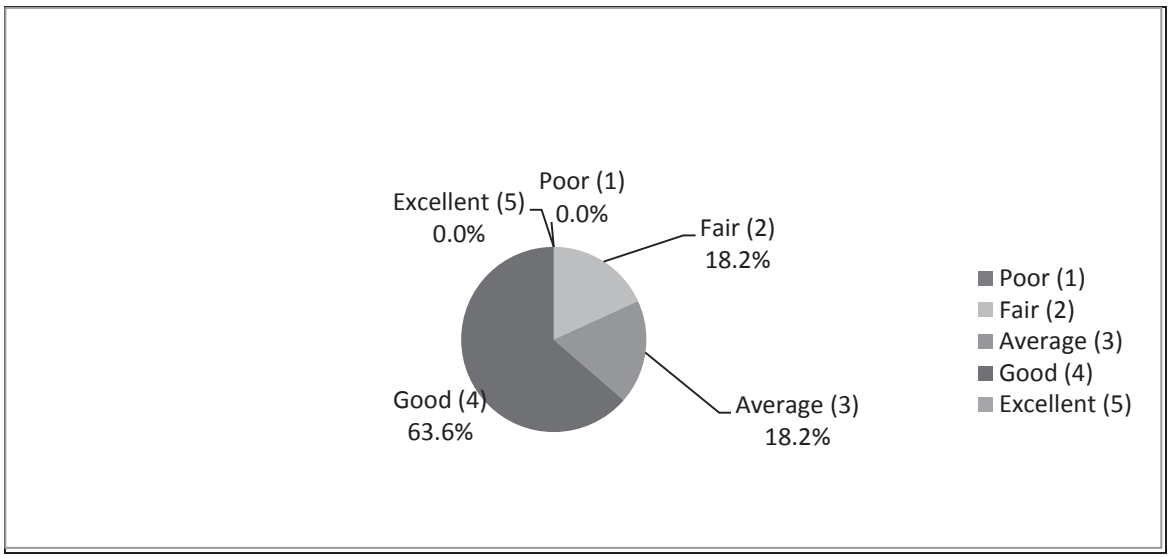
Improvement of the boat ramp was the most frequently mentioned concern of the recreationists, representing 23 percent of the comments received. Specific concerns were that the ramp was too steep and too narrow. Portable toilet cleanliness and the desire for permanent restroom facilities were the topics 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.

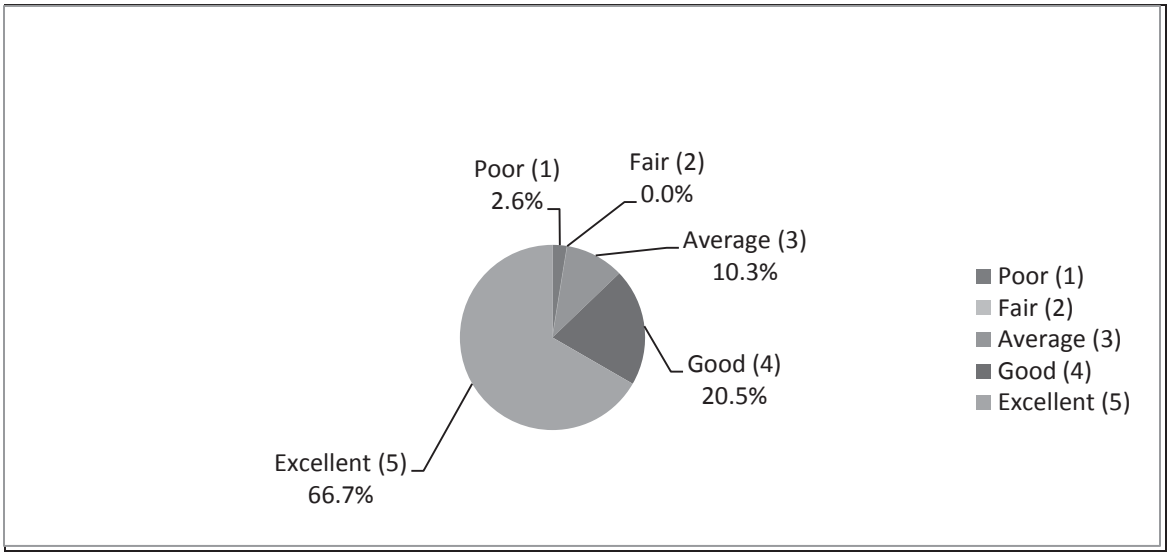
Maintenance was rated as poor (1) by one respondent, a summertime visitor. That recreationist noted specifically that the grass was in need of cutting. Maintenance and fishing were rated once each as fair (2). Parking and the overall facilities were scored as fair (2) twice each over the course of the 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.

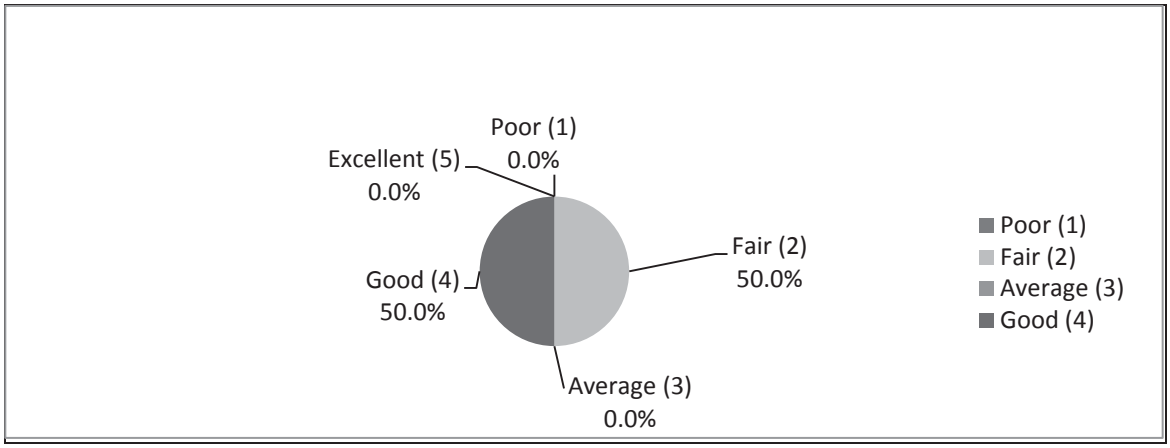
Maintenance at the Dorsey Park Boat Launch was rated the highest of the areas addressed, with a 4.5 average score. The ratings ranged from 4.1 in the summer, the location's busiest time, to 5.0 in the fall. Parking received an average rating of 4.3, with the fall visitors again providing the highest 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



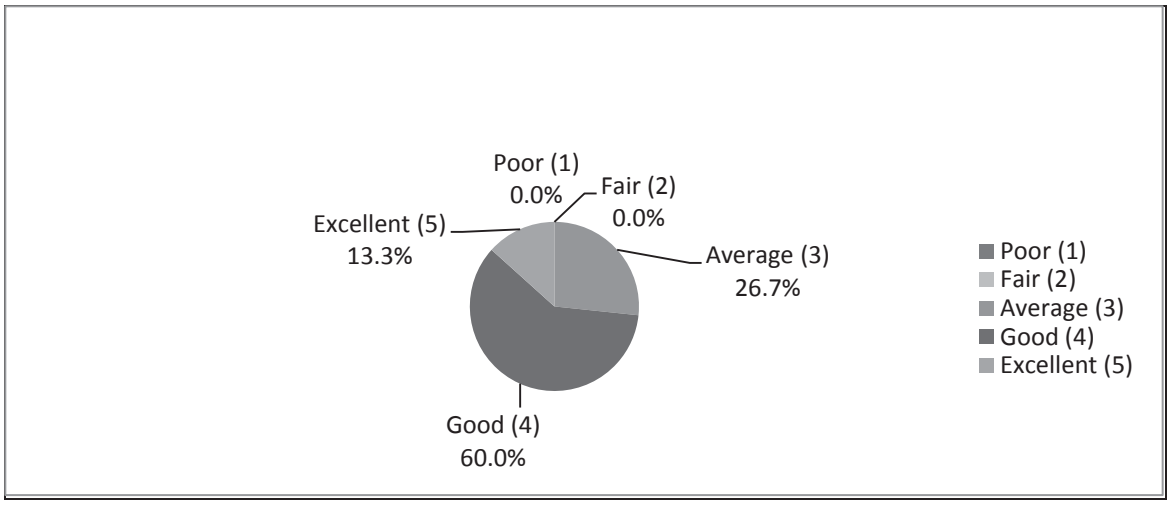
Fishing received the strongest average rating of 4.0, with parking and maintenance at 2.5 and 2.0 respectively. The low ratings are reflected in the comments received about the site. Two thirds of the comments from the Line Bridge Access site, which is maintained by Harford County, requested that trash 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

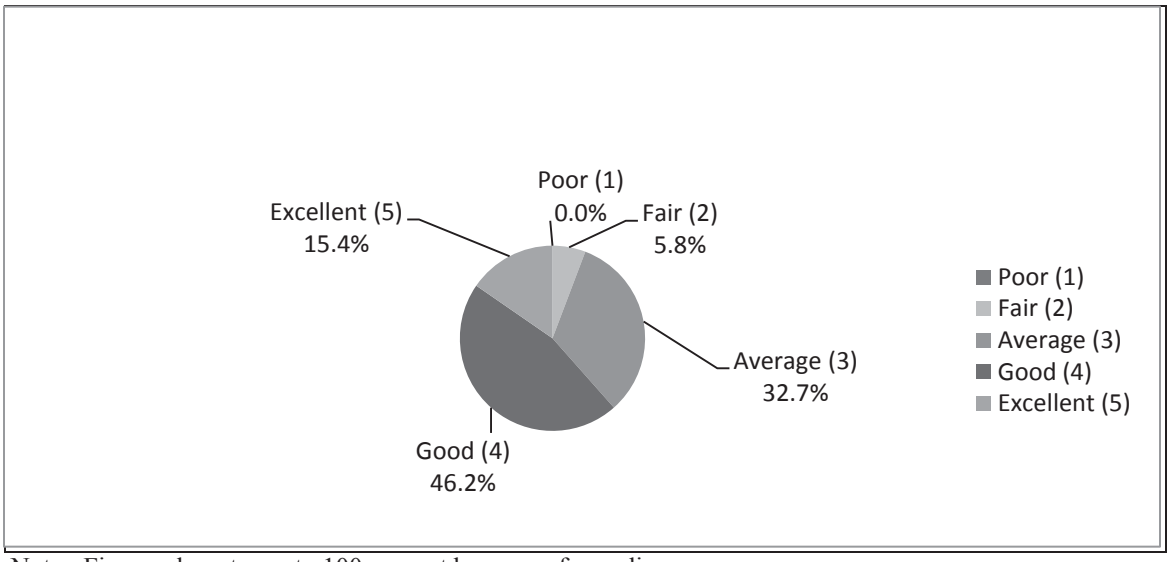
(5 percent). Comments related to repairs to the bulkhead (10 percent) and the docks (5 percent) were also received.

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).

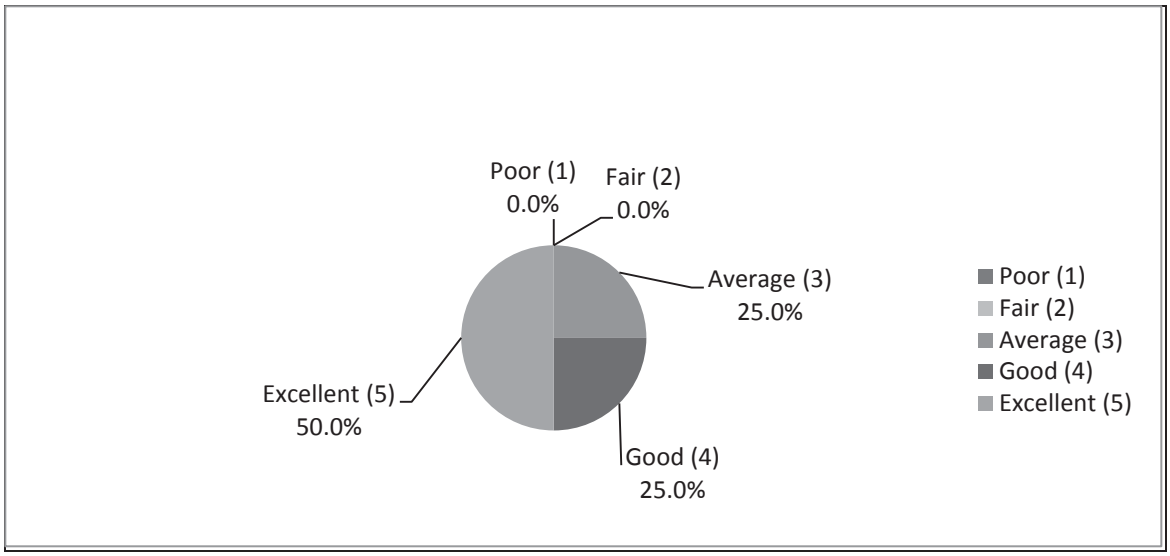
Recreationists who visited in the spring of 2011 rated the facilities much higher than those who had visited in the prior spring. All of those visitors rated each of the four aspects of the Conowingo Creek Boat Launch as good (4) or excellent (5). Forty-six percent of the survey respondents in the spring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

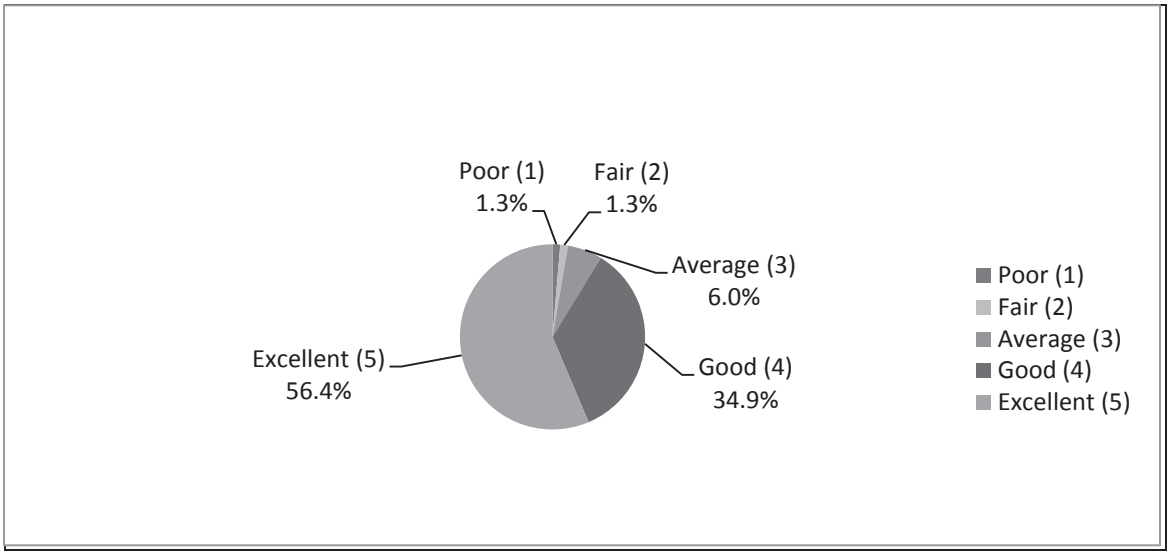
Two items were noted by recreationists surveyed at Funk's Pond: the need for installation/replacement of trash cans and the addition of historical markers. The visitors commented that they "like all improvements" and that the site "looks good for the improvements."

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,

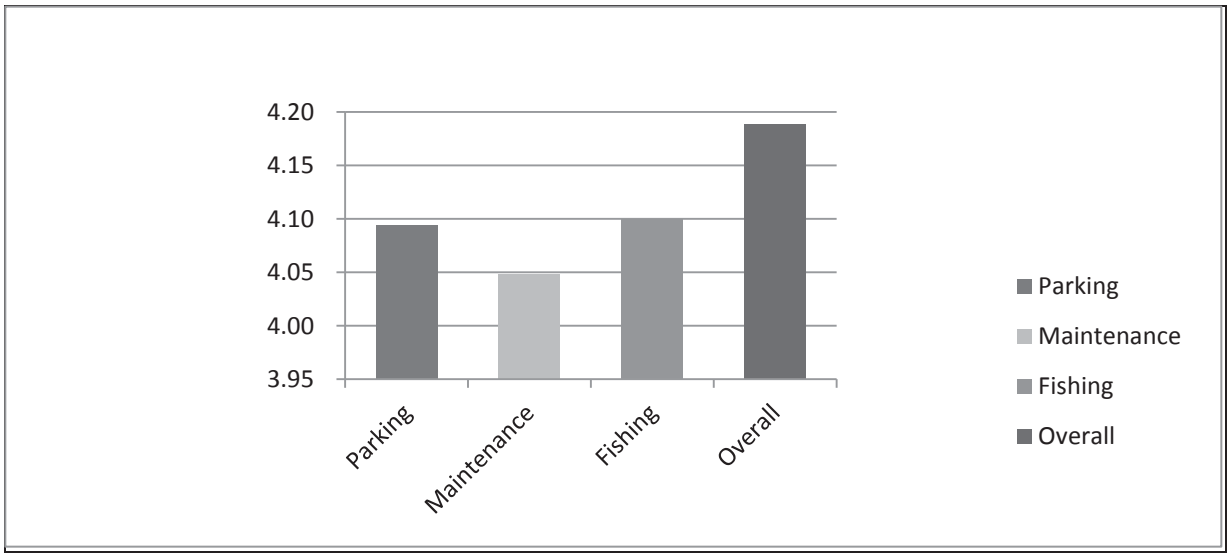
typically the busiest season at the site, garnering a 4.94 rating. Maintenance received an average rating of 4.8. More than 90 percent of interviewed visitors considered the various aspects of the Octoraro Creek Access to be good (4) or excellent (5). None of those surveyed assigned the ratings of fair (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.

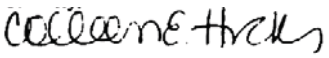
Exelon is filing this document with the Commission electronically. To access the document on the Commission's website (http://www.ferc.gov), go to the "eLibrary" link, and enter the docket number, P-405 or P-2355. Exelon is also making the document available for download at its corporate website. To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

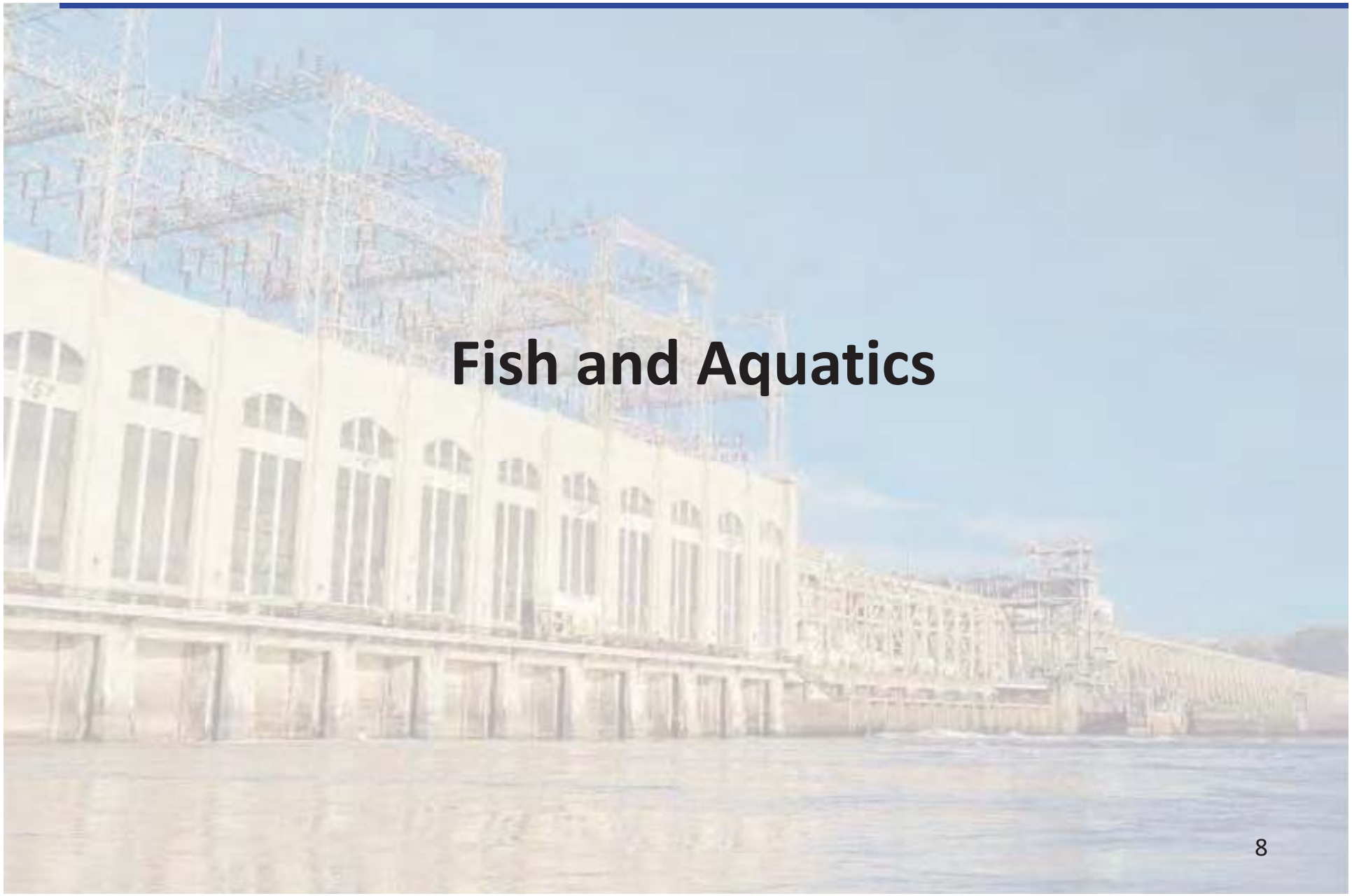
- Any proposal for new information gathering or studies must be accompanied by a showing of good cause why the proposal should be approved, and must include, as appropriate to the facts of the case, a statement explaining:
  - Any material changes in the law or regulations applicable to the information 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

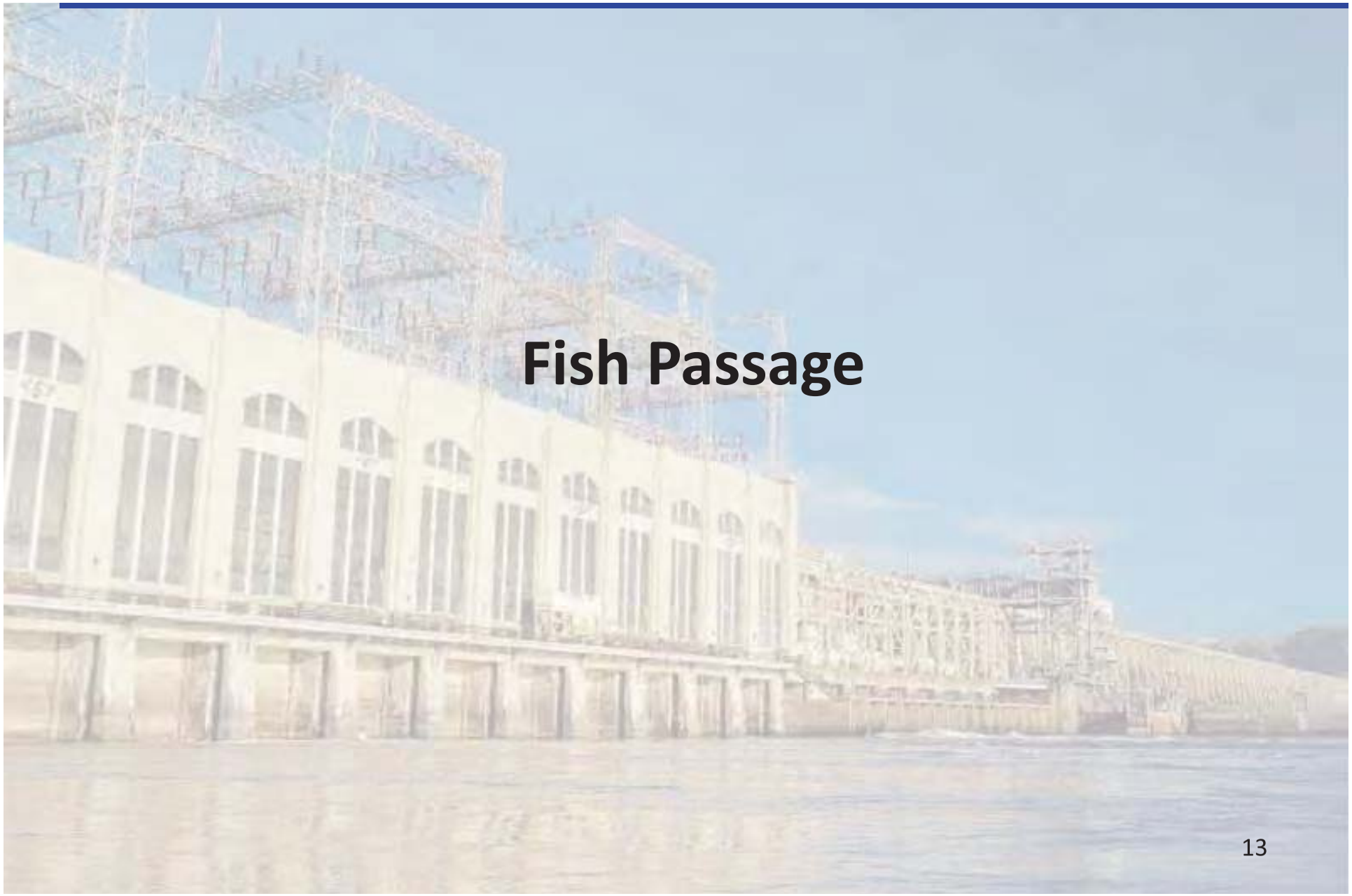
- Study Objective
  - Review shortnose and Atlantic sturgeon status, occurrence in the Susquehanna River, and habitat requirements.
  - Compare Conowingo east fish lift and any East Coast passage facilities where successful upstream passage has been documented.
  - Assess habitat availability below Conowingo 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

- 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

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

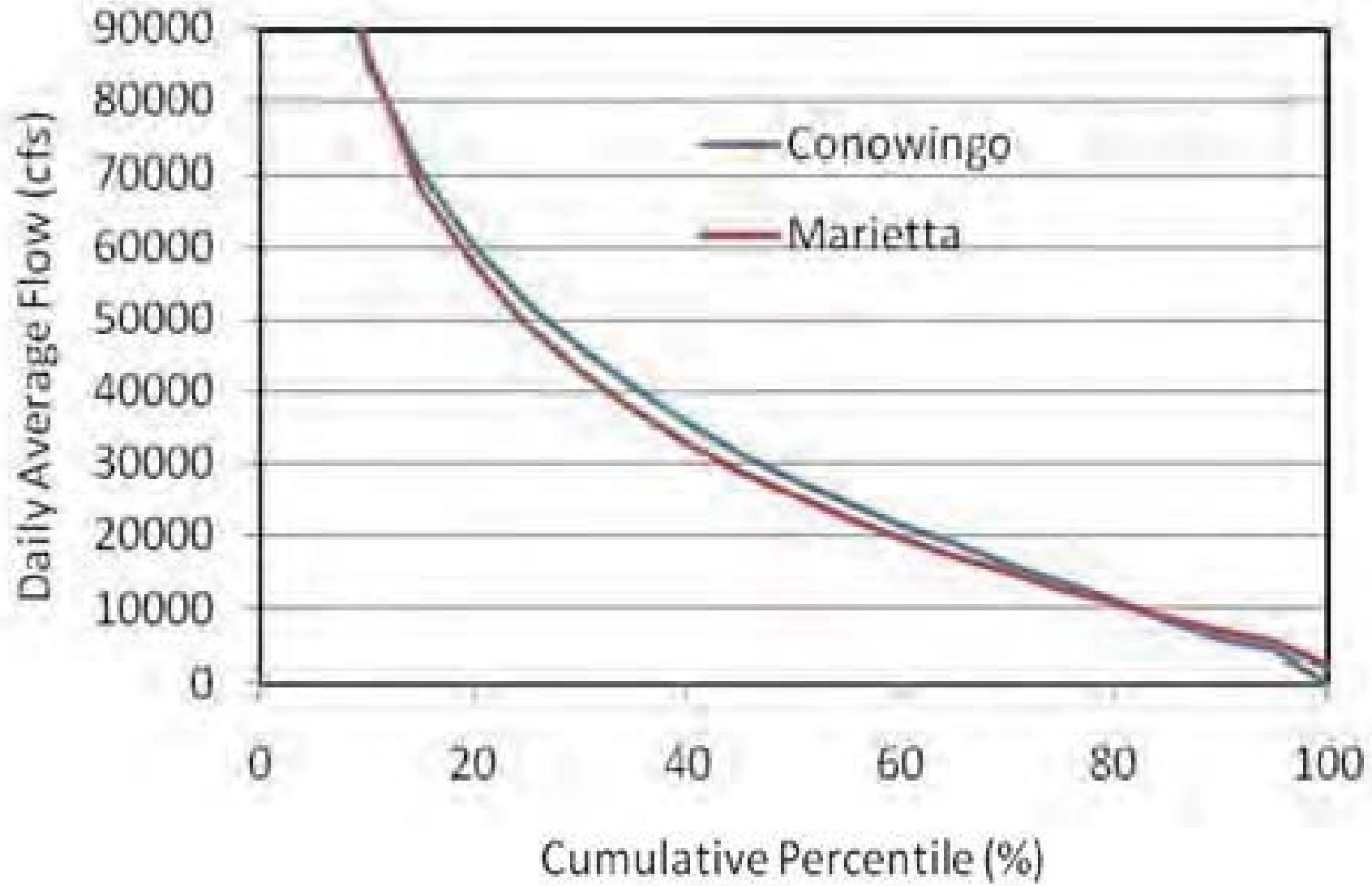
Water Use

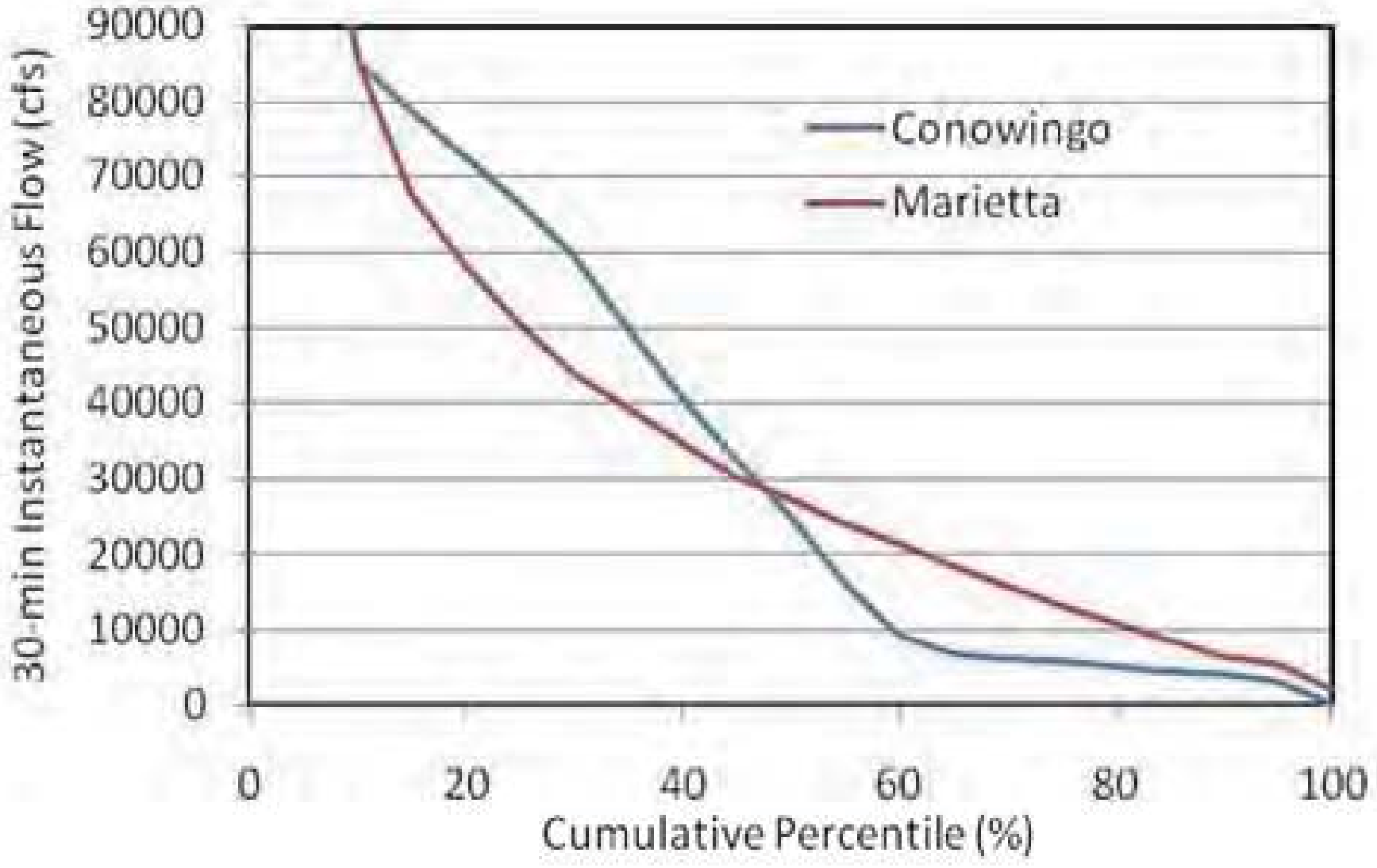
Muddy Run 3.2-Hydrologic Study of Muddy Run Water Withdrawal and Return Characteristics

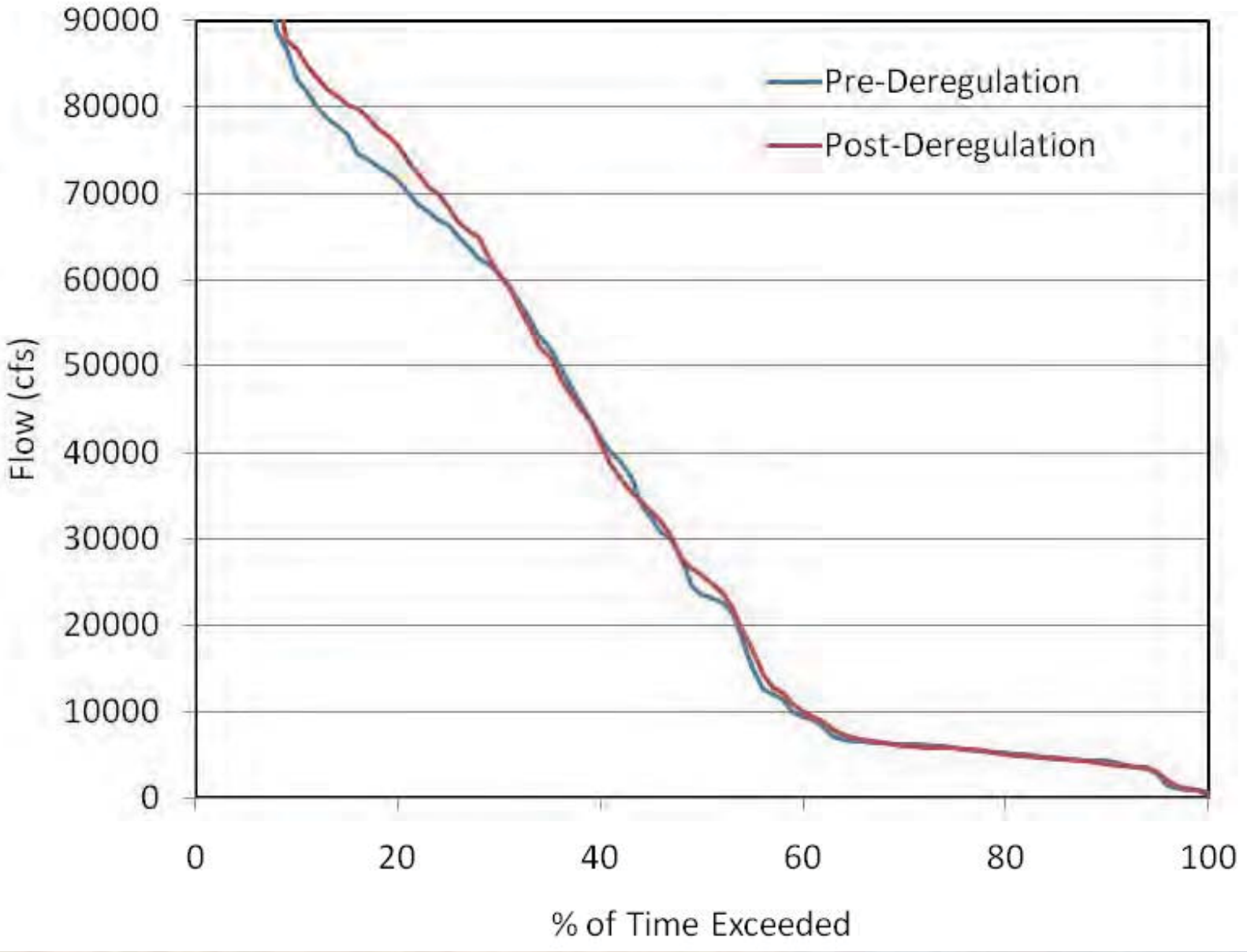
- Study Objectives
  - Describe historic flow management in the lower Susquehanna River
  - Examine the water withdrawal and return characteristics of the Muddy Run Project
  - Describe the operations of the Muddy Run Project
  - Develop bathymetric mapping of the Middy Run Project reservoir and tailrace
  - 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
0
20
40
60
80
100
Cumulative Percentile (%)
Conowingo
Marietta


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

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

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

- 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

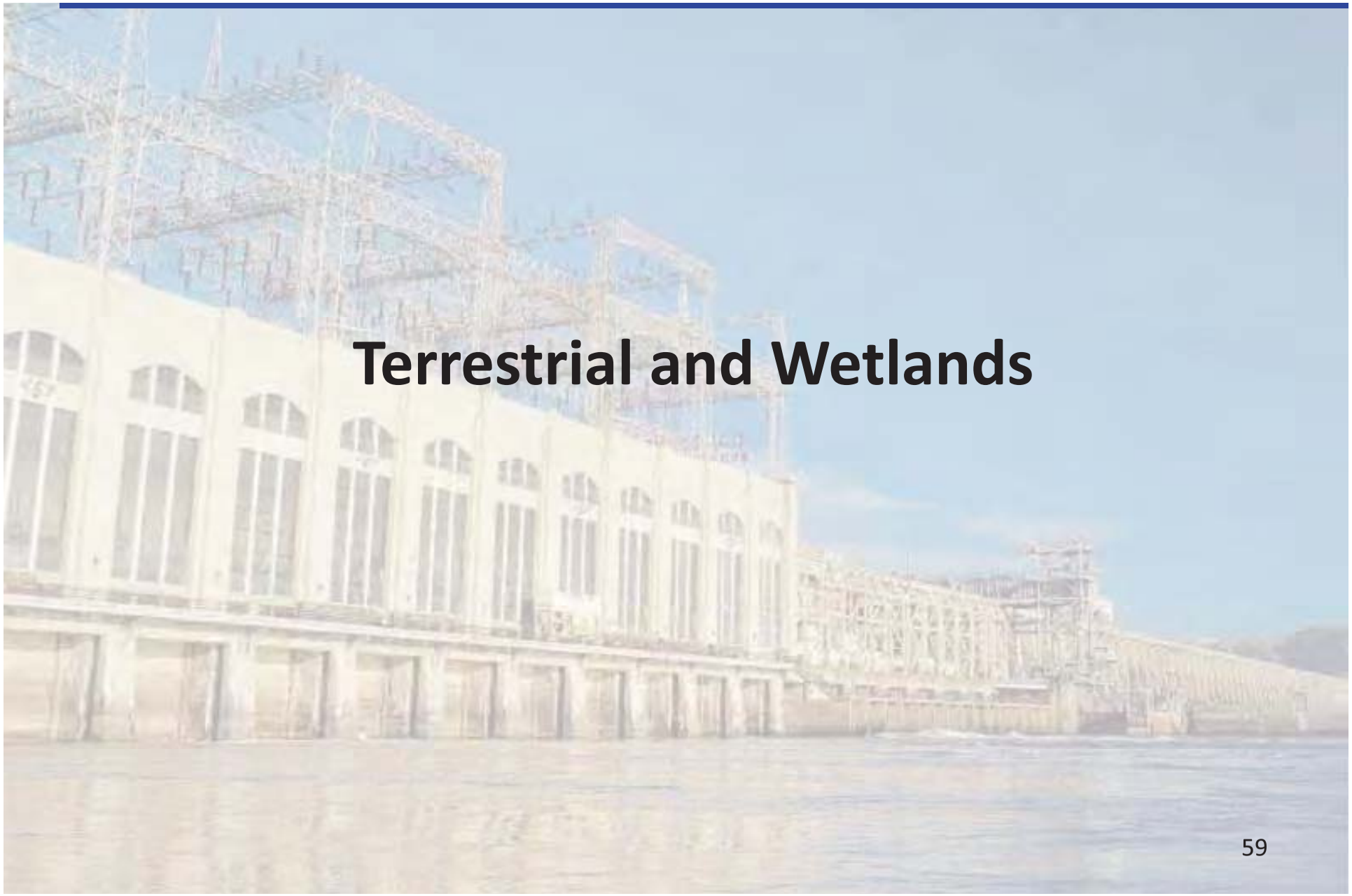
- Study Objectives
  - Identify properties listed or eligible for listing in the National Register of Historic Places (NRHP) in the Muddy Run Project Area of Potential Effect (APE) and to identify and assess possible effects from Project operations.
- Work Completed
  - Phase 1A archaeological assessment
    - 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

- 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

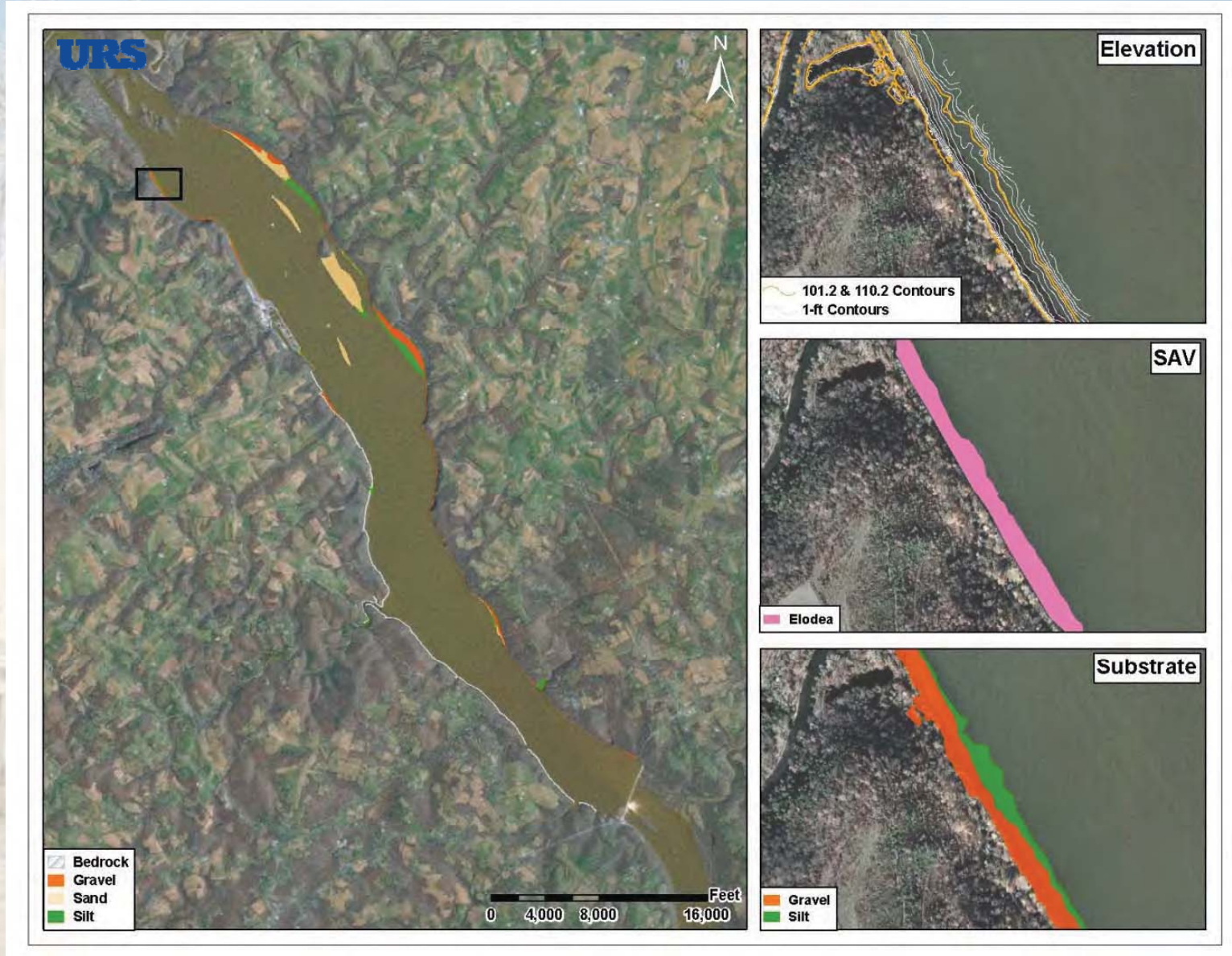
Muddy Run 3.9- Study to Identify Potential Habitat of Rough Green Snake

- 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

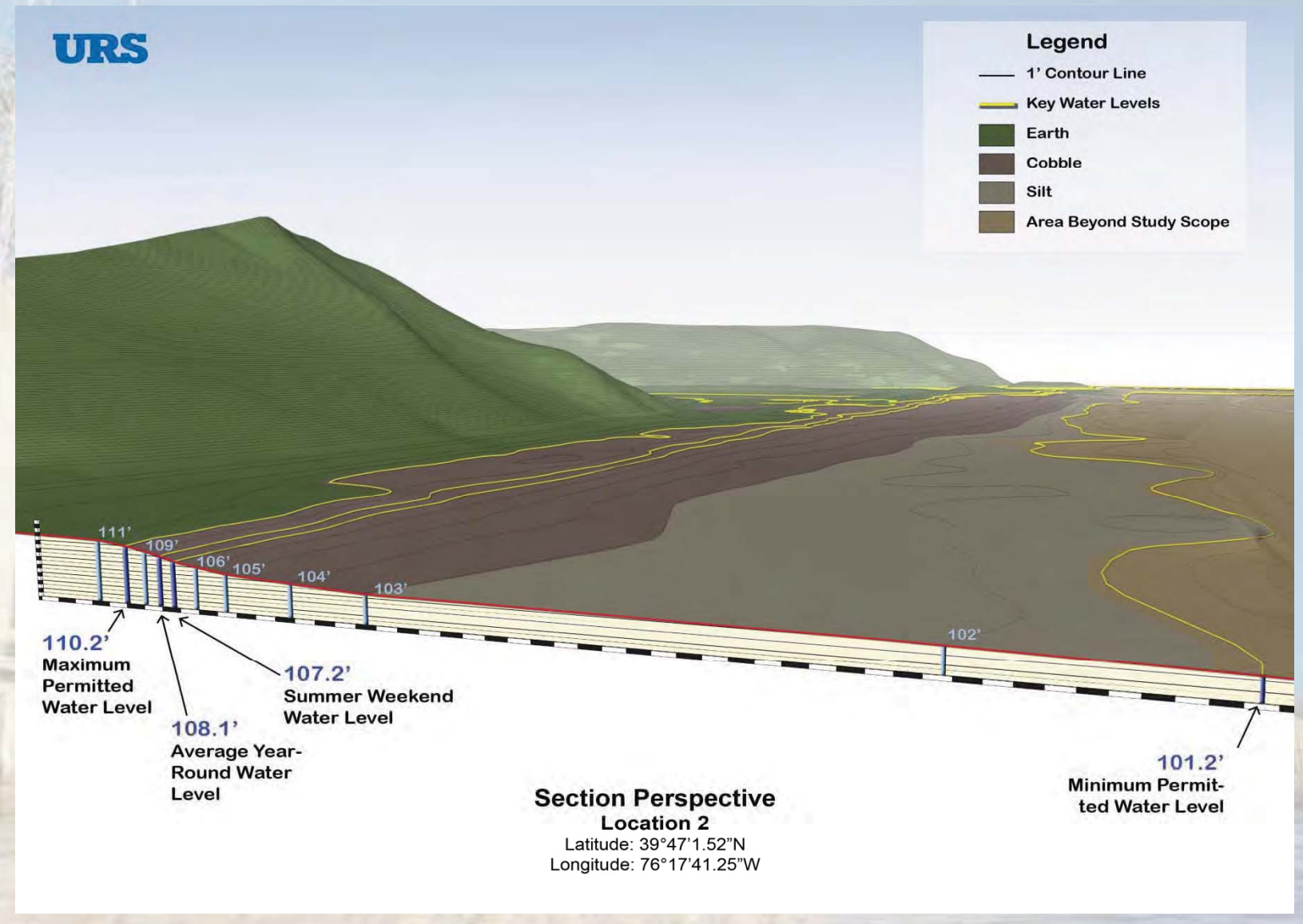
Conowingo 3.12 Water Level Management (Littoral Zone and Water Level Fluctuation)

- 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)



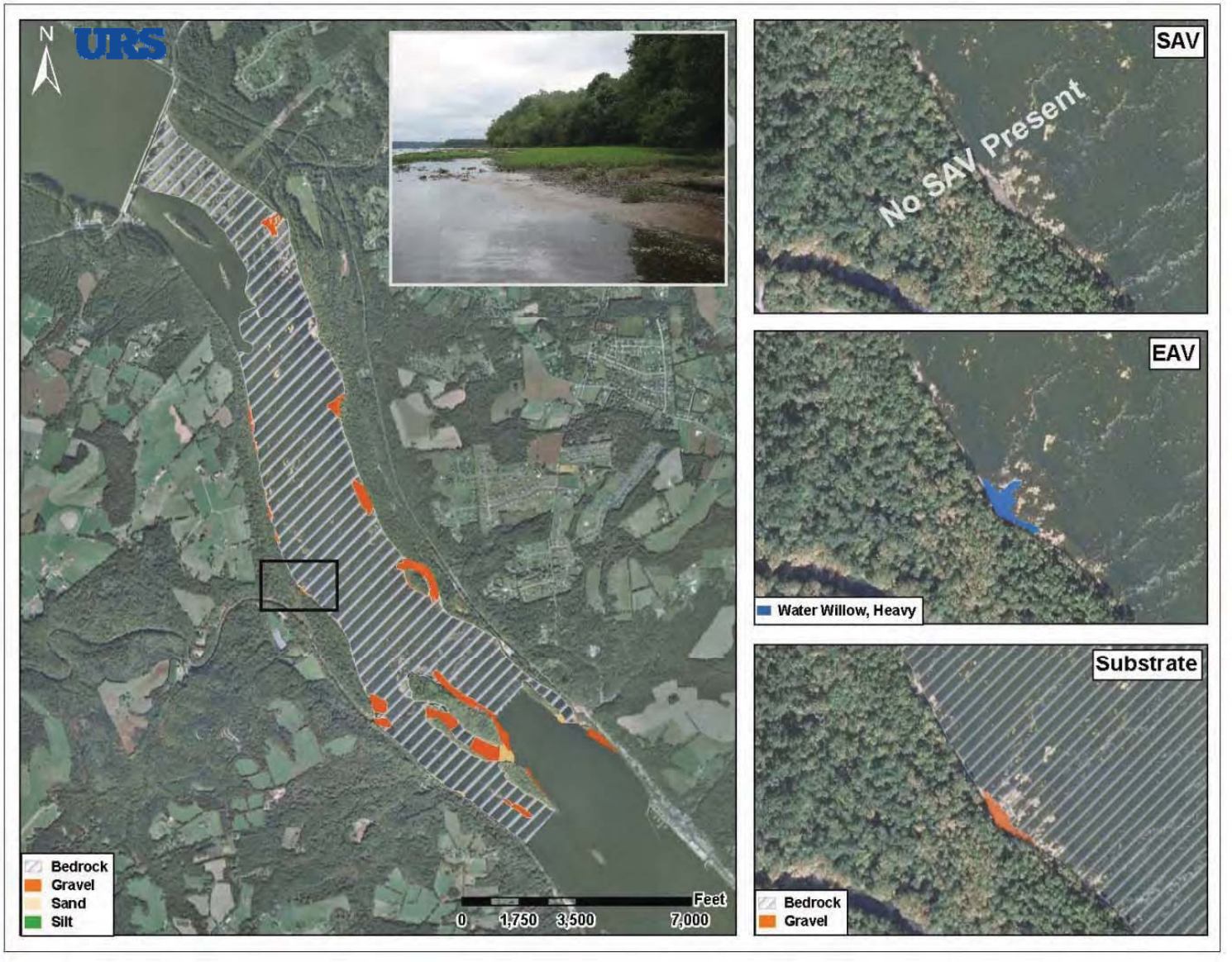
Conowingo 3.12 Water Level Management (Littoral Zone and Water Level Fluctuation)



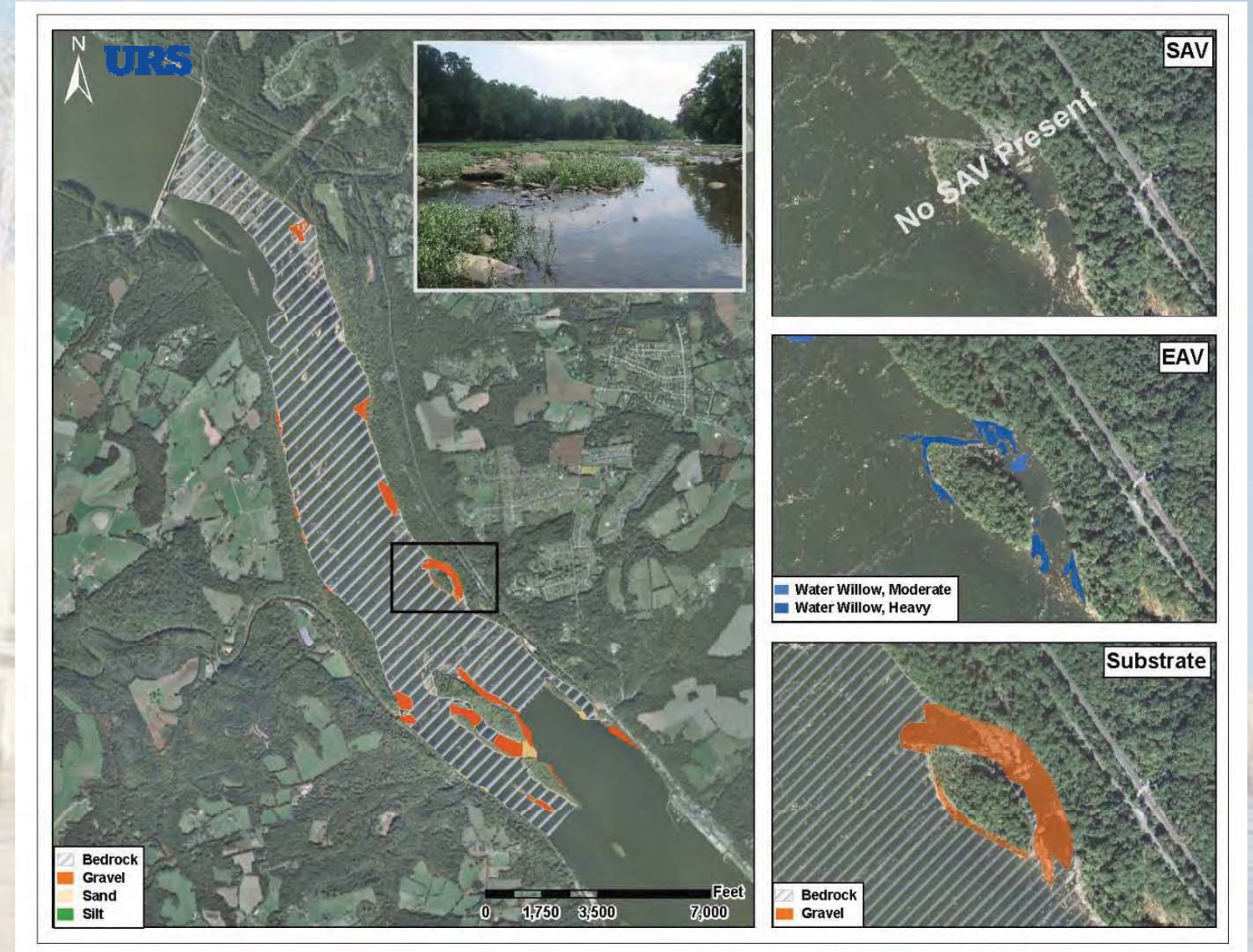
Conowingo 3.17 Downstream EAV/SAV Study (Water Level Vegetative Cover Study)

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

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

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

Mr. Chris Iverson
1200 Nursery Road
Wrightsville, PA 17368

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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 Wildlife Federation, PA Federation of Sportsmen's Club, Inc.
2426 North 2nd Street
Harrisburg, PA 17110

Pennsylvania Office of the Governor
Governor
225 Main Capitol
Harrisburg, PA 17120

U.S. Fish and Wildlife Service
Hadley
300 Westgate Center Drive
Hadley, MA 01035-9587

University of Maryland Center for Environmental & Estuarine Studies
Director
Cambridge, MD 21613

Delaware River Basin Commission
Executive Director
P.O. Box 7360
West Trenton, NJ 08628-2404

Peter R. Valeri
Federal Energy Regulatory Commission
Regional Engineer
19 W 34th Street, Room 400
New York, NY 10001-3006

Liana Vitali
Chesapeake Research Consortium
410 Severn Avenue, Suite 109
Annapolis, MD 21240

Douglas Weaver
York Haven LLC
York Haven Hydro Station
P.O Box 67
York Haven, PA 17370

R. Timothy Weston
Kirkpatrick & Lockhart, Preston Gates Ellis, LLP
17 North 2nd Street Floor 18
Harrisburg, PA 17101-1638

Cynthia Wilkerson
National Park Service
US Customs House Stewardship and Partnership
200 Chestnut Street
Philadelphia, PA 19106

Pennsylvania Department of Agriculture
2301 N. Cameron Street
Harrisburg, PA 17110-9405

U.S. Fish and Wildlife Service
Director
P.O. Box 67000
Harrisburg, PA 17106-7000

U.S. Department of the Interior, Bureau of Indian Affairs
1849 C Street, NW
Washington, D.C. 20420

U.S. Fish and Wildlife Service
315 South Allen Street Ste 322
State College, PA 16801-4851

West Virginia Dept. of Education & Arts Division of Culture & History
Capitol Complex
Charleston, WV 25305

Christopher Urban
Pennsylvania Fish and Boat Commission
Chief - Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823-9620

Mr. Clyde S. Van Dyke
Cecil County Department of Parks and Recreation
Director
County Administration Building
200 Chesapeake Blvd., Suite 1200
Elkton, MD 21921

Herbert H. Ward
Upper Chesapeake Watershed Association
138 West Lanvale Street
Baltimore, MD 21217-4120

Dale Weinrich
Maryland Department of Natural Resources
Matapeake Work Center
301 Marine Academy Drive
Stevensville, MD 21666

Mr. John A. Whittaker, IV
Winston & Strawn, LLP
jwhittak@winston.com
1700 K Street, NW
Washington
DC, 20006

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.

General Comments for Conowingo Section 3.27 and Muddy Run Section 3.1 Pertaining to Project Lands

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

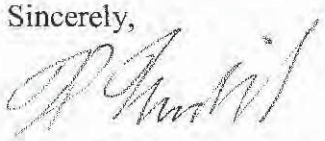
MD stated during these meetings that they have far more pertinent, local and regionally specific data showing significant growth pressure, but that the consultants had not contacted any of the relevant resource agencies or local and regional non-government organizations when they did their studies. In 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