

# PRE-APPLICATION DOCUMENT

PIKE ISLAND LOCKS AND DAM  
HYDROELECTRIC PROJECT

Prepared for:  
**Pike Island Hydropower Corporation**

Prepared by:  
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***Kleinschmidt***

## TABLE OF CONTENTS

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DEFINITIONS OF TERMS, ACRONYMS, AND ABBREVIATIONS .....	VII
1.0 INTRODUCTION.....	1-1
1.1 Agents For Client .....	1-2
1.2 PAD Content.....	1-2
2.0 PLANS, SCHEDULE, AND PROTOCOLS .....	2-3
2.1 Process Plan and Schedule Through Filing of License Application	2-3
2.2 Proposed Communications Protocols.....	2-5
2.2.1 Parties to the Licensing.....	2-5
2.2.2 General Communications.....	2-5
2.2.3 Documents .....	2-7
2.2.4 Study Requests.....	2-10
3.0 GENERAL DESCRIPTION OF RIVER BASIN .....	3-1
3.1 References .....	3-3
4.0 PROJECT LOCATION, FACILITIES, AND OPERATIONS.....	4-1
4.1 Proposed Facilities.....	4-2
4.1.1 Powerhouse.....	4-4
4.1.2 Intake and Tailrace Channel .....	4-4
4.1.3 Transmission Facilities .....	4-5
4.1.4 Site Access .....	4-6
4.1.5 Capacity and Energy Production .....	4-6
4.2 Current and Proposed Project Operations .....	4-7
4.2.1 Normal Operations.....	4-8
4.2.2 Low Water Operations.....	4-8
4.2.3 High Water Operations.....	4-8
4.3 Other Project Information.....	4-8
4.3.1 Delivery of Water for Non-Power Uses.....	4-8
4.3.2 Proposed Project Boundary.....	4-8
4.4 References .....	4-9
5.0 DESCRIPTION OF EXISTING ENVIRONMENT .....	5-1
5.1 Geology and Soils.....	5-1
5.1.1 Existing Geological Features .....	5-1
5.1.2 Soils .....	5-1
5.1.3 Bedrock Geology .....	5-5
5.1.4 Reservoir Shoreline and Streambank Conditions.....	5-7
5.1.5 Erosion.....	5-7

5.1.6	References.....	5-7
5.2	Water Resources .....	5-8
5.2.1	Drainage Area.....	5-8
5.2.2	Streamflow, Gage Data, Flow Statistics, and Climate .....	5-10
5.2.3	Existing Instream Flow Uses .....	5-11
5.2.4	Water Use.....	5-11
5.2.5	Federally-Approved Water Quality Standards.....	5-12
5.2.6	Water Quality Monitoring .....	5-13
5.2.7	References.....	5-14
5.3	Fish and Aquatic Resources .....	5-16
5.3.1	Aquatic Resources and Habitats.....	5-16
5.3.2	Fish Passage .....	5-18
5.3.3	Essential Fish Habitat .....	5-19
5.3.4	Benthic Macroinvertebrates .....	5-19
5.3.5	Freshwater Mussels .....	5-19
5.3.6	References.....	5-21
5.4	Upland Wildlife and Botanical Resources .....	5-22
5.4.1	Wildlife Habitats in the Project Area and Vicinity .....	5-22
5.4.2	Mixed Deciduous Forest Habitats .....	5-22
5.4.3	Pine Plantation Habitat .....	5-23
5.4.4	Wildlife Resources in the Project Area and Vicinity.....	5-23
5.4.5	Mammalian Species .....	5-24
5.4.6	Avian Species .....	5-25
5.4.7	Reptiles.....	5-26
5.4.8	Amphibians.....	5-27
5.4.9	Butterflies and Skippers .....	5-28
5.4.10	Insects, Spiders, and other Invertebrates .....	5-29
5.4.11	Temporal and Spatial Distribution of Wildlife Species .....	5-30
5.4.12	Botanical Resources.....	5-30
5.4.13	Invasive Wildlife and Plant Species.....	5-31
5.4.14	Invasive Wildlife Species.....	5-31
5.4.15	Invasive Plants and Weeds.....	5-32
5.4.16	References.....	5-34
5.5	Shoreline Wildlife and Botanical Resources .....	5-36
5.5.1	Floodplain and Wetland Species and Habitats of the Project Area and Vicinity.....	5-36
5.5.2	Riverine Wetlands (System).....	5-40
5.5.3	Riparian and Littoral Species and Habitats of the Project Area and Vicinity .....	5-41
5.5.4	References.....	5-42
5.6	Threatened and Endangered Species.....	5-44
5.6.1	Existing Environment .....	5-44

5.6.2	Federally Listed Species .....	5-44
5.6.3	Indiana Bat.....	5-45
5.6.4	Northern Long-Eared Bat.....	5-46
5.6.5	Bald Eagle.....	5-46
5.6.6	Running Buffalo Clover .....	5-46
5.6.7	State Listed Species.....	5-47
5.6.8	Rare, Threatened, Endangered and Special Status Botanical Species .....	5-53
5.6.9	Special Status Migratory Birds.....	5-53
5.6.10	Essential Fish Habitat .....	5-53
5.6.11	References.....	5-53
5.7	Recreation and Land Use .....	5-55
5.7.1	Existing Recreation Opportunities and land use.....	5-55
5.7.2	Existing and Future Recreation needs .....	5-55
5.7.3	Park and recreation areas within the project area .....	5-56
5.7.4	Adjacent Recreation areas .....	5-56
5.7.5	Other Recreational sites in the Pike Island Pool .....	5-57
5.7.6	References.....	5-57
5.8	Aesthetic Resources .....	5-58
5.8.1	Visual Character of the Project Vicinity .....	5-58
5.8.2	Visual Character of Project Lands and Waters.....	5-58
5.8.3	References.....	5-59
5.9	Cultural Resources.....	5-60
5.9.1	History of the Project Vicinity .....	5-60
5.9.2	Historic and Archeological Sites in the Project Vicinity.....	5-61
5.9.3	Prior Cultural Resource Investigations.....	5-61
5.9.4	References.....	5-61
5.10	Socioeconomic Resources .....	5-62
5.10.1	General Land Use Patterns.....	5-62
5.10.2	Population Patterns.....	5-63
5.10.3	Household/Family Distribution and Income .....	5-63
5.10.4	Project Vicinity Employment Sources .....	5-64
5.10.5	References.....	5-64
5.11	Tribal Resources .....	5-66
5.11.1	Tribal Resources.....	5-66
5.11.2	References.....	5-67
6.0	PRELIMINARY LISTING OF POTENTIAL ISSUES, INFORMATIONAL NEEDS, AND MITIGATION BY RESOURCE .....	6-1
6.1	Preliminary Issues by Resource.....	6-1
6.1.1	Geology and Soils .....	6-1
6.1.2	Water Resources.....	6-1



6.1.3	Fish and Aquatic Resources (Including T&E Species) .....	6-1
6.1.4	Wildlife Resources (Included T&E Species).....	6-2
6.1.5	Botanical Resources (Including T&E Species and Riparian, Wetland and Littoral Habitat Resources).....	6-2
6.1.6	Recreation and Land Use.....	6-3
6.1.7	Aesthetic Resources .....	6-3
6.1.8	Cultural and Tribal Resources .....	6-3
6.1.9	Socioeconomic Resources .....	6-3
6.2	Applicant Proposed Studies and Information Gathering Needs by Resource.....	6-3
6.2.1	Fish Assemblage Surveys.....	6-3
6.2.2	Fish Protection and Upstream and Downstream Passage Studies.....	6-4
6.2.3	Freshwater Mussel Surveys.....	6-4
6.2.4	Water Quality Study .....	6-4
6.2.5	Aquatic Habitat Study.....	6-5
6.2.6	Terrestrial Habitat and RTE Plant Species Study .....	6-6
6.2.7	Wetlands and Waters Delineation .....	6-6
6.2.8	Recreational Resources .....	6-6
6.2.9	Cultural Resources .....	6-6
6.2.10	Socioeconomics.....	6-7
6.2.11	Tribal Resources.....	6-7
6.3	Relevant Resource Management Plans.....	6-7
6.3.1	Relevant Qualifying Federal and State or Comprehensive Waterway Plans of West Virginia.....	6-7
6.3.2	Relevant Qualifying Federal and State or Comprehensive Waterway Plans of Ohio .....	6-10
6.3.3	Additional Resource Plans for Applicant’s Proposed Project on the Ohio River.....	6-12

### **LIST OF TABLES**

Table 2.1	Mailing Lists for the Pike Island Licensing .....	2-9
Table 2.2	Document Distribution for the Pike Island Licensing .....	2-9
Table 4.1	Dam’s Physical Elements .....	4-1
Table 4.2	Monthly Average Energy Production .....	4-7
Table 5.1	Project Vicinity Soil Names, Descriptions and Area .....	5-3
Table 5.2	Weather Conditions at Pike Island (RM) for a Period of 1916-2020.....	5-10
Table 5.3	Pike Island Project Flow Data for a Period of 1960-2020.....	5-11

Table 5.4	Ohio River Water Temperature Criteria .....	5-13
Table 5.5	Fish species caught in the Pike Island Pool surveys from 2011, 2012, and 2018 .....	5-17
Table 5.6	Federally Endangered Ohio River Freshwater mussels .....	5-20
Table 5.7	Species of Mammals in Ohio .....	5-24
Table 5.8	Migratory Birds in Project Area.....	5-26
Table 5.9	Reptile Species in Project Area .....	5-26
Table 5.10	Amphibian Species in the Project Area.....	5-27
Table 5.11	Butterfly and Skipper Species in the Project Vicinity .....	5-28
Table 5.12	Insects, Spiders, and Invertebrates in the Project Vicinity .....	5-29
Table 5.13	Botanical Species in the Project Vicinity .....	5-30
Table 5.14	Common Plant Species of Ohio.....	5-32
Table 5.15	Common Invasive Non-Indigenous Plant Species of Ohio .....	5-33
Table 5.16	Federally Listed Species that May Occur in Project Area .....	5-45
Table 5.17	Ohio State Species of Concern That May Be Found in Belmont and Jefferson Counties .....	5-48
Table 5.18	USFWS IPaC Migratory Bird List with Potential to Occur at Project.....	5-53

## LIST OF FIGURES

Figure 2.1	TLP Process Flow Chart.....	2-4
Figure 3.1	Project Location.....	3-2
Figure 4.1	Project Facilities .....	4-3
Figure 4.2	Single Line diagram .....	4-6
Figure 5.1	Ohio Geologic Map.....	5-2
Figure 5.2	Geologic Map of West Virginia.....	5-3
Figure 5.3	Project Area Soil types .....	5-4
Figure 5.4	Project Geology .....	5-6
Figure 5.5	Pike Island Project Location in the Ohio River Drainage Area .....	5-9
Figure 5.6	Water Temperature and Dissolved Oxygen Levels at the Montgomery Locks and Dam Project for a Period of 2008-2020.....	5-14
Figure 5.7	FEMA Flood Zones .....	5-37
Figure 5.8	Project Wetlands .....	5-39

## **LIST OF APPENDICES**

- Appendix A Agency Consultation
- Appendix B Flow Duration Curves

## DEFINITIONS OF TERMS, ACRONYMS, AND ABBREVIATIONS

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ACHP	Advisory Council on Historic Preservation
Af	Acre-foot, the amount of water needed to cover one acre to a depth of one foot
ALT	Androscoggin Land Trust
APE	Area of Potential Effect as pertaining to Section 106 of the National Historic Preservation Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CEII	Critical Energy Infrastructure Information
CFR	Code of Federal Regulations
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
DLA	Draft License Application
DO	dissolved oxygen
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
EA	Environmental Assessment
EAP	Emergency Action Plan
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EL	Elevation
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
FOIA	Freedom of Information Act
FPA	Federal Power Act
FWCA	Fish and Wildlife Coordination Act
GIS	Geographic Information Systems
GWh	Gigawatt-hour (equals one million kilowatt-hours)
Hp	Horsepower
Hz	hertz (cycles per second)
HPMP	Historic Properties Management Plan
ILP	Integrated Licensing Process
Installed Capacity	The nameplate MW rating of a generator or group of generators

Interested Parties	The broad group of individuals and entities that have an interest in a proceeding
kV	Kilovolts
KVA	Kilovolt amps
kW	kilowatt
kWh	kilowatt-hour
License Application	Application for New License submitted to FERC no less than two years in advance of expiration of an existing license. See DLA
MW	megawatt
MWh	megawatt-hour
NEPA	National Environmental Policy Act
NGO	Non-governmental organization
NMFS	National Marine Fisheries Services, same as NOAA Fisheries
NOAA Fisheries	NOAA National Marine Fisheries Service, same as NMFS
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NOI	Notice of Intent
Normal Operating Capacity	The maximum MW output of a generator or group of generators under normal maximum head and flow conditions
NWI	National Wetlands Inventory
PAD	Pre-Application Document
PDF	Portable Document Format
PLP	Preliminary Licensing Proposal
PM&E	Protection, Mitigation and Enhancement Measures
PMF	Probable Maximum Flood
Project Area	The area within the proposed FERC Project Boundary
Project Boundary	The boundary line that surrounds those areas needed for operation of the Project.
Project Vicinity	The general geographic area in which the Project is located
QC	Quality control
RM	River mile
Run-of-river	A hydroelectric Project that uses the flow of a stream with little or no reservoir capacity for storing water
SD	Scoping Document
Service List	A list maintained by FERC of parties who have formally intervened in a proceeding. In licensing, there is no Service List until the license application is filed and accepted by FERC. Once FERC establishes a Service List, any documents filed with FERC must also be sent to the Service List
SHPO	State Historic Preservation Officer

Tailrace	Channel through which water is discharged from the powerhouse turbines
T&E Species	Threatened and endangered species
TLP	Traditional Licensing Process
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WQC	Water Quality Certificate

## 1.0 INTRODUCTION

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Pike Island Hydropower Corporation provides this Pre-Application Document as required by Title 18 § 5.6 and §16.8 of the U.S. Code of Federal Regulations (CFR) for the Pike Island Locks and Dam Hydroelectric Project (Pike Island Project, or Project). This PAD accompanies Pike Island Hydropower Corporation's Notice of Intent (NOI) and Preliminary Permit Application to seek a new license for the Project. The Applicant proposes to construct a new hydroelectric powerhouse at the United States Army Corps of Engineers' Pike Island Locks and Dam. The hydroelectric project would be constructed and operated pursuant to the information provided in the Application for Preliminary Permit filed with FERC simultaneously with this PAD.

Pike Island Hydropower Corporation (PO Box 224, Rhinebeck, NY 12572-0224), the Applicant, is an entity fully owned by Current Hydro, LLC (Current Hydro). Current Hydro is acting agent for Pike Island Hydropower Corporation.

Current Hydro further is the acting agent for Current Hydro Project 19, LLC, the entity holding the preliminary permit for the New Cumberland Locks and Dam Hydroelectric Project No. 15045 (New Cumberland Locks and Dam Hydroelectric Project), to be located at the U.S. Army Corps of Engineers' New Cumberland Locks and Dam upstream from the Pike Island Locks and Dam. Current Hydro Project 19, LLC is also fully owned by Current Hydro, LLC.

Current Hydro, as agent for both projects, intends to develop the Pike Island Locks and Dam Hydroelectric Project concurrent with the proposed New Cumberland Locks and Dam Hydroelectric Project. The goal is to create synergies in design, construction, procurement, operation, permitting, and environmental scoping for the operator, FERC, the resource agencies, and other interested parties.

Pike Island Hydropower Corporation distributed notification of this PAD and NOI simultaneously to Federal and state resource agencies, local governments, Native American tribes, members of the public, and others interested in the licensing proceeding. The distribution list for the NOI and PAD is provided in the cover letter to this filing. As specified in 18 CFR § 5.6 (c) and (d) the PAD provides FERC and the entities listed above with summaries of existing, relevant, and reasonably available information related to the Project that is in the Applicant's possession or was obtained through due diligence. The

Applicant conducted some preliminary consultation with resource agencies in advance of filing this PAD (Appendix A)

## **1.1 Agents For Client**

The following persons are authorized to act as agent for the Applicant pursuant to 18 CFR § 5.6(d)(2)(i):

Joel Herm Joel@currenthydro.com

Jan Borchert Jan@currenthydro.com

Current Hydro, LLC, Post Office Box 224, Rhinebeck NY, 12572

Phone: 917-244-3607

## **1.2 PAD Content**

This PAD follows the content and form requirements of 18 CFR § 5.6 (c) and (d), with minor changes in form for enhanced readability. This PAD contains all of the information required by 18 CFR § 5.6 (c) and (d) for distribution to Federal and state resource agencies, local governments, Native American tribes, members of the public, and others likely to be interested in the licensing proceeding.

The PAD is organized as follows:

- Table of Contents; List of Tables; List of Figures; List of Appendices; List of Photographs; and Definitions of Terms, Acronyms, and Abbreviations.
- Section 1.0 – Introduction and Background Information.
- Section 2.0 – Process Plan and Schedule, Communications Protocol, and TLP Flow Chart, per 18 CFR § 5.6(d)(1).
- Section 3.0 – General Description of the Little Androscoggin River basin, per 18 CFR § 5.6(d)(3)(xiii).
- Section 4.0 – Description of Project Location, Facilities, and Operation, per 18 CFR § 5.6(d)(2).
- Section 5.0 – Description of the Existing Environment by Resource Area, per 18 CFR § 5.6(d)(3)(ii)-(xii).
- Section 6.0 – Description of Impacts, Issues, Study and Information Needs, Resource Measures, and Existing Plans, per 18 CFR § 5.6(d)(3) and (4).
- Appendices: Agency Consultation; Flow Duration Curves



## **2.0 PLANS, SCHEDULE, AND PROTOCOLS**

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In its NOI, Pike Island Hydropower Corporation requests FERC's approval to use the Traditional Licensing Process (TLP) for the Project. The TLP has three stages (18 CFR 4.38). The first stage involves coordination between the Applicant, resource agencies, affected Indian tribes, and the public and includes the sharing of project information, notification of interested parties, and study planning and implementation using the PAD. The second stage involves study implementation and additional data gathering as well as development of a draft License Application (DLA) and review of the draft License Application by resource agencies and optionally, FERC. The third stage commences with the filing the final License Application (FLA), whereby FERC initiates its own review and public comment process, ultimately issuing a license for the Project. Figure 2.1 depicts the regulatory milestones of the TLP.

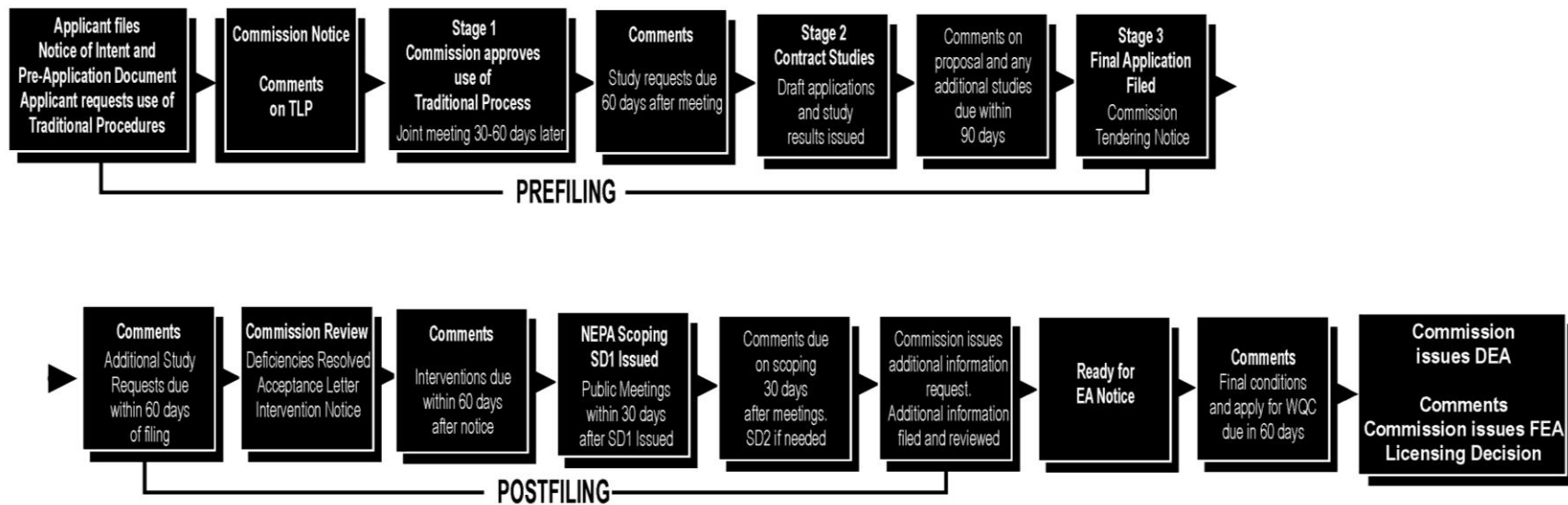
### **2.1 Process Plan and Schedule Through Filing of License Application**

The Process Plan and Schedule outlines actions by FERC, Pike Island Hydropower Corporation, and other participants in the licensing process through filing of the FLA. Pike Island Hydropower Corporation plans to file the Final License Application prior to expiration of the preliminary permit. The following diagram prepared by FERC and provided as Figure 2.1 illustrates the TLP pursuant to 18 CFR 4.38.

**Figure 2.1 TLP Process Flow Chart**

*TRADITIONAL LICENSING PROCESS*

Figure 2. Traditional Licensing Process



Source: FERC, 2004

## **2.2 Proposed Communications Protocols**

Effective communication is essential for a timely, cost-effective licensing. Pike Island Hydropower Corporation anticipates that the primary means of communication will be in-person and virtual meetings, documents, email, and telephone.

### **2.2.1 Parties to the Licensing**

Under FERC proceedings, participating individuals typically are identified as one of two groups: a) Interested Parties, which is the broad group of individuals and entities that may have an interest in a proceeding, including Native American tribes, agencies, groups and individuals that may wish to participate in the licensing process and are sometimes referred to as "stakeholders" and b) Licensing Participants, which is a subset of Interested Parties and consists of individuals and entities that are actively participating in a proceeding, such as by participating on committees. Licensing Participants may receive additional communications relative to the specific activity or function. Any Interested Party may elect to be a Licensing Participant by request to Pike Island Hydropower Corporation.

FERC also maintains a mailing list of Interested Parties, on which the Applicant's mailing list is typically based. FERC generally integrates the Applicant's Interested Parties mailing list with their own once the licensing process has started. Once the FLA is filed with the FERC, FERC will establish an official Service List for parties who formally intervene in the proceeding. Typically, this is comprised of the Licensing Participants who have been recognized by FERC as official parties.

### **2.2.2 General Communications**

Communications include written correspondence, emails, and notes from individual and conference telephone calls. Pike Island Hydropower Corporation's goal is to keep the lines of communication open during the licensing process and make it easy for Interested Parties, Licensing Participants and the public to get information related to the licensing and the interests of other stakeholders.

#### **2.2.2.1 Telephone**

Pike Island Hydropower Corporation anticipates that telephone calls among Interested Parties and Licensing Participants will be treated informally, with no specific

documentation unless specifically agreed upon in the discussion or as part of formal agency consultation proceedings.

Pike Island Hydropower Corporation anticipates that FERC will distribute to the FERC Mailing List summaries of any informal decisional telephone calls in which it participates prior to acceptance of the FLA.

### **2.2.2.2 Electronic Communications**

Pike Island Hydropower Corporation anticipates distribution of relevant documents and submittal of comments, correspondence, and study requests from agencies will be conducted primarily electronically (either by electronic filing of documents with the FERC and/or via email distribution). In addition, some formal agency consultation proceedings and correspondence may, as a matter of convenience and expediency, occur electronically or via email. Pike Island Hydropower Corporation will maintain documentation of all correspondence as part of formal agency consultation proceedings.

The Commission makes information available to the public via the Internet through eLibrary, a records information system that contains documents submitted to and issued by the FERC. Documents filed with the FERC as part of the Project's licensing process are available for viewing and printing via eLibrary, accessed through the Commission's homepage or directly at <http://www.ferc.gov/docsfilings/elibrary.asp>. Interested Parties and Licensing Participants can also subscribe to the docket for the Project under eSubscription and be sent notices of issuances and filings by email. Instructions for subscribing to the electronic FERC docket is provided on FERC's website at <http://www.ferc.gov/docs-filing/esubscription.asp>.

### **2.2.2.3 Meetings**

Pike Island Hydropower Corporation will work with all Interested Parties to develop meeting schedules that include practical locations and times to accommodate the majority of participants. In general, Pike Island Hydropower Corporation will schedule meetings between the hours of 9 a.m. and 4 p.m. Pike Island Hydropower Corporation will make every effort to begin and end meetings on time.

Pike Island Hydropower Corporation will notify all Interested Parties at least two weeks in advance of the next planned public meeting. Pike Island Hydropower Corporation will provide a meeting agenda by email, and will also distribute any documents or other information that will be the subject of meeting discussions.

#### **2.2.2.4 PROPOSED LOCATION AND DATE FOR JOINT AGENCY MEETING AND FOR THE SITE VISIT [§16.8 (B)(3)(II)]**

Pike Island Hydropower Corporation will host a Joint Agency Meeting (JAM) and site viewing no earlier than 30 days, and no later than 60 days after TLP approval, if FERC approves this request. The Applicant anticipates hosting a virtual Joint Agency Meeting on or about October 5, 2021. The Applicant will provide log-in information and the date and time following FERC's decision regarding use of the TLP.

#### **2.2.3 Documents**

Pike Island Hydropower Corporation will maintain digital copies of all mailing lists, announcements, notices, communications, and other documents related to the licensing of the Project. Pike Island Hydropower Corporation will regularly update the public files to ensure the public has access to the latest information related to the licensing process available to them and that all public documents are available. Anyone may obtain documents by contacting:

Joel Herm  
Joel@currenthydro.com  
Current Hydro, LLC  
Post Office Box 224  
Rhinebeck NY, 12572

As discussed above, documents submitted to and issued by the FERC for the Project are available through eLibrary under the Docket that FERC assigns to the project (<http://www.ferc.gov/docsfilings/elibrary.asp>). In addition, all materials filed with or issued by the FERC will be available for review and copying at the FERC offices in Washington, DC:

Federal Energy Regulatory Commission  
Public Reference Room, Room 2-A  
Attn: Secretary  
888 First Street, N.E.  
Washington, D.C. 20426

### **2.2.3.1 Public Reference File**

The public reference file is a listing of important materials pertaining to the licensing. This includes background reference material as well as the consultation record, all relevant studies and data collected during the development of the PAD, meeting summaries, notices, reports as well as Project documents such as the current FERC license.

Pike Island Hydropower Corporation will maintain digital public reference files on the project. Individuals may request a digital copy of any material, or, for a nominal copying fee, hard copies of all documents, by contacting the Applicant.

All communications added to the public reference file will be available to the public consistent with the public records procedures set forth in the Freedom of Information Act (FOIA).

### **2.2.3.2 Restricted Documents**

Certain Project-related documents are restricted from public viewing in accordance with FERC regulations. CEII (18 CFR 388.113) related to the design and safety of dams and appurtenant facilities, and that is necessary to protect national security and public safety are restricted. Anyone seeking CEII information from FERC must file a CEII request. FERC's website at [www.ferc.gov/help/how-to/file-ceii.asp](http://www.ferc.gov/help/how-to/file-ceii.asp) contains additional details related to CEII.

Information related to protecting sensitive archaeological or other culturally important information is also restricted under Section 106 of the National Historic Preservation Act. In addition, information related to threatened and endangered species are protected under Section 7 of the Endangered Species Act. Anyone seeking this information from FERC must file a FOIA request. Instructions for FOIA are available on FERC's website at [www.ferc.gov/legal/ceii-foia/foia.asp](http://www.ferc.gov/legal/ceii-foia/foia.asp).

### **2.2.3.3 Mailing Lists**

Pike Island Hydropower Corporation will maintain a Licensing Mailing List of all Interested Parties including Licensing Participants. The list will include email addresses and when available, U.S. postal addresses, for distributing notices and documents for public review (Table 2.1).

FERC also maintains a mailing list of Interested Parties for the Project. Pike Island Hydropower Corporation anticipates that once the licensing proceeding begins, Pike

Island Hydropower Corporation's Licensing Mailing List and FERC's Mailing List will be consolidated into one common list.

After Pike Island Hydropower Corporation files the Final License Application (FLA), FERC will establish an official Service List (Table 2.1) for parties who formally intervene in the proceeding. Once FERC establishes a Service List, any written documents filed with FERC must also be sent to the Service List. A Certificate of Service must be included with the document filed with FERC.

**Table 2.1 Mailing Lists for the Pike Island Licensing**

Entity	Type	Description
Pike Island Hydropower Corporation	Interested Parties Mailing List	A list of Interested Parties prepared by Applicant in anticipation of the Project licensing proceeding.
FERC	Project No. Mailing List	A mailing list of Interested Parties prepared and maintained by FERC throughout the Project licensing proceeding.
FERC	Project No. Service List	A mailing list of parties that have formally intervened in the licensing proceeding, prepared and maintained by FERC after it accepts the License Application.

#### 2.2.3.4 Document Distribution

Pike Island Hydropower Corporation will distribute, whenever possible, all documents electronically, either via email or Cloud Sharing Link, or for download from the Project website: <https://www.currenthydro.com/pike-island-ferc>. Pike Island Hydropower Corporation may distribute hard copies of some documents by request. Distribution of information will follow the guidelines presented below (Table 2.2).

**Table 2.2 Document Distribution for the Pike Island Licensing**

Document	Method	Distribution
Public Meeting Notices	Email or US Mail, Newspapers, and website	Public and all Potential Interested Parties
Meeting Agendas	Email* and website	Interested Parties
Meeting Summaries	Website*	On Request

Document	Method	Distribution
Major Documents: Proposed Study Plans, Study Reports, Draft License Application, Final License Application, etc.	Email* and website	Notice of availability by US Mail or Email to Interested Parties; Major documents via Cloud Sharing Link to Licensing Participants
PAD support documents	Email*	On Request
Written Communications	Email*	On Request

\*U.S. Mail service by special request.

## 2.2.4 Study Requests

In the development of the PAD, Pike Island Hydropower Corporation has worked with Interested Parties and Licensing Participants to identify areas where there is little or no information relevant to issues of potential concern for Project effects to the human and natural environments. However, stakeholders may identify additional studies for consideration. As specified by CFR 18, § 5.9(b), any study request must:

- Describe the goals and objectives of each study proposal and the information to be obtained.
- If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.
- If the requestor is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.
- Describe existing information concerning the subject of the study proposal, and the need for additional information.
- Explain any nexus between Project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.
- Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.
- Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.



The requestor should also describe any available cost-share funds or in-kind services that the sponsor of the request may contribute towards the study effort.

Email or mail completed study requests in MS Word or PDF format to:

Joel Herm  
Joel@currenthydro.com  
Current Hydro, LLC  
Post Office Box 224  
Rhinebeck NY, 12572

### 3.0 GENERAL DESCRIPTION OF RIVER BASIN

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The proposed Project is located at the USACE Pike Island Locks and Dam facility in the Village of Yorkville in Belmont County, OH (Figure 3.1). The tailrace would discharge into the Ohio River at the Ohio-West Virginia border. The proposed location is part of the northeastern region of the greater Ohio River Drainage Basin which encompasses approximately 204,000 square miles.

The Ohio River is formed by the confluence of the Allegheny River and Monongahela River at Point State Park in Pittsburgh, Pennsylvania. From its headwaters at Pittsburgh, the Ohio River flows 981 miles northwest and west in Pennsylvania until it reaches the West Virginia/Ohio border. There it turns south and flows south and southwest until it joins the Mississippi River near Cairo, Illinois.

Flows in the Ohio River are largely controlled by an array of reservoirs located throughout the watershed. Major tributaries draining the Ohio River Basin upstream of the proposed Project include Chartiers Creek, Raccoon Creek, and the Beaver River drainage. The combined drainage area of the Allegheny River, Monongahela River, Chartiers Creek, Raccoon Creek, and the Beaver River watersheds upstream of the Project are 23,829 square miles. The entire length of the Ohio River is navigable by barges, with depths averaging approximately 24 feet. The U. S. Army Corps of Engineers (USACE) owns and operates locks and dams at 20 locations on the river, where they maintain a nine-foot minimum depth for commercial navigation (ORF 2021; ORSANCO 2021).

Land cover in Ohio River Basin consists primarily of hardwood deciduous forests with agriculture and urban development constituting the most significant forms of land usage. Industrial and commercial uses are typical in more populous areas of the Basin or more closely concentrated abutting the Ohio River. Of Belmont County's estimated 343,872 acres, approximately 58% is forested. Approximately 10% of land in the County consists of low and high density developments for residential, industrial, or commercial purposes, and nearly 27% is agricultural. There are 22 reservoirs in Belmont, including five lakes, various coal company ponds, and recreational reservoirs (HTL 2021; ODSA 2017).

At the proposed project site, the USACE owns the Pike Island Locks and Dam facility, where water is used for navigational purposes. Land adjacent to the facility is primarily industrial and residential.

**Figure 3.1 Project Location**



### **3.1 References**

HTL 2021: OH HomeTownLocator - Belmont County OH Reservoirs, Accessed July 2021.

ODSA 2020: Ohio Development Services Agency - Ohio County Profiles, Belmont County, Accessed July 2021. <https://development.ohio.gov/files/research/C1008.pdf>

ORF 2021: Ohio River Foundation - Ohio River Facts, Accessed July 2021.  
[http://www.ohioriverfdn.org/education/ohio\\_river\\_facts/](http://www.ohioriverfdn.org/education/ohio_river_facts/)

ORSANCO 2021: Ohio River Valley Water Sanitation Commission - Tributaries. Accessed: July 2021. <http://www.orsanco.org/river-facts/tributaries/>

## 4.0 PROJECT LOCATION, FACILITIES, AND OPERATIONS

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The Pike Island Locks and Dam is located on the Ohio River on the Ohio/West Virginia border near the Ohio Villages of Yorkville and Tiltonsville, and the West Virginia City of Wheeling. The lake is in Belmont, Ohio, Jefferson County, Ohio, and Ohio County, West Virginia. This facility is owned and operated by the USACE, Pittsburgh District, and is therefore not proposed to be a formal project facility. The reservoir operation and river flow control will remain under USACE.

The proposed project will be located at the existing United States Army Corps of Engineers (USACE) Pike Island Locks and Dam (the dam) on the Ohio River at river mile 84.2. The counties of Belmont County, Ohio, and Ohio County, West Virginia, border the dam. The dam was placed into service in 1965.

The gated dam contains two navigational locks and is of reinforced concrete construction. Gated dams are constructed to permit increased control over the water level in the navigation pool upriver of the dam.

The dam's primary physical elements are further described in the following table:

**Table 4.1 Dam's Physical Elements**

Pike Island Locks and Dam	
Year Placed Into Operation	1965
Location	Wheeling, WV
Water Body Ohio River	Ohio River
Latitude	40° 9' 3.59" N
Longitude	80° 42' 20.5" W
Structural Height	64 ft.
Gates	9
Gate Dimensions	110 ft. by 29 ft.
Main Lock Dimensions	110 ft. by 1,200 ft.
Auxiliary Lock Dimensions	110 ft. by 600 ft.
Overall Length	1,306 ft.
Storage Capacity	89,300 acre-ft.

There are no existing hydroelectric facilities at the proposed project site. The proposed development of the site involves the construction of a new 20 megawatt (MW) hydropower facility at the western end (Ohio side) of the dam.

The dam, as described above, consists of two operational locks and a reinforced concrete dam with nine (9) gates. This type of spillway permits increased control over the water level in the navigation pool upriver of the dam. As the gates are raised or lowered to control the amount of water flowing under them, the upstream impoundment is maintained at a relatively constant level for an authorized depth of at least 9 feet throughout its length. However, the dam cannot be operated to control the flood flows. An incidental benefit derived from the pool formed by the dam is the availability of a source of municipal and industrial water.

The site utilizes two operational locks. The primary lock is 1,200 ft. long and 110 ft. wide, and the auxiliary lock is 600 ft. long and 110 ft. wide. The walls and floors of the locks are of reinforced concrete construction. Located at each end of the lock chambers are two miter gates. The primary lock is accompanied by a central control building that contains office space, electrical controls, and other equipment related to the operation of the locks and dam.

The Pike Island Locks and Dam form one impoundment pool that spans river miles 84.2 through 54.4 on the Ohio River for an approximate total of 29.9 miles. This pool extends from the Pike Island Locks and Dam in Wheeling, WV upstream to the New Cumberland Locks and Dam in Stratton, Ohio. The normal pool elevation of the impoundment created by the dam is 644 ft. MSL. The normal elevation of the lower pool, downstream of the dam, is 623 MSL. The surface area of the upper pool at normal pool elevation is believed to be 5,140 acres (Bedford Energy Associates 2014).

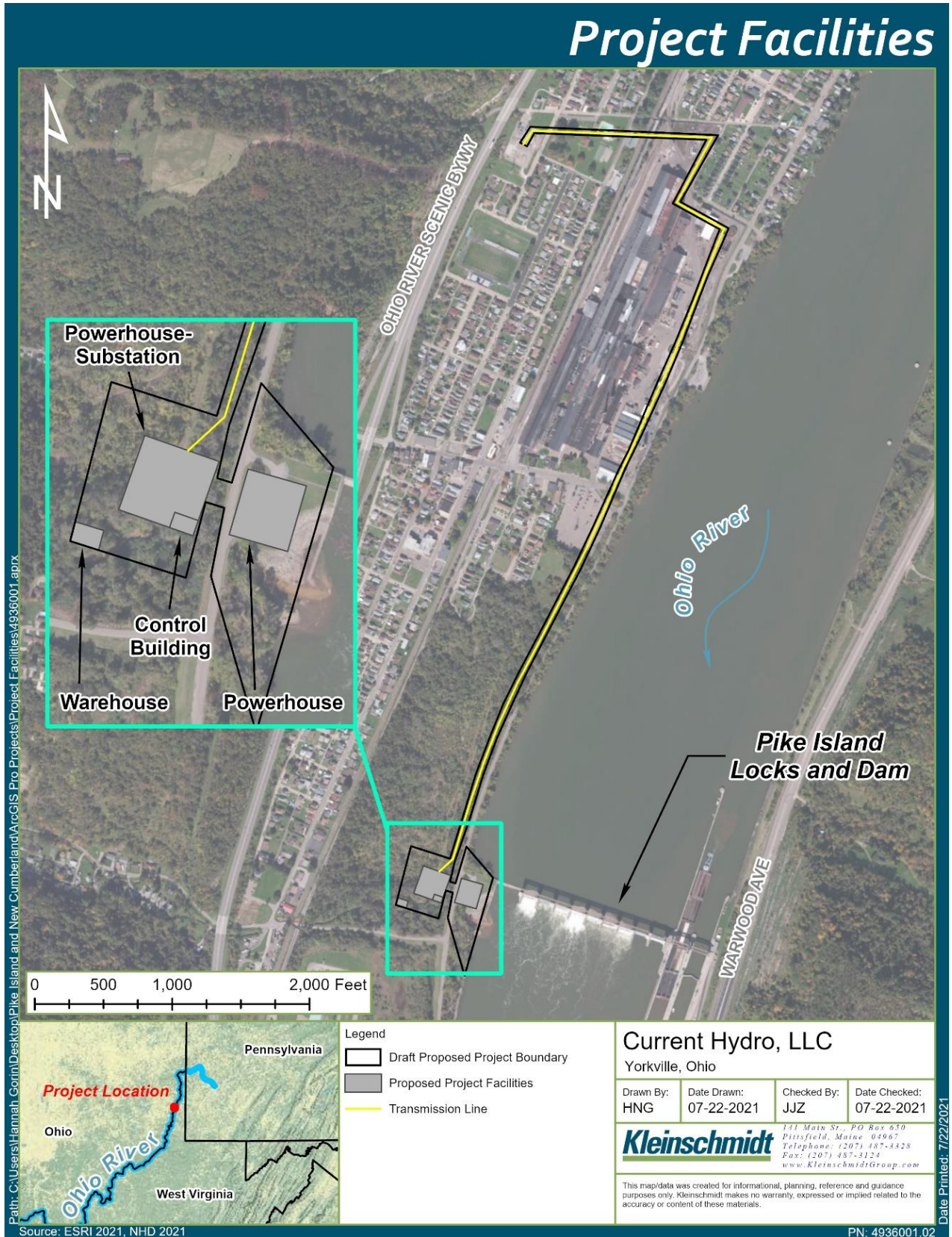
The reservoir is normally referred to as a navigational pool. The dam and its associated pool are controlled and operated by the USACE, Pittsburgh District. The Project will be operated in a run-of-river mode that maintains the navigation channel at all times. The reservoir's storage capacity is believed to be 89,300 acre-ft (Bedford Energy Associates 2014). Because the reservoir is impounded by the USACE facility, it is not considered part of the proposed hydroelectric project. The creation of new reservoirs is not proposed.

#### **4.1 Proposed Facilities**

A conceptual plan of proposed facilities is provided in Figure 4.1. The hydroelectric Project would include an intake, the powerhouse, the discharge from the powerhouse, a powerhouse-substation and transmission lines from the powerhouse-substation to an existing substation. As noted, the USACE locks and dam and reservoir would not be project components.



Figure 4.1 Project Facilities



#### **4.1.1 Powerhouse**

The proposed hydroelectric powerhouse will be reinforced concrete, approximately 160 ft. by 160 ft. in plan, and will be constructed on the Ohio side, slightly downstream from the dam, on the right bank facing downstream. The powerhouse will contain two, three, or four identical Kaplan pit turbine-generators with a combined hydraulic capacity of 14,200 cfs and a combined net power capacity of 20,000 kW. The powerhouse will contain controls and ancillary electrical and mechanical systems, and erection space. The powerhouse will be connected to a powerhouse-substation via an underground utilidor under Ohio River Road.

The Applicant is currently evaluating the option of a two-, three-, or four-unit powerhouse installation to optimally use the limited available space between the dam and Ohio River Road. The number of powerhouse units is not expected to change the powerhouse overall hydraulic capacity or its capacity factor, which is anticipated to be about 86%. While the maximum hydraulic capacity will not be impacted by the decision on the number of turbine-generator units installed, the minimum operating flow will vary somewhat with the design decision. The minimum river flow at which the powerhouse can begin operations is 2,000 cfs for the 2-unit arrangement, 1,400 cfs for the 3-unit arrangement, and 1,000 cfs for the 4-unit arrangement. The expected annual average generation of the Project is 151 GWh.

The proposed maximum net head is 19.2 ft. for all three considered configurations.

#### **4.1.2 Intake and Tailrace Channel**

The proposed intake channel will be located upstream of the powerhouse and will convey flow from the upper pool to the powerhouse. The new intake will measure approximately 160 ft. in width and 100 to 200 ft. in length and consist of an armored channel. Powerhouse trash racks will prevent large debris from entering the turbine system.

The proposed tailrace will convey water exiting the powerhouse back into the river channel downstream of the dam. The approx. 160-ft. wide by approximately 300-ft. long tailrace will consist of an armored channel. Stone riprap will be placed along the banks and in areas of higher velocity to prevent scouring and erosion.



### **4.1.3 Transmission Facilities**

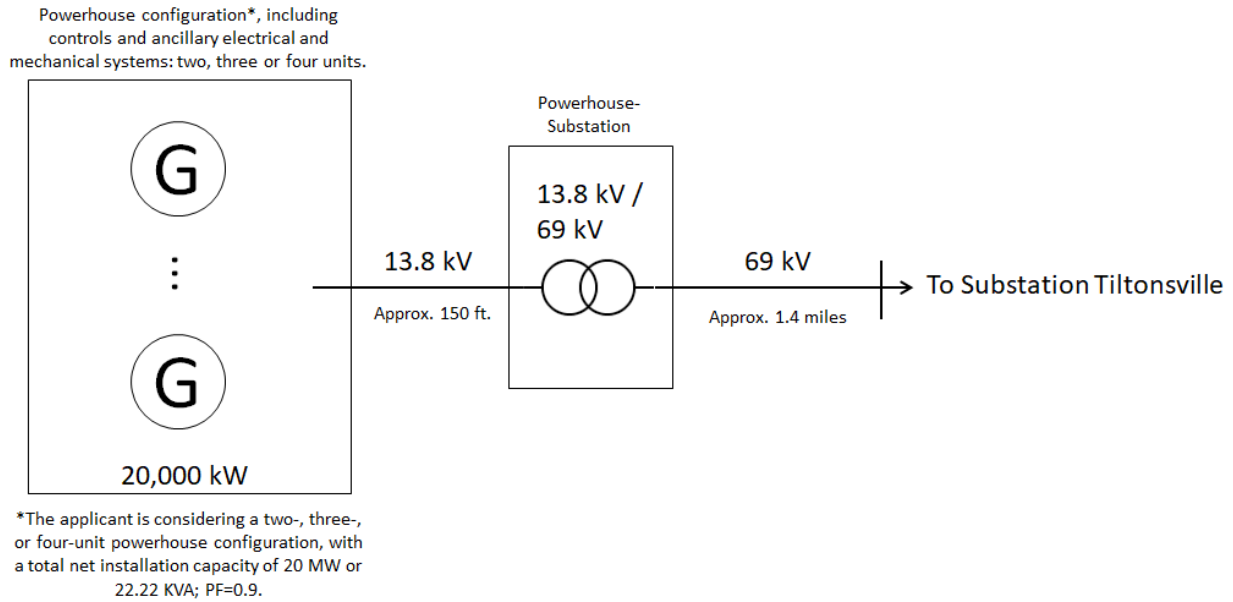
A proposed three-phase step-up transformer (13.8 kV to 69 kV) will be located in a new powerhouse-substation on the west-side of Ohio River Road (Old State Highway 7). The powerhouse-substation will be approximately 200 ft. wide by 200 ft. long. The powerhouse-substation will be located within a separate approximately 300 ft. by 400 ft. lot. The 300 ft. by 400 ft. lot will be developed from the powerhouse excavation spoil material. The lot will also house a warehouse (approximately 60 ft. x 40 ft.), a control building (approximately 60 ft. x 40 ft.), and a yet-to-be-defined parking area.

The Applicant has identified existing transmission infrastructure in the vicinity of the proposed project area, specifically an existing substation in Tiltonsville, OH. A new approximately 1.4 miles long 69 kW transmission line is proposed to run from the powerhouse-substation on the west side and adjacent to Ohio River Road (Main Street, 1 miles), and adjacent to Medilla Avenue to Maiden Lane towards the substation at the corner of Walter Street and Maiden Lane (0.4 miles).

A proposed approximately 150-ft. long underground 13.8 kV utilidor will connect the powerhouse with the powerhouse-substation under Ohio River Road.

The Applicant will study alternatives for energy transmission and interconnection and use that information to define exact length, route and voltage of this new transmission line, which will likely partially overlay rights-of-way along the existing roads of Tiltonsville, OH. A conceptual single-line diagram can be found in Figure 4.2 (below).

**Figure 4.2 Single Line diagram**



#### 4.1.4 Site Access

The Applicant proposes access to the powerhouse and powerhouse-substation will be provided directly from the Ohio River Road (Old State Highway 7).

#### 4.1.5 Capacity and Energy Production

The proposed hydroelectric turbine-generator configuration has a hydraulic capacity of 14,200 cfs and a net proposed power capacity of 20 MW. The estimated average annual energy generation is 151 GWh, with a capacity factor of about 87%. The hydraulic net head used for estimating capacity and energy output is the historical gross head measured at the gages minus estimated head losses. Maximum net head at nominal flows is 21.5 ft.

The month with the highest estimated average energy generation is August. The approach recommended for most projects where flow-duration curve analysis might be used to compute energy is to base dependable capacity on the average capacity available in the peak demand months. (USACE, 1985) The dependable capacity has been calculated as the product of 20 MW (installed capacity) and the monthly capacity factor and is displayed in Table 4.2.

**Table 4.2 Monthly Average Energy Production**

<b>Average energy generation</b>	<b>kWh</b>	<b>Capacity Factor</b>	<b>Dependable Capacity (Installed Capacity x Capacity Factor)</b>
January	11,999,191	81%	16.2 MW
February	10,452,334	78%	15.7 MW
March	11,226,730	77%	15.3 MW
April	9,997,856	76%	15.1 MW
May	12,534,504	85%	16.9 MW
June	13,135,470	92%	18.4 MW
July	14,230,406	96%	19.2 MW
August	14,660,602	99%	19.8 MW
September	13,704,931	97%	19.4 MW
October	14,208,396	97%	19.4 MW
November	13,206,589	92%	18.3 MW
December	12,291,017	83%	16.6 MW
Annual	151,648,027	87%	17.4 MW

#### **4.2 Current and Proposed Project Operations**

The reservoir is normally referred to as a navigational pool. The dam and its associated pool are controlled and operated by the USACE, Pittsburgh District.

The Project will be operated in a run-of-river mode, consistent with the USACE navigation channel operations and river flow management. The Ohio River flows and reservoir levels will remain under the control of the USACE Pittsburgh District. The project's construction and operation is not anticipated to affect the Pike Island Locks and Dam barge transportation operations.

The USACE will be responsible for establishing daily or seasonal ramping rates, flushing flows, reservoir operations, and flood control operations.

#### **4.2.1 Normal Operations**

During normal operations, the project will utilize 14,200 cfs to generate hydroelectric energy, using all installed turbine-generators. The remaining flow will pass through the dam's spillway, according to the USACE's operational regime. According to the available hydrologic data, the available stream flow exceeds 14,200 cfs for 98.1% of the time.

#### **4.2.2 Low Water Operations**

If less than 14,200 cfs of streamflow are available, powerhouse operation continues, regulated by the powerhouse units. The minimum hydraulic unit flow will either be 1,100 cfs (4-unit arrangement), 1,400 cfs (3-unit arrangement), or 2,000 cfs (2-unit arrangement). The minimum hydraulic unit flow values limit the minimum flow at which a single unit can begin operations.

#### **4.2.3 High Water Operations**

During high water periods, the facility's power output can decrease due to smaller available head between the upstream and downstream pool levels. Depending on the number of turbine-generator-units, the powerhouse high-water curtailment head will be either 6.5 ft. (4-unit arrangement), 6.9 ft. (3-unit arrangement), or 6.9 ft. (2-unit arrangement) respectively.

The majority of the river flow passes over the spillway, following USACE's operational regime.

### **4.3 Other Project Information**

#### **4.3.1 Delivery of Water for Non-Power Uses**

Not applicable.

#### **4.3.2 Proposed Project Boundary**

The proposed project boundary encloses the intake and tailrace channels, site access, and the powerhouse to the east of Ohio River Road, as well as the 300 ft. by 400 ft. lot to the

west of Ohio River Road, for the powerhouse-substation, warehouse, control building, site access and parking area, and the proposed transmission line from the powerhouse-substation to the substation in Tiltonsville, OH (see Figure 4.1 above).

The total area enclosed by the project boundary is approximately 8.4 acres.

#### **4.4 References**

Bedford Energy Associates LLC. 2014. Preliminary Permit for the Pike Island Hydroelectric Project under P-14611, filed on 03/26/2014, accession number: 20140327-0001.

U.S. Army Corps of Engineers (USACE). 1985. Engineering and Design - Hydropower, Publication EM 1110-2-1701, Proponent CECW-EH, Published on 12/31/1985, Available online:

<https://www.publications.usace.army.mil/LinkClick.aspx?fileticket=i95PzC5j8ul%3d&tabid=16439&portalid=76&mid=43544>.

## **5.0 DESCRIPTION OF EXISTING ENVIRONMENT**

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### **5.1 Geology and Soils**

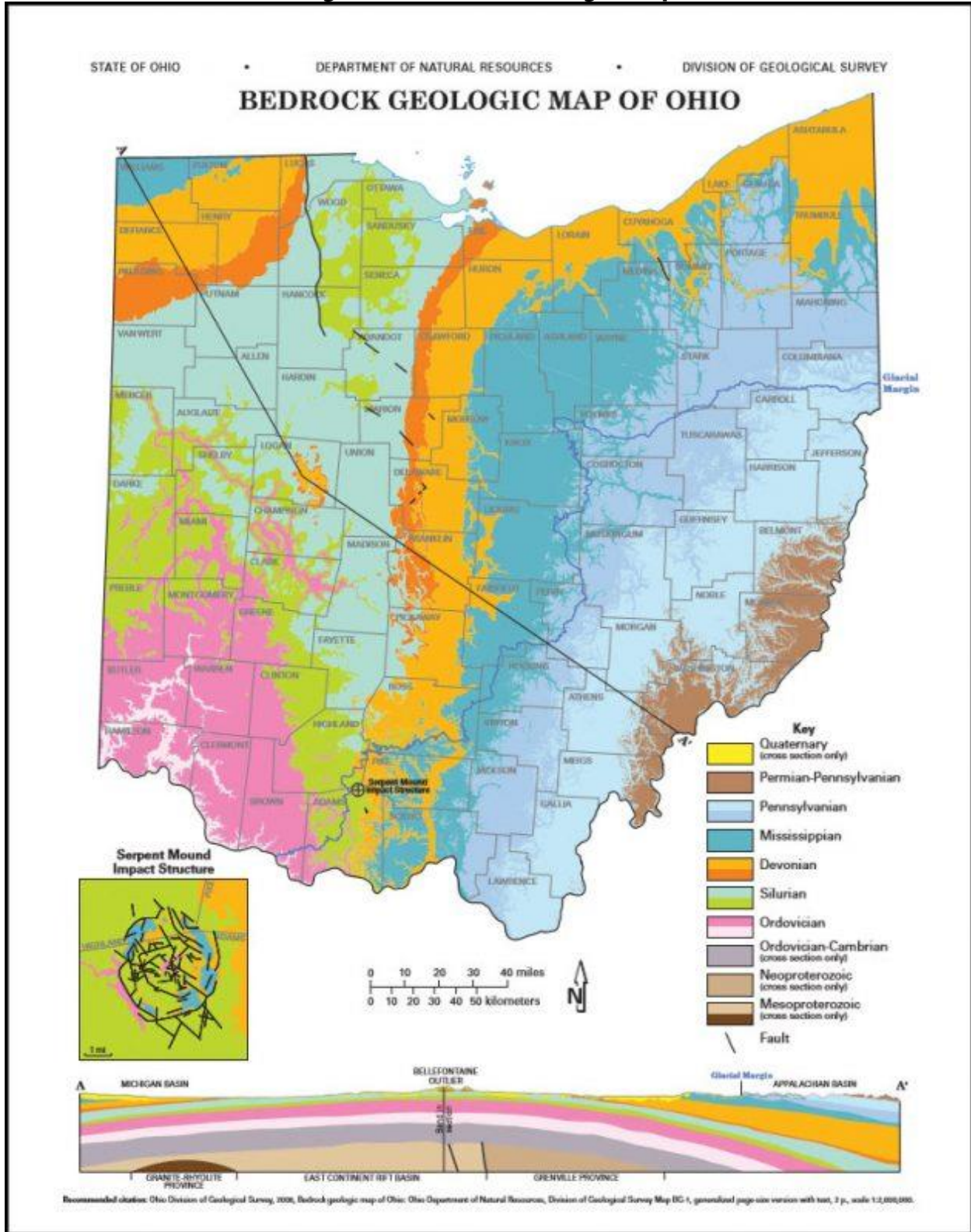
#### **5.1.1 Existing Geological Features**

The Project is located in the Appalachian Plateau Physiographic Province in the Allegheny Plateau Section. The Project is specifically located on the Little Switzerland Plateau, which varies in elevation from 540 feet to 1400 feet. Landslides are somewhat common in this region. To the north is the Glaciated Allegheny Plateau and to the south is the Valley and Ridge region (Brockman, 1998). Physiographic maps of Ohio and West Virginia are shown below in the figures below, respectively.

#### **5.1.2 Soils**

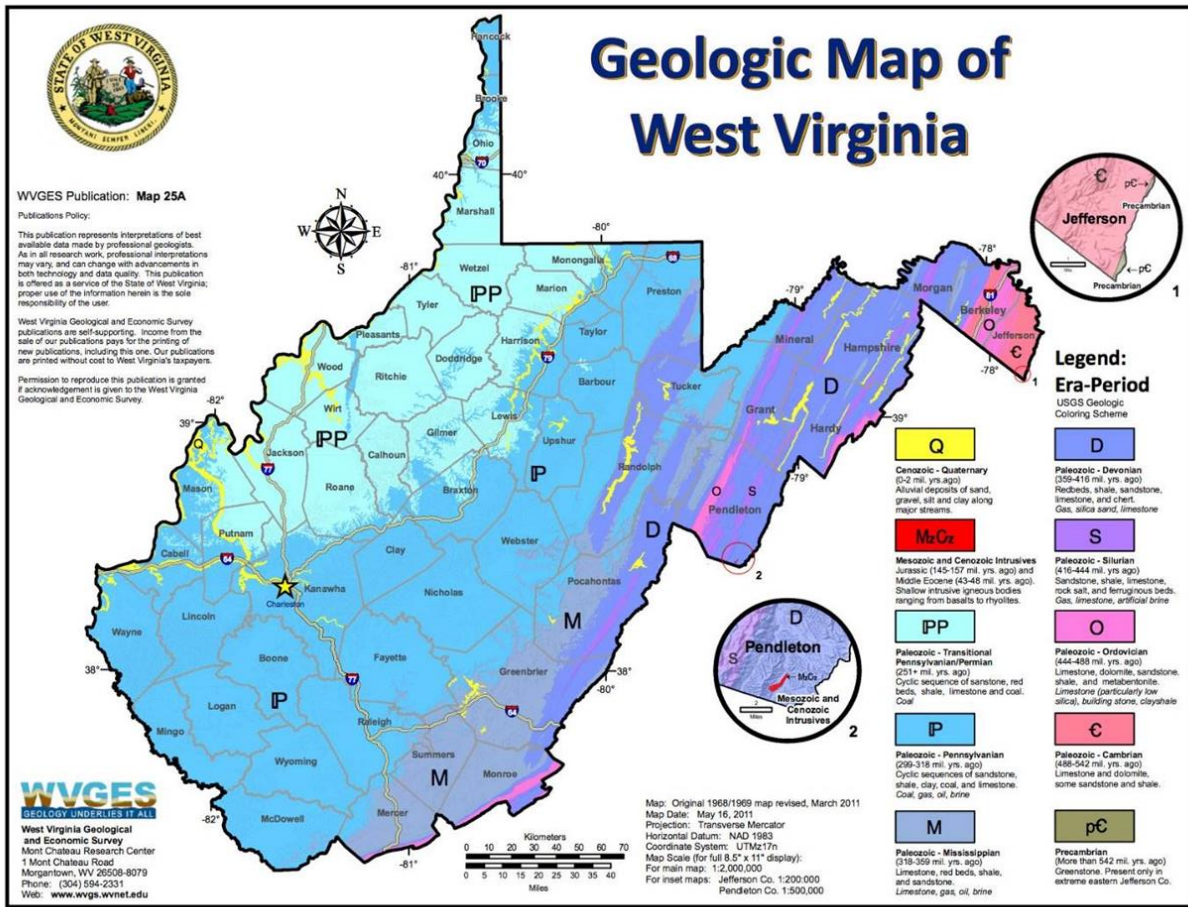
Table 5.1 lists the various soil types in the area surrounding the Project and describes the extent to which they occur. Generally, the soils in the Project Area are silt loams (Figure 5.3). The soils within the Project Area include those from Chavies, Duncannon, and Nolin families. Chavies soil family consists of well drained alluvium derived from sandstone and siltstone with 0 to 55 percent slopes. Duncannon soil family consists of well drained soils that formed in silty to very fine sandy loam material, presumed to be eolian, overlying a variety of residuum materials, stream deposits and glacial deposits with slopes from 0 to 35 percent. Nolin soil family consists of well drained soils formed in alluvium derived from limestones, sandstones, siltstones, shales, and loess with 0 to 25 percent slopes (NRCS, 2021).

**Figure 5.1 Ohio Geologic Map**





**Figure 5.2 Geologic Map of West Virginia**

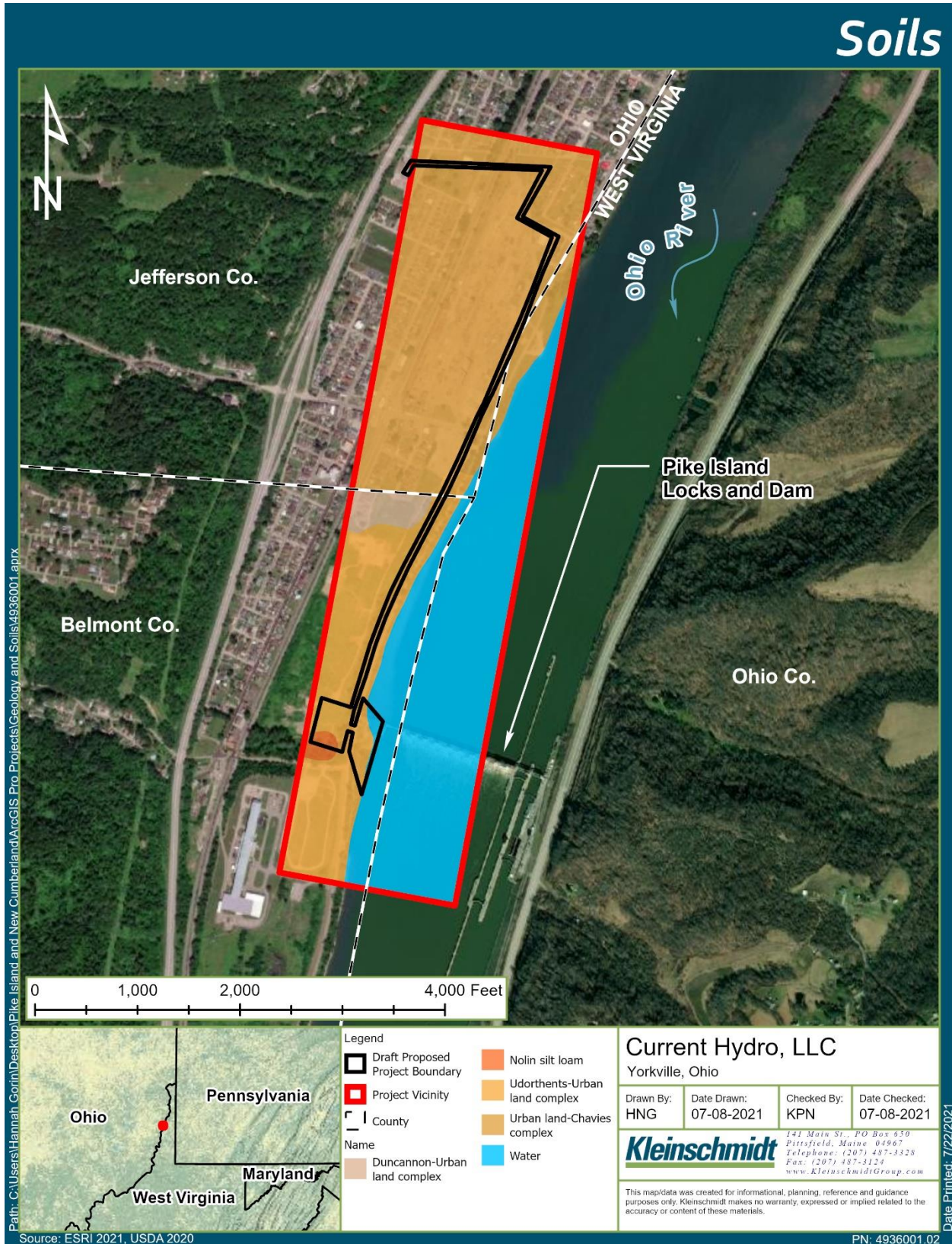


**Table 5.1 Project Vicinity Soil Names, Descriptions and Area**

Soil Map Unit Symbol	Map Unit Name and Description	Acres	Percentage
UsA	Urban land-Chavies complex, 0 to 3 percent slopes	124.6	41.7
W	Water	111.1	37.2
Ud	Udorthents-Urban land complex	54.6	18.3
DuB	Duncannon-Urban land complex, 0 to 15 percent slopes	6.3	2.1
No	Nolin silt loam, 0 to 3 percent slopes, occasionally flooded	1.9	0.7
Total		298.6	100.0



Figure 5.3 Project Area Soil types

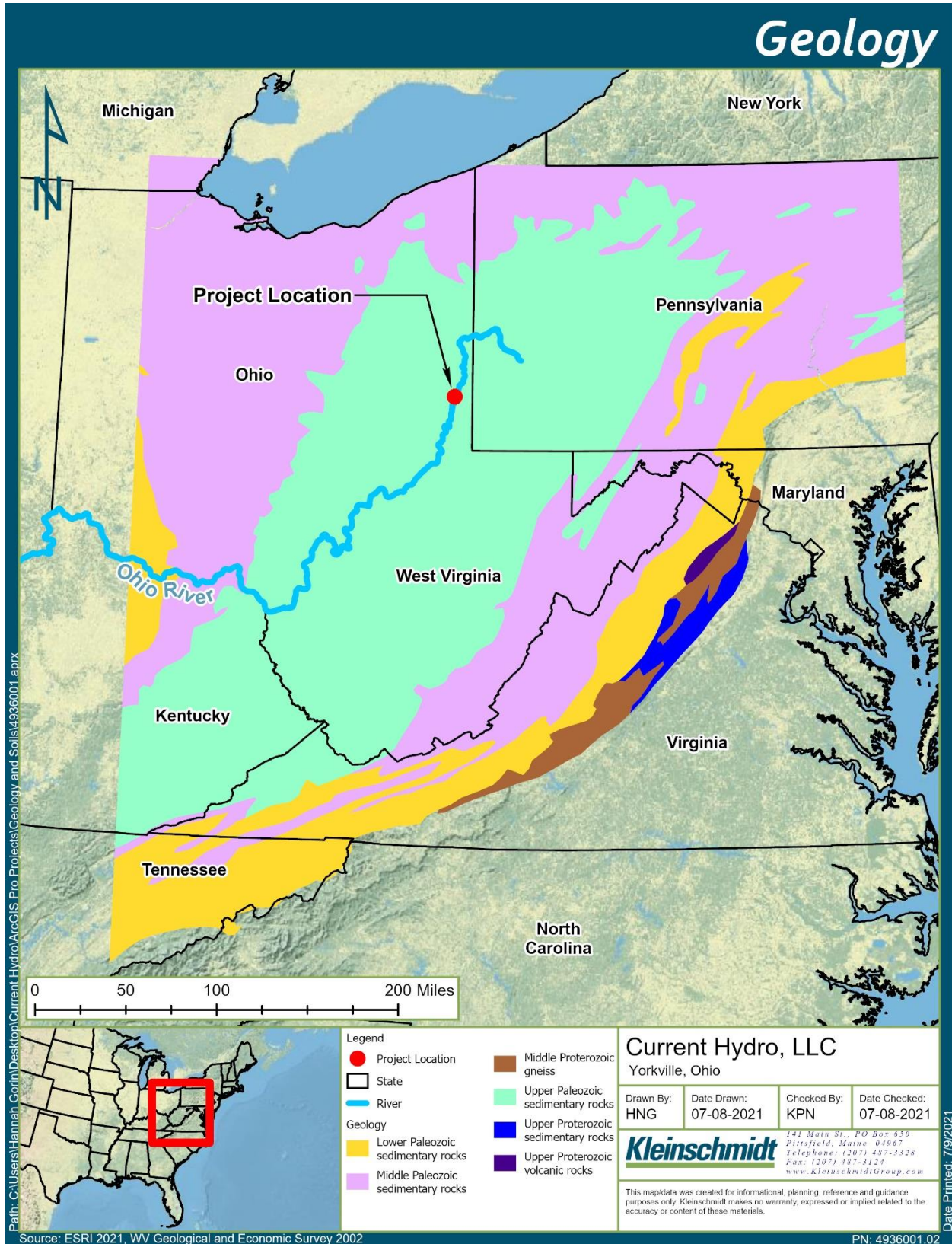


### **5.1.3 Bedrock Geology**

The bedrock geology of the general region of the proposed Project is known to be of the Pennsylvanian period (approximately 302 to 307 million years ago) of continental and marine origin and comprised of sedimentary rocks: mainly shale, sandstone, siltstone, mudstone, limestone, and some coal (Figure 5.4). Small bedrock units exist of the Permian and Pennsylvanian periods (approximately 298 to 302 million years ago) solely of a continental origin and comprised of sedimentary rocks: mainly shale, sandstone, siltstone, mudstone, and minor coal (ODGS 2006 and WVGES 2011).



**Figure 5.4 Project Geology**



#### **5.1.4 Reservoir Shoreline and Streambank Conditions**

The shoreline in the immediate vicinity of the Project impoundment is predominantly surrounded by urbanized and other industrial land uses and other highly developed landscapes, including residences, and in some locations, a thin band of deciduous tree cover, shrubs, lawn, and weeds can be found along the riverbank. Fine-grained sediments are commonly located on the riverbanks near lock and dam structures in the Ohio River.

#### **5.1.5 Erosion**

The Applicant proposes to operate the Project as run-of-river, and as such, there is little potential for the project to contribute to movement of soils and erosion due to project operations.

#### **5.1.6 References**

Brockman, C. Scott. 1998. Physiographic Regions of Ohio. Available:

[https://www.epa.state.oh.us/portals/27/SIP/Nonattain/F2-physiographic\\_regions\\_of\\_Ohio.pdf](https://www.epa.state.oh.us/portals/27/SIP/Nonattain/F2-physiographic_regions_of_Ohio.pdf)

NRC 2006: U.S. Nuclear Regulatory Commission - Ohio River Mainstem System Study Integrated Main Report (Programmatic Environmental Impact Statement Included) DRAFT SIP/PEIS – May 2006, Accessed June 2021.

<http://pbadupws.nrc.gov/docs/ML0810/ML081000184.pdf>

Ohio Division of Geological Survey (ODGS). 2006. Bedrock geologic map of Ohio: Ohio Department of Natural Resources, Division of Geological Survey. Available:

[https://ohiodnr.gov/wps/wcm/connect/gov/af200770-8656-455b-b41b-ee19ef48ef45/BG-1\\_8.5x11.pdf?MOD=AJPERES&CVID=ne.WWkh](https://ohiodnr.gov/wps/wcm/connect/gov/af200770-8656-455b-b41b-ee19ef48ef45/BG-1_8.5x11.pdf?MOD=AJPERES&CVID=ne.WWkh)

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2021. Web Soil Survey. [Online] URL:

<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

West Virginia Geological and Economic Survey (WVGES). 2011. Geologic Map of West Virginia. Available: [www.wvgs.wvnet.edu/www/maps/Geologic\\_Map\\_of\\_West\\_Virgini-Map25A.pdf](http://www.wvgs.wvnet.edu/www/maps/Geologic_Map_of_West_Virgini-Map25A.pdf)

## **5.2 Water Resources**

### **5.2.1 Drainage Area**

The Ohio River is a principal tributary of the Mississippi River. It begins at the confluence of the Allegheny and Monongahela Rivers in Pittsburgh, PA. The combined drainage area of the Allegheny and Monongahela Rivers at their confluence is 19,100 square miles. The river flows 981 miles northwest and west throughout PA until it reaches the West Virginia/Ohio border. It then flows south and southwest until its confluence with the Mississippi River near Cairo, IL. The Project Area is located at river mile 84.2 on the Ohio River (Figure 5.5). Tributaries of the Ohio River upstream of the Project Area include Chartiers Creek, Raccoon Creek, and the Beaver River drainage. The total drainage area at the Project is 24,600 square miles.

Locks and dams are operated at a total of 20 locations on the Ohio River. An additional 17 locks and dams are operated on the Allegheny and Monongahela Rivers. The Pittsburgh District of the USACE operates a total of 23 locks and dams across the Ohio River, Monongahela, and Allegheny Rivers. This navigation system includes USACE navigation projects upstream of the Project Area at Emsworth (River Mile 6.2), Dashiels (River Mile 13.2), and Montgomery River (River Mile 31.7). These three upstream locks and dams are all located in Pennsylvania.



Figure 5.5 Pike Island Project Location in the Ohio River Drainage Area



## 5.2.2 Streamflow, Gage Data, Flow Statistics, and Climate

Weather statistics are recorded at a weather station that is located at the Project. Average precipitation is approximately 38 inches per year, with the highest rainfall totals occurring during the late spring and early summer. Average annual snowfall is approximately 21 inches, with zero inches of snow observed during each month during at least one month during the period of record (Table 5.2) (ACIS 2021).

The nearest upstream gage that records flow is located at Sewickley, PA. This gage (03086000) has a drainage area of 19,500 square miles. The USGS also maintains a gage on the Beaver River at Beaver Falls, PA (03107500). This gage has a drainage area of 3,106 square miles. Based on available flow data from these two USGS gages, flows were prorated based on the drainage area for Pike Island Lock and Dam for the period of 1960-2020. The minimum, mean, and maximum flows during this period were 3,421 cfs, 41,942 cfs, and 435,366 cfs, respectively (Table 5.2). Flow duration curves are provided in Appendix B.

**Table 5.2 Weather Conditions at Pike Island (RM) for a Period of 1916-2020**

Month	Precipitation (inches)			Snowfall (inches)		
	Mean	Max	Min	Mean	Max	Min
Jan	2.87	9.67	0.54	6.2	26.0	0.0
Feb	2.44	7.05	0.34	6.1	27.2	0.0
Mar	3.47	7.56	0.83	4.0	17.0	0.0
Apr	3.36	7.42	0.70	0.6	12.1	0.0
May	3.84	8.39	1.09	-	-	0.0
Jun	4.04	11.13	0.86	-	-	0.0
Jul	3.79	9.18	0.60	-	-	0.0
Aug	3.61	8.99	0.70	-	-	0.0
Sept	3.26	12.05	0.15	-	-	0.0
Oct	2.61	7.03	0.11	-	-	0.0
Nov	2.81	12.86	0.37	1.5	33.0	0.0
Dec	2.84	6.28	0.26	4.2	22.4	0.0
Year	37.91	63.66	5.67	21.1	58.0	0.0

Source: ACIS 2021

**Table 5.3 Pike Island Project Flow Data for a Period of 1960-2020**

<b>CFS</b>	<b>Mean</b>	<b>Min</b>	<b>Max</b>
Jan	54,968	6,384	435,366
Feb	60,435	7,178	288,845
Mar	75,605	8,755	352,674
Apr	65,592	12,420	283,951
May	47,486	7,371	204,863
Jun	31,426	4,923	399,029
Jul	21,893	4,310	221,331
Aug	16,760	3,931	133,961
Sept	18,300	4,234	370,671
Oct	21,389	3,431	134,865
Nov	36,307	3,627	242,440
Dec	54,263	4,881	261,552
Annual	41,942	3,421	435,366

Source: USGS 2021

### **5.2.3 Existing Instream Flow Uses**

Ohio State Water quality standards designate beneficial uses for water bodies in the 23 major drainage basins in Ohio. The Ohio River is designated as warm water, public water supply, agricultural water supply, industrial water supply, and bathing waters. The Ohio River is used as a water supply for over five million people, and serves as warm water fish habitat and as a source of recreation (OHEPA 2021).

### **5.2.4 Water Use**

In the 18<sup>th</sup> century, the Ohio River Basin became a key transportation route leading to the establishment of such cities as Pittsburgh, Pennsylvania; Cincinnati, Ohio; and Louisville, Kentucky. The first federally built lock and dam was completed at Davis Island, approximately five miles south of Pittsburgh, in 1885. The Ohio River Basin's water resources are currently managed to serve both conjunctive and competing beneficial uses within the basin, as well as demands downstream of the basin. Current uses include water supply for municipal and industrial (M&I), agricultural, hydropower, navigation, barge transportation, water quality, flood control, fish and wildlife habitat, and recreation (PDCNR 2017). Companies that utilize the Ohio River for operations include utilities, chemical plants, petroleum companies, terminal and storage services, barge and tow companies, marine repair and services, and manufacturing companies. Electrical utilities



located on the Ohio River constitute over five percent of the nation's power generating capacity. Major industrial uses include coal mining, oil and gas production, construction, transportation projects, forestry, agriculture, and recreation.

Consumptive or non-consumptive demands are demand categories for these various uses. Consumptive uses or "out-of-stream" uses are water withdrawals that return only a portion or no portion of withdrawn water back to the Ohio River Basin. Examples of consumptive uses are M&I and agricultural water supplies. M&I water demands include all water uses, both publicly supplied and self-supplied, residential, commercial, governmental/institutional, industrial, manufacturing, and other demands such as unaccounted-for water use (system losses and firefighting) (PDEP 2006). Total daily withdrawals are approximately 50 billion gallons with over 2 billion gallons being consumed.

The majority of land in the Ohio River Basin is a mix of urban and industrial, row crops and intensive agriculture, pasture and forested. Agriculture and forest land use classes occupied 37.39 and 51.55 percent of the landscape, respectively, in the Ohio River Basin in 2001. In 2001, 8.9 percent of the Ohio River Basin was urban (USEPA 2014).

### **5.2.5 Federally-Approved Water Quality Standards**

The Ohio River Valley Water Sanitation Commission (ORSANCO) is an interstate commission that operates programs to improve water quality in the Ohio River basin. ORSANCO includes membership from eight states in the Ohio River Basin, as well as five federal agencies (NOAA, USACE, USEPA, USFWS, and USGS). Member states operate under the Clean Streams Law, which provides regulations to restore and maintain the chemical, physical, and biological substance of the nation's waters (ORSANCO 2021).

ORSANCO dissolved oxygen parameters for the protection of warm water aquatic life habitat are:

- The minimum DO concentration shall not be less than 4.0 mg/L at any time.
- Average DO concentration shall be at least 5.0 mg/L for each calendar day.
- During the April 15 - June 15 spawning season, a minimum concentration of 5.0 mg/L shall be maintained at all times (ORSANCO 2021).

West Virginia water quality parameters for temperature note that water temperature cannot rise more than 5°F above natural temperature, and cannot exceed 87 degrees at

any time during May through November. Additionally, water temperature may not exceed 73°F during the month of December through April (WVDEP 2021).

State of Ohio water temperature parameters for the mainstem Ohio River are described in Table 5.4. The maximum allowable instantaneous water temperature is 89°F during July and the first several days of August. The state of Ohio water quality standards for the Ohio River note notes a minimum dissolved oxygen concentration of 5.0 mg/L per calendar day, and a minimum of 4.0 mg/L for any place outside of an established mixing zone (OHEPA 2021).

**Table 5.4 Ohio River Water Temperature Criteria**

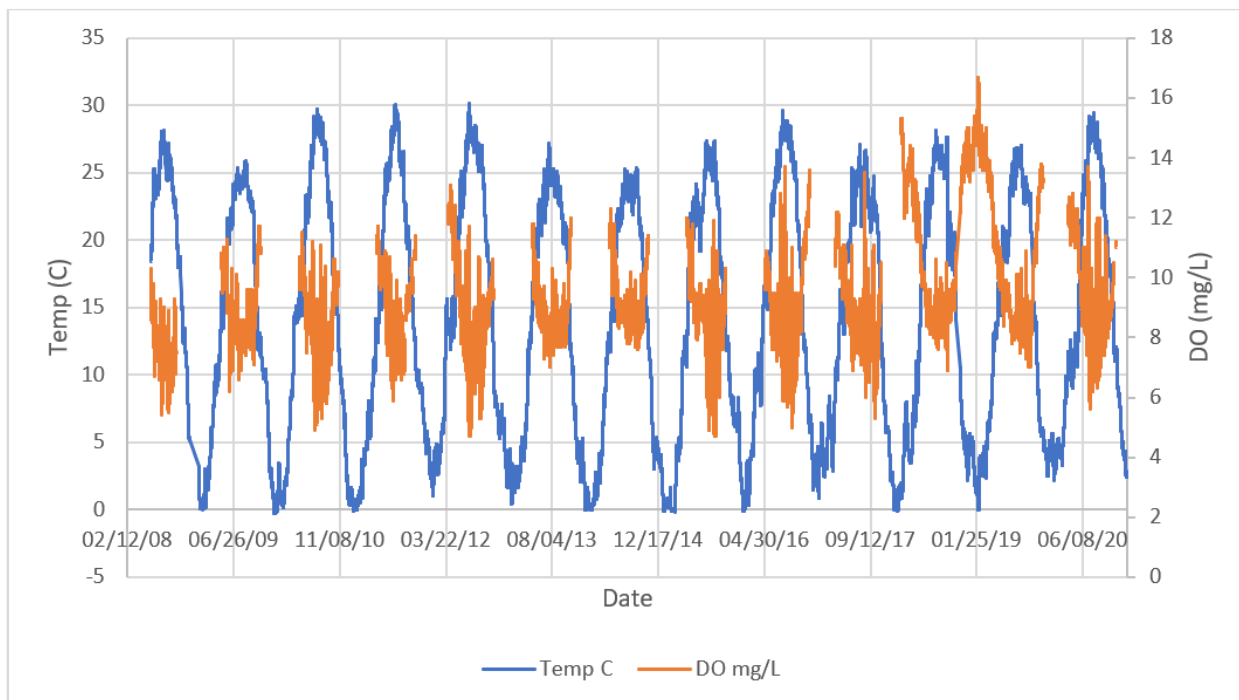
<b>Month</b>	<b>Period Average (°F)</b>	<b>Instantaneous Maximum (°F)</b>
January 1-31	45	50
February 1-29	45	50
March 1-15	51	56
March 16-31	54	59
April 1-15	58	64
April 16-30	64	69
May 1-15	68	73
May 16-31	75	80
June 1-15	80	85
June 16-30	83	87
July 1-31	84	89
August 1-3	84	89
September	84	87
September	82	86
October 1-15	77	82
October 16-31	72	77
November 1-30	67	72
December 1-31	52	57

### **5.2.6 Water Quality Monitoring**

The USGS gage at the Montgomery Locks and Dam (03108490), located approximately 53 river miles upstream of the Project, documents daily dissolved oxygen and pH levels in the Ohio River. The currently available period of record is 2008-2020. The maximum observed water temperature during this timeframe was 30.2 °C (86.4 °F) on July 9, 2012,

which is below the Ohio state water temperature criteria of 89 °F for instantaneous water temperature readings during July. Additionally, this maximum water temperature value is below the West Virginia instantaneous water temperature maximum of 87 °F. A minimum DO level of 4.7 mg/L occurred on July 12, 2012 (Figure 5.6). A majority of DO levels that were recorded on July 12 were above 5 mg/L, however, and the daily average DO level for this date was 7.4 mg/L.

**Figure 5.6 Water Temperature and Dissolved Oxygen Levels at the Montgomery Locks and Dam Project for a Period of 2008-2020**



(source: USGS 2021)

### 5.2.7 References

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## **5.3 Fish and Aquatic Resources**

### **5.3.1 Aquatic Resources and Habitats**

#### **5.3.1.1 Fish Species and Habitats**

The game species fishery in the upper Ohio River mainstem in the vicinity of the Project area is regulated jointly by the Ohio Department of Natural Resources (ODNR) and the West Virginia Division of Natural Resources (WVDNR) through the Revised Ohio Administrative Code. The agreement is designated as the Eastern Unit: Ohio-West Virginia encompassing Lawrence County east of South Point, and Gallia, Meigs, Athens, Washington, Monroe, Belmont, Jefferson (Project Location), and Columbiana counties. The agreement states that West Virginia and Ohio will honor the other states' fishing regulations.

Regulated game species under the Eastern Unit include walleye, sauger, saugeye, striped bass, white bass, muskellunge, black and white crappie, and largemouth and smallmouth bass (ODNR 2021). Common carp are also regulated to promote population control through unlimited limits and catch and no-release requirements. Ohio and West Virginia honor other state's fishing licenses along their common borders on the mainstem of the Ohio River and within its banks, embayments, and tributaries.

The state manages the fishery of the upper Ohio River in coordination with the United States Fish and Wildlife Service (USFWS) to implement stocking programs, improve habitat, and increase recreational access and awareness.

The most recent fish surveys conducted in the Pike Island Pool took place in 2011, 2012, and 2018 and data is reported by the Ohio River Valley Water Sanitation Commission (ORSANCO). During these surveys, there were 1,562 fishes caught representing 59 species (Table 5.5). The most abundant species identified was Smallmouth bass (*Micropterus dolomieu*), Gizzard Shad (*Dorosoma cepedianum*), and Channel catfish (*Micropterus dolomieu*), accounting for 12.4%, 6.2%, and 5.6% of the total catch, respectively (ORSANCO 2021).

**Table 5.5 Fish species caught in the Pike Island Pool surveys from 2011, 2012, and 2018**

<b>Common Name</b>	<b>Scientific Name</b>
Banded Darter	<i>Etheostoma zonale</i>
Banded Killifish	<i>Fundulus diaphanus</i>
Black Buffalo	<i>Ictiobus niger</i>
Black Crappie	<i>Pomoxis nigromaculatus</i>
Black Redhorse	<i>Moxostoma duquesnei</i>
Bluebreast Darter	<i>Etheostoma camurum</i>
Bluegill	<i>Lepomis macrochirus</i>
Bluntnose Minnow	<i>Pimephales notatus</i>
Brook Silverside	<i>Labidesthes sicculus</i>
Carpiodes sp	<i>Carpiodes sp</i>
Central Stoneroller	<i>Campostoma anomalum</i>
Channel Catfish	<i>Ictalurus punctatus</i>
Channel Darter	<i>Percina copelandi</i>
Channel Shiner	<i>Notropis wickliffi</i>
Common Carp	<i>Cyprinus carpio</i>
Emerald Shiner	<i>Notropis atherinoides</i>
Flathead Catfish	<i>Pylodictis olivaris</i>
Freshwater Drum	<i>Aplodinotus grunniens</i>
Gizzard Shad	<i>Dorosoma cepedianum</i>
Golden Redhorse	<i>Moxostoma erythrurum</i>
Green Sunfish	<i>Lepomis cyanellus</i>
Greenside Darter	<i>Etheostoma blennioides</i>
Highfin Carp sucker	<i>Carpiodes velifer</i>
Johnny Darter	<i>Etheostoma nigrum</i>
Largemouth Bass	<i>Micropterus salmoides</i>
Lepomis Hybrid	<i>Lepomis hybrid</i>
Logperch	<i>Percina caprodes</i>
Longear Sunfish	<i>Lepomis megalotis</i>
Longnose Gar	<i>Lepisosteus osseus</i>
Micropterus sp	<i>Micropterus sp</i>
Mooneye	<i>Hiodon tergisus</i>
Morone Sp	<i>Morone sp</i>
Northern Hog Sucker	<i>Hypentelium nigricans</i>

Common Name	Scientific Name
Northern Pike	<i>Esox lucius</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Quillback	<i>Carpionodes cyprinus</i>
Rainbow Darter	<i>Etheostoma caeruleum</i>
River Carpsucker	<i>Carpionodes carpio</i>
River Darter	<i>Percina shumardi</i>
River Redhorse	<i>Moxostoma carinatum</i>
Rock Bass	<i>Ambloplites rupestris</i>
Sand Shiner	<i>Notropis stramineus</i>
Sauger	<i>Sander canadensis</i>
Saugeye	<i>Sander vitreus</i> x <i>canadensis</i>
Silver Redhorse	<i>Moxostoma anisurum</i>
Silver Shiner	<i>Notropis photogenis</i>
Skipjack Herring	<i>Alosa chrysochloris</i>
Smallmouth Bass	<i>Micropterus dolomieu</i>
Smallmouth Buffalo	<i>Ictiobus bubalus</i>
Smallmouth Redhorse	<i>Moxostoma breviceps</i>
Spotfin Shiner	<i>Cyprinella spiloptera</i>
Spotted Bass	<i>Micropterus punctulatus</i>
Streamline Chub	<i>Erimystax dissimilis</i>
Striped Shiner	<i>Luxilus chrysocephalus</i>
Tippecanoe Darter	<i>Etheostoma tippecanoe</i>
Trout-Perch	<i>Percopsis omiscomaycus</i>
Walleye	<i>Sander vitreus</i>
White Bass	<i>Morone chrysops</i>
Yellow Perch	<i>Perca flavescens</i>

### 5.3.2 Fish Passage

The National Oceanic and Atmospheric Administration (NOAA) along with the USFWS provide consultation and guidance to the Federal Energy Regulatory Committee (FERC) and Hydroelectric Project operators to minimize adverse impacts on fish passage. Working with the state agencies, USACE, USEPA, and the local resource agencies provides

collaborative efforts to develop effective fish passage and entrainment recommendations and solutions for implementation.

### **5.3.3 Essential Fish Habitat**

There is no NOAA designated Essential Fish Habitat located in the upper Ohio River.

### **5.3.4 Benthic Macroinvertebrates**

Macroinvertebrates occur in almost all river and stream types of the United States and around the world. Their communities play a crucial role in the transfer of organic material throughout the aquatic food web. In most freshwater aquatic settings, macroinvertebrate communities are dominated by juvenile aquatic insects, however, mollusks (snails, clams, mussels), crustaceans (scuds, shrimp, crayfish, etc), and worms (annelids) (Hauer et al 2017). The distribution and overall population density of aquatic macroinvertebrates can be used to characterize the overall quality of the environmental conditions and water quality of an aquatic system (Gutierrez 2003).

### **5.3.5 Freshwater Mussels**

Freshwater mussels are a good biological indicators of water quality and the ecological health of river systems. They are considered ecosystem engineers because they can transform their surroundings and make habitats more suitable for other organisms (Gutierrez 2003, Vaughn et al 2008). They are sensitive to pollution, sedimentation, and variations in temperature and dissolved oxygen fluctuations. Many of these key aquatic organisms have been in decline throughout freshwater systems in the United States. In the Ohio River, the ODNR and USFWS have listed many species of mussels as endangered, threatened, candidates for federal listing, or species of special concern (ODNR 2021). Table 5.6 displays the federally listed freshwater mussel species potentially occurring within the Pike Island Project area and in the Upper Ohio River.



**Table 5.6 Federally Endangered Ohio River Freshwater mussels**

<b>Species</b>	<b>Status</b>	<b>Comments</b>
Rayed bean ( <i>Villosa fabalis</i> )	Endangered	Most likely located in smaller tributaries to the Ohio River
White catspaw ( <i>Epioblasma obliquata perobliqua</i> )	Endangered	Not in the Project Area
Clubshell - <i>Pleurobema clava</i>	Endangered	Not in the Project Area
Fanshell - <i>Cyprogenia stegaria</i>	Endangered	Not in the Project Area
Pink mucket - <i>Lampsilis abrupta</i>	Endangered	Known occurrences in the Ohio River upstream and downstream of Pike Island. No occurrences in the Project Area.
Sheepnose mussel - <i>Plethobasus cyphus</i>	Endangered	Upstream occurrences limited to Allegheny River upstream from Pittsburgh. Downstream in Ohio River channel from near Marietta downstream to Mississippi confluence.
Snuffbox - <i>Epioblasma triquetra</i>	Endangered	No known occurrences in immediate area upstream or downstream
Purple cat's paw - <i>Epioblasma obliquata obliquata</i>	Endangered	Not in the Project Area
Rabbitsfoot - <i>Quadrula cylindrica ssp. cylindrica</i>	Endangered	Not in the Project Area
Northern riffleshell - <i>Epioblasma torulosa rangiana</i>	Endangered	Not in the Project Area

### 5.3.6 References

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## **5.4 Upland Wildlife and Botanical Resources**

Pike Island Hydropower Corporation has reviewed the results of previous study efforts and contacted the ODNR: Division of Wildlife, USFWS, OEPA, and other agencies and stakeholders to identify any additional information that is available related to the Project's wildlife and botanical resources. During the development of the FERC EIS for the Ohio River Projects in 1988, there was an in-depth search of data for these existing resources. There have been no additional studies in the direct Project site; however, the following section summarizes the information available and any new data received from Pike Island Hydropower Corporation's outreach.

### **5.4.1 Wildlife Habitats in the Project Area and Vicinity**

The Project site supports many wildlife species typically found in the disturbed and early successional vegetation stages in the Ohio River Valley and Great Lakes Basin. The study area of the FEIS was centralized within the Appalachian Plateau ecoregion, a region of narrow valleys and rolling hills, with elevations ranging from about 600 to 5,000 feet. The region is heavily urbanized with both industrial and residential development along the rivers. The few areas of undeveloped forestland do not generally occur adjacent to the rivers. These mixed mesophytic forests are within the oak-chestnut region of the eastern deciduous forest. The extensive, forested bottomlands are now narrow strips ranging in width from a few feet to several hundred feet of successional stage trees.

### **5.4.2 Mixed Deciduous Forest Habitats**

The general Project area is known to contain stands of mixed deciduous forest and interspersed pine plantations typical of those found in the region. The mixed deciduous forests in the Project area are found in the riparian zones located next to the Ohio River and in some local upland locations. These mixed deciduous forest and Pine plantation stands have the potential to support 18-24 bird species and three mammal species (Table 5.7). Potential wildlife occurring in this forest type include raptors, shorebirds, woodpeckers, several songbirds, and small mammals. Red-tailed hawk (*Buteo jamaicensis*) could potentially nest along the forested edges within the general Project area, and woodpeckers could use snags in this habitat as feeding and nesting sites. White-tailed deer (*Odocoileus virginianus*) have the potential to use this habitat for rest and daytime cover. Fox squirrel (*Sciurus niger*) and eastern chipmunks (*Tamias striatus*) could use downed logs and snags for foraging and breeding (FERC 1991). Many of the bird species potentially occurring in this habitat are tolerant of disturbed conditions, excluding the

red-eyed vireo (*Vireo olivaceus*) and least flycatcher (*Empidonax minimus*), both of which are known to reach their highest densities in mostly undisturbed forest habitats (FERC 1991).

Mixed deciduous forests in the riparian corridors tend to support a greater density and diversity of wildlife than the upland stands because of their proximity to water. In addition, the forested riparian habitats within the general Project area provide an important riparian corridor for the dispersal and migration of various species of migratory songbirds and small mammals. White-tailed deer (*Odocoileus virginianus*) could also use the riparian habitat as travel corridors. Several species of reptiles and amphibians have the potential to exist in riparian areas and corridors (FERC 1991).

#### **5.4.3 Pine Plantation Habitat**

Stands of Pine plantations in the vicinity of the Project area are rarer, though they support the fewest number of species. These stands provide bedding areas for wildlife, thermal cover for wintering deer, and foraging and nesting sites for woodpeckers and other bird species (FERC 1991).

#### **5.4.4 Wildlife Resources in the Project Area and Vicinity**

The Pennsylvania Fish and Wildlife Database lists over 200 species of birds, approximately 50 species of mammals, and approximately 50 species of reptiles and amphibians that may occur in the FEIS study area. The Division of Wildlife Resources, Department of Natural Resource offices in Ohio and West Virginia report similar numbers and species diversity. It was reported that 123 species of birds, 7 mammal species, and 49 species in the upper Ohio River were recorded at the time the FEIS was drafted. The study area is also in the pathway used by migratory bird species. It was estimated that 100,000 - 350,000 dabbling ducks and 250,000 - 500,000 diving ducks used this corridor during the fall migration (FERC 1988).

Potential terrestrial wildlife resources within the Project vicinity were identified based on the known habitat types within the Project vicinity and associated species known to exist in these habitats. Many of these species may or may not be present in the immediate project area but are associated with these macrohabitats categorized along the Ohio River.

### 5.4.5 Mammalian Species

There are over 50 different species of mammals known to exist in Ohio, all of which have the potential to exist in the general Project area. Table 5.7 provides a summary of common mammals that may be present within the Project vicinity (ODNR 2021).

**Table 5.7 Species of Mammals in Ohio**

<b>Common Mammalian Species to Occur in Ohio</b>	
<b>Carnivores</b>	
Bobcat	Long-Tailed Weasel
Coyote	Least Weasel
Red Fox	American Mink
Gray Fox	American Badger
Black Bear	Striped Skunk
River Otter	Raccoon
Ermine (Short-Tailed Weasel)	
<b>Rodents</b>	
Eastern Chipmunk	Allegheny Woodrat
Thirteen-Lined Ground Squirrel	Meadow Vole
Eastern Gray Squirrel	Prairie Vole
Eastern Fox Squirrel	Southern Bog Lemming
Red Squirrel	Common Muskrat
Southern Flying Squirrel	Brown Rat
Woodchuck (Groundhog)	House Mouse
American Beaver	Woodland Jumping Mouse
Eastern Harvest Mouse	Meadow Jumping Mouse
North American Deermouse	
<b>Bats</b>	
Little Brown Bat	Big Brown Bat
Northern Long-Eared Bat	Evening Bat
Indiana Bat	Eastern Red Bat
Eastern Small-Footed Bat	Hoary Bat
Tri-Colored Bat	Silver-Haired Bat

<b>Common Mammalian Species to Occur in Ohio</b>	
<b>Insectivores (Shrews and Moles)</b>	
Masked Shrew	Northern Short-tailed
North American Least Shrew	Eastern Mole
Smoky Shrew	Hairy-tailed Mole
American Pygmy Shrew	Star-nosed Mole
<b>Rabbits</b>	
Eastern Cottontail Rabbit	Snowshoe Hare
<b>Marsupials</b>	
Virginia Opossum	
<b>Cervids</b>	
White-Tailed Deer	

#### 5.4.6 Avian Species

Each year, approximately 200 species of birds use the lands and surroundings in the general area of the Project. Many of these species are transient and present only during their migration as they stop along the Ohio River to feed and rest. The Project is located between two major migration routes, the Mississippi and Atlantic Flyways, which results in a high species diversity along the Ohio River. Waterfowl, songbirds, and birds of prey are all common sights on the Ohio River. According to the USFWS Information for Planning and Conservation (IPaC) Report, 3 migratory birds were identified as potentially occurring within the Project Boundary, including bald eagle (year-round residents), black-capped chickadee, and yellow-bellied sapsucker (USFWS 2021; USFWS 2017). Table 5.8 provides a summary of additional migratory bird species that may be present within the Project vicinity (ODNR 2021).

**Table 5.8 Migratory Birds in Project Area**

<b>Migratory Birds with Potential to Occur in the Project Area</b>	
<b>Common Name</b>	<b>Scientific Name</b>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>
Blue-winged Warbler	<i>Vermivora pinus</i>
Canada Warbler	<i>Wilsonia canadensis</i>
Cerulean Warbler	<i>Dendroica cerulea</i>
Henslow's Sparrow	<i>Ammodramus henslowii</i>
Kentucky Warbler	<i>Oporornis formosus</i>
Least Bittern	<i>Ixobrychus exilis</i>
Louisiana Waterthrush	<i>Parkesia motacilla</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>
Prairie Warbler	<i>Dendroica discolor</i>
Prothonotary Warbler	<i>Protonotaria citrea</i>
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>
Short-eared Owl	<i>Asio flammeus</i>
Upland Sandpiper	<i>Bartramia longicauda</i>
Willow Flycatcher	<i>Empidonax traillii</i>
Wood Thrush	<i>Hylocichla mustelina</i>
Worm Eating Warbler	<i>Helmitheros vermivorum</i>

**5.4.7 Reptiles**

Table 5.9 provides a summary of reptile species that may be present within the Project vicinity (ODNR 2008; ODNR 2021; Conant 1952).

**Table 5.9 Reptile Species in Project Area**

<b>Common Reptiles to Inhabit Lands within Ohio</b>	
<b>Turtles</b>	
Eastern Musk Turtle	Snapping Turtle
Spotted Turtle	Eastern Box Turtle
Blanding's Turtle	Northern Map Turtle
Ouachita Turtle	Midland Painted Turtle
Red-Eared Slider	Eastern Spiny Softshell

<b>Common Reptiles to Inhabit Lands within Ohio</b>	
Midland Smooth Softshell	Wood Turtle
<b>Lizards and Skinks</b>	
Eastern Fence Lizard	Little Brown Skink
Common Wall Lizard	Common Five-Lined Skink
Broad-Headed Skink	
<b>Non-venomous Snakes</b>	
Kirtland's Snake	Common Watersnake
Lake Erie Watersnake	Copper-Bellied Watersnake
Northern Brownsnake	Midland Brownsnake
Northern Red-Bellied Snake	Eastern Hog-Nosed Snake
Eastern Smooth Earthsnake	Northern Ring-Necked Snake
Midwestern Wormsnake	Eastern Wormsnake
Northern Black Racer	Blue Racer
Eastern Ratsnake	Eastern Foxsnake
Eastern Black Kingsnake	Eastern Milksnake
Eastern Gartersnake	Plains Gartersnake
Butler's Gartersnake	Common Ribbonsnake
Rough Greensnake	Smooth Greensnake
Queensnake	
<b>Venomous Snakes</b>	
Northern Copperhead	Eastern Massasauga
Timber Rattlesnake	

#### 5.4.8 Amphibians

Table 5.10 provides a summary of amphibian species that may be present within the Project vicinity. (ODNR 2012a; MSU 2010).

**Table 5.10 Amphibian Species in the Project Area**

<b>Common Amphibians to Inhabit Lands within Ohio</b>	
<b>Amphibians</b>	
American Toad	Bullfrog
Blue-Spotted Salamander	Cope's Gray Treefrog
Cave Salamander	Eastern Spadefoot
Eastern Cricket Frog	Four-Toed Salamander



<b>Common Amphibians to Inhabit Lands within Ohio</b>	
Eastern Tiger Salamander	Gray Treefrog
Fowler's Toad	Green Salamander
Green Frog	Jefferson Salamander
Hellbender	Marbled Salamander
Longtail Salamander	Mountain Chorus Frog
Midland Mud Salamander	Mudpuppy
Mountain Dusky Salamander	Northern Leopard Frog
Northern Dusky Salamander	Northern Slimy Salamander
Northern Red Salamander	Northern Two-Lined Salamander
Northern Spring Peeper	Ravine Salamander
Pickerel Frog	Red-Spotted Newt/Red Eft
Redback Salamander	Southern Leopard Frog
Smallmouth Salamander	Spring Salamander
Spotted Salamander	Wehrle's Salamander
Streamside Salamander	Wood Frog
Western Chorus Frog	

#### 5.4.9 Butterflies and Skippers

Table 5.11 provides a summary of butterfly and skipper species that may be present within the Project vicinity. (ODNR 2009).

**Table 5.11 Butterfly and Skipper Species in the Project Vicinity**

<b>Common Butterflies and Skippers to Inhabit Lands within Ohio</b>	
<b>Butterflies and Skippers</b>	
American Painted Lady	American Copper
Baltimore Checkerspot	American Snout
Black Swallowtail	Banded Hairstreak
Cabbage White	Bronze Copper
Common Buckeye	Clouded Sulphur
Common Wood Nymph	Common Sooty Wing
Eastern Comma	Coral Hairstreak
Eastern Tiger Swallowtail	Eastern Tailed Blue
European Skipper	Edward's Hairstreak
Giant Swallowtail	Frosted Elfin
Great Spangled Fritillary	Gray Hairstreak

<b>Common Butterflies and Skippers to Inhabit Lands within Ohio</b>	
Hackberry	Grizzled Skipper
Karner Blue	Harvester
Meadow Fritillary	Little Wood Satyr
Mourning Cloak	Monarch
Pearl Crescent	Orange Sulphur
Persius Duskywing	Peck's Skipper
Question Mark	Purplish Copper
Red-Spotted Purple	Red Admiral
Spicebush Swallowtail	Silver-Spotted Skipper
Summer Azure	Spring Azure
Zebra Swallowtail	Viceroy

#### 5.4.10 Insects, Spiders, and other Invertebrates

Insect, spiders, and other invertebrates are found almost everywhere within the State of Ohio, where there is a diverse insect fauna comprised of well over 1000 species. Table 5.12 provides a summary of common insect, spider, and invertebrate species that may be present within the Project vicinity. (ODNR 2012b).

**Table 5.12 Insects, Spiders, and Invertebrates in the Project Vicinity**

<b>Common Insects, Spiders, and other Invertebrates to Inhabit Lands within Ohio</b>	
<b>Insects, Spiders, and other Invertebrates</b>	
American Burying Beetle	Black Widow
Black And Yellow Garden Spider	Bold Jumping Spider
Blacklegged Tick	Common House Spider
Brown Recluse	Damselfly
Crayfish	Field Cricket
Dragonfly	Honey Bee
Harvestman	Seventeen-Year Cicada
Katydid	Wolf Spider
Seven-Spotted Lady Beetle	

#### 5.4.11 Temporal and Spatial Distribution of Wildlife Species

Due to the Project being located in a highly urbanized and developed region and the resulting habitat fragmentation, species with important commercial, recreational, or cultural value are not likely to use the Project area or immediate surrounding lands for permanent habitat. Much of the land directly butting the Ohio River has been altered to accommodate current or past commercial or industrial land use activities. Wildlife with potential to occupy the Project area year-round are those species adapted to flourish in the local urban conditions and altered environment.

#### 5.4.12 Botanical Resources

Along the floodplains of the Ohio River in the general Project area, bottomland deciduous hardwood forests are the natural climax community. However, much of this habitat type has been eliminated by industrial, commercial, or residential development. The remaining riparian areas are often less than a few hundred feet in width. This habitat type has a typical four-layer plant structure. Dominant tree species in the overstory tend to be silver maple, sycamore, cottonwood, and black willow; minor tree species include slippery elm, pin oak, river birch, sweet gum, and hickories. Representative species in the lower canopy include hackberry, black locust, American elm, green ash, box elder, pawpaw, buckeye, and black walnut. Shrubs include spicebush, Virginia creeper, poison ivy, dogwoods, black elderberry, and grape species. Herbaceous density and diversity of ground cover varies with the amount of light penetration. Typical ground cover includes wingstem, touch-me-nots, white snakeroot, and a profusion of invasive nonindigenous plant species (USFWS 2020). Table 5.13 provides a summary of botanical species that may be present in these habitats and within the Project vicinity. (The Nature Conservancy)

**Table 5.13 Botanical Species in the Project Vicinity**

Species	Scientific Name
Silver Maple	<i>Acer saccharinum</i>
American Sycamore	<i>Platanus occidentalis</i>
Cottonwood	<i>Populus</i>
Black Willow	<i>Salix nigra</i>
Slippery Elm	<i>Ulmus rubra</i>
Pin Oak	<i>Quercus palustris</i>
River Birch	<i>Betula nigra</i>
Sweet Gum	<i>Liquidambar styraciflua</i>

Species	Scientific Name
Hickory	<i>Carya</i>
Hackberry	<i>Celtis</i>
Black Locust	<i>Robinia pseudoacacia</i>
American Elm	<i>Ulmus americana</i>
Green Ash	<i>Fraxinus pennsylvanica</i>
Box Elder	<i>Acer negundo</i>
Pawpaw	<i>Asimina triloba</i>
Buckeye	<i>Aesculus glabra</i>
Black Walnut	<i>Juglans nigra</i>
Spicebush	<i>Lindera benzoin</i>
Virginia Creeper	<i>Parthenocissus quinquefolia</i>
Poison Ivy	<i>Toxicodendron radicans</i>
Dogwood	<i>Cornus</i>
Black Elderberry	<i>Sambucus</i>
Wingstem	<i>Verbesina alternifolia</i>
Touch-Me-Not	<i>Mimosa pudica</i>
White Snakeroot	<i>Ageratina altissima</i>

#### 5.4.13 Invasive Wildlife and Plant Species

Invasive nonindigenous wildlife and plant species are those that have been introduced outside their natural native geographic range as a result of human influence and have the potential to pose a major threat to the natural biodiversity of any ecosystem. These species cause significant, and at times, irreversible ecological damage with potential economic losses totaling in the millions as they rapidly and aggressively migrate into natural or human altered plant communities.

#### 5.4.14 Invasive Wildlife Species

Table 5.14 below provides a summary of common invasive nonindigenous wildlife species found in Ohio. The species presented in Table 5.14 are species that have many invasive biological traits, are generally widespread in Ohio, and are known to invade natural wildlife communities and habitats.

**Table 5.14 Common Plant Species of Ohio**

<b>Common Invasive Non-indigenous Plant Species of Ohio</b>	
<b>Mammals</b>	
Wild Boar	<i>Sus scrofa</i>
<b>Fish</b>	
Round Goby	<i>Neogobius melanostomus</i>
Ruffe	<i>Gymnocephalus vernalis</i>
White Perch	<i>Morone americana</i>
Grass Carp	<i>Ctenopharyngodon idella</i>
Silver Carp	<i>Hypophthalmichthys molitrix</i>
Bighead Carp	<i>Hypophthalmichthys nobilis</i>
Black Carp	<i>Mylopharyngodon piceus</i>
<b>Aquatic Invertebrates</b>	
Sea Lamprey	<i>Petromyzon marinus</i>
Zebra Mussel	<i>Dreissena polymorpha</i>
Rusty Crayfish	<i>Orconectes rusticus</i>
<b>Insects</b>	
Codling Moth	<i>Cydia pomonella</i>
Gypsy Moth	<i>Lymantria dispar</i>
European Corn Borer	<i>Ostrinia nubilalis</i>
Asian Long-Horned Beetle	<i>Anoplophora glabripennis</i>
Walnut Twig Beetle	<i>Pityophthorus juglandis</i>
Emerald Ash Borer	<i>Agrilus planipennis</i>
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>

SOURCE: iNaturalist 2021

#### **5.4.15 Invasive Plants and Weeds**

Invasive nonindigenous plant species are the second most common cause of native plant loss, trailing slightly behind habitat loss due to human encroachment, urbanization, and development (Snyder et al. 2004).

The Ohio Invasive Plants Council (OIPC) is a coalition of agencies, organizations, and individuals located throughout Ohio who are concerned about the introduction, spread, and control of invasive nonindigenous plant species in Ohio's natural habitats. The OIPC works to promote public awareness of issues directly related to invasive nonindigenous species, and to encourage land management and research to detect invasive species and prevent new invasions into natural ecosystems (OIPC 2018).

Ohio does not keep an official list of invasive nonindigenous plant species, and the State also lacks a comprehensive, specimen-based checklist of its vascular flora. Approximately one-fourth of the plant species known to occur in Ohio originate from outside the State. Most of these nonindigenous plant species are not considered invasive in their natural regions. Of the more than 700 known nonindigenous plants in Ohio, less than 100 are known to be invasive and problematic in their natural regions. Table 5.15 below provides a summary of common invasive nonindigenous plant species found in Ohio. The species presented in Table 5.15 are species that have many invasive biological traits, are generally widespread in Ohio, and are known to invade natural plant communities and habitats. Most of these plant species are considered to be invasive throughout much of their range in the United States as well as many adjacent states (ODNR 2017; Snyder et al. 2004).

**Table 5.15 Common Invasive Non-Indigenous Plant Species of Ohio**

<b>Common Invasive Non-Indigenous Plant Species of Ohio</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Scientific Name</b>
Japanese Honeysuckle	<i>Lonicera japonica</i>	Common Reed	<i>Phragmites australis</i>
Japanese Knotweed	<i>Fallopia japonica</i>	Reed Canary Grass	<i>Phalaris arundinacea</i>
Autumn Olive	<i>Elaeagnus umbellata</i>	Garlic Mustard	<i>Alliaria petiolata</i>
Buckthorns	<i>Rhamnus frangula, R. cathartica</i>	Multiflora Rose	<i>Rosa multiflora</i>
Purple Loosestrife	<i>Lythrum salicaria</i>	Bush Honeysuckles	<i>Lonicera maackii, L. tatarica, L. morrowii</i>
Mile-A-Minute Weed	<i>Persicaria perfoliata</i>	Kudzu	<i>Pueraria lobata</i>

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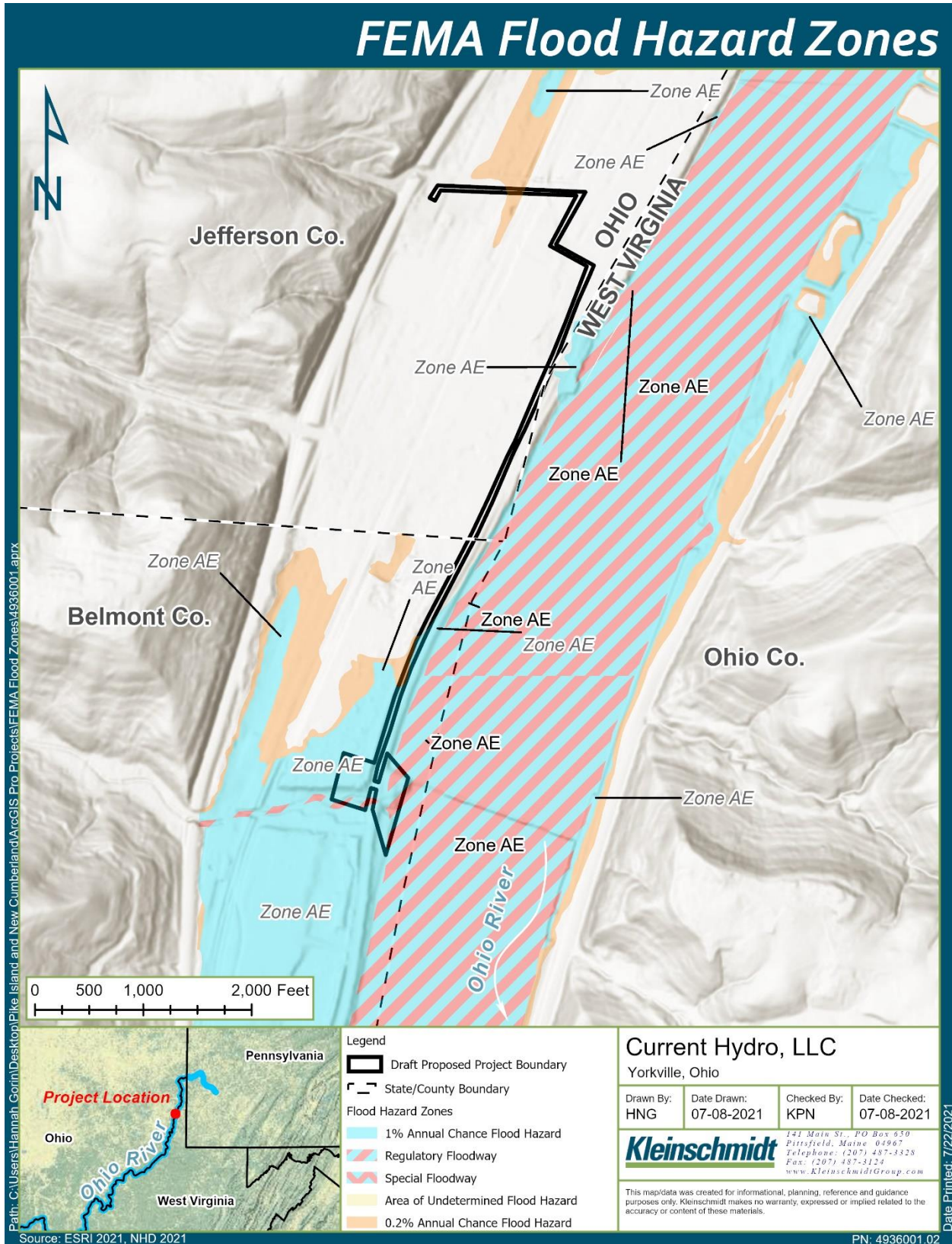
## **5.5 Shoreline Wildlife and Botanical Resources**

### **5.5.1 Floodplain and Wetland Species and Habitats of the Project Area and Vicinity**

#### **5.5.1.1 Floodplains**

Most of the land within the Project Boundary is located within a Special Flood Hazard Area (SFHA), identified in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM). Each zone within an SFHA is labeled according to the potential of being inundated by the flood event having a 1 percent chance of being equaled or exceeded in any given year. SFHA Zone AE, which is defined as areas subject to inundation by a 1 percent annual chance flood event, is the dominant zone within the general Project area and most of the land identified within the Project Boundary. Moderate flood hazard areas are those that are located between the limits of the base flood and have a 0.2 percent annual chance (or 500 year) flood. Both zones are identified in Figure 5.7 below, which present data from the most current FEMA FIRM Maps, where Zone X (shaded with black dots) and Zone AE (shaded in light blue dots) can be seen in relation to the approximate Project Boundary (FEMA 2006a; FEMA 2006b; FEMA 2006c; FEMA 2015).

Figure 5.7 FEMA Flood Zones



### **5.5.1.2 Wetlands**

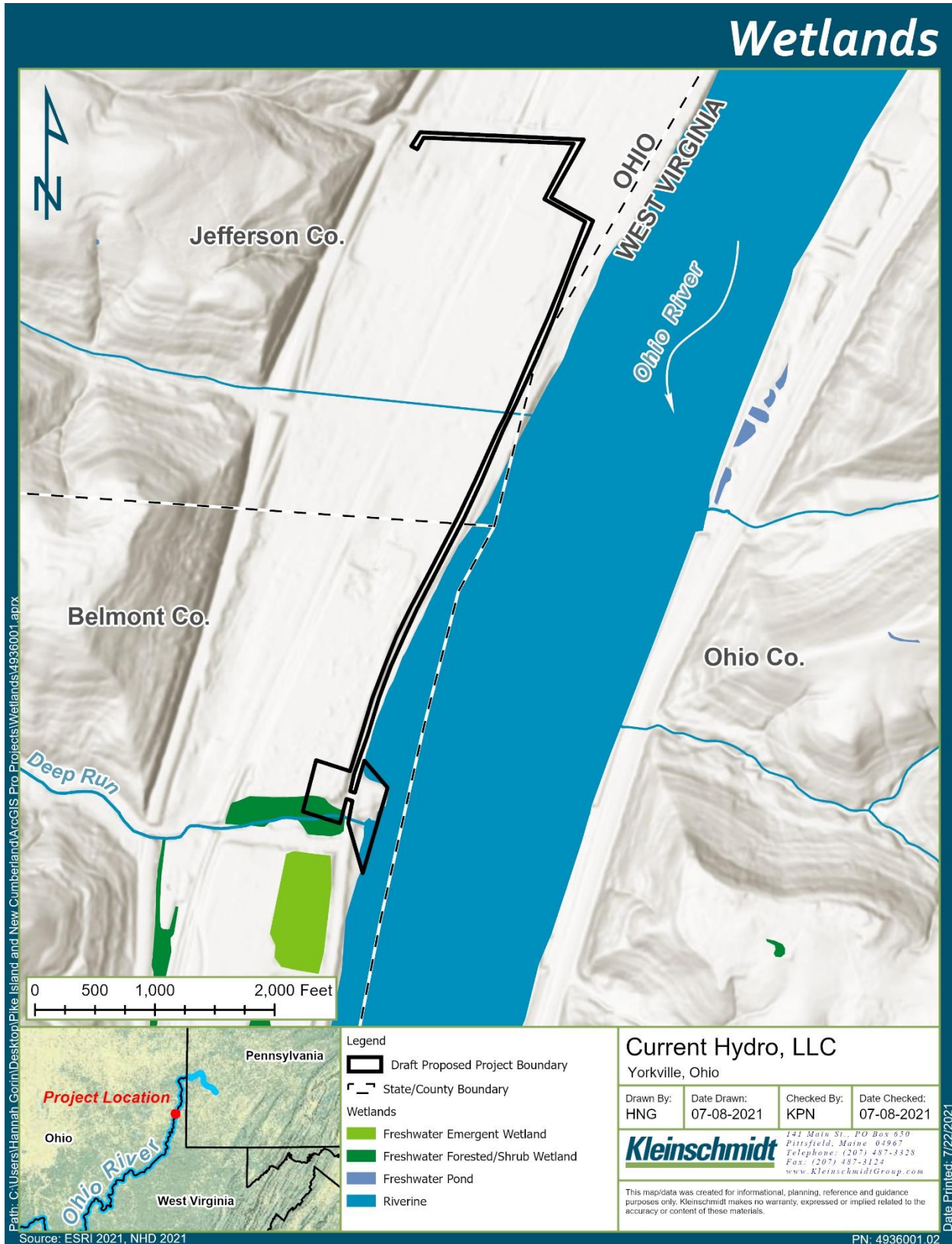
Wetlands are defined as those lands that are transitional between terrestrial and aquatic systems, where the water table is generally found at or near the surface or the land is covered by shallow water less than 6.6 feet deep, with the following general conditions: (1) the land must periodically support predominantly hydrophytic plant species (wetland plants); (2) the substrate is composed of hydric soils (predominantly undrained); and (3) the substrate is non-soil and saturated with water or covered by shallow water at some time during the growing season (Cowardin 1979).

Wetlands on the Ohio River have been recorded as being of two major types - riverine and palustrine. These wetlands are present in narrow bands around the perimeter of islands located within the channel, in submerged beds around the islands, in pockets of abutting land, and within interior landform depressions, sloughs, overflow channels, and abandoned portions of the riverbed. No formal delineation of wetland, riparian, or littoral habitats has been conducted within the Project Boundary.

The USFWS National Wetlands Inventory (NWI) provides a publicly available resource of abundance, distribution, and characteristics of United States wetlands. Using this, and the results of the Information for Planning and Conservation (IPaC) Trust Resource Report generated for the general Project area, riverine wetlands (R2UBH) and freshwater/forested shrub wetland may be present within portions of the Project Boundary (Figure 5.8). Other wetland types were noted further upstream of the Project Dam and located abutting the Pike Island Pool and its tributaries primarily consisting of confined narrow bands adjacent to the Ohio River (USFWS 2021; USFWS 2017).



Figure 5.8 Project Wetlands



### 5.5.2 Riverine Wetlands (System)

The Riverine Wetland Class is characterized by being found in floodplains and riparian zones including all the wetlands and deepwater habitats contained within the stream or river channels with a well-developed floodplain, except those wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, includes all wetlands and deepwater habitats contained within or habitats with water containing ocean-derived salts in excess of 0.5 ppt (Cowardin 1979 and USFWS 1985).

The Riverine system in the general Project area is defined as being of the Lower Perennial subclass. This subclass is defined as having a low gradient and slow water velocity. There is no tidal influence, with water flowing throughout the year. The substrate consists mainly of sand and mud with oxygen deficits having the potential to occur. The gradient is lower than that of the Upper Perennial Subsystem and the floodplain is well developed.

Dominant vegetation for this type of wetland is spatterdock (*Nuphar* Sp.), pickerelweed (*Pontederia cordata*), broadleaf arrowhead (*Sagittaria latifolia*), water smartweed (*Polygonum amphibium*), water hemp (*Amaranthus* Sp.), bur marigold (*Bidens* Sp.), and wild rice (*Zizania* Sp.) (USFWS 1985). Dominant fauna of Riverine Wetlands include species that tend to reach their maximum abundance in still water, as well as having common populations of true planktonic organisms. Riverine Wetlands provide critical habitat for many birds, ranging from waterfowl and shorebirds to migratory songbirds; some spending their entire lives in wetland environments, with others utilizing wetlands for breeding, feeding, or resting. Common mammals found to utilize Riverine Wetlands include muskrat, and beavers. Reptiles (i.e., turtles and snakes) and amphibians (i.e., frogs and salamanders) are also important residents (USFWS 1985). A comprehensive list of wildlife potentially occurring within the Project Boundary can be found in Section 5.4 (Upland Wildlife and Botanical Resources) and 5.5 (Shoreline Wildlife and Botanical Resources).

Ohio designates all wetlands as State Resource Waters. These wetlands support a wealth of wildlife resources, provide diverse habitat, and support complex food chains. Half of the federally listed threatened and endangered species identified in Ohio depend directly on wetlands, including bog turtles (*Clemmys muhlenbergii*). Wetlands provide habitat for bald eagles (*Haliaeetus leucocephalus*) and nesting habitat for many species of migratory songbirds. Some mammals that have the potential to inhabit wetlands include: shrews, moles, mice, rats, lemmings, voles, muskrats, rabbits, beavers, mink, raccoons, black bears, and white-tailed deer (ODNR 2007; ODNR 2013; NRCS 2001).

### **5.5.3 Riparian and Littoral Species and Habitats of the Project Area and Vicinity**

#### **5.5.3.1 Riparian**

Riparian zones are areas of land occurring at the land-water interface along watercourses and water bodies, which include floodplains and streambanks. Riparian habitat is distinctly different from surrounding lands due to the unique soils and vegetation characteristics found in this zone, which is strongly influenced by the presence of water. Riparian vegetation is extremely important as it can remove excess nutrients and sediment from surface water runoff as well as shallow groundwater. Riparian vegetation also provides streambank stability and shade to the watercourses and water bodies it abuts and can control the amount of sunlight attenuating in the water and the resulting temperatures vital to sustaining optimal conditions for aquatic plants, fish, and other animals. Robust riparian cover makes aquatic habitats in the Ohio River Valley suitable for a large number and a high diversity of fish and other aquatic life as compared to the adjacent upland habitats (USDA 1996; FERC 1998).

Riparian vegetation is present in long, narrow stretches along the banks of the Ohio River and is dominated by floodplain forest vegetation consisting of hydrophilic species (e.g., black willow – *Salix nigra*). Ohio defines the riparian zone as the land and vegetation that is situated along the bank of a stream or river. Industrialization and development in the Project vicinity has resulted in the loss of large tracts of riparian vegetation in the surrounding areas that abut the Project Reservoir. Existing Riparian areas in the Project vicinity provide enhanced bank stability and important habitat for local flora and fauna. Most of these remnant tracts of riparian zones appear to be deciduous forested land with approximately >50 percent crown closure (ODNR 2007).

#### **5.5.3.2 Littoral**

The littoral zone is the uppermost area located along the perimeter of the Project impoundment located between the high and low water levels and allow full attenuation of sunlight to reach the riverbed. This zone sustains a relatively diverse community, including a large variety of algae species (e.g., diatoms), submerged and floating aquatic plants, grazing snails, clams, insects, crustaceans, fishes, and amphibians. Many of the insect species that inhabit this zone are in their egg or larval stages (e.g., dragonflies and midges). The flora and fauna of the littoral zone also serve as critical components to the

local food chain, providing food for larger animals such as turtles, snakes, and ducks (UCMP 2004).

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## **5.6 Threatened and Endangered Species**

### **5.6.1 Existing Environment**

This section describes rare, threatened, and endangered species with potential to occur in the Project area within Hancock County, West Virginia, Belmont County, Ohio, and Jefferson County, Ohio. The 1973 ESA protects those animals and plants and associated habitats that are in danger of becoming extinct. The USFWS classifies animals and plants into two categories: "endangered species" are in danger of extinction throughout the area in which they are usually found and "threatened species" are those that could become endangered in the near future. The bald eagle was removed from the ESA list on June 28, 2007. However, bald eagles remain federally protected under the Bald and Golden Eagle Protection Act of 1940 and the Migratory Bird Treaty Act.

At the state level, plant and wildlife species in the Project area may also be protected under regulations by the OHDNR. Depending on their level of vulnerability to extinction, species may be listed as endangered or threatened at the state level. Additionally, a species may be identified as special concern if it does not meet the criteria of endangered or threatened but is particularly vulnerable to becoming threatened under continued or increased stress. Other factors that may initiate a special concern designation include instances where there is concern for a species' status, but insufficient information exists to permit an adequate status evaluation (OHDNR 2021). West Virginia does not currently have state threatened species and endangered species legislation (WVDNR 2021).

### **5.6.2 Federally Listed Species**

A search of the Project boundary using the Information for Planning and Consultation (IPaC) tool was used to describe endangered and threatened species that may occur near the Project (USFWS 2021a). Federally listed species were also documented for Hancock, Belmont, and Jefferson Counties using the ECOS Environmental Conservation Online System (USFWS 2021b). Federally listed species that may be present in the Project area, based on known or expected distributions, are listed in Table 5.16. Life history characteristics and range information are described below for each listed species. There is no known critical habitat for any species within the Project area, or in habitats immediately surrounding the project.

**Table 5.16 Federally Listed Species that May Occur in Project Area**

Common Name	Scientific Name	Federal Status	County
Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened	Hancock, Belmont, Jefferson
Indiana bat	<i>Myotis sodalist</i>	Endangered	Hancock, Belmont, Jefferson
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Protection Under Bald and Golden Eagle Protection Act	Hancock, Belmont, Jefferson
Monarch Butterfly	<i>Danaus plexippus</i>	Candidate	Hancock, Belmont, Jefferson
Running Buffalo Clover <sup>1</sup>	<i>Trifolium stoloniferum</i>	Endangered	Belmont

<sup>1</sup>Proposed for delisting

### 5.6.3 Indiana Bat

The Indiana bat was listed as endangered under the Endangered Species Preservation Act of 1966. It was listed in 1967 as endangered under current ESA regulations. A major cause of the Indiana bat's decline has been human disturbances occurring in winter hibernacula. Indiana bats are especially vulnerable to disturbances at wintering areas, as the species requires specific cave characteristics (i.e., temperature, humidity, and cave structure), and a large percentage of the population roosts in a small number of caves. Additional causes of the species' decline have been the loss of summer habitat, pesticide use, and the spread of white nose syndrome (USFWS 2006). The Indiana bat's current range extends across 23 states in the central and northcentral United States (USFWS 2007).

Indiana bats typically use underground caves as hibernacula during the winter months. Other areas where overwintering occurs include cave-like structures such as abandoned mines. Suitable roosting habitats include extensive vertical areas or passages which provide a variety of roost sites and temperatures, and prevent large swings in temperature. Indiana bats generally use hibernacula with stable temperatures that remain between 10°C and freezing. In the summer, females often roost under peeling bark on dead trees in areas with direct sunlight. Maternity roosts after the breeding season typically occur in riparian zones, bottomland habitats, or on floodplains and wooded wetlands (USFWS 2007).

#### **5.6.4 Northern Long-Eared Bat**

The northern long-eared bat was listed as threatened in 2015. The USFWS has not yet established a designation of critical habitat or developed a recovery plan for the species (USFWS 2017). The northern long-eared bat feeds on invertebrates and is known to glean prey from vegetation and water surfaces. The species winters in underground caves and cave-like structures, usually in groups. During the summer months, northern long-eared bats roost singularly or in small colonies in caves, under bark, or in hollows of live and dead trees. Suitable roosting trees have characteristics that include exfoliating bark, cavities, and cracks. Northern long-eared bats have young during late-spring and early-summer, with the offspring weaned approximately one month after birth (USFWS 2015).

#### **5.6.5 Bald Eagle**

The bald eagle is a federally protected species under the Bald and Golden Eagle Protection Act. The bald eagle is the second largest bird of prey in North America. Mature adults stand in excess of 3 ft. in height with a wingspan of 6-8 ft. The female bald eagle is larger than the male, weighing as much as 14 pounds. Males generally weigh 7-10 pounds. Mature adults are easily recognized by their large size and contrast of white head and tail with a dark brown body and wings. Bald eagles are long lived (up to 30 years), and become sexually mature at four to six years of age. They mate for life, and build large (approximately five ft. in diameter and 3 ft. in depth) nests in open trees near water. Breeding occurs in the spring, with both parents incubating eggs. In winter, bald eagles leave nesting grounds for areas with large expanses of unfrozen water for hunting. Fish and waterfowl are both prey sources, and bald eagles also scavenge (NHFG 2005).

#### **5.6.6 Running Buffalo Clover**

Running buffalo clover is a federally endangered species found throughout the Midwest, including areas of Belmont County Ohio. This perennial species produces runners that extend below the stems and run along the surface of the ground. The species uses these runners to expand its density. The species requires some disturbance and open habitat, but is intolerant of full sun, full shade, or severe disturbances. Common habitats generally include partially shaded woodlots, mowed areas (e.g. lawns, parks, cemeteries), and along streams and trails (USFWS 2003).

### **5.6.7 State Listed Species**

The OHDNR's searchable database was utilized to generate a list of state listed animal species that are known or likely to occur within Jefferson and Belmont Counties. A total of 49 Ohio state listed species may be present in Jefferson County. A total of 42 Ohio state listed species may be present in Belmont County (OHDNR 2021) (Table 5.17).

**Table 5.17 Ohio State Species of Concern That May Be Found in Belmont and Jefferson Counties**

Common Name	Scientific Name	Group	State Status	Habitat <sup>1</sup>	County
Eastern Hellbender	<i>Cryptobranchus alleganiensis alleganiensis</i>	Amphibian	Endangered	Rocky, clear creeks and rivers with large rocks for shelter. Avoids water warmer than 20°C	Jefferson and Belmont
Four-toed Salamander	<i>Hemidactylum scutatum</i>	Amphibian	Endangered	Under objects or among mosses in wet habitats	Jefferson
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Bird	Endangered	Forest and open woodland, coniferous, mixed, or deciduous. Nest in tree crotch or on branch	Jefferson and Belmont
Henslow's Sparrow	<i>Ammodramus henslowii</i>	Bird	Species of Concern	In grassy areas during breeding and non-breeding	Jefferson and Belmont
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Bird	Species of Concern	In grassy areas during breeding and non-breeding	Jefferson and Belmont
Eastern Whip-poor-will	<i>Anostomus vociferus</i>	Bird	Species of Concern	Breed in forest and open woodland. Nests on ground in open sites under trees or brush	Jefferson
Common Nighthawk	<i>Chordeiles minor</i>	Bird	Species of Concern	Mountains and plains in open and semi open areas. Forests, grasslands, and in vicinity of cities and towns	Jefferson
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Bird	Species of Concern	Breed in forest edge and woodland with thickets. Spend migration period in areas ranging from tropical evergreen to arid subtropical scrub	Jefferson and Belmont
Northern Bobwhite	<i>Colinus virginianus</i>	Bird	Species of Concern	White variety of vegetation types. Prefers early successional stages	Jefferson
Bobolink	<i>Dolichonyx oryzivorus</i>	Bird	Species of Concern	Areas with tall grasses and mixed-grass pastures	Jefferson and Belmont
American Coot	<i>Fulica americana</i>	Bird	Species of Concern	Freshwater lakes, ponds, marshes, and larger rivers, as well as land bordering these habitats	Jefferson and Belmont

Common Name	Scientific Name	Group	State Status	Habitat <sup>1</sup>	County
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Bird	Species of Concern	Open woodland, especially with beech or oak. Parks and cultivated areas	Jefferson and Belmont
Vesper Sparrow	<i>Pooecetes gramineus</i>	Bird	Species of Concern	Plains, prairies, dry shrublands, savannas, weedy pastures, fields, sagebrush, arid scrub, and clearings	Jefferson and Belmont
Cerulean Warbler	<i>Setophaga cerulea</i>	Bird	Species of Concern	Breeding habitat includes mature hardwood forest. Non-breeding habitat is on the eastern slopes of the Andes mountains	Jefferson and Belmont
Northern Harrier	<i>Circus hudsonius</i>	Bird	Endangered	Open grasslands, shrubland, marshes. Nests on ground in cover	Jefferson
Barn Owl	<i>Tyto alba</i>	Bird	Endangered	Nest in cavities, forage in dense grass fields	Jefferson
Long-eared Owl	<i>Asio otus</i>	Bird	Special Interest	Deciduous and evergreen orchards, wooded parks, farm woodlots, River woods, desert oases	Jefferson and Belmont
Brown Creeper	<i>Certhis americana</i>	Bird	Special Interest	Forest, woodlands, forested floodplains, and swamp	Jefferson and Belmont
Wilson's snipe	<i>Gallinago delicata</i>	Bird	Special Interest	Wet grassy or marshy areas	Belmont
Common Raven	<i>Corvus corax</i>	Bird	Special Interest	Ranges across lowland to mountain habitat, with open country to forested areas	Jefferson
Least Flycatcher	<i>Empidonax minimus</i>	Bird	Special Interest	Brushy and scrubby growth, thickets, deciduous forest edge, open second growth, and swamps	Belmont
Purple Finch	<i>Haemorhous purpureus</i>	Bird	Special Interest	Open coniferous forest, mixed forest, forest edge, open woodland, second growth, cultivated areas with trees, swamp openings, city parks, suburbs	Jefferson
Blackburnian Warbler	<i>Setophaga fusca</i>	Bird	Special Interest	Coniferous and mixed forest, open woodland, second growth	Jefferson
Magnolia Warbler	<i>Setophaga magnolia</i>	Bird	Special Interest	Hemlocks, low dense thickets of spruce and fir, overgrown clearings, swamp and pond borders	Jefferson and Belmont
Common Gallinule	<i>Gallinula galeata</i>	Bird	Species of Concern	Freshwater habitats with emergent vegetation	Belmont

Common Name	Scientific Name	Group	State Status	Habitat <sup>1</sup>	County
Bell's Vireo	<i>Vireo bellii</i>	Bird	Special Interest	Dense shrub habitat for breeding and nonbreeding seasons	Jefferson
Blue-headed Vireo	<i>Vireo solitarius</i>	Bird	Special Interest	Mixed coniferous-deciduous woodland, humid montane forest; winters in a variety of woodland types	Jefferson
River Jewlwing	<i>Calopteryx auquabilis</i>	Damselfly	Endangered	Ponds and Rivers	Belmont
Riffle Snaketail	<i>Ophiogomphus carolus</i>	Dragonfly	Endangered	Ponds and rivers	Jefferson
Goldeye	<i>Hiodon alosoides</i>	Fish	Endangered	Quiet turbid water of medium to large rivers, lakes ponds, and marshes	Jefferson
Ohio Lamprey	<i>Ichthyomyzon bdellium</i>	Fish	Endangered	Adults inhabit medium to large rivers. Larvae burrow near debris in mud bottoms of pools in creeks and small rivers	Jefferson
American Eel	<i>Anguilla rostrata</i>	Fish	Endangered	Coastal waters at juvenile lifestage. Enter rivers and spend adult life in freshwater environments before moving back to ocean to spawn	Jefferson and Belmont
Tippecanoe Darter	<i>Etheostoma Tippecanoe</i>	Fish	Endangered	Shallow gravel riffles with moderate gradient	Jefferson and Belmont
Channel Darter	<i>Percina copelandi</i>	Fish	Endangered	Warm, low and moderate gradient rivers and large creeks over sand/gravel substrates	Jefferson and Belmont
River Darter	<i>Percina shumardi</i>	Fish	Endangered	Large rivers and lower parts of tributaries. Spawn in areas of scattered rubble and clean gravel	Jefferson and Belmont
Western Banded Killifish	<i>Fundulus diaphanous menona</i>	Fish	Endangered	Slow moving water over gravel, sand, or detritus covered bottom	Belmont

Common Name	Scientific Name	Group	State Status	Habitat <sup>1</sup>	County
Paddlefish	<i>Polyodon spathula</i>	Fish	Threatened	Slow moving water of large and medium sized rivers, river margin lakes, channels, oxbows, and backwaters	Belmont
Allegheny Crayfish	<i>Faxonius obscurus</i>	Fish	Species of Concern	Clear streams with gavel bottoms	Jefferson and Belmont
Muskellunge	<i>Esox masquinongy</i>	Fish	Species of Concern	Vegetated lakes, stumpy weedy bays, pools and backwaters of creeks and small to large rivers	Jefferson and Belmont
Longnose Dace	<i>Rhinichthys cataractae</i>	Fish	Species of Concern	Clean, swiftly flowing gravel or boulder creeks and small to medium rivers	Jefferson and Belmont
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Mammal	Endangered	Spend winter in caves. Roost in caves or under tree bark and similar habitat during warmer months	Jefferson and Belmont
Smoky Shrew	<i>Sorex fumeus</i>	Mammal	Species of Concern	Damp wooded areas. Nest sites beneath stumps, logs, or rocks	Belmont
Black Bear	<i>Ursus americanus</i>	Mammal	Endangered	Forests and nearby openings. Den under fallen trees, or in tree cavities and similar structure	Jefferson and Belmont
Big Brown Bat	<i>Eptesicus fuscus</i>	Mammal	Species of Concern	Summer roosts are generally in buildings, bridges, hollow trees and spaces behind bark. Hibernate in caves, mines and buildings	Jefferson and Belmont
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	Mammal	Species of Concern	Forested areas adjacent to lakes, ponds, or streams	Jefferson and Belmont
Red Bat	<i>Lasiurus borealis</i>	Mammal	Species of Concern	Wide range of forested and semi-forested areas, including developed areas with large trees	Jefferson and Belmont
Hoary Bat	<i>Lasiurus cinereus</i>	Mammal	Species of Concern	Deciduous and coniferous forests and woodlands, including developed areas	Jefferson and Belmont
Woodland Vole	<i>Microtus pinetorum</i>	Mammal	Species of Concern	Upland wooded areas with a tuck layer of loose soil	Jefferson



Common Name	Scientific Name	Group	State Status	Habitat <sup>1</sup>	County
Little Brown Bat	<i>Myotis lucifugus</i>	Mammal	Species of Concern	Often use human made-structures for resting and maternity sites	Jefferson and Belmont
Woodland Jumping Mouse	<i>Napaeozapus insignis</i>	Mammal	Species of Concern	Deciduous and coniferous forests with herbaceous groundcover	Jefferson
Tri-colored Bat	<i>Perimyotis subflavus</i>	Mammal	Species of Concern	Forested habitats, foraging near trees and along waterways	Jefferson and Belmont
Black Sandshell	<i>Ligumia recta</i>	Mollusk	Endangered	Typically found in medium sized to large rivers with strong current and gravel/sand substrate	Jefferson
Southern Red-backed Vole	<i>Clethrionomys gapperi</i>	Mammal	Extirpated	Cool, mesic deciduous, coniferous, or mixed forest. Also found in muskegs and sedge marshes	Jefferson
Threehorn Wartyback	<i>Obliquaria reflexa</i>	Mollusk	Endangered	Large rivers with moderately strong current and stable substrates	Jefferson and Belmont
Wavy-rayed lampmussel	<i>Lampsilis fasciola</i>	Mollusk	Species of Concern	Riffle reaches of clear small to medium sized streams and rivers	Belmont
Queensnake	<i>Regina eptemvittata</i>	Reptile	Species of Concern	Only occurs where crayfish are present and abundant. Generally near streams with cover	Jefferson and Belmont
Eastern Box Turtle	<i>Terrapene carolina carolina</i>	Reptile	Species of Concern	Forests, fields, and brushy areas	Jefferson and Belmont

<sup>1</sup>Natureserve 2021

### 5.6.8 Rare, Threatened, Endangered and Special Status Botanical Species

The only known occurrence of rare, endangered, and special status (RTE) botanical species near or within the project boundary is the endangered running buffalo clover (described above in section 5.6.6).

### 5.6.9 Special Status Migratory Birds

The IPaC tool also lists migratory birds that are of particular concern, either due to status on the USFWS Birds of Conservation (BCC) list, or because they warrant special attention in a specific area. The IPaC tool identified seven migratory bird species as potentially occurring at the Project or on lands adjacent to the Project (Table 5.18) (USFWS 2021a).

**Table 5.18 USFWS IPaC Migratory Bird List with Potential to Occur at Project**

Common Name	Scientific Name	Status <sup>1</sup>
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	BCC Rangewide (CON)
Black-capped Chickadee	<i>Poecile atricapillus praticus</i>	BCC-BCR
Bobolink	<i>Dolichonyx oryzivorus</i>	BCC Rangewide (CON)
Cerulean Warbler	<i>Dendroica cerulea</i>	BCC Rangewide (CON)
Prairie Warbler	<i>Dendroica discolor</i>	BCC Rangewide (CON)
Wood Thrush	<i>Hylocichla mustelina</i>	BCC Rangewide (CON)
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	BCC-BCR

<sup>1</sup>USFWS Status: BCC Rangewide (CON) = Bird of Conservation Concern throughout its range in the continental USA and Alaska; BCC-BCR= Bird of Conservation Concern only in particular Bird Conservation Regions (BCRs) in the USX

### 5.6.10 Essential Fish Habitat

Pursuant to the amended Magnuson-Stevens Fishery Conservation and Management Act, Congress mandated that habitats essential to federally managed commercial fish species be identified, and that measures be taken to conserve and enhance habitat. The Magnuson-Stevens Act defines EFH for federally managed fish species as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. There are no current records of federally managed EFH within the project area.

### 5.6.11 References

New Hampshire Fish and Game (NHFG). 2021. Bald Eagle *Haliaeetus leucocephalus*. Information Sheet.

Ohio Department of Natural Resources (OHDNR). 2021. State Listed Species. Available online: <https://ohiodnr.gov/wps/portal/gov/odnr/discover-and-learn/safety-conservation/about-ODNR/wildlife/state-listed-species>. Accessed May 9, 2021.

United States Fish and Wildlife Service (USFWS). 2003. Running Buffalo Clover *Trifolium stoloniferum*: info sheet. 2 pp.

United States Fish and Wildlife Service (USFWS). 2007. Indiana Bat Draft Recovery Plan: First Revision. USFWS Great Lakes-Big Rivers Region- Region 3. Fort Snelling, MN.

United States Fish and Wildlife Service (USFWS). 2015. Northern Long-eared Bat Info Sheet. 2pp.

United States Fish and Wildlife Service (USFWS). 2021a. Information for Planning and Consulting (IPaC): Explore Location. Available online: Accessed May 9, 2021.

United States Fish and Wildlife Service (USFWS). 2021b. ECOS Environmental Conservation Online System: Threatened and Endangered Species. Available online: <https://ecos.fws.gov/ecp/>. Accessed May 9, 2021.

West Virginia Division of Natural Resources (WVDNR). 2021. Rare, Threatened, and Endangered Species. Available online: <http://www.wvdnr.gov/Wildlife/Endangered.shtm>. Accessed May 9, 2021.

## **5.7 Recreation and Land Use**

### **5.7.1 Existing Recreation Opportunities and land use**

The Ohio River is the center of several recreational activities available to residents of the area and visitors. The United States Army Corps of Engineers (USACE) Great Lakes and Ohio River Division manages 1.5 million acres of land and water throughout the district. This has provided attraction for recreational activities and land use. Some of the most popular activities along the Ohio River amongst the USACE-controlled projects include boating, fishing, water skiing, sight-seeing, and swimming (USACE 2021).

Most of the fishing in the Ohio River takes place along the tailwaters of dams with some anglers utilizing the islands and embayment's that offer productive fish habitat in the area. Since the ODNR has been conducting fishing surveys in 1992 and 1993, fishing use levels have remained relatively steady in the area. According to the 1992 and 1993 surveys, the ODNR estimated fishing pressure for a 491-stretch of river to be approximately 2.5 angler hours for both years. Popular game species that are fished in the area include black basses, white bass, hybrid bass, catfish, crappie, walleye and sauger (USFWS 2016).

Within the Pike Island Pool, the residential communities are more prevalent compared to other pools, but industrial features and forested lands are still present.

### **5.7.2 Existing and Future Recreation needs**

The 2018 Ohio Statewide Comprehensive Outdoor Recreation Plan (SCORP) is a recreational assessment with the intent to develop strategies to enhance the resources available in the state of Ohio (ODNR 2018). The state's most popular recreational activities were related to trail activities, as well as scenic driving, bicycling, touring historic/heritage sites and farms, and swimming. Strategic goals identified in the SCORP, related to water-based recreation, included an emphasis on rivers, lakes, and wetlands, with an emphasis on providing access and recreational opportunities related to Ohio's waters and increasing paddling opportunities.

Other activities that have become increasingly popular along the Ohio River include wildlife observation and photography. There are chartered bird watching tours available at the commercial sternwheel service. Improved environmental conditions along the Ohio River resulted in improved wildlife activity thus increasing the popularity of these recreational activities (USFWS 2016, ODNR 2018).

### **5.7.3 Park and recreation areas within the project area**

Fishing access to the tailwater of the Pike Island Project can be found off Old State Highway 7 in Yorkville, OH. There is a paved lot with two entry points and exit points and parking space for 24 vehicles. There is signage that identifies the access points, along with a grassy area, and a pathway from the park area to the edge of the river near River Mile (84). The proposed project is anticipated to impact the fishing access area; as such, the Applicant proposes to work with agencies and stakeholders to identify appropriate mitigation for impacts to the fishing access area.

### **5.7.4 Adjacent Recreation areas**

Warren Township Memorial Park is in Tiltonsville, OH located approximately one mile north of the proposed powerhouse. Features include a public swimming pool, a playground, ball courts and a parking lot.

Mazeroski Park is also in Tiltonsville, OH located 1.9 miles north of the proposed powerhouse on Hodgens Avenue. The park includes a baseball field, an open field, and a picnic area that overlooks the Ohio River.

Fairway River Links Golf Course is in Rayland and located along the river approximately two miles upstream of the proposed powerhouse. The course is located off Liberty Avenue and opened in 1928 offering 18 holes of golf year-round (GO 2021).

Rayland Marina is an area of approximately 10 acres located four miles north of the proposed powerhouse. The marina is situated at the confluence of Short Creek and the Ohio River and features a paved boat launch, docks, a camping area, a picnic area with shelters, boat storage and a parking lot (RM 2017).

Wheeling Heritage and Brooke Pioneer Trails are asphalt trails along the river across from the Project on the West Virginia side. They run for approximately 13 miles from Wheeling, West Virginia to Pike Island L&D where the Brook Pioneer Trail begins. The Brook Pioneer Train is approximately 9.7 miles of trails, with a three-mile gap near Wellsburg, West Virginia.

Plummer Field and Ruby Park are in Brooke County, West Virginia located along the river approximately five miles upstream of the Project. The field and the park intersect the Brooke Pioneer Trail.

### **5.7.5 Other Recreational sites in the Pike Island Pool**

There are other access points to the river that are located further upstream of the Project than the recreational sites listed above. On the Ohio side, there is the Brilliant Boat Club located in Wells Township approximately ten miles upstream of Pike Island. At approximately 17 miles upstream of the Project is a paved boat launch in Steubenville, and another marina is located approximately 23 miles upstream of the Project off South River Avenue in Toronto, Ohio. Approximately 24 and 25 miles upstream of the Project there is river access at Newburgh landing Marina and Driftwood Smokehouse and Marina, respectively.

On the West Virginia side there is river access approximately ten miles upstream of the Project at the Crooked Dock in Wellsburg. There is access at the Weirton Marina approximately 19 miles upstream of the Project and at the New Cumberland Firefighters Memorial Public Access site located approximately 30 miles upstream of the Project.

### **5.7.6 References**

FERC 1988: Federal Energy Regulatory Commission - Office of Hydropower Licensing: Hydroelectric Development in the Upper Ohio River Basin - Final Environmental Impact Statement, Docket No. ELSS-19-114, September 1988

GO 2021: Fairway River Links Golf Course, GolfOhio.com, Accessed July 2021  
<http://www.golfohio.com/courses/rayland/fairway-riverlinks-gc/>

RM 2017: Facilities at Rayland Marina, RaylandMarina.com, Accessed July 2021  
[http://www.raylandmarina.com/facilities\\_at\\_rayland\\_marina.htm](http://www.raylandmarina.com/facilities_at_rayland_marina.htm)

ODNR 2018: Ohio Department of Natural Resources, 2018 Ohio Statewide Comprehensive Outdoor Recreation Plan (SCORP).  
[https://ohiodnr.gov/static/documents/real-estate/2018\\_SCORP\\_Appendices.pdf](https://ohiodnr.gov/static/documents/real-estate/2018_SCORP_Appendices.pdf)

USACE. 2021. Great Lakes and Ohio River Division – Recreation. Accessed July 23, 2021.  
<https://www.lrd.usace.army.mil/Missions/Recreation/>

USFWS 2016: U.S. Fish and Wildlife Service, Ohio River Islands National Wildlife Refuge - Comprehensive Conservation Plan, Accessed July 2021.  
[https://www.fws.gov/northeast/planning/ORI\\_WEB/Chap3.htm](https://www.fws.gov/northeast/planning/ORI_WEB/Chap3.htm)

## **5.8 Aesthetic Resources**

### **5.8.1 Visual Character of the Project Vicinity**

The Pike Island Locks and Dam is one of 20 locks and dams on the Ohio River. Open water and recreation areas in this section of the Ohio River provide opportunities for boating, angling, wildlife viewing, hiking, and picnicking. The existing lock and dam development is located on the eastern side of the river, and consists of a 1,306 foot long concrete dam and two locks. The locks are a total of 1,800 feet in length.

Highway 2/Warwood Avenue parallels the river both upstream and downstream of the Project reach on the West Virginia side of the river. Residential areas are also located along this stretch of river beyond the road, although they are obscured by woodland habitat. The western side of the river, adjacent to the area of the proposed development, is adjacent to the town of Yorkville, Ohio. The residential area of town is set back from the river behind several hundred meters of forested habitat. An industrial site complex, Ohio Coatings Company, is situated on the banks of the Ohio River immediately downstream of the dam.

The only resource with a scenic designation within the Yorkville area of Jefferson and Belmont Counties is the Ohio River Scenic Byway, a scenic roadway that follows State Route 7 in this area, and encompasses the entire length of the Ohio River (ORSB 2021).

### **5.8.2 Visual Character of Project Lands and Waters**

The Yorkville community, located on the western side of the river on the same side as the proposed development site and opposite of the Pike Island locks and dam structure, would not have view of the project due to the existing buffer of riparian vegetation. The upstream community of Tiltonsville has views of the river, but this area is approximately a mile upstream of the existing lock and dam system and proposed development.

Historically, the region has centered around coal mining. The region is encompassed by the Eastern Marcellus Shale field. Pike Island Locks and Dam was a conduit for coal barges that traversed the Ohio River and its tributary rivers (ORSANCO 2015). Though scenic, the Ohio River has historically been a working river tied to energy production, as evidenced by the numerous man-made lock and dam structures throughout the drainage that facilitate navigation. Additionally, thousands of tons of industrial cargo, primarily fossil

fuels, are shipped through the Pike Island Pool daily, limiting the overall natural aesthetic value (ORSANCO 2014).

### **5.8.3 References**

Ohio River Scenic Byway (ORSB). 2021. Ohio River Scenic Byway: Unwind and Explore Ohio's Eastern and Southern Shores. Available online: <https://ohioriverscenicbyway.org/>. Accessed June 2, 2021.

Ohio River Valley Water Sanitation Commission (ORSANCO). 2014. Assessment of Ohio River Water Quality Conditions. Available online: <http://www.orsanco.org/wp-content/uploads/2016/07/2014305breport.pdf> . Accessed June 2, 2021.

Ohio River Valley Water Sanitation Commission (ORSANCO). 2015. Hydraulic Fracturing in the Ohio River Basin. Available online: <http://www.orsanco.org/wp-content/uploads/2016/12/Hydraulic-Fracturing-in-the-Ohio-River-Basin-Water-Resources-Initiative.pdf>. Accessed June 2, 2021.



## **5.9 Cultural Resources**

### **5.9.1 History of the Project Vicinity**

The Project's proposed site is located in the Villages of Yorkville and Tiltonsville, which are part of Belmont and Jefferson counties. Jefferson and Belmont counties are located in the eastern part of Ohio bordering the state line at the Ohio River. The proposed facilities would be located primarily in Ohio, situated along the western side of the Ohio River at the existing USACE-controlled Pike Island Locks and Dam. The tailrace discharges into the Ohio River at the Ohio-West Virginia border.

#### **5.9.1.1 Settling of Jefferson and Belmont Counties**

Settlers began populating Jefferson County ten years prior to its official establishment in 1797. The fur trade brought French and British travelers to the territory, yet Jefferson's first majority population was comprised of Quakers and soldiers from the American Revolution. They built homes around Fort Steuben, which was established 1786 for the purpose of surveying land and was abandoned shortly thereafter (USFWS 2016; JCCOGS 2021).

Similarly, early settlers of Belmont County were war veterans and Quakers who saw population numbers rise as groups made their way to the area via Zane's Trace, a frontier road constructed around 1797. Belmont County was established in 1801, two years prior to Ohio becoming a state (OHC 2017).

The proximity of both counties to the Ohio River was a catalyst for growth, as the River facilitated transport of goods and people and contributed to the agricultural and industrial viability of the area (USFWS 2016).

#### **5.9.1.2 History of Pike Island Locks and Dam**

Pike Island Locks and Dam is located on the Ohio River in both Ohio and West Virginia; it reaches Tiltonsville and Yorkville, Ohio on the west, and Wheeling, West Virginia on the east, where the locks are in place. The current Pike Island L&D replaced old L&Ds 10 and 11, which consisted of manually operated wooden wicket dams constructed near the beginning of the 20th century. Construction of the locks was completed in 1963, with completion of the dam following in 1965 (USACE 2017).

### **5.9.2 Historic and Archeological Sites in the Project Vicinity**

There are no identified sites utilized by local Native Americans known within the Project Boundary. For more information on Tribal Resources, refer to Section 5.11.

With respect to historical sites in the vicinity, Hodgen's Cemetery Mound (National Register Reference Number: 75001443) is located approximately 2 miles (3.2 km) outside of the proposed Project area. It is the only known historical site or district currently registered in Yorkville or Tiltonsville. The historical Native American burial mound encompasses roughly one acre of land on Arn Avenue in Tiltonsville, Jefferson County (OHPO 2015; JCCOGS 2021).

### **5.9.3 Prior Cultural Resource Investigations**

There are no known prior cultural resource investigations within the proposed FERC Project boundary.

### **5.9.4 References**

JCCOGS 2021: Jefferson County Chapter of the Ohio Genealogical Society - History of Jefferson County, Accessed July 2021.

[http://www.jeffcochapter.com/FamilyHistories/Barkhurst/Jefferson\\_County\\_History\\_2\\_.pdf](http://www.jeffcochapter.com/FamilyHistories/Barkhurst/Jefferson_County_History_2_.pdf)

Jefferson County Chapter of the Ohio Genealogical Society (JCCOGS 2021: Jefferson County Chapter of the Ohio Genealogical Society, Hodgen's Mound Cemetery.

<http://jeffcochapter.com/Townships.php?area=WarrenTownship&twp=193>

OHC 2017: Ohio History Connection - Belmont County, Accessed July 2021.

[http://www.ohiohistorycentral.org/w/Belmont\\_County](http://www.ohiohistorycentral.org/w/Belmont_County)

OHPO 2015: Ohio History Connection - State Historic Preservation Office, National Register Searchable Database. <http://nr.ohpo.org/Details.aspx?refnum=75001443>

USACE 2017: United States Army Corps of Engineers - Pike Island Locks & Dam, Accessed 5.11.17. <http://www.lrp.usace.army.mil/Missions/Navigation/Locks-and-Dams/Pike-Island-Locks-Dam/>

USFWS 2016: U.S. Fish and Wildlife Service, Ohio River Islands National Wildlife Refuge - Comprehensive Conservation Plan, Accessed July 2021.

[https://www.fws.gov/northeast/planning/ORI\\_WEB/Chap3.htm](https://www.fws.gov/northeast/planning/ORI_WEB/Chap3.htm)

## **5.10 Socioeconomic Resources**

The following section provides a summary of selected socioeconomic factors for the Project vicinity, which includes the counties of Belmont and Jefferson, the villages of Tiltonsville and Yorkville, the townships of Warren and Pease, in which the villages are located, and the state of Ohio.

### **5.10.1 General Land Use Patterns**

#### **5.10.1.1 Belmont County**

Urban development in Belmont County is mostly limited to the central north region in the city of St. Clairesville and the northeast city of Martins Ferry. The cities are the most populous in the county and the surrounding areas are for the most part rural. The total percentage of lands classified as urban (residential, commercial, industrial, transportation, and urban grasses) is approximately less than two percent of the entire county. Like many other counties in the region, Belmont has a history in the mining industry, and western portions of the county have been heavily strip mined (BCSP 2011). In 2009, the majority (69.6%) of the land in Belmont County was classified as forested land. Approximately 10% of total lands in the county consist of low- and high-density developments for residential, industrial, or commercial purposes, and over 27% is agricultural. Agricultural lands are identified as being either croplands (14.9%) or pasture (12.9%) (BCSP 2011).

#### **5.10.1.2 Jefferson County**

Jefferson County is most densely populated in Steubenville, located in the eastern central part of the County along the Ohio River. Steubenville offers a mix of commercial, residential, and industrial uses within its urban development. To the west, north, and south of the city, forested and agricultural lands are most prominent. Land use in Jefferson is approximately 75.9% forested and 30% agricultural. The County Auditor estimated in 2013 that more than 45% of Jefferson County's 259,809 acres were vacant, with the remaining 25% distributed amongst residential parcels (28,823 acres), government owned lands Pre- (12,436 acres), industrial usage (9,418 acres), commercial properties (6,098 acres), and nonprofit organizations (2,199 acres) (JCBC 2013).

Population and employment numbers have been unstable over the past several decades in Jefferson and Belmont counties. The industrial landscape in the area has been changing. The diminishing steel industry has made way for the potential expansion of natural gas extraction in Jefferson. Also expanding are business corridors leading west out of

Steubenville, as development increases in response to improvements made to U.S. highways and state routes (JCBC 2013).

## **5.10.2 Population Patterns**

### **5.10.2.1 Belmont County**

Data from the United States Census Bureau from 2019 reports that an estimated 67,006 people were living in Belmont County. Belmont has endured a consistent drop in population; in 1960, the population was 83,684. Population in the County has an average density of 125.9 people per square mile (USCB 2019).

### **5.10.2.2 Jefferson County**

Surveys conducted by the United States Census Bureau in 2019 report that an estimated 65,325 people were residing in Jefferson County. Population estimates for 2019 reveal a further 0.687% decrease in residents within one year. The average population density of Jefferson County is rated as high, with 160.1 people per square mile (Census Reporter 2021).

### **5.10.2.3 Village of Tiltonsville**

The 2019 population of Tiltonsville is estimated to be 1,406 and has increased 1.5% from the previous year. Data USA 2021a).

## **5.10.3 Household/Family Distribution and Income**

### **5.10.3.1 Belmont County**

In 2019 dollars, the annual per capita personal income for Belmont County was \$27,609, below the State of Ohio's per capita personal income of \$32,780. In 2019, Belmont County had 25,651 households with an average household size of approximately 2.5 individuals. In 2019, Belmont County reported 10.2% of their residents living below the poverty level, slightly below the state average of 13.1%. Approximately 90.6% of the adults age 25 and older in Belmont County had an education attainment of high school graduate or higher, while 16.9% held bachelor's degrees or higher (Census Reporter 2021a).

### **5.10.3.2 Jefferson County**

In 2019, Jefferson County had 27,515 households and an average household size of approximately 2.3 individuals. Jefferson County residents had an annual per capita income

of \$25,958 in 2019, lower than the \$32,780 average per capita income of Ohio. In 2019, Jefferson County reported 17.3% of their residents living below the poverty level, higher than the state average of 13.1%. Of residents 25 and older in Jefferson, 93.1% had an education attainment of high school graduate or higher, with 19% obtaining bachelor's degrees or higher (Census Reporter 2021b).

### **5.10.3.3 Village of Tiltonsville**

In 2019, the Village of Tiltonsville had an average household size of approximately 2.24 individuals. Tiltonsville residents had a median household income of \$33,125 in 2019. The village had reported 19% poverty rate which was higher than the state average of 13.1% (Data USA 2019a)

## **5.10.4 Project Vicinity Employment Sources**

### **5.10.4.1 Belmont County**

The economy of Belmont County, OH employs approximately 29,000 people. The largest industries in Belmont County are Health Care & Social Assistance (5,038 people), Retail Trade (3,839 people), and Manufacturing (2,636 people), and the highest paying industries are Mining, Quarrying, & Oil & Gas Extraction (\$80,060), Agriculture, Forestry, Fishing & Hunting, & Mining (\$74,190), and Utilities (\$72,660) (Data USAb).

### **5.10.4.2 Jefferson County**

The economy of Jefferson, OH employs 1.51k people. The largest industries in Jefferson, OH are Manufacturing (354 people), Health Care & Social Assistance (316 people), and Accommodation & Food Services (144 people), and the highest paying industries are Public Administration (\$63,141), Manufacturing (\$38,000), and Educational Services (\$35,972) (Data USAc).

## **5.10.5 References**

BCSP 2011: Belmont County Economic Development Strategy, May 2011. Accessed July 23, 2021. <http://belmontcountycommissioners.com/wp-content/uploads/2015/06/StrategicPlan2011.pdf>

Census Reporter. 2021a. Belmont County, OH. Accessed July 23, 2021. <https://censusreporter.org/profiles/05000US39013-belmont-county-oh/>

Census Reporter. 2021b. Jefferson County, OH. Accessed July 23, 2021. <https://censusreporter.org/profiles/05000US39081-jefferson-county-oh/>

Data USA. 2021a. Tiltonsville, OH. Accessed July 23, 2021.

<https://datausa.io/profile/geo/tiltonsville-oh>

Data USA. 2021b. Belmont County, OH. Accessed July 23, 2021.

<https://datausa.io/profile/geo/belmont-county-oh#economy>

Data USA. 2021c. Jefferson County, OH. Accessed July 23, 2021.

<https://datausa.io/profile/geo/jefferson-county-oh#economy>

Jefferson County Board of Commissioners (JCBC) 2013: Jefferson County Ohio Land Use Plan, October 2013. Accessed July 23, 2021.

<http://rpc.jeffersoncountyoh.com/LinkClick.aspx?fileticket=hOc0iHyJKPY%3D&tabid=95&mid=435>

United States Census Bureau (USCB). 2021. QuickFacts, Belmont County, Ohio. Accessed July 23, 2021. <https://www.census.gov/quickfacts/belmontcountyohio>

## **5.11 Tribal Resources**

### **5.11.1 Tribal Resources**

#### **5.11.1.1 Tribal Lands and Interests**

There are no federally recognized tribes or reservations in the state of Ohio. As such, the Applicant is not aware that the Project affects any Native American lands, known Native American traditional cultural properties or religious properties, or National Register-eligible or -listed sites associated with Native American Nations within the Project boundary. However, the Applicant has identified the following tribes as having potential interest in the project:

- Absentee-Shawnee Tribe of Indians of Oklahoma
- Delaware Nation
- Delaware Tribe of Indians
- Eastern Shawnee Tribe of Oklahoma
- Seneca-Cayuga Tribe of Oklahoma
- Shawnee Tribe
- Osage Nation Historic Preservation Office
- Miami Tribe of Oklahoma
- Seneca Nation of Indians
- Tonawanda Band of Seneca

#### **5.11.1.2 Identification and Consultation with Tribes**

Consultation conducted as part of a 2017 proposal to develop the Pike Island Locks and Dam noted that the previous proposal would not endanger cultural or religious sites of interest to the Delaware Nation. During the previous consultation, the Delaware Nation stated: "After having reviewed the information provided for this location, on behalf of the Delaware Nation, please continue with the project as planned, keeping in mind during construction should an archaeological site or artifacts inadvertently be uncovered, all construction and ground disturbing activities should immediately be halted until the appropriate state agencies, as well as this office, are notified (within 24 hours), and a proper archaeological assessment can be made." (Delaware 2016, as cited in Young 2017).

### **5.11.1.3 Protection and Mitigation**

As part of the licensing process, the Applicant would consult with SHPO and Tribes under Section 106 of the National Historic Preservation Act. The defined APE is currently considered to be the Project Area; however, this can be refined based on consultation with SHPO, Tribes, and other interested parties. Qualified cultural resources consultants would work to identify locations requiring a comprehensive cultural resources survey. The Applicant would consult with SHPO, Tribes, and other interested parties throughout the licensing process regarding inventory needs as well as appropriate measures for protection and/or mitigation of identified cultural and/or Tribal resources.

### **5.11.2 References**

Delaware 2016: The Delaware Nation, consultation communication, as cited in Young Energy Services. 2017. Pre-Application Document Volume 1.

Ohio History Connection. 2021. Online: <https://www.ohiohistory.org/learn/american-indian-relations/federally-recognized-tribes>. Accessed July 28, 2021.



## **6.0 PRELIMINARY LISTING OF POTENTIAL ISSUES, INFORMATIONAL NEEDS, AND MITIGATION BY RESOURCE**

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### **6.1 Preliminary Issues by Resource**

#### **6.1.1 Geology and Soils**

Geology and soils in the Project area have been presented in this PAD. The geology and soils in the vicinity of the Project are well-known and will be addressed in the 408 process.

#### **6.1.2 Water Resources**

The Applicant is committed to maintaining dissolved oxygen (DO) downstream and will investigate alternatives when flows are within the operational range of the Project. Alternatives may include an air injection system or minimum flows over the Dam gates as ways of providing suitable DO below the Project to meet state water quality standards.

The USACE maintains the pool elevation to allow for a depth suitable for navigation, Pike Island Energy will not have the ability or authority to operate in anything but run-of-river mode. The USACE determines the total discharge flow from the Dam, and Pike Island Energy will use a portion of that flow for generation.

#### **6.1.3 Fish and Aquatic Resources (Including T&E Species)**

Fish can pass both upstream and downstream through the existing lock chambers at Pike Island. Minimum flow would be released in the Project's tailrace area to maintain recreational fishing activities and protect aquatic habitats when the Project is shut down. For trash racks Pike Island Hydropower Corporation will consider alternatives, recognizing that implementation of the USFWS standard would result in unacceptable head loss for this type of project. Alternatives will be discussed with the USFWS and other Stakeholders, including angled trash racks with access to the bypass channel. Smaller fish are expected to pass safely through the bulb turbines while larger fish would be diverted by the trash racks. USFWS expressed concern for future upstream and downstream American eel passage. Pike Island Hydropower Corporation will consider eel passage when evaluating trash racks and bypasses as part of the Project design.

FERC's policy regarding the need for entrainment studies and compensation, particularly for the Ohio River area projects, has evolved over the past few years. In

response to the New Martinville case, FERC has deleted any requirement for compensation for game or non-game fish (bucks for fish) and found that “entrainment mortality that has no appreciable impact of fish populations can hardly be characterized as ‘losses’ to the fishery”, thus limiting any need for entrainment studies on rivers like the Ohio River.

With respect to water quality, Pike Island Hydropower Corporation will make efforts to maintain an instantaneous minimum DO level of 4.0 mg/L, and average DO minimum 5.0 mg/L per day at all times during April 15 – June 15 spawning season. Other target DO levels for optimum habitat and growth, as well as water quality monitoring and modeling, will be considered and discussed. The design of the Project may include an air injection system that will allow for dissolved oxygen to meet state water quality standards.

#### **6.1.4 Wildlife Resources (Included T&E Species)**

The proposed Project footprint is small and restricted to the Ohio side of the River at the western end of the USACE dam and transmission line. However threatened and endangered wildlife habitat or species do have the potential to occur within the Project boundary. The FERC Project area will be surveyed for wildlife resources and habitats. However considering the small Project area, significant impact on the wildlife resources is not anticipated. If needed, appropriate measures will be taken to mitigate impacts before construction activities commence.

#### **6.1.5 Botanical Resources (Including T&E Species and Riparian, Wetland and Littoral Habitat Resources)**

The footprint of the proposed Project is small and restricted to the Ohio side of the River at the western end of the USACE dam and transmission line. Threatened and endangered botanical habitat or species have the potential to occur within the Project boundary thus the Project area will be surveyed for botanical resources and habitats. Considering the size of the Project area significant impacts on botanical resources is not expected.

The Project will use a portion of the flow available from the existing USACE project and will not affect any floodplains, wetlands, riparian or littoral habitats. The only exceptions would occur in the area of the actual powerhouse and intake, and the area immediately downstream of the Project. If needed, appropriate measures will be taken to mitigate impacts before construction activities commence.

### **6.1.6 Recreation and Land Use**

Access to fishing is provided at the western end of the USACE L&D, as well as immediately downstream of USACE facility.

### **6.1.7 Aesthetic Resources**

Aesthetic Resources in the area appear to be limited and are not expected to be impacted by the Project.

### **6.1.8 Cultural and Tribal Resources**

Cultural resources in the area appear to be limited; however, cultural resources clearance will be conducted.

### **6.1.9 Socioeconomic Resources**

The Project is expected to have limited socioeconomic effect.

## **6.2 Applicant Proposed Studies and Information Gathering Needs by Resource**

The following list of potential studies is based upon a review of existing information relevant to the proposed Project and upon previous agency consultation. Additional studies and/or changes to studies may be required based upon additional consultation. Unless otherwise noted, study plans would be submitted for review and comment by stakeholders prior to the start of studies, and study results submitted for review and comment by these same stakeholders following study implementation.

### **6.2.1 Fish Assemblage Surveys**

In place of conducting traditional netting study, the Applicant proposes to conduct an environmental DNA (eDNA) sampling. Sampling is proposed for mid to late summer when flows are lower and young-of-year fish will be present. eDNA is a sampling method for detecting aquatic species which can provide a measure of species presence, abundance, and distribution without having to collect the fish. Fish release DNA into their environment via slime, scales, epidermal cells, gametes, or feces. eDNA is non-invasive, less costly, and faster method to monitor fishes. The method has been shown to identify a greater diversity of the species by capturing organisms which can be under-represented in traditional surveys. eDNA sampling can be used to detect for presence of ESA-listed species and invasive species detection. The detection of vertebrates using eDNA in water samples was first demonstrated in 2008, and since then 63 studies published between

2012 and 2020 found 90% identified positive relationships between eDNA concentrations and abundance of the target species. The ODNR and the ORSANCO collects data and maintains a database on fish abundance and distribution in the area. These data will be used to develop a list of fish species found in the area. The list will be used to ensure that the eDNA lab has markers for these species. The data will also be used to determine relative abundance.

### **6.2.2 Fish Protection and Upstream and Downstream Passage Studies**

The Applicant will conduct a desktop fish entrainment study. This study will describe the physical characteristics of the proposed project that may influence fish impingement and entrainment rates, including the intake location and dimensions; the velocity distribution in front of the intake structure; and the clear spacing between trash rack bars. Next, current, and future routes for fish movement past the dam and the risks of injury or mortality for each will be identified, taking into consideration seasonality of movement, flow direction and velocity, and current and future flow management regimes. The analysis will identify individual species and guilds/groups for factors that may influence their vulnerability to entrainment and mortality. The assessment will include the potential for fish impingement, estimate entrainment rates, estimate turbine passage survival rates.

### **6.2.3 Freshwater Mussel Surveys**

The objective of a freshwater mussel study is to determine the locations of any mussel beds or federally listed mussels to better assess the potential for impacts to federally listed mussel species and their habitats. It will be determined if they would potentially be affected by the Project or if any mussels should be relocated. The survey will be conducted by an approved mussel surveyor using approved survey protocols. The area to be surveyed will include the APE.

### **6.2.4 Water Quality Study**

Baseline water quality studies will be conducted to augment available water temperature and dissolved oxygen (DO) data. Monitoring will occur on a continuous basis for one year prior to construction to establish baseline conditions and to generate water quality data that will be used to further document existing conditions. One water quality logger will be placed above the dam, one below the dam in the APE and a third 1 mile downstream from the dam. In addition, monthly sampling of other parameters such as pH, turbidity, and conductivity will be included before and during the construction period to track and manage turbidity, sedimentation, and other potential changes in water quality which

might adversely affect water quality downstream of the Project. DO and water temperature data will be collected from the project intake and tailrace areas.

### 6.2.5 Aquatic Habitat Study

A habitat field survey is proposed to delineate lentic aquatic littoral and demersal habitat in terms of substrate and cover. The purpose of the study is to map the distribution and abundance of lentic aquatic habitat within the Project impoundment, and evaluate the types of aquatic habitats that occur there. The Applicant proposes to map the distribution and abundance of littoral aquatic habitat within the APE. Major habitat and shoreline types will be delineated. The data will then be used to evaluate project effects on aquatic resources in the area. Habitat suitability is defined primarily by substrate, cover, and depth. Each of these habitat parameters will be assigned specific attributes to be used for field delineation. These will generally include:

- **substrate:** fines (sediment, organic detritus, mud etc.), sand, gravel, cobble, boulder, bedrock, rubble
- **cover type:** object cover (i.e. boulder, woody debris, riprap, etc.), overhead cover (overhanging limbs, structures, etc.); vegetative cover (emergent, submergent)
- **cover density:** absent, low, moderate, high
- **depth (at normal pool):** surface to substrate (ft)

Delineation of the habitat will be conducted by boat and will occur during summer during a period of relatively stable impoundment levels so that aquatic vegetation is established, and so that observations of depth relative to substrate and cover can be observed under consistent conditions.

Habitat delineation will be conducted by a boat traveling through the littoral zone parallel to shore. The field crew will traverse the littoral zone parallel to shore, methodically recording habitat attributes and geo-referencing with GPS each boundary where a pronounced change in substrate and/or depth occurs. Upon completion of the survey, all data will be rechecked for quality control and archived. Geospatial mesohabitat data will be transferred to a GIS format and used to develop both visual maps depicting distribution as well as tabular information quantifying the abundance and distribution of habitat features in the study area. A summary report will provide a narrative discussion of habitat use by aquatic fish and macroinvertebrates native to the study area.

### **6.2.6 Terrestrial Habitat and RTE Plant Species Study**

A field study will be conducted to describe and document plant communities within affected Project areas, general wildlife habitat types and conditions, and the location and extent of RTE and invasive plant species in the APE. The goals of this study are to develop a comprehensive plan to control the spread of invasive plant species throughout the proposed Project study area and to establish baseline environmental conditions that would maximize the effectiveness of restoration efforts following ground disturbance.

### **6.2.7 Wetlands and Waters Delineation**

The Applicant proposed to conduct a field study is to document the location and extent of jurisdictional wetlands/waters of the US within the Project study area including all areas that may be temporarily or permanently displaced during construction and/or operation in the APE. All jurisdictional wetlands within the United States are regulated by USACE and the USEPA. Completion of wetland surveys would aid the Applicant in designing Project features that would minimize impacts on jurisdictional wetlands/waters of the US and inform the design of appropriate mitigation if necessary. The study will also seek to advance the gathering of information needed to support the USACE 404 process.

### **6.2.8 Recreational Resources**

The Applicant will consult with state and local governments and appropriate interests to better ascertain recreational conditions, future plans and potential Project impacts as well as opportunities to facilitate recreation in the Project Area. The Applicant would consult throughout the licensing process regarding recreation needs as well as appropriate measures for protection and/or mitigation of identified recreational resources.

### **6.2.9 Cultural Resources**

The Applicant proposes to assess the effects of construction and Project operations, if any, on historic properties, including archaeological resources and above-ground structures. The objective of this study is to determine potential construction or operational impacts the proposed hydroelectric project could have on Cultural Resources. The Applicant will define an area of potential effect (APE) in consultation with SHPO and Tribal parties. Upon establishment of an APE, qualified cultural resources consultants will work to identify locations within the project area requiring a Phase 1 cultural resources survey. The Applicant will consult with SHPO and Tribes throughout the licensing process

regarding inventory needs as well as appropriate measures for protection and/or mitigation of identified cultural resources.

### **6.2.10 Socioeconomics**

No socioeconomic studies are proposed beyond analysis and evaluation of existing available information. No specific issues identified at this time. Information from other studies proposed herein can be utilized to assess effect, if any, of the Project on these resources.

### **6.2.11 Tribal Resources**

As part of the licensing process, the Applicant would consult with SHPO and appropriate Tribal interests in accordance with requirements of Section 106 of the National Historic Preservation Act. The Applicant would consult with SHPO and Tribes throughout the licensing process regarding inventory needs as well as appropriate measures for protection (and/or mitigation) of identified cultural and/or Tribal resources

## **6.3 Relevant Resource Management Plans**

The Project is situated on the West Virginia side of the Ohio River and will use the USACE New Cumberland Dam which spans the river, so consideration of Ohio planning goals is also important. The Commission's Library of Comprehensive Plans contains 23 Plans for West Virginia and 12 Plans for Ohio. Each plan is listed separately with a brief explanation for its inclusion as an applicable qualifying comprehensive plan, beginning with those plans listed for West Virginia and following with those listed for Ohio.

### **6.3.1 Relevant Qualifying Federal and State or Comprehensive Waterway Plans of West Virginia**

1. Atlantic States Marine Fisheries Commission. 2000. Interstate Fishery Management Plan for American eel (*Anguilla rostrata*). (Report No. 36). April 2000.
  - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a species not present in the proposed Project's waterway.
2. Forest Service. 1993. George Washington National Forest revised land and resource management plan. Department of Agriculture, Harrisonburg, Virginia. •
  - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the Project is not located.

3. Forest Service. 1988. Monongahela National Forest land and resource management plan. Department of Agriculture, Elkins, West Virginia. June 1988. •
  - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the Project is not located.
4. National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.
  - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the Project is not located.
5. National Park Service. 2013. Chesapeake Bay public access plan. Annapolis, Maryland. January 2013.
  - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the Project is not located.
6. Ohio River Basin Commission. 1978. Upper Ohio main stem comprehensive coordinated joint plan. Cincinnati, Ohio. January 1978.
  - The Applicant has determined that this Plan is no longer relevant to the proposed Project because it is out of date.
7. Ohio River Basin Commission. 1978. Middle Ohio main stem comprehensive coordinated joint plan. Cincinnati, Ohio. January 1978.
  - The Applicant has determined that this Plan is no longer relevant to the proposed Project because it is out of date.
8. Ohio River Basin Commission. 1977. Kanawha River Basin comprehensive coordinated joint plan. Cincinnati, Ohio. July 1977.
  - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the Project is not located.
9. Ohio River Basin Commission. 1977. Big Sandy & Guyandotte River Basins comprehensive coordinated joint plan. Cincinnati, Ohio. January 1977.
  - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the Project is not located.
10. U.S. Fish and Wildlife Service. n.d. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.
  - Fisheries USA is the recreational fisheries policy of the USFWS. The policy is committed to the objectives of usability, sustainability, and action and defines the USFWS's stewardship role in management of the nation's recreational fishery resources.
  - The USFWS's goals include the following: ensure and enhance the quality, quantity, and diversity of the recreational fishing opportunities; develop and enhance partnerships between governments and the private sector for



conserving and managing recreational fisheries; cooperate to maintain a healthy recreational fisheries industry.

- The Project will not conflict with the Fisheries USA policy and the goals of the USFWS with respect to recreational fishing opportunities. The Applicant is committed to working in cooperation with the USFWS and West Virginia to design its Project to avoid or mitigate significant effects on recreational fishing opportunities. The Applicant will evaluate potential projects effects on existing fishing opportunities in the Project Area during the development of its RRMP.
11. West Virginia Department of Natural Resources. 1976. Wildlife Resources Division strategic plan, 1975-1985. Charleston, West Virginia.
    - The Applicant has determined that this Plan is no longer relevant to the proposed Project because it is out of date.
  12. West Virginia Department of Natural Resources. 1977. Today's plan for tomorrow's wildlife: a strategic plan for fish, game, and nongame management, 1975-1985. Charleston, West Virginia.
    - The Applicant has determined that this Plan is no longer relevant to the proposed Project because it is out of date.
  13. West Virginia Department of Natural Resources. 1982. Little Kanawha River Basin plan. Charleston, West Virginia.
    - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
  14. West Virginia Department of Natural Resources. 1983. Greenbrier River Basin plan. Charleston, West Virginia.
    - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
  15. West Virginia Department of Natural Resources. 1983. New River Basin plan. Charleston, West Virginia.
    - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
  16. West Virginia Department of Natural Resources. 1984. Elk River Basin plan. Charleston, West Virginia.
    - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
  17. West Virginia Department of Natural Resources. 1984. Gauley River Basin plan. Charleston, West Virginia.

- The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
18. West Virginia Department of Natural Resources. Soil Conservation Service of the Department of Agriculture. 1985. Lower Kanawha River Basin, Volume III: problems, concerns, alternative solutions, and a suggested plan. Charleston, West Virginia.
    - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
  19. West Virginia Department of Natural Resources. 1986. Big Sandy River Tug Fork Basin plan. Charleston, West Virginia.
    - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
  20. West Virginia Department of Natural Resources. 1987. Guyandotte River Basin plan. Charleston, West Virginia.
    - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
  21. West Virginia Department of Natural Resources. 1988. Ohio River Basin plan. Charleston, West Virginia.
    - Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
  22. West Virginia Governor's Office of Community and Industrial Development. West Virginia State Comprehensive Outdoor Recreation Plan (SCORP): 1982-1992. Charleston, West Virginia.
    - The Applicant has determined that this Plan is no longer relevant to the proposed Project because it is out of date. [Note that the updated plan is referenced in Section 7.2]

### **6.3.2 Relevant Qualifying Federal and State or Comprehensive Waterway Plans of Ohio**

1. Environment Canada, U.S. Environmental Protection Agency, Ohio Environmental Protection Agency, et al. 2004. Lake Erie LaMP (Lakewide Management Plan) Report. April 2004.
  - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
2. National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.

- The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the Project is not located.
3. Ohio Department of Natural Resources. 1991. Statewide river inventory. Columbus, Ohio. August 1991.
    - The Applicant has determined that this Plan is no longer relevant to the proposed Project because it is out of date.
  4. Ohio Department of Natural Resources. Ohio Statewide Comprehensive Outdoor Recreation Plan (SCORP): A plan for the future. Columbus, Ohio. July 2003.
    - The Applicant has determined that this Plan is no longer relevant to the proposed Project because it is out of date.
  5. Ohio Department of Natural Resources. 2004. Boating on Ohio Waterways Plan. Columbus, Ohio. May 2004.
    - The Applicant has determined that this Plan is no longer relevant to the proposed Project because it is out of date.
  6. Ohio Environmental Protection Agency. 1995. Cuyahoga River remedial action plan. Twinsburg, Ohio. November 1995.
    - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
  7. Ohio Environmental Protection Agency. 2003. Total Maximum Daily Loads for the Lower Cuyahoga River. Twinsburg, Ohio. September 2003.
    - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
  8. Ohio River Basin Commission. 1978. Upper Ohio main stem comprehensive coordinated joint plan. Cincinnati, Ohio. January 1978.
    - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
  9. Ohio River Basin Commission. 1978. Middle Ohio main stem comprehensive coordinated joint plan. Cincinnati, Ohio. January 1978.
    - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.

10. Ohio River Basin Commission. 1976. Muskingum River Basin comprehensive coordinated joint plan. Cincinnati, Ohio. October 1976.
  - The Applicant has determined that this Plan is not relevant to the proposed Project because it pertains to a geographical area in which the proposed Project is not located.
11. U.S. Fish and Wildlife Service. 1988. The Lower Great Lakes/St. Lawrence Basin: A component of the North American waterfowl management plan. December 29, 1988
  - The objective of The Lower Great Lakes/St. Lawrence Basin Joint Venture is to deliver a full spectrum of bird conservation through regionally based, biologically driven, landscape-oriented partnerships.
  - The proposed Project will involve the construction and operation of a powerhouse located at the existing lock and dam. The Project will be operated as run-of-river and, as such, no appreciable change in water levels are anticipated outside the immediate area of the intake, tailrace, and dam apron. There will be localized changes in flow velocities and direction in the river upstream and downstream of the dam, which could affect wetlands used as waterfowl habitat, if any occur in close proximity to the existing lock and dam. The Applicant will be developing a hydraulic model for the Project in order to determine the APE. If any wetlands are located within the APE, the extent of any changes to hydraulic conditions in these tributaries will be addressed in that modeling. In addition, the APE will determine the study areas for any resource studies conducted in association with this licensing. Any wetlands potentially affected by hydraulic changes will be included in those studies.

### **6.3.3 Additional Resource Plans for Applicant's Proposed Project on the Ohio River**

In conducting its research and outreach to identify relevant Comprehensive Plans, the Applicant has attempted to identify additional plans which may be relevant to the proposed project as Resource Plans, but which have not been certified by the Secretary of the Commission as Comprehensive Plans.

1. Statewide Comprehensive Outdoor Recreation Plan-SCORP- State of West Virginia. 2015- 2020. West Virginia Development Office ([www.wvcommerce.org/scorp](http://www.wvcommerce.org/scorp))53
  - The goal of the SCORP is to guide outdoor recreation land acquisition, facility development, programming, and management and to encourage healthy lifestyles in West Virginia.

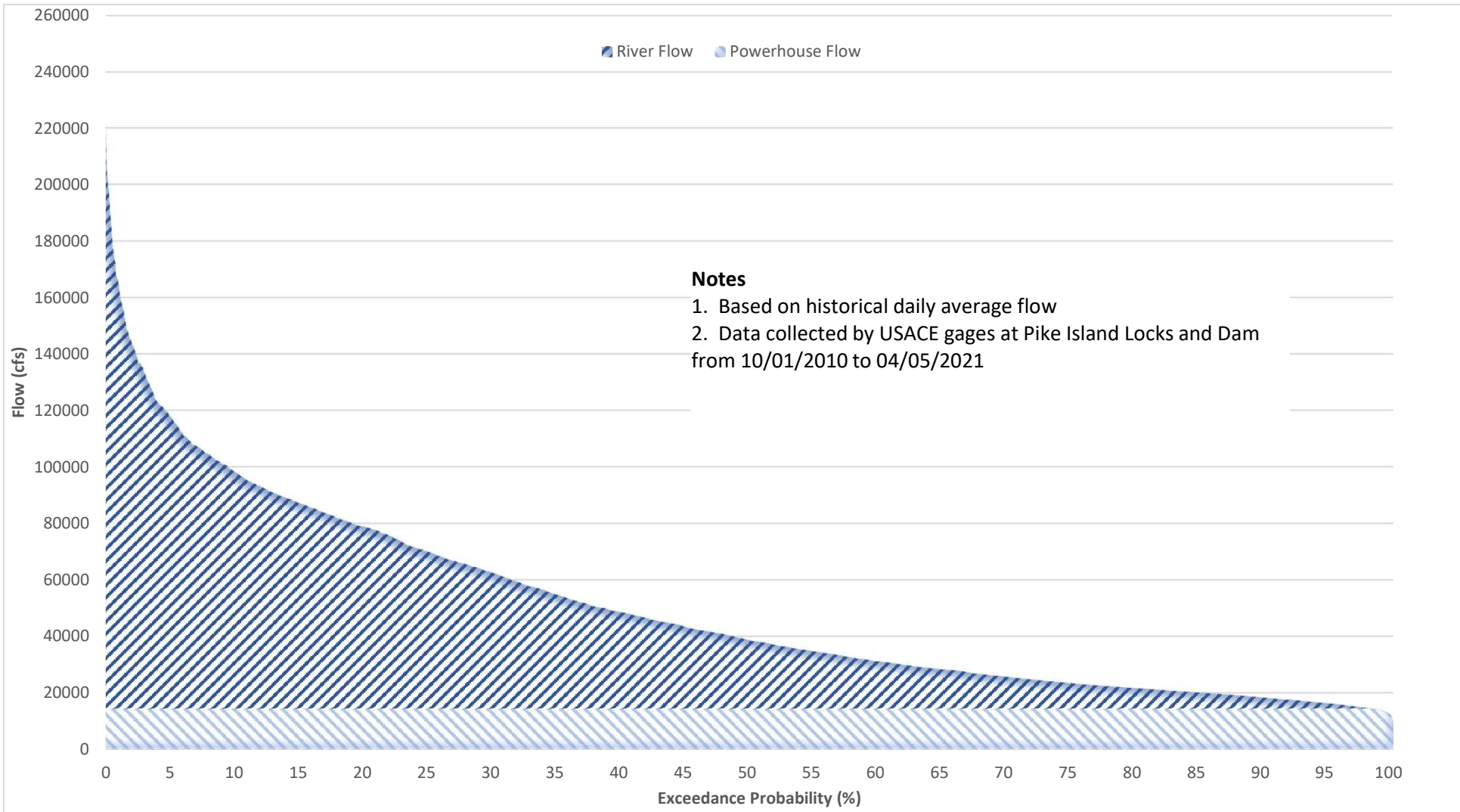
- The Applicant will work in cooperation with West Virginia Development Office to ensure that the Project will be consistent with the objectives and recommendations of the 2015- 2020 West Virginia SCORP. The Applicant will evaluate potential project effects on existing recreational opportunities in the Project area during the development of its RRMP.
2. Ohio Department of Natural Resources. Ohio Statewide Comprehensive Outdoor Recreation Plan (SCORP). A plan for the future. Columbus, Ohio 2013
    - The goal of the SCORP is to guide outdoor recreation land acquisition, facility development, programming, and management and to encourage healthy lifestyles in Ohio.
  3. West Virginia Department of Natural Resources 2015. Division of Natural Resources Proposed State Wildlife Action Plan.
    - The plan is under development and will be a roadmap that will guide the agency and partners in making future habitat conservation recommendations in West Virginia<sup>54</sup>.
    - The Applicant has consulted with the DNR.
  4. Ohio Department of Natural Resources. 2004. Boating on Ohio Waterways Plan. Columbus, Ohio. 2011-2015.
    - The plan focuses on promoting recreational boating.
    - The Applicant will work in cooperation with recreational boating goals

**APPENDIX A**  
**AGENCY CONSULTATION**

Date	Project	Agency / Stakeholder	Agency/ Stakeholder Participants	Other participants	Type of Consultation	Summary of Consultation
1/5/2021	Pike / NC	USFWS	Richard McCorkle	Current Hydro	Informal Phone Call	Discussed potential development of two 20 MW projects at the Pike Island and New Cumberland Locks and Dams, designed for a low design-flow with high-capacity factor. Discussed concerns the USFWS might have with such a proposal.
1/8/2021	Pike / NC	Kleinschmidt	Laura Cowan and Chris Tomichek	Current Hydro	Phone Calls and Email Exchanges	Partnership in licensing efforts and proposed study plan. Continuing engagement since January 2021.
6/23/2021	Pike / NC	USFWS	Richard McCorkle, Janet Norman	Current Hydro, Chris Tomichek (Kleinschmidt)	Informal Virtual Meeting	Applicant presented draft of proposed Study Plan (as attached to PAD), specifically discussing mussel survey, the use of eDNA to identify full assemblage in combination with ORSANCO data to estimate relative abundance, water quality study, American Eel, and definition of area of potential effect.
6/24/2021	Pike / NC	USFWS	Richard McCorkle	Current Hydro	Informal Phone Call	10-minute discussion of USFWS Qualified Freshwater Mussel Surveyors: <a href="https://www.fws.gov/northeast/pafo/pdf/Mussel_qualified_00082020.pdf">https://www.fws.gov/northeast/pafo/pdf/Mussel_qualified_00082020.pdf</a>
5/7/2021	NC	Norfolk Southern Railroad	Laura Hoag, Jason Wazelle, Scott Plum	Current Hydro	Email Outreach, Virtual Meeting	Since 5/7/21 we had multiple email exchanges about right-of-way, property boundary, and the frequency and type of railroad traffic on that stretch on the WV side of the Ohio River near New Cumberland Locks and Dam.
6/29/2021	Pike / NC	Edge Engineering & Science	Casey Swecker		Informal Phone Call	Mr. Swecker is USFWS Qualified Freshwater Mussel Surveyor. Since 6/29/21: Discussion of a practicable approach to a Mussel Survey and Aquatic Habitat Study in the vicinity of both projects.
3/11/2021	NC	USACE	Julia Butzler	Joel Herm	Phone Calls and Email Exchanges	Since March 2021 multiple exchanges in regard to USACE As-builts, tech sharing agreement, security clearances for site visits, maps and drawings. Further requests for environmental studies conducted by the Corps.
6/25/2021	NC	Bureau of Indian Affairs	Eastern Regional Office	Jan Borchert	Email Outreach	Informal request for support in identifying Tribal Nations affected by the project.
7/20/2021	Pike	USFWS	Richard McCorkle	Jan Borchert	Informal Phone Call	10-minute discussion of permitting plan and proposed use of TLP
7/22/2021	NC	Norfolk Southern Railroad	Jason Wazelle, Scott Plum	Jan Borchert	Informal Virtual Meeting	Short description of our project proposal and associated questions: RR ownership, potential private crossing and electric cables to pass under RR tracks.
1/13/2021	Pike / NC	FERC	John Smith and Janet Hutzel	Current Hydro	Informal Virtual Meeting	The applicant and FERC have been discussing coordination within FERC to manage both New Cumberland & Pike.

**APPENDIX B**  
**FLOW DURATION CURVES**





## Pike Island Locks and Dam

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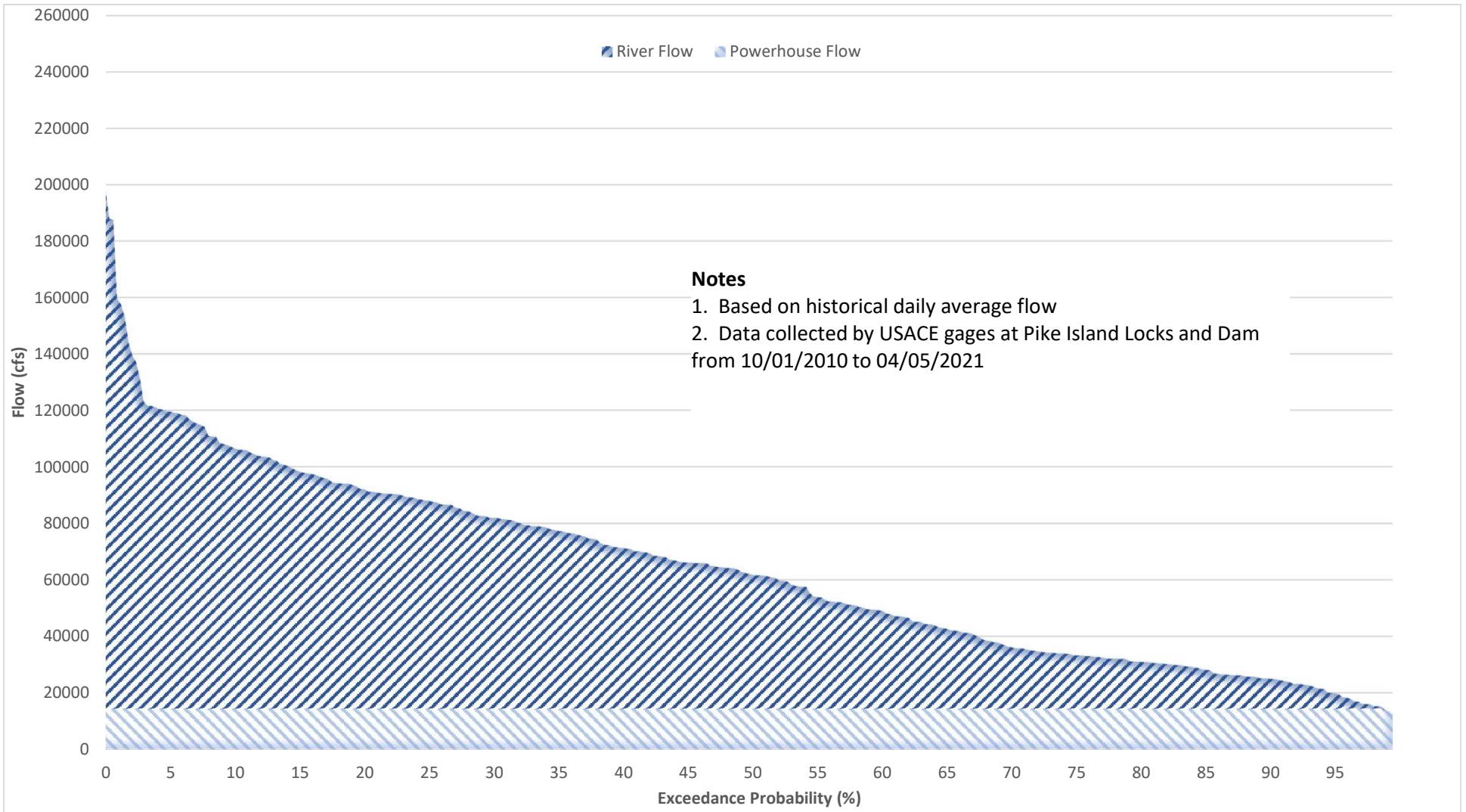


CURRENT HYDRO

## Figure 2: Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



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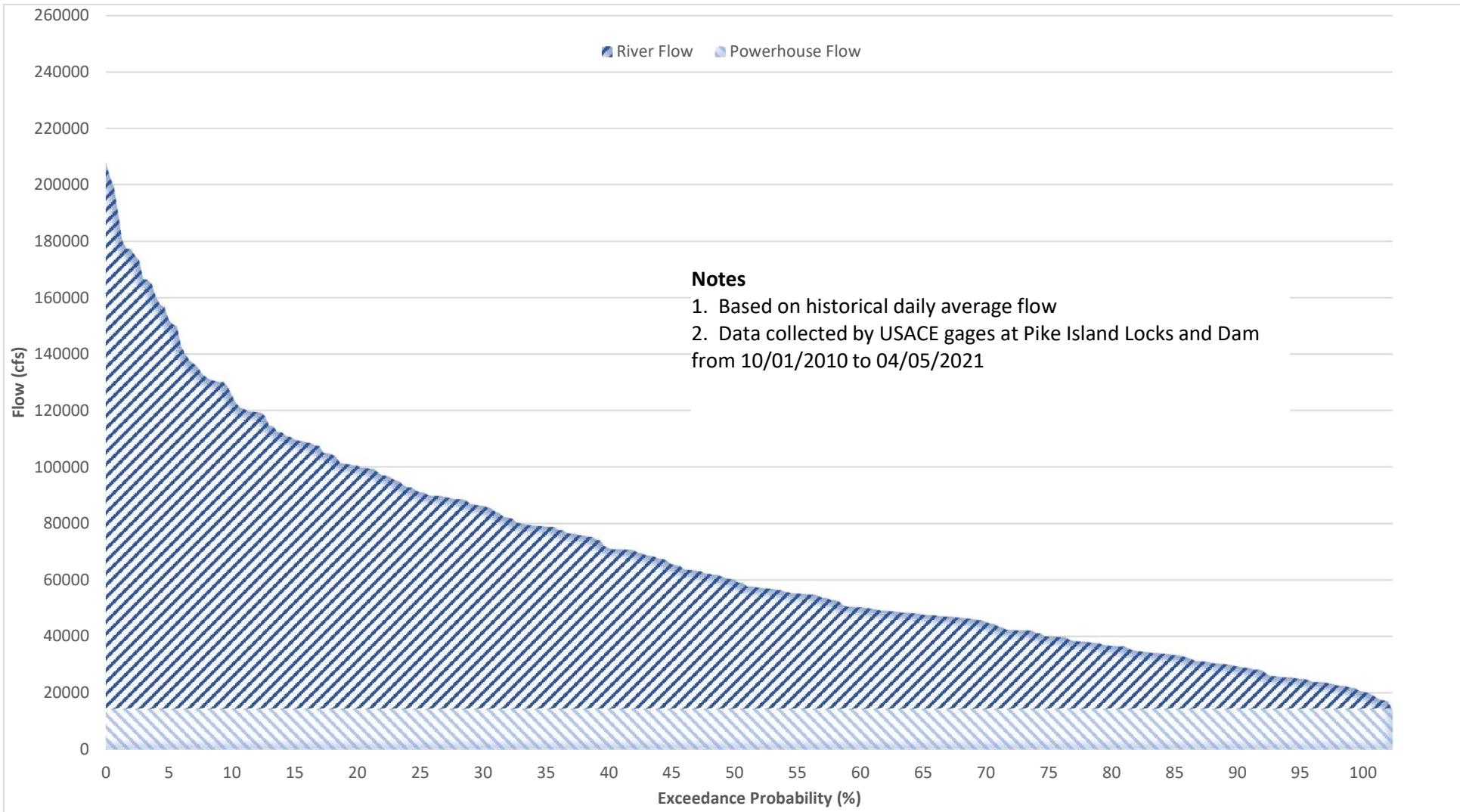


CURRENT HYDRO

## Figure 3: January Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



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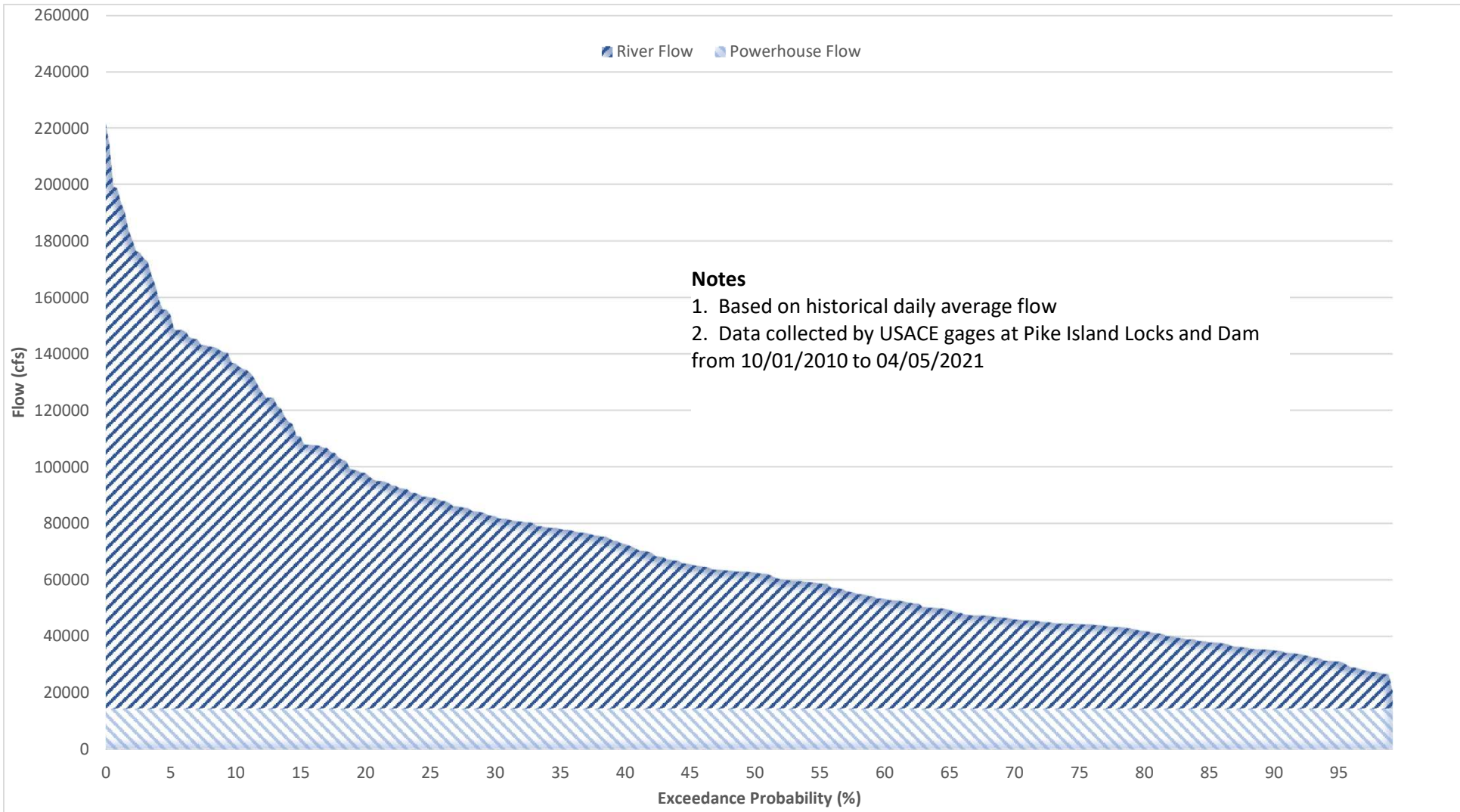
CURRENT HYDRO

## Figure 4: February Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez





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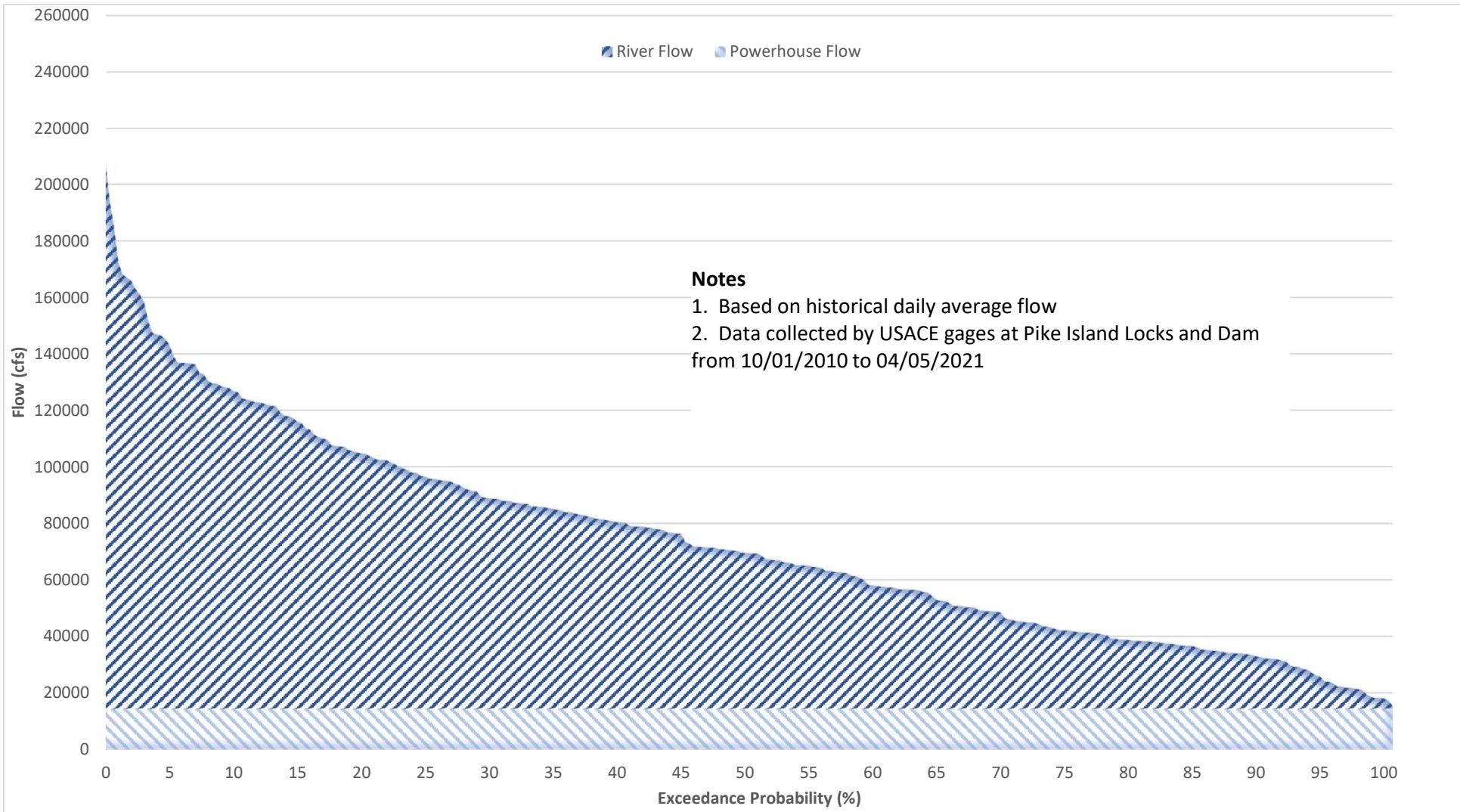


CURRENT HYDRO

## Figure 5: March Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



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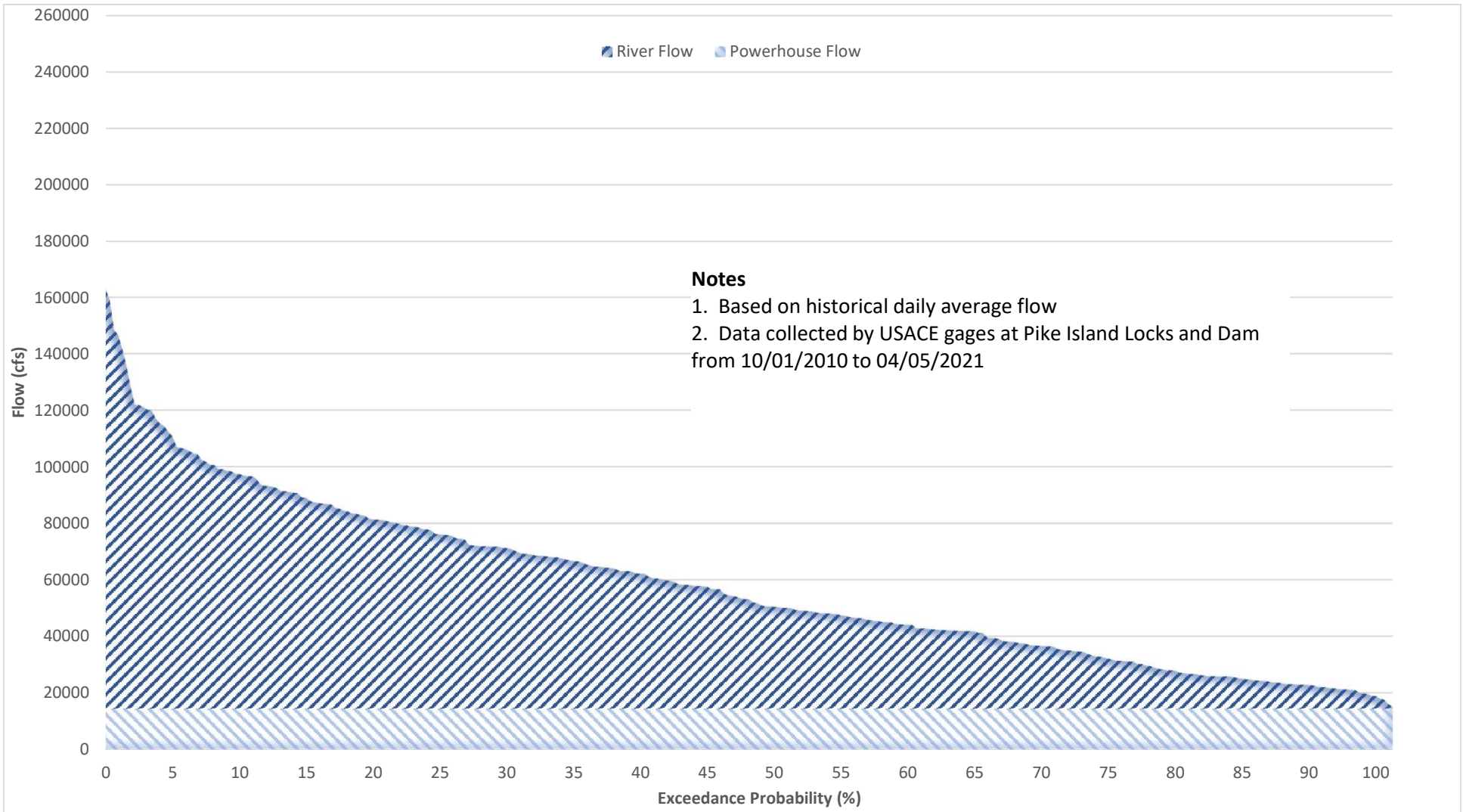


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## Figure 6: April Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



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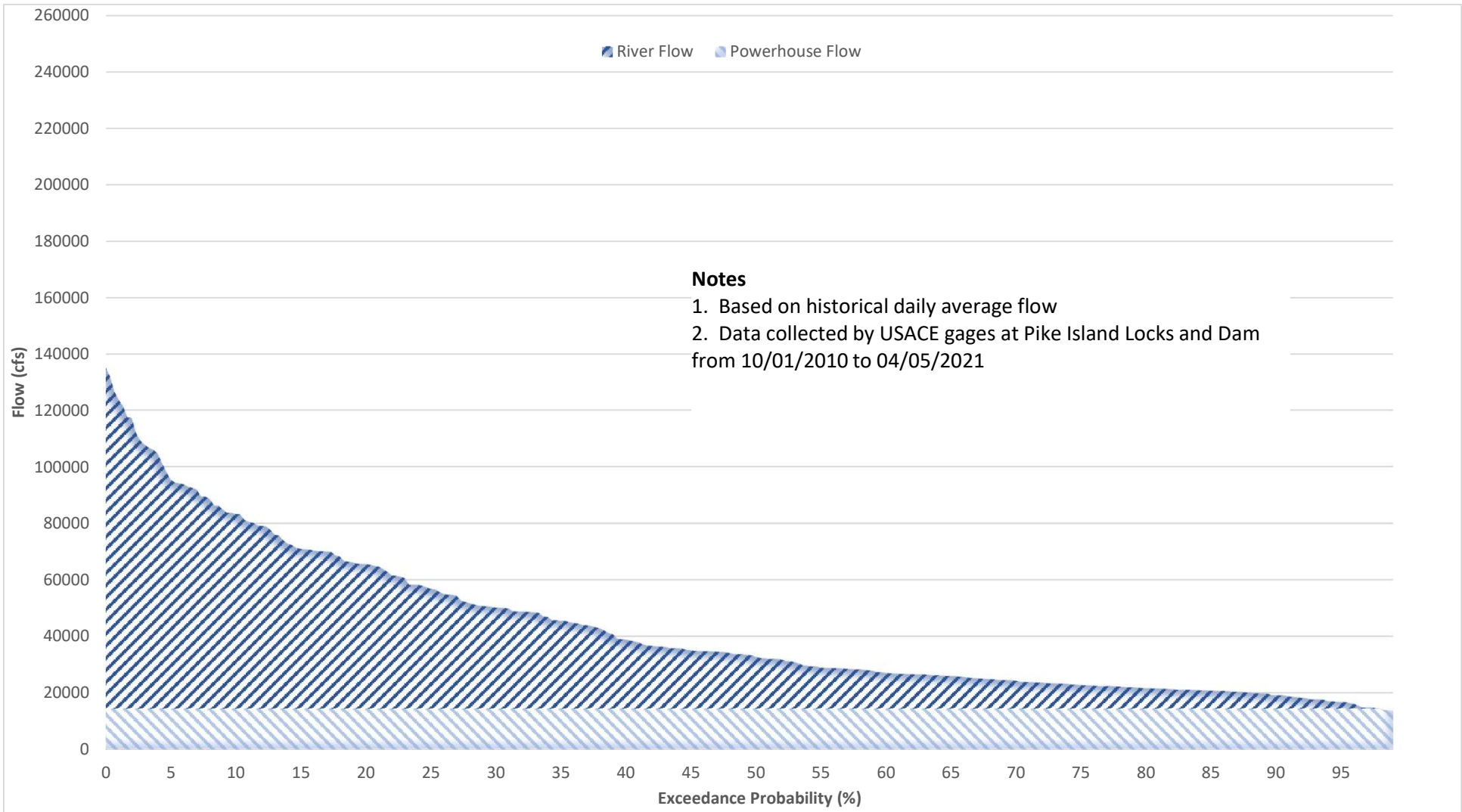
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## Figure 7: May Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez





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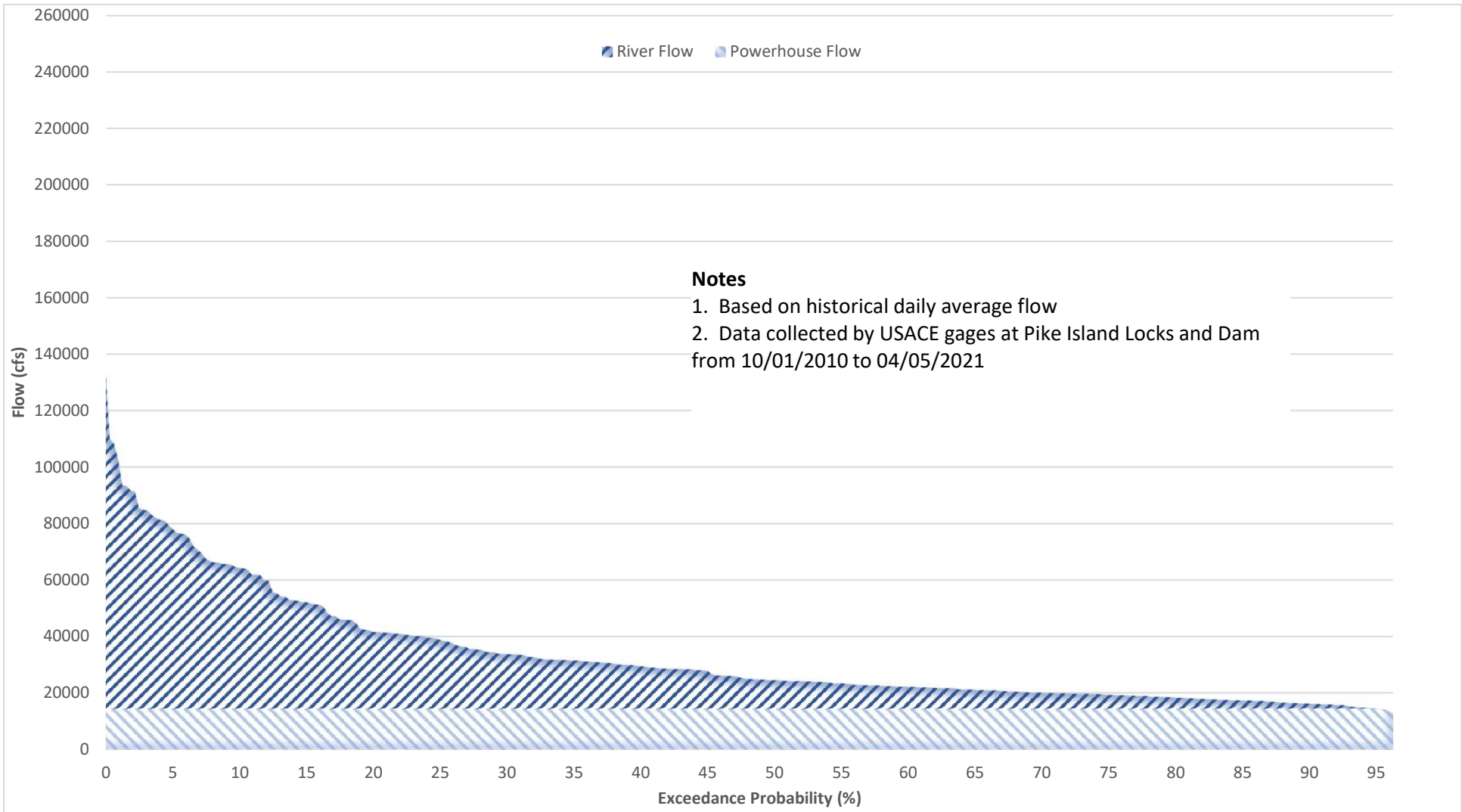


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## Figure 8: June Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



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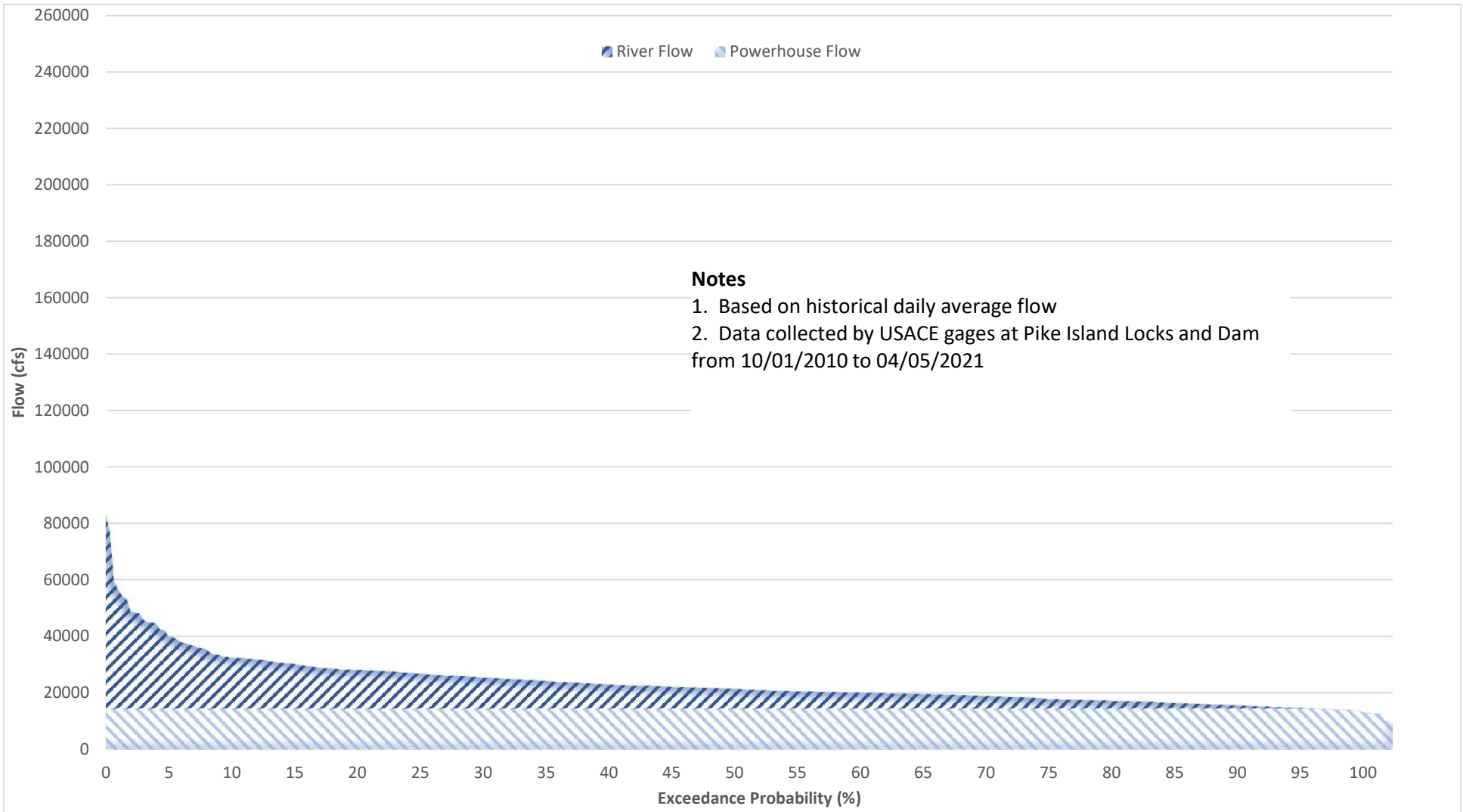
CURRENT HYDRO

## Figure 9: July Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez





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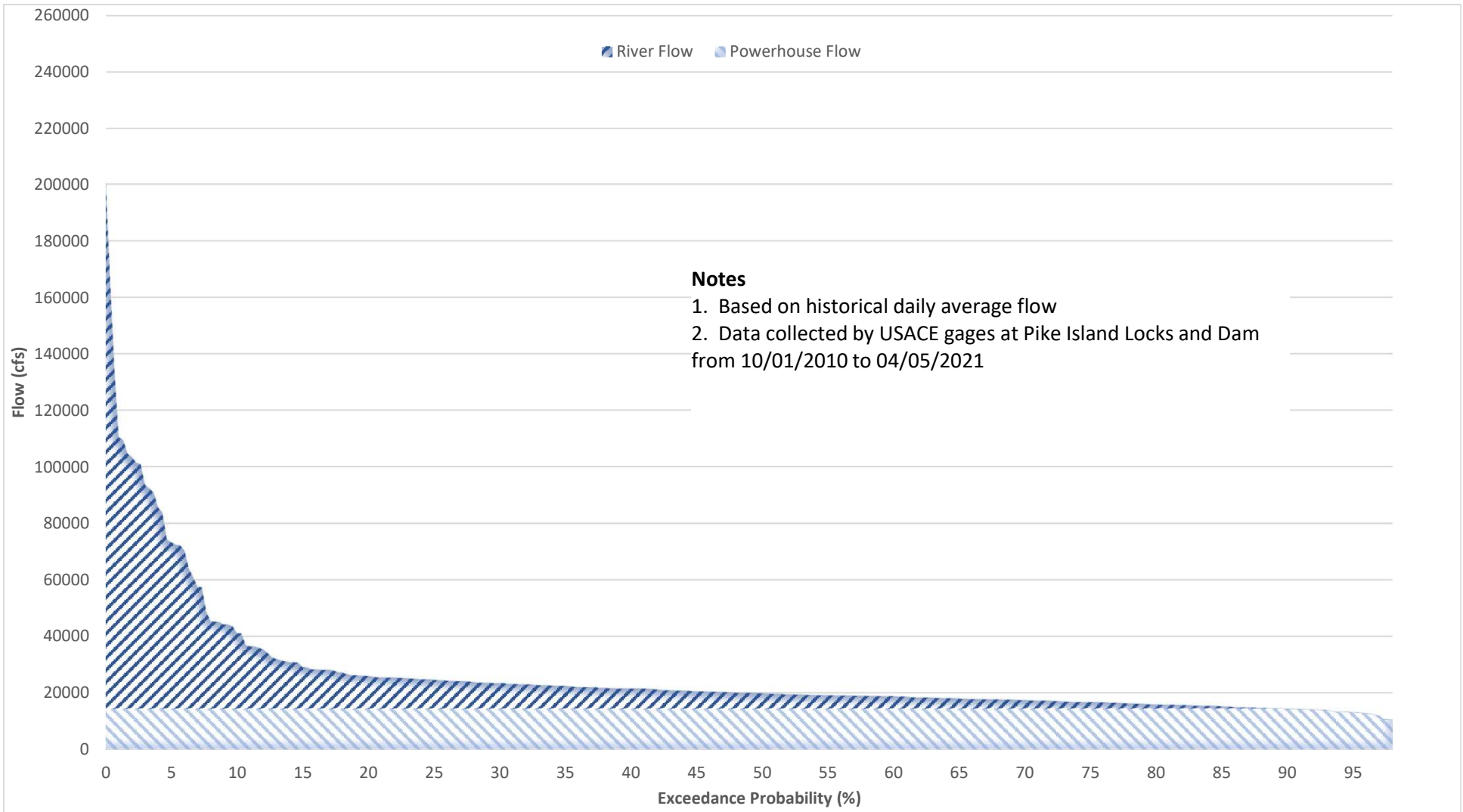


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## Figure 10: August Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



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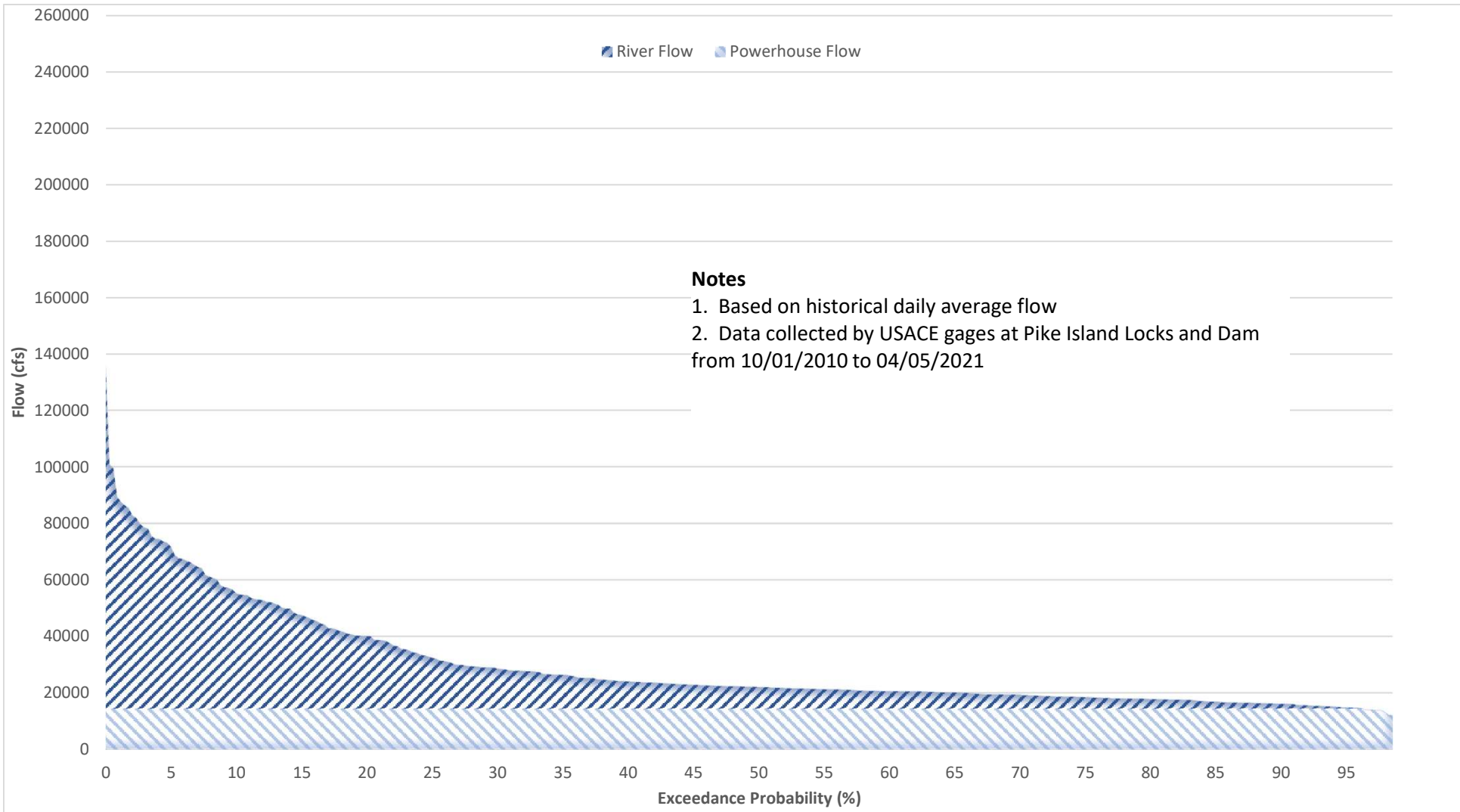


CURRENT HYDRO

## Figure 11: September Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



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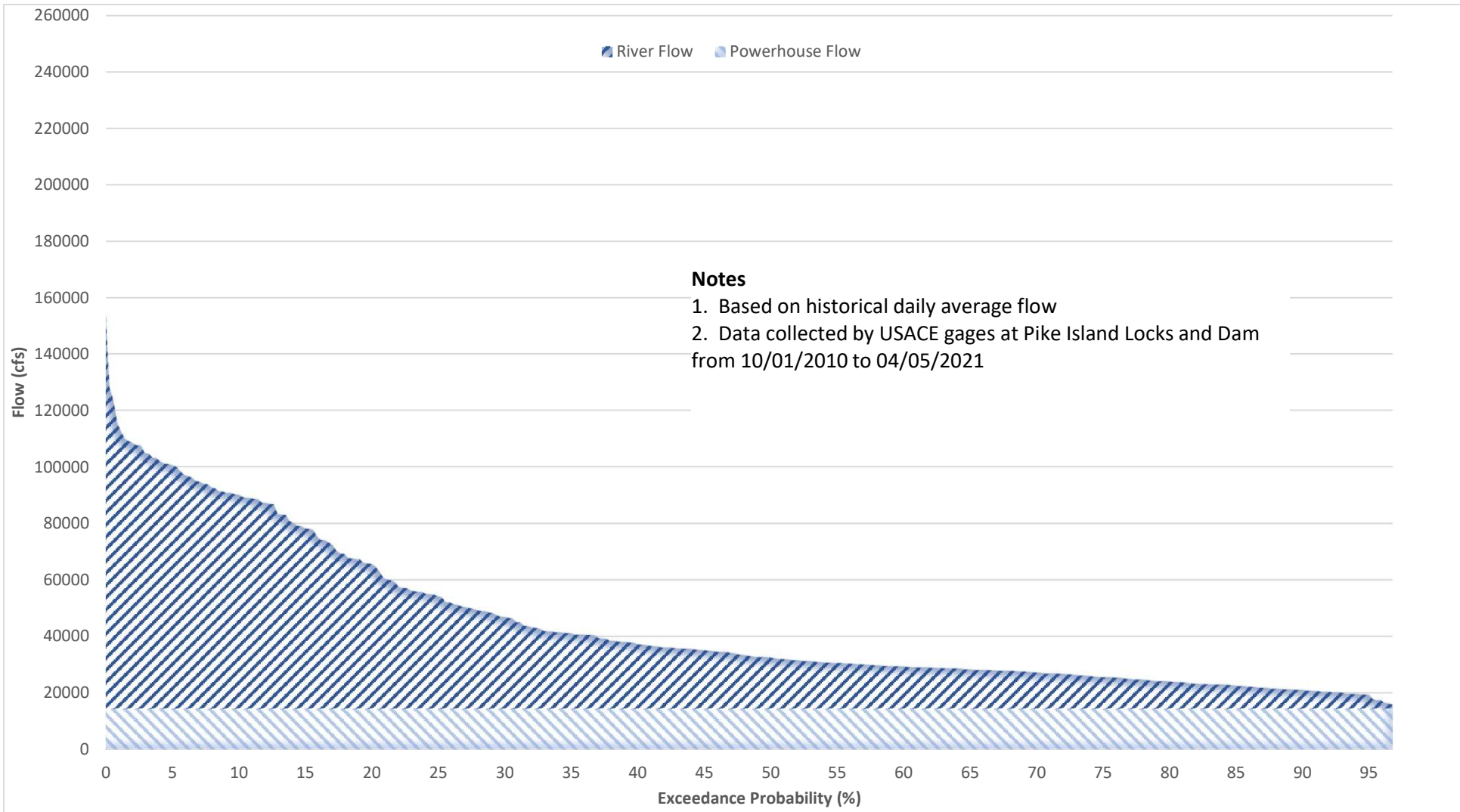


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## Figure 12: October Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



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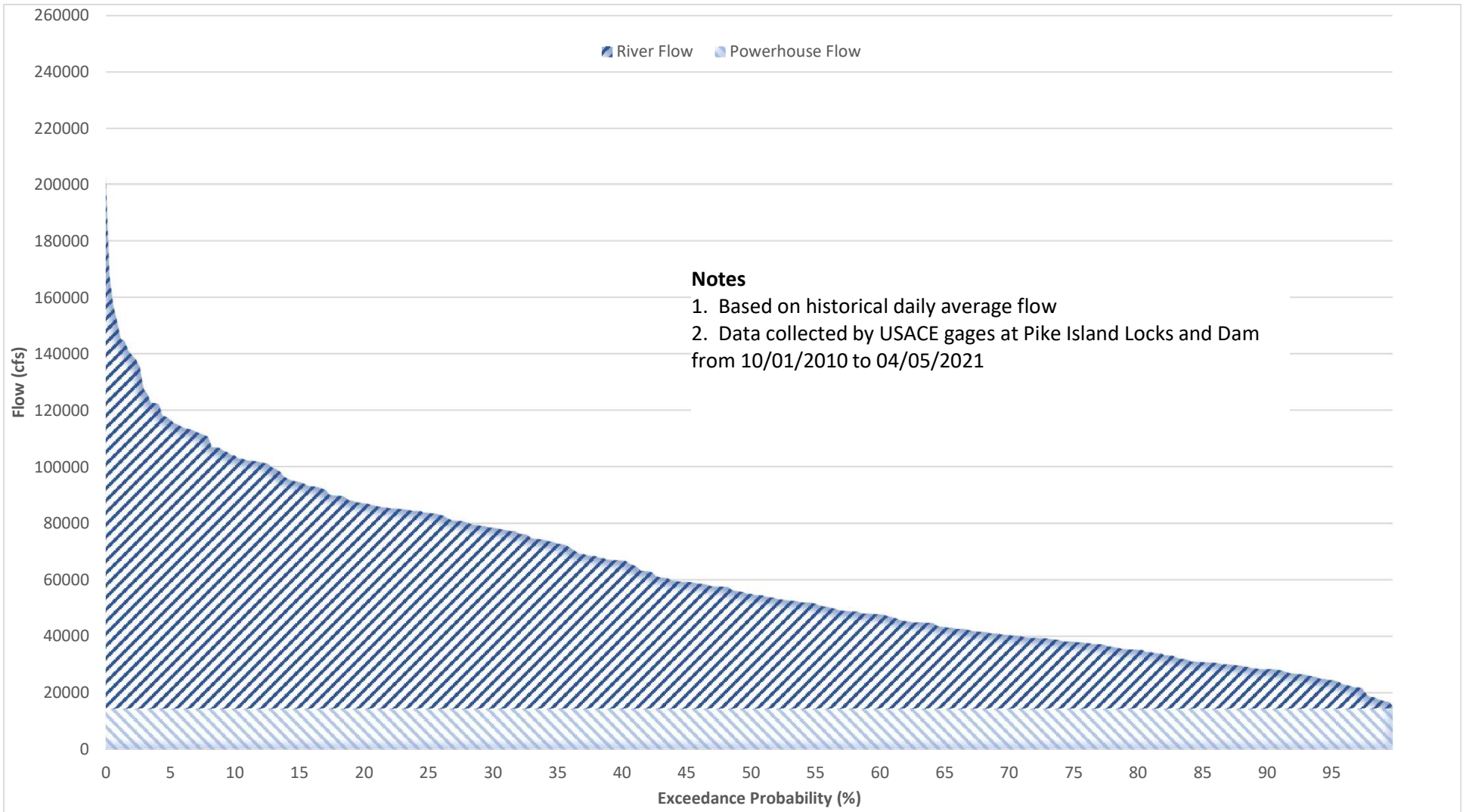


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## Figure 13: November Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



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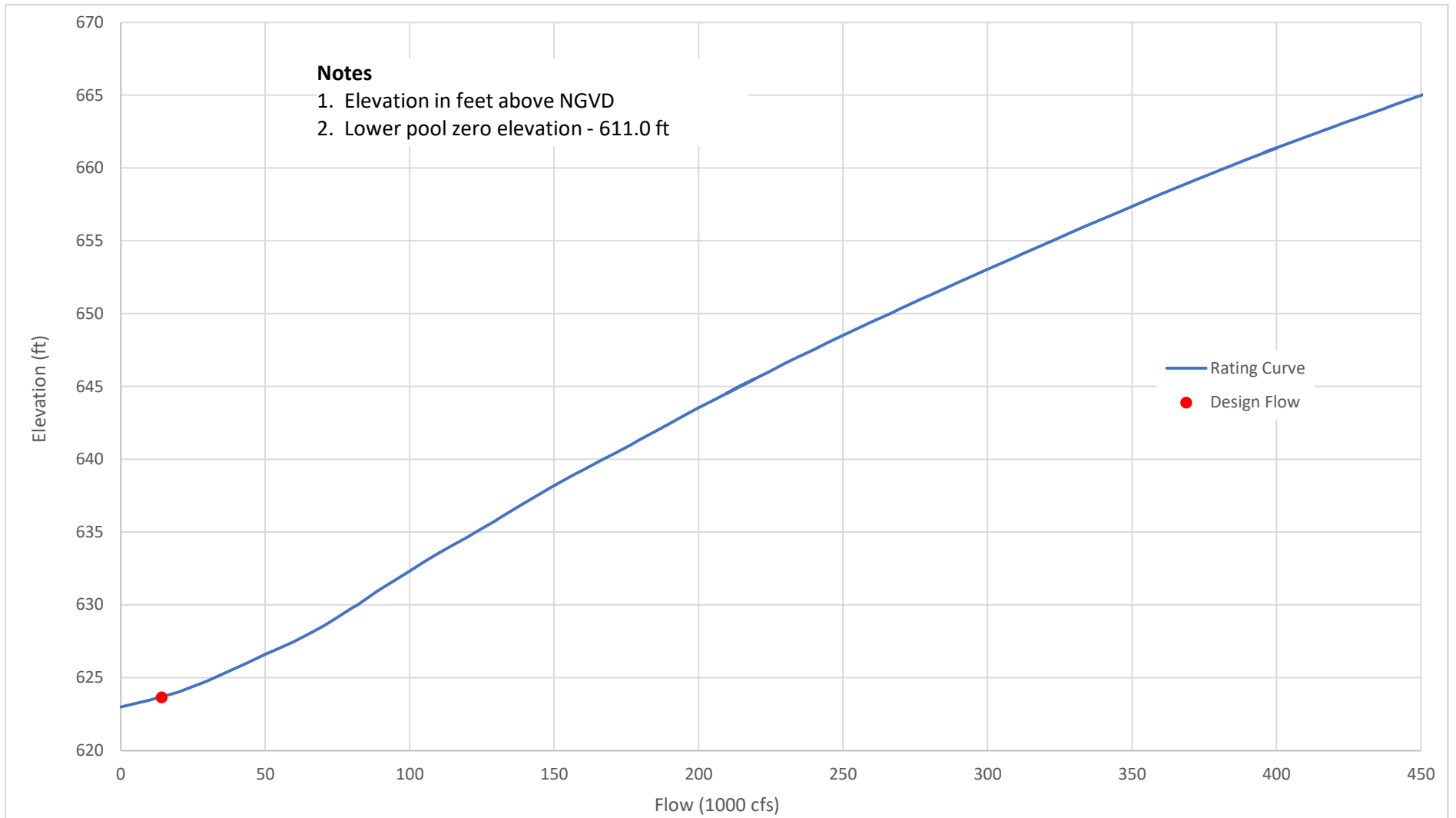


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## Figure 14: December Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



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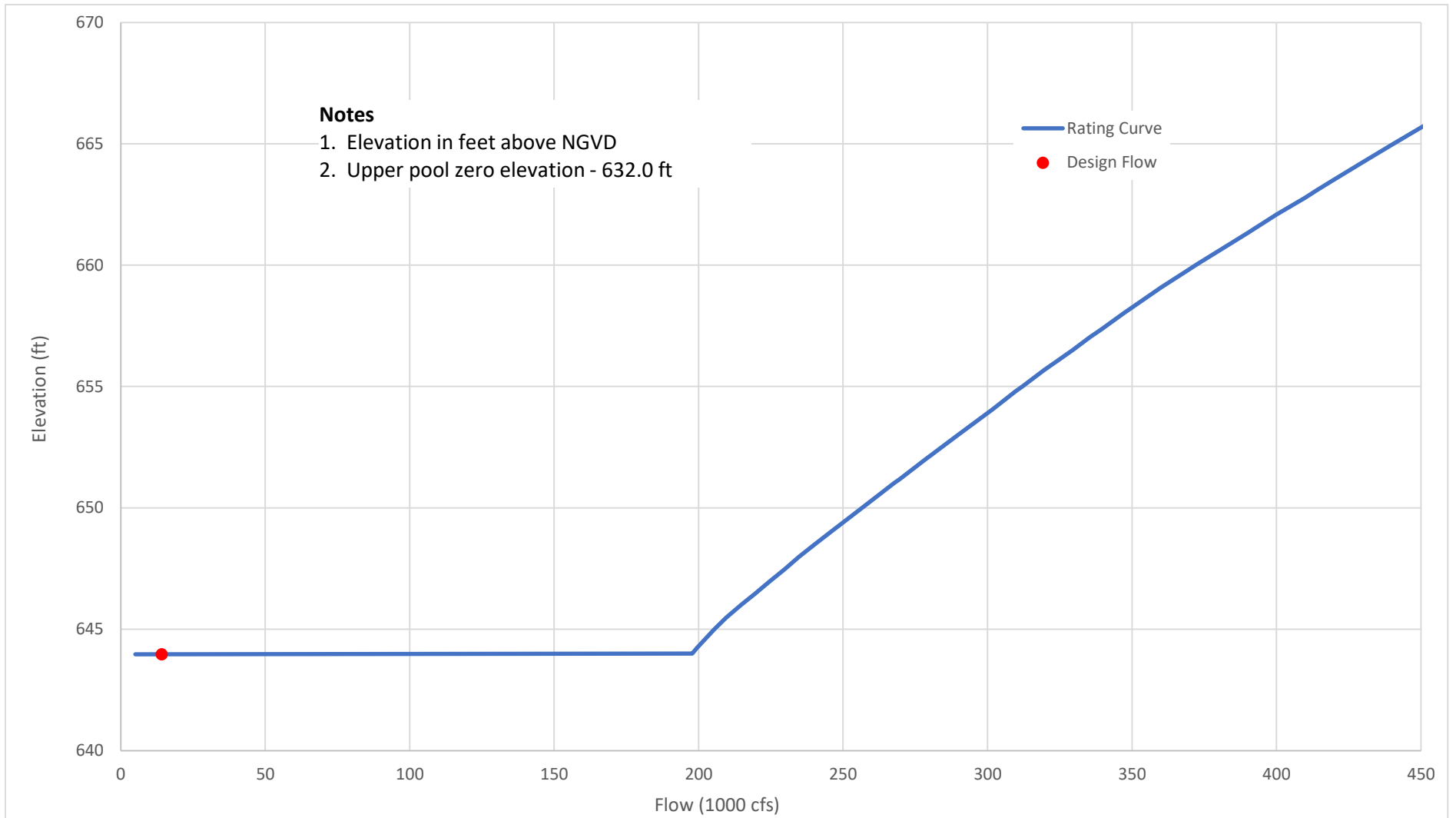
## Figure 15: Stage-Discharge Curve - Lower Pool

Date: May 24, 2021

Reference: "Ohio River Pike Island Locks and Dam Stage-Discharge Curve"

USACE 1977

Prepared by: LMGonzalez



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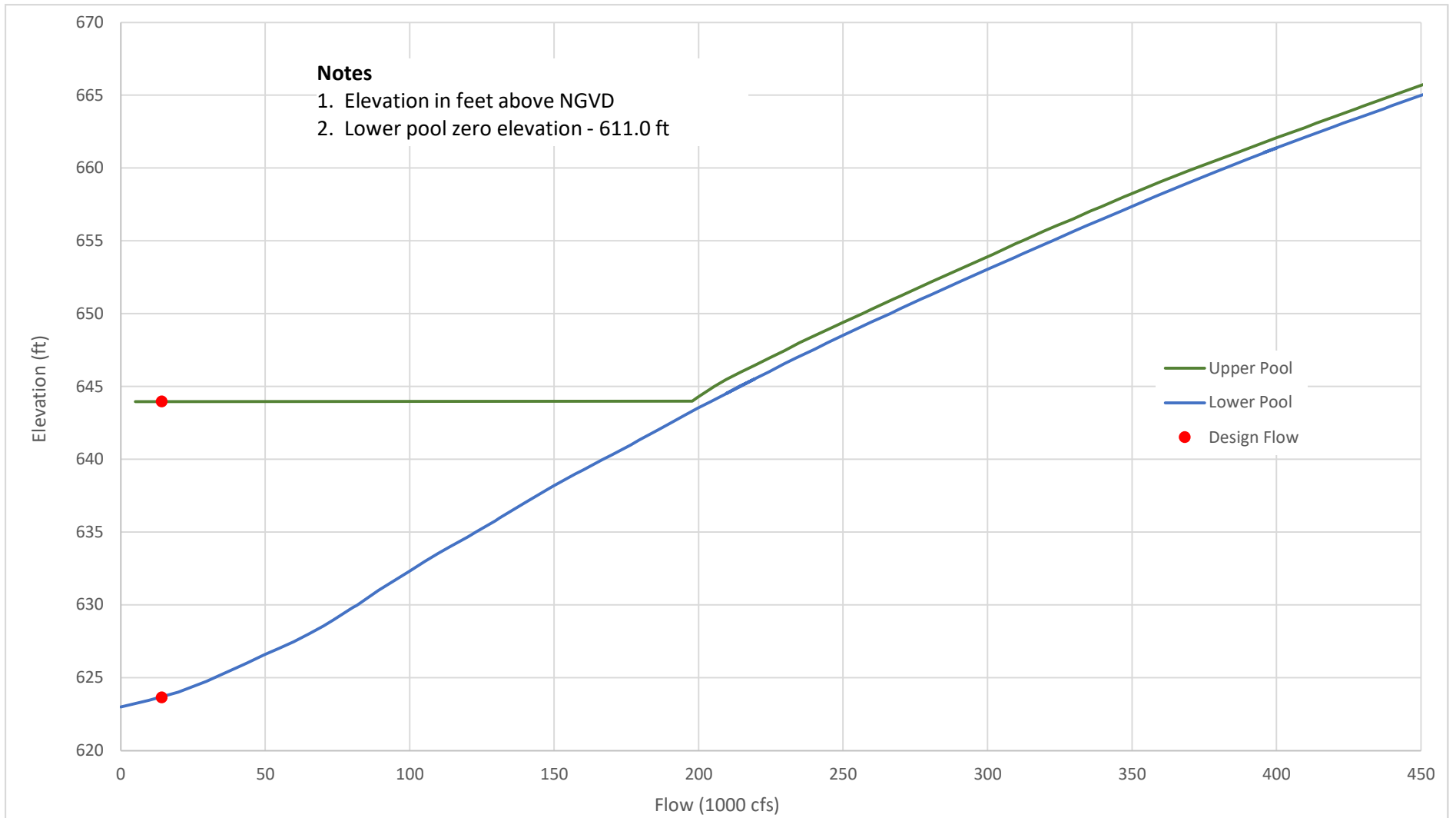
## Figure 16: Stage-Discharge Curve - Upper Pool

Date: May 24, 2021

Reference: "Ohio River Pike Island Locks and Dam Stage-Discharge Curve"

USACE 1977

Prepared by: LMGonzalez



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## Figure 15: Stage-Discharge Curve - Lower Pool

Date: May 24, 2021

Reference: "Ohio River Pike Island Locks and Dam Stage-Discharge Curve"

USACE 1977

Prepared by: LMGonzalez