Notification of Intent

Current Hydro Project 19, LLC

to File an Application for an Original License for the

New Cumberland Locks and Dam Hydroelectric Project

(FERC No. 15045)

Before the

United States of America

Federal Energy Regulatory Commission

Current Hydro Project 19, LLC Project No. 15045

Notice of Intent

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To File an Application for Original License for the

New Cumberland Locks and Dam Hydroelectric Project

(FERC No. 15045)

August 11, 2021

Pursuant to 18 C.F.R. Section 5.5 of the Federal Energy Regulatory Commission's (Commission or FERC) regulations, Current Hydro Project 19, LLC, applicant for the New Cumberland Locks and Dam Hydroelectric Project (FERC No. 15045), hereby gives notice and declares its intent to apply for an original license for the New Cumberland Locks and Dam Hydroelectric Project (New Cumberland Project, or Project).

In accordance with 18 C.F.R. Section 5.5 and Section 16.6(b), the following information is provided.

1. The existing licensee's name and address:

Current Hydro Project 19, LLC
Post Office Box 224, Rhinebeck NY, 12572
Phone: 917-244-3607

The exact name, address, and telephone number of persons authorized to act as agent for the Applicant in this application are:

Joel Herm	Joel@currenthydro.com
Jan Borchert	Jan@currenthydro.com

Current Hydro, LLC
Post Office Box 224
Rhinebeck NY, 12572
Phone: 917-244-3607

2. Project Number:

New Cumberland Locks and Dam Hydroelectric Project, FERC No. P-15045

3. License expiration date:

This project has not yet been built; as such, no license currently exists.

4. Applicant's statement of intent:

Current Hydro Project 19, LLC hereby unequivocally declares its intent to apply for an original license for the New Cumberland Locks and Dam Hydroelectric Project, FERC Project Number P-15045. Current Hydro Project 19, LLC requests that the Commission conduct the licensing using the Traditional Licensing Process (TLP).

5. Principal Proposed Project works:

The proposed project is to be located on the West Virginia side of the 1,315 ft. long USACE New Cumberland Locks & Dam. The proposed project will consist of (1) An approximately 160 ft. by 160 ft. hydroelectric powerhouse which will contain two, three, or four identical Kaplan pit turbine-generators with a total hydraulic capacity of about 13,733 cfs, and a net proposed power capacity of 20,000 KW; (2) An approximately 200 ft. by 200 ft. switch yard for interconnection with the existing 138 kV transmission lines, to the east of Route 2; (3) An approximately 0.25 miles long 138 kV transmission line connecting the powerhouse with the switch yard; (4) A newly constructed 1,500 ft. long access road to the powerhouse, east of the rail road tracks; (5) A separate 250 ft. long access road connecting the switch yard with Route 2; and (6) other appurtenant facilities.

The project will operate in run-of-river mode to maintain the navigation channel at all times, not employing any storage capacity of the New Cumberland Locks and Dam's impoundment pool.

6. Type of License

The application is for a power license.

7. Project Location:

Dam:	USACE New Cumberland Locks & Dam
State:	West Virginia
County:	Hancock County, WV
Nearby Town:	Stratton, OH and New Cumberland, WV
Body of Water:	Ohio River
Latitude:	40° 31'41.57 "N
Longitude:	80° 37'32.67 "W

The principal project location will be on the West Virginia side of the New Cumberland Locks and Dam, about two miles upstream of New Cumberland, WV.

8. Installed plant capacity:

The New Cumberland Locks and Dam Hydroelectric Project is proposed to have a total rated capacity of 20,000 kW.

9. The location of all the sites where the information required under § 16.7 is available to the public.

Section 16.7 only applies to a licensee of an existing project.

10. The names and mailing address of:

i. Every county in which any part of the project is located, and in which any Federal facility that is used or to be used by the project is located:

The New Cumberland Locks and Dam Hydroelectric Project is located entirely in Hancock County, WV. The New Cumberland Locks and Dam – the Federal facility used by the Project – is also located in Jefferson County, OH:

Jefferson County, Ohio
Jefferson County Commissioners' Office
301 Market Street
Steubenville, OH 43952-2133
(740) 283-8500

Hancock County, West Virginia
Hancock County Clerk
P.O. Box 367
New Cumberland, WV 26047-0367
(304) 564-3311 Ext. 266

ii. Every city, town, or similar political subdivision in which any part of the project is or is to be located and any Federal facility that is or is to be used by the project is located:

Stratton, Ohio
136 2nd Avenue
Stratton, OH 43961

New Cumberland, West Virginia
City Hall
104 N Court Street
New Cumberland, WV 26047
(304) 564-3383

iii. Every city, town, or similar political subdivision that has a population of 5,000 or more people and is located within 15 miles of the existing or proposed project dam:

East Liverpool, Ohio
City Hall
126 West Sixth Street
East Liverpool Ohio 43920
(330) 385-3381

Steubenville, Ohio
Mayor's Office
115 South Third Street
Steubenville, Ohio 43952
(740) 283-6000

Toronto, Ohio
Mayor's Office
416 Clark Street
Toronto, OH 43964
(740) 537-3743

Weirton, West Virginia
City of Weirton
200 Municipal Plaza
Weirton, WV 26062
(304) 797-8500

iv. Every irrigation district, drainage district, or similar special purpose political subdivision:

There are no irrigation or drainage districts or similar special purpose political subdivisions associated with or in the general area of the Project.

v. Every other political subdivision in the general area of the Project or proposed Project that there is reason to believe would be likely to be interested in, or affected by, the notification:

Ohio Senators:

Senator Robert Portman
338 Russell Senate Office Building
Washington, DC 20510

Senator Sherrod Brown
713 Hart Senate Office Building
Washington, DC 20510

West Virginia Senators:

Senator Shelley Wellons Moore Capito
172 Russell Senate Office Building
Washington, DC 20510

Senator Joe Manchin III
303 Hart Senate Office Building
Washington, DC 20510

v. Affected Indian Tribes:

The Applicant has identified the following Tribes as being potentially affected:

Bureau of Indian Affairs
1849 C Street NW, MS 2624 MIB
Washington DC 20240

Miami Tribe of Oklahoma
Miami Nation Headquarters
P.O. Box 1326
Miami, OK 74355-1326

Absentee-Shawnee Tribe of Indians of Oklahoma
2025 S. Gordon Cooper Drive
Shawnee OK 74801

Delaware Tribe of Indians
Delaware Tribal Offices
5100 Tuxedo Blvd.
Bartlesville, OK 74006

Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Eastern Shawnee Tribe of Oklahoma
Tribal Historic Preservations Officer
P.O. Box 350
Seneca, MO 64865

Seneca-Cayuga Tribe of Oklahoma
PO Box 453220
Grove, OK 74344

Shawnee Tribe
29 S Hwy 69A
Miami, OK 74354

Seneca Nation of Indians
90 Ohi:Yo' Way
Salamanca, NY 14779

Tonawanda Band of Seneca
7027 Meadville Road
Basom, NY 14013

Osage Nation Historic Preservation Office
627 Grandview Avenue
Pawhuska, OK 74056

11. Distribution:

In accordance with 18 C.F.R. Section 5.5, the Applicant must distribute this notification of intent to appropriate Federal, state, and interstate resource agencies, Indian tribes, local governments, and members of the public likely to be interested in the proceeding. A complete listing of appropriate agencies, tribes, local governments and non-governmental organizations (NGOs) is provided in the cover letter to the filing.

All correspondence and service of documents relating to this Notification of Intent and subsequent proceedings should be addressed to:

Joel Herm, CEO
Current Hydro, LLC
Post Office Box 224
Rhinebeck NY, 12572
Phone: 917-244-3607
Joel@Currenthydro.com

12. Non-federal representative:

Pursuant to 36 C.F.R. § 800.2(c)(4), Current Hydro Project 19, LLC requests that FERC authorize Current Hydro Project 19, LLC to initiate consultation, as described in Section 106 of the National Historic Preservation Act, with the State Historic Preservation Officer (SHPO) and others regarding relicensing of the Project. Current Hydro Project 19, LLC also, pursuant to 50 C.F.R. §402.08, requests that FERC designate Current Hydro 19, LLC as its nonfederal representative for the Project for the purpose of informal consultation with the U.S. Fish and Wildlife Service, pursuant to Section 7 of the Endangered Species Act.

Pre-Application Document

New Cumberland Project

FERC No. 15045

Prepared for:

Current Hydro Project 19, LLC

Prepared by:

Kleinschmidt Associates

August 2021

Kleinschmidt

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DEFINITIONS OF TERMS, ACRONYMS, AND ABBREVIATIONS

APE	Area of Potential Effect as pertaining to Section 106 of the National Historic Preservation Act
CEII	Critical Energy Infrastructure Information
CFR	Code of Federal Regulations
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
DLA	Draft License Application
DO	dissolved oxygen
EFH	Essential Fish Habitat
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
GIS	Geographic Information Systems
GWh	Gigawatt-hour (equals one million kilowatt-hours)
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
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.
MW	megawatt
MWh	megawatt-hour
NOAA Fisheries	NOAA National Marine Fisheries Service, same as NMFS
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
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
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
Service List	A list maintained by FERC of parties who have formally intervened in a proceeding. In a new 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
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 INTRODUCTION

Current Hydro Project 19, LLC (Applicant) provides this Pre-Application Document (PAD) as required by Title 18 § 5.6 and §16.8 of the U.S. Code of Federal Regulations (CFR) for the New Cumberland Locks and Dam Hydroelectric Project (New Cumberland Project, or Project). This PAD accompanies the Applicant's Notice of Intent (NOI) to seek a new license for the Project. The Applicant proposes to construct a new powerhouse at the United States Army Corps of Engineers' (USACE) New Cumberland Locks and Dam project. The hydroelectric project would be constructed and operated pursuant to the information provided in the Application for Preliminary Permit filed with FERC on September 28, 2020. On January 8, 2021, FERC issued Current Hydro Project 19, LLC a 48-month Preliminary Permit for the site, effective January 1, 2021.

Current Hydro Project 19, LLC (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 Current Hydro Project 19, LLC.

Current Hydro further is the acting agent for Pike Island Hydropower Corporation (Applicant for the Pike Island Locks and Dam Hydroelectric Project), and has also filed a Preliminary Permit Application, Pre-Application Document and Notice of Intent for the Pike Island Locks and Dam Hydroelectric Project, to be located at the U.S. Army Corps of Engineers' Pike Island Locks and Dam on the Ohio River in Belmont County, Ohio and Ohio County, West Virginia; the next dam downstream from the New Cumberland Project.

Current Hydro, as agent for both projects, intends to develop the proposed Pike Island Locks and Dam Hydroelectric Project concurrent with the 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.

Current Hydro Project 19, LLC 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

In its NOI, the Applicant 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.

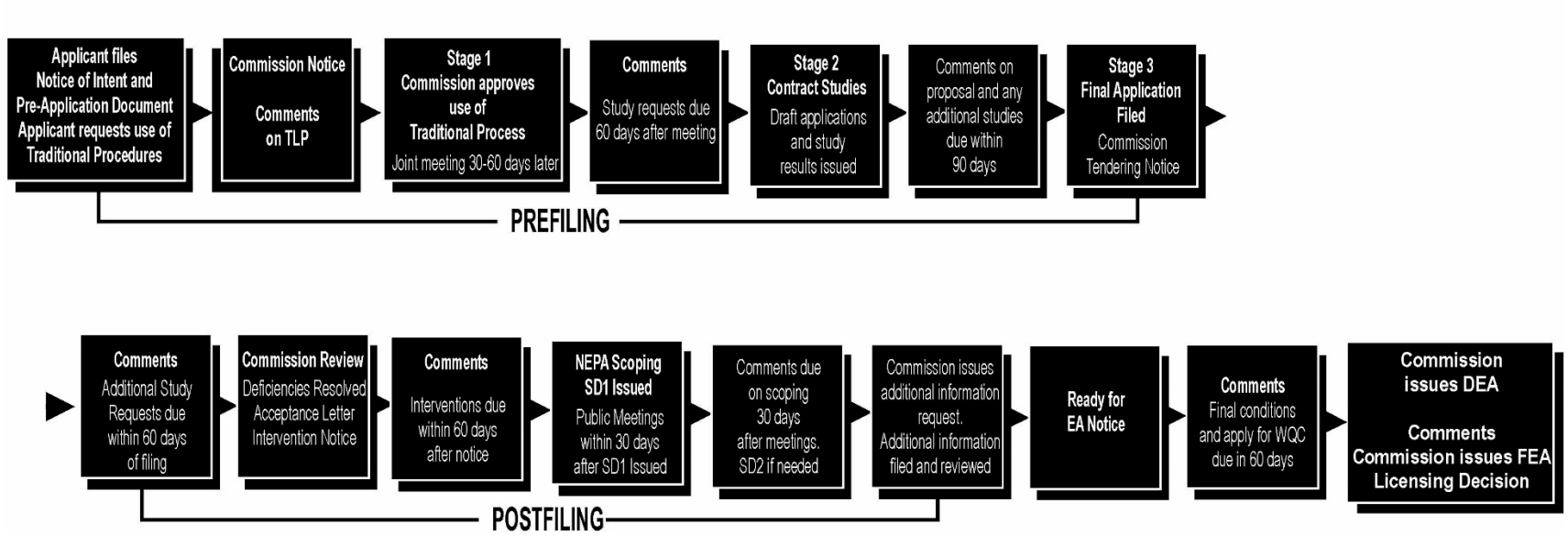
2.1 Process Plan and Schedule Through Filling of License Application

The Process Plan and Schedule outlines actions by FERC, Current Hydro Project 19, LLC, and other participants in the licensing process through filing of the FLA. The Applicant plans to file the FLA prior to expiration of the preliminary permit on January 1, 2025. 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. The Applicant anticipates that the primary means of communication will be in-person and virtual meetings, documents, emails, 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 Current Hydro Project 19, LLC.

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. The Applicant’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

Current Hydro Project 19, LLC 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.

Current Hydro Project 19, LLC 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

Current Hydro Project 19, LLC 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. The Applicant 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 under FERC docket No. 15045. 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

Current Hydro Project 19, LLC will work with Interested Parties to develop meeting schedules that include practical locations and times to accommodate the majority of participants. In general, the Applicant will schedule meetings between the hours of 9 a.m. and 4 p.m., and will make every effort to begin and end meetings on time.

Current Hydro Project 19, LLC will notify all Interested Parties at least two weeks in advance of the next planned public meeting. Current Hydro Project 19, LLC will provide a meeting agenda by email, and will also distribute any documents or other information that will be the subject of meeting discussions.

2.2.3 Proposed Location and Date for Joint Agency Meeting and for the Site Visit [§16.8 (B)(3)(II)]

Current Hydro Project 19, LLC plans to host a virtual Joint Agency Meeting (JAM) on October 5th, 2021. Any stakeholders or members of the public who would like to attend should contact the Applicant to obtain instructions for joining the virtual meeting. The Applicant can be contacted at Joel@currenthydro.com.

Current Hydro Project 19, LLC understands that this date may occur before FERC gives their determination on the TLP request; in that event, Current Hydro Project 19, LLC will provide a follow-up notification to the distribution list with an updated date no later than 2 weeks before the meeting.

2.2.4 Documents

Current Hydro Project 19, LLC will maintain digital copies of all mailing lists, announcements, notices, communications, and other documents related to the licensing of the Project. Current Hydro Project 19, LLC 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 Docket P-15045 (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

2.2.4.1 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.

Current Hydro Project 19, LLC 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).

2.2.4.2 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 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.

2.2.4.3 Mailing Lists

The Applicant 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. Current Hydro Project 19, LLC anticipates that once the licensing proceeding begins, Current Hydro

Project 19, LLC's Licensing Mailing List and FERC's Mailing List will be consolidated into one common list.

After the Applicant 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 New Cumberland Licensing

Entity	Type	Description
Current Hydro Project 19, LLC	Interested Parties Mailing List	A list of Interested Parties prepared by Applicant in anticipation of the Project licensing proceeding.
FERC	Mailing List	A mailing list of Interested Parties prepared and maintained by FERC throughout the Project licensing proceeding.
FERC	Project No. 15045 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.

2.2.4.4 Document Distribution

Current Hydro Project 19, LLC will distribute, whenever possible, all documents electronically in standard MS Word format or PDF, via email of Cloud Sharing Link, or for download from the Project website: https://www.currenthydro.com/new-cumberland-ferc. The Applicant may distribute hard copies of some documents for convenience or by request. Distribution of information will follow the guidelines presented below (Table 2.2).

Table 2.2. Document Distribution for the New Cumberland Licensing

Document	Method	Distribution
Public Meeting Notices	Email or US Mail, Newspapers, and website	Public and all Potential Interested Parties
Meeting Agendas	Email* or website	Interested Parties
Meeting Summaries	Website*	On Request
Major Documents: Proposed Study Plans, Study Reports, draft License Application, final License Application, etc.	Email* or 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

*US Mail service by special request.

2.2.5 Study Requests

In the development of the PAD, Current Hydro Project 19, LLC has reviewed existing information including a 2017 PAD submitted to FERC by Rye Hydro. In addition, Current Hydro Project 19, LLC had a meeting with United Stated Fish and Wildlife Service (USFWS) licensing representatives to review proposed study plans. 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 a not 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 filed 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

3.1 Overview

The proposed Project is located at river mile 54.5 on the Ohio River at the USACE New Cumberland Lock and Dam facility (Figure 3.1). The proposed location is part of the northeastern region of the greater Ohio River Drainage Basin which encompasses approximately 204,000 square miles.

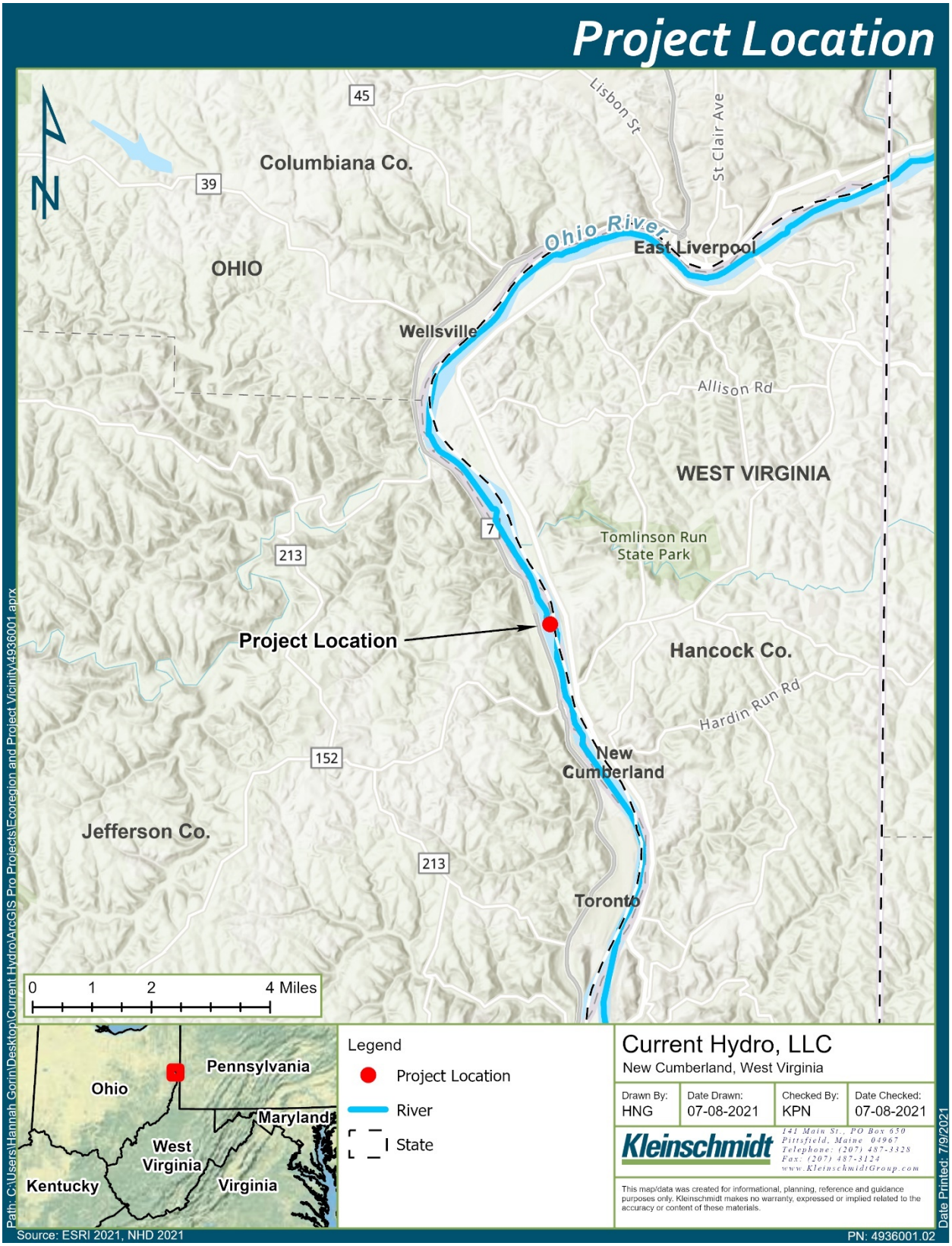
The Ohio River is formed by the confluence of the Allegheny River and Monongahela River at Point State Park in Pittsburgh, Pennsylvania. From its headwaters at Pittsburgh, the Ohio River flows 981 miles northwest and west in Pennsylvania until it reaches the West Virginia/Ohio border. There it turns 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 the 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. There are 26 recorded reservoirs in Jefferson County, including various mining company ponds, recreational ponds, and lakes. (HTL 2021).

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

Figure 3.1 Project Location Map



3.2 References

HTL 2021: OH HomeTownLocator - Jefferson County OH Reservoirs, Accessed July 2021. http://ohio.hometownlocator.com/features/cultural,class,reservoir,scfips,39081.cfm

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/

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

The New Cumberland Dam is located on the Ohio River on the Ohio/West Virginia border near the towns of Stratton, Ohio and New Cumberland, West Virginia. The impoundment is in Jefferson County, Ohio and Hancock County, West Virginia. This Locks and Dam facility (including spillway) is owned and operated by the USACE and is therefore not proposed to be a part of the formal hydroelectric project facility. The reservoir operation and river flow control will remain under USACE.

The existing New Cumberland Locks and Dam (the dam) is of reinforced concrete construction, with a gated spillway and two navigational locks.

Its primary physical elements are further described in the following table:

Table 4.1 Dam's Physical Elements

New Cumberland Locks and Dam	
Year Placed Into Operation	1959
Location	Stratton, OH
Water Body Ohio River	Ohio River
Latitude	40°31'41.57"N
Longitude	80°37'32.67"W
Structural Height	64 feet
Gates	11 - Tainter
Gate Dimensions	110 feet by 21.5 feet
Main Lock Dimensions	110 feet by 1,200 feet
Auxiliary Lock Dimensions	110 feet by 600 feet
Overall Length	1,315 feet
Storage Capacity	74,000 acre-feet

There are no existing hydroelectric facilities at the proposed project site.

The existing USACE facility consists of two operational locks, and a reinforced concrete dam with eleven (11) Tainter Gates, as described in table above. This type of spillway is to permit 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 pool 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.

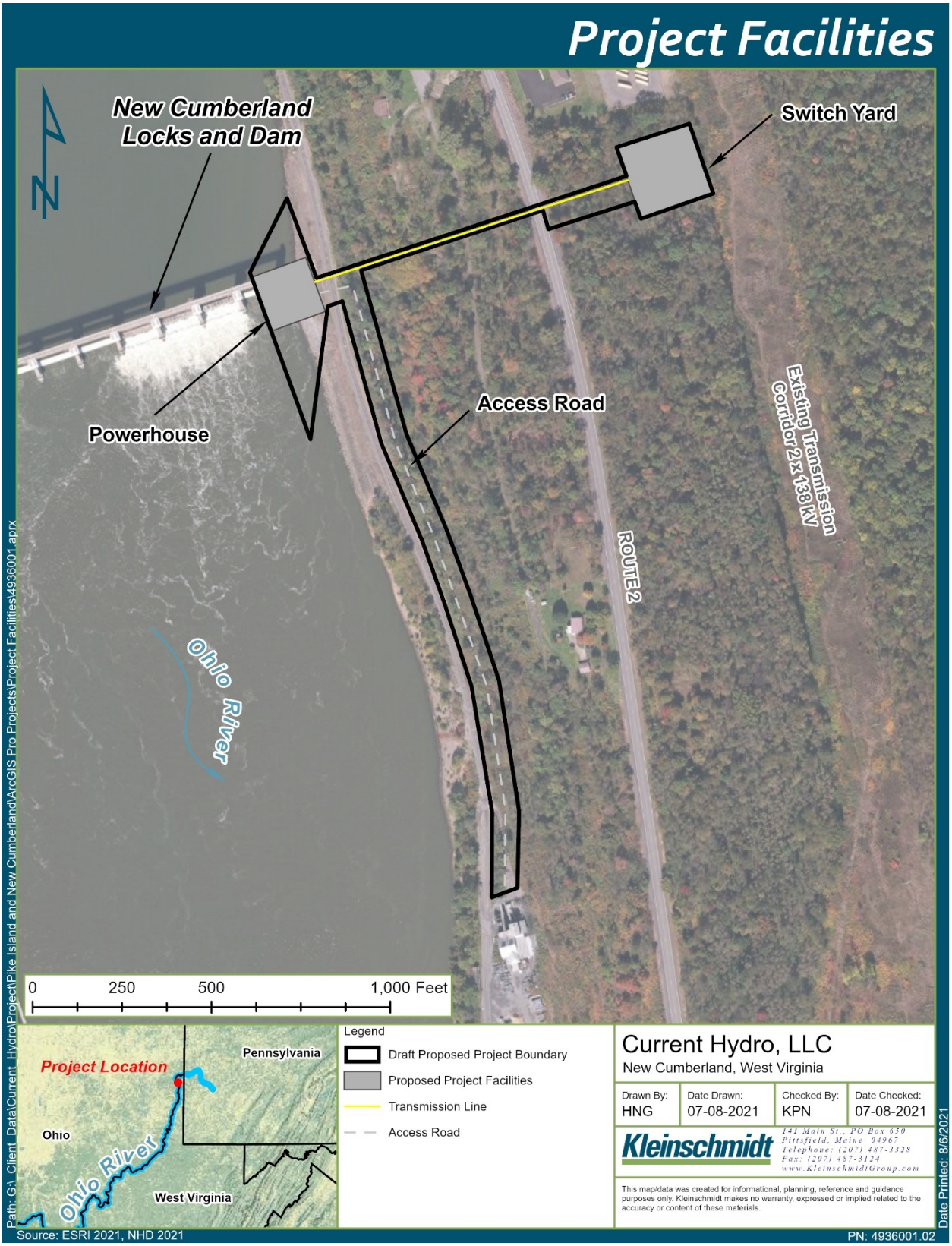
The site utilizes two operational locks. The main lock is 1,200 feet long and 110 feet wide, and the auxiliary lock is 600 feet long and 110 feet wide. The walls and floors of the locks are of reinforced concrete construction. Located at each end of the lock chambers are two miter gates. The main lock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

The USACE dam impounds the New Cumberland Reservoir, which extends 22.7 miles up the Ohio River and covers an area of 3,646 acres with a maximum storage of 74,000 acre-feet at the summer pool elevation of 664.5 feet Because the reservoir is impounded by the USACE facility, it is not considered part of the proposed hydroelectric project.

4.1 Proposed Facilities

A conceptual plan of proposed project facilities is provided in Figure 4.1. The Project would include an intake channel, a powerhouse, a tailrace channel, and transmission lines from the powerhouse to a new switch yard interconnecting with an existing 138 kilovolt (kV) transmission line. As noted, the USACE locks and dam, and reservoir would not be part of the hydroelectric project.

Figure 4.1 Project Facilities



4.1.1 Powerhouse

The Applicant proposes to construct a new hydroelectric powerhouse of reinforced concrete, approximately 160 feet by 160 feet, adjacent to the USACE New Cumberland Locks & Dam on the West Virginia side. The proposed powerhouse will contain two, three, or four identical Kaplan pit turbine-generators with a combined hydraulic capacity of 13,733 cubic feet per second (cfs) for a combined net power capacity of 20,000 kilowatt (kW). The powerhouse will contain controls and ancillary electrical and mechanical systems, a powerhouse transformer with switch gear, and erection space. The powerhouse will be connected to a switch yard for interconnection to an existing 138 kV transmission line, located east of Route 2.

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 the railroad.

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 82 precent. 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 that 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 141 Gigawatt-hour (GWh).

The proposed maximum net head is 20.5 feet 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 feet in width, and 100 to 200 feet 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 into the river downstream of the dam. The approximately 160-feet wide by approximately 300-feet 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.

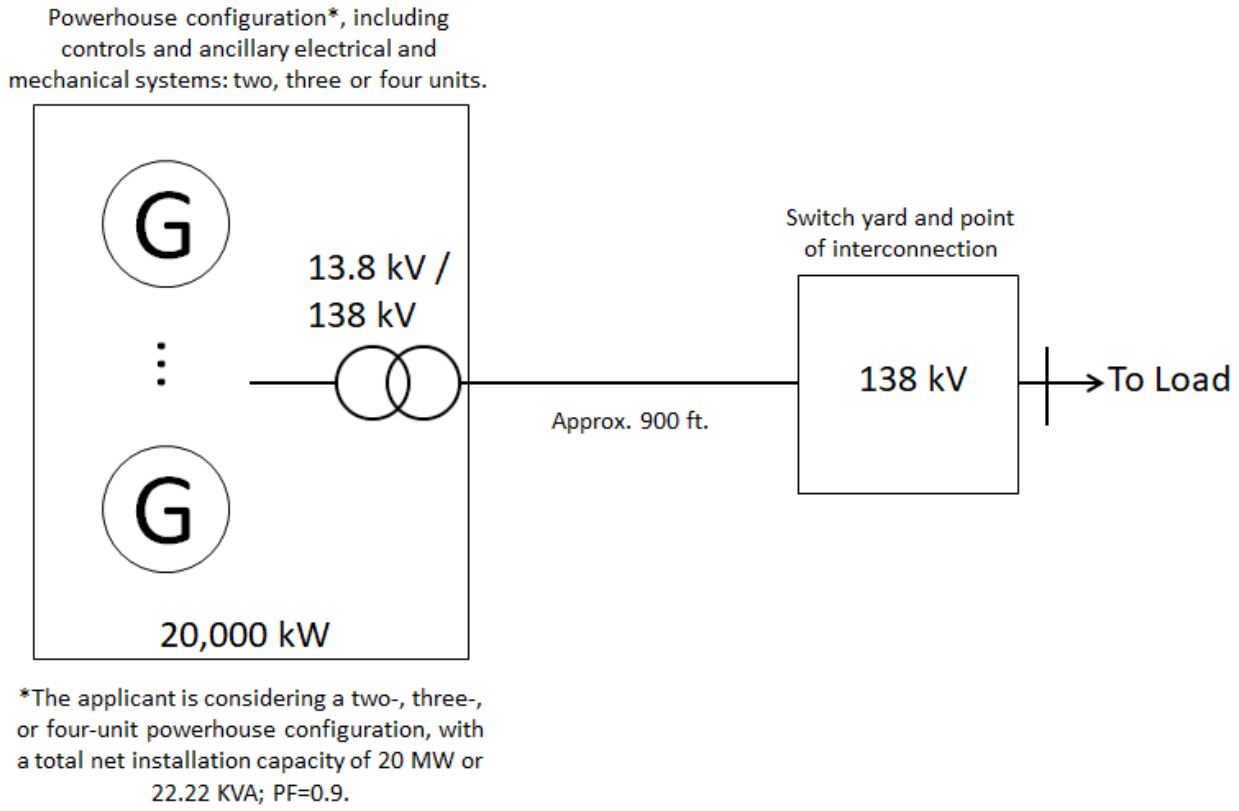
4.1.3 Transmission Facilities

The Applicant has identified existing transmission infrastructure in the vicinity of the proposed project, specifically two 138 kV transmission lines, about 0.2 miles east of the project. A powerhouse transformer with switch gear will step up the generation voltage from 13.8 kV to 138 kV. A switch yard, approximately 200 feet wide by 200 feet long, will be located adjacent to the existing transmission corridor and the potential point of transmission interconnection.

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.

A conceptual single-line diagram can be found in Figure 4.2 (below).

Figure 4.2 Conceptual Single-Line Diagram



4.1.4 Site Access

The Applicant proposes access to the powerhouse from the south via Crescent Brick Drive. A newly constructed road of approximately 1,500 feet length would run on the east side of the railroad tracks, and then cross the tracks close to the powerhouse location.

A separate approximately 250 feet long access road would connect the proposed switch yard with Route 2.

4.1.5 Capacity and Energy Production

The proposed hydroelectric turbine-generator configuration has a powerhouse hydraulic capacity of 13,733 cfs and a net proposed power capacity of 20 megawatt (MW). The estimated average annual energy production is about 141 GWh, with a capacity factor of about 82 percent. 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 about 20.1 feet.

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

Average energy generation	kWh	Capacity Factor %	Dependable Capacity (Installed Capacity x Capacity Factor) MW
January	11,020,399	75	15.0
February	9,574,775	71	14.2
March	10,147,102	70	14.1
April	10,251,962	71	14.3
May	11,000,785	78	15.6
June	12,458,192	87	17.4
July	13,614,388	91	18.3
August	14,389,636	97	19.3
September	13,201,911	94	18.8
October	12,730,773	93	18.6
November	12,184,871	86	17.2
December	11,161,603	76	15.2
Annual	141,179,127	82	16.4

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 are not anticipated to affect the barge transportation operations.

The USACE will be responsible to establish 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 13,773 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 13,773 cfs for 98.96 percent of the time.

4.2.2 Low Water Operations

If less than 13,773 cfs river flow is 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 feet (4-unit arrangement), 6.9 feet (3-unit arrangement), or 6.9 feet (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, as well as the 200 feet by 200 feet switch yard and switch yard access road, and the proposed transmission line from the powerhouse to the switch yard (see Figure 3.1 above).

The total area enclosed by the project boundary is approximately 5.1 acres.

4.4 References

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

5.0 DESCRIPTION OF EXISTING ENVIRONMENT

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 Plateaus and to the south is the Valley and Ridge region (Brockman, 1998). Physiographic maps of Ohio and West Virginia are shown below in Figure 5.1 and Figure 5.2, respectively.

Figure 5.1 Bedrock Geologic Map of Ohio

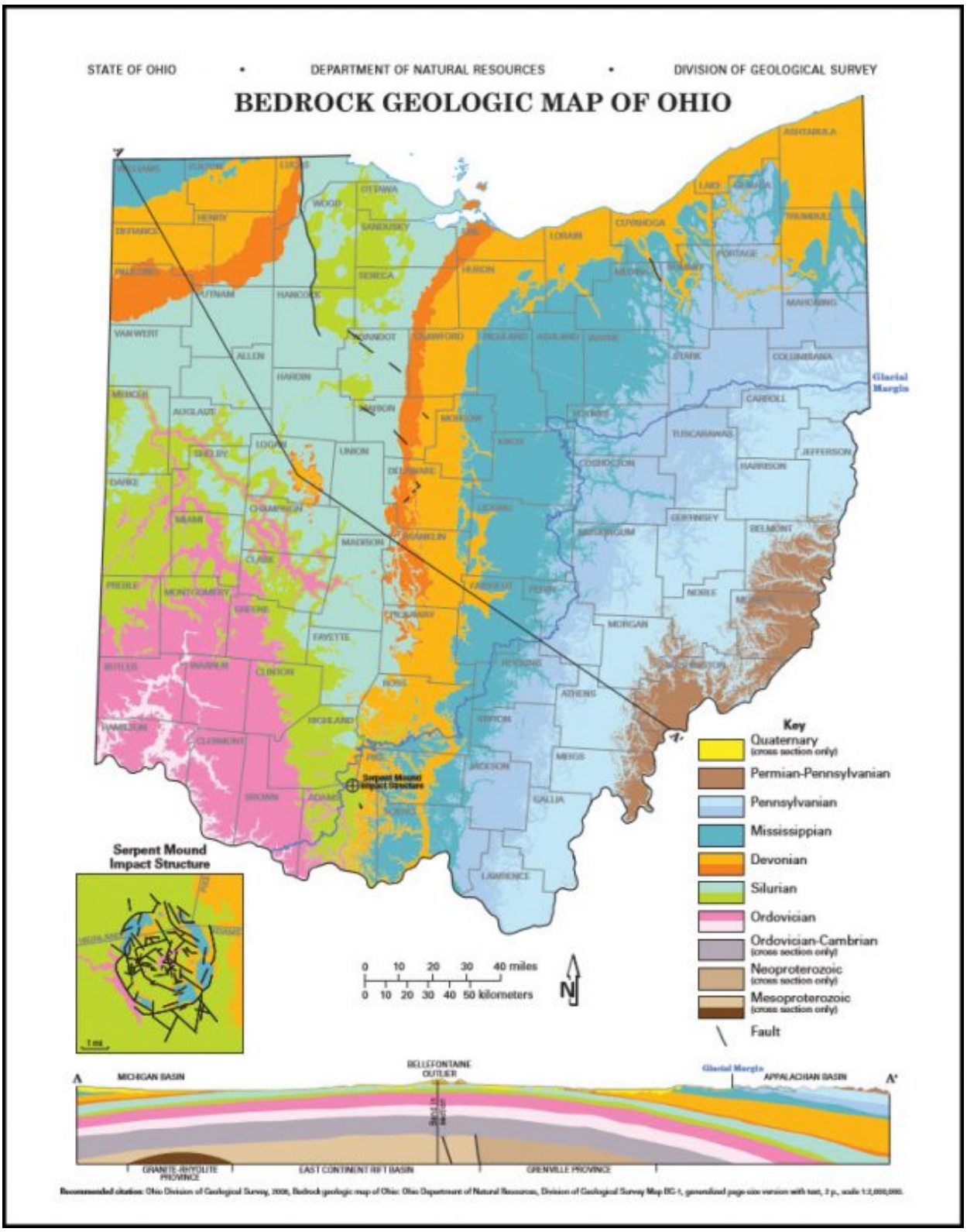
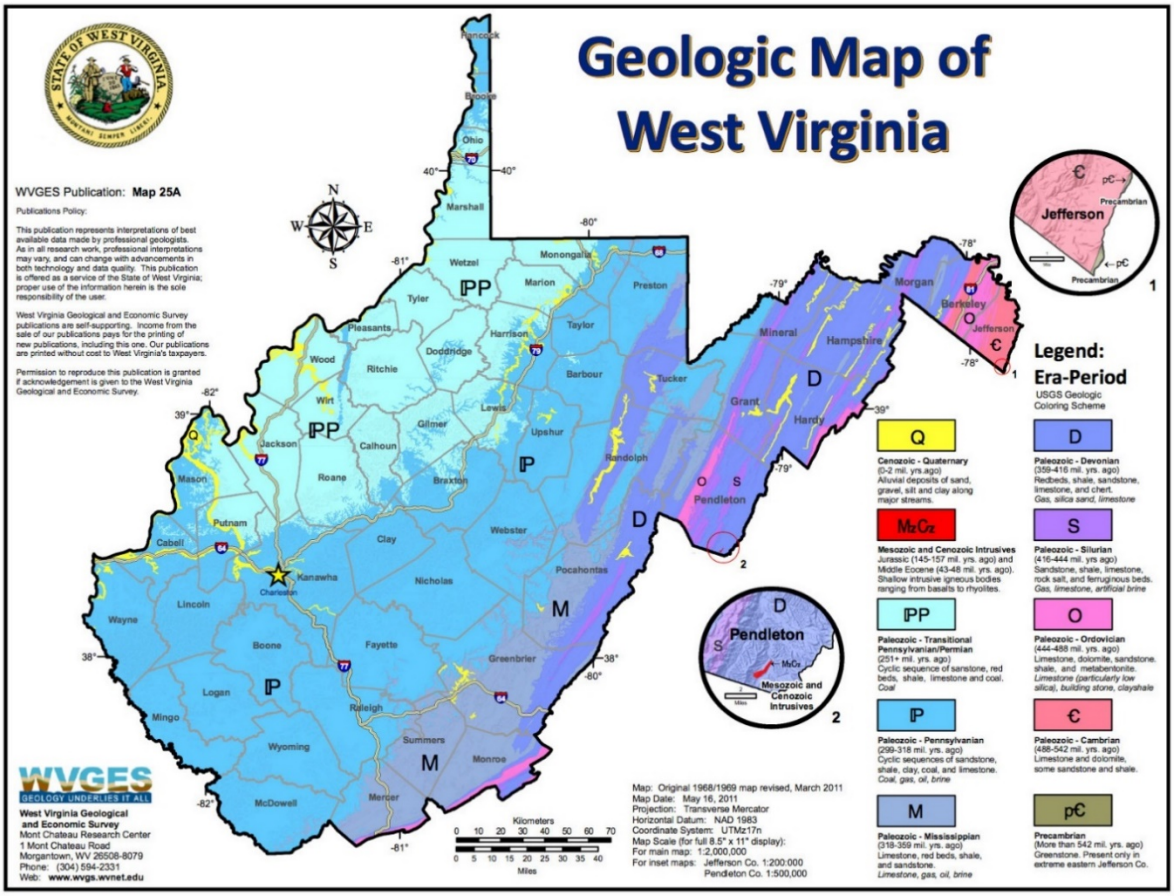


Figure 5.2 Geologic Map of West Virginia



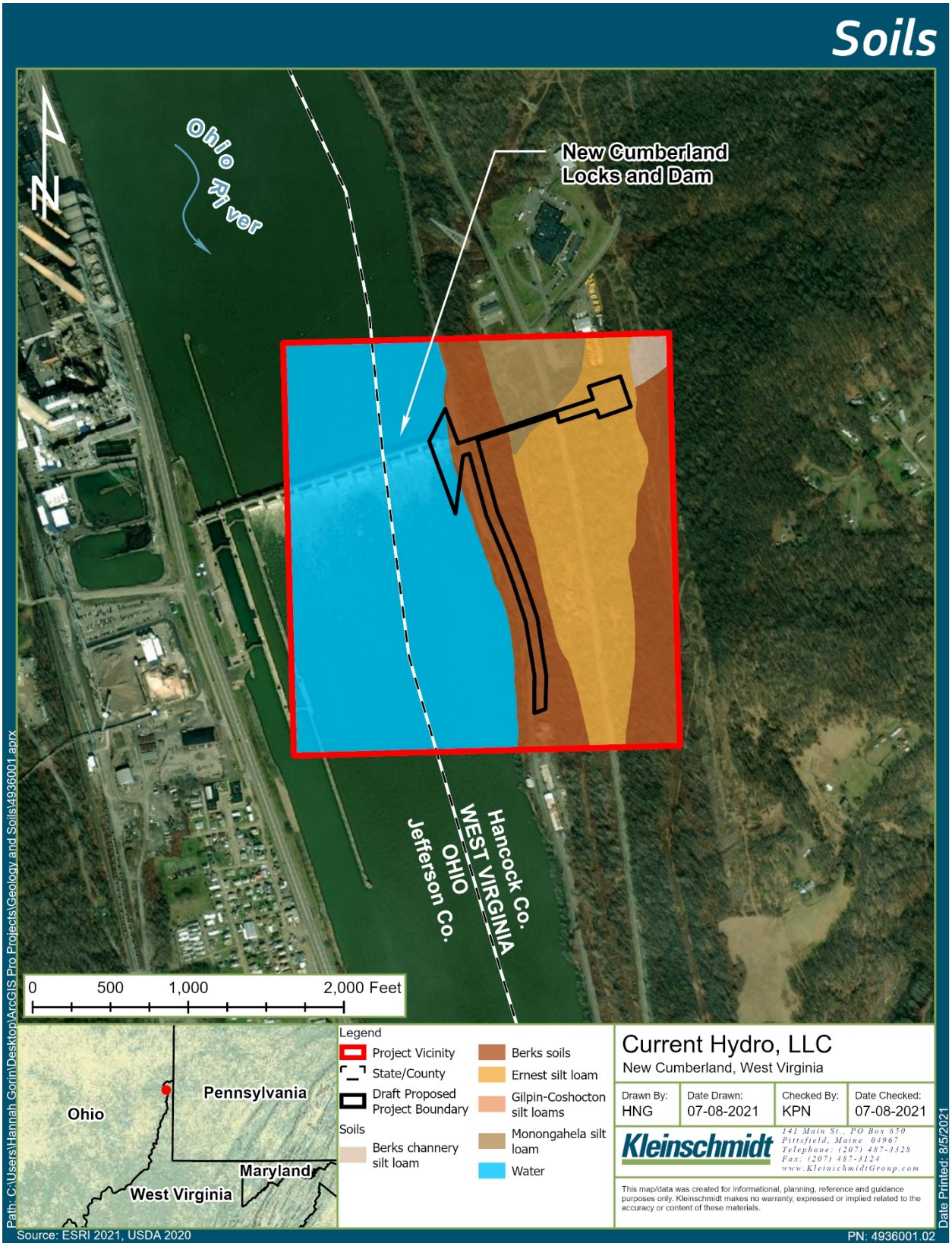
5.1.2 Soils

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 with the greatest representation within the Project Area include those from Berks, Ernest, Westmoreland, and Clarksburg families. Berks family soils consist of well drained soils formed in residuum weathered from shale, siltstone and fine-grained sandstone on rounded and dissected uplands with 0 to 80 percent slopes. Ernest family soils consist of moderately well or somewhat poorly drained soils made of colluvium derived from acid shale, siltstone, and sandstone with 0 to 50 percent slopes. Westmoreland family soils consist of well drained soils made of Residuum derived from weathered, interbedded siltstone, sandstone, and limestone with 0 to 70 percent slopes. Clarksburg family soils consist of moderately well drained soils made of Colluvium derived of weathered, interbedded siltstone, sandstone, and limestone with 0 to 25 percent slopes (NRCS, 2021).

Table 5.1 Project Vicinity Soil Map Unit Names and Descriptions

Soil Map Unit Symbol	Map Unit Name and Description	Acres	Percentage
W	Water	209.9	36.1
Ur	Urban land	100.0	17.2
BkF	Berks soils, 35 to 65 percent slopes	67.8	11.7
ErC	Ernest silt loam, 8 to 15 percent slopes	49.0	8.4
WtF	Westmoreland-Berks complex, 40 to 70 percent slopes	45.3	7.8
CkD	Clarksburg silt loam, 15 to 25 percent slopes	38.8	6.7
MoB	Monongahela silt loam, 3 to 8 percent slopes	27.7	4.8
Ud	Udorthents-Urban land complex	18.9	3.3
No	Nolin silt loam, 0 to 3 percent slopes, occasionally flooded	11.1	1.9
GoD	Gilpin-Coshocton silt loams, 15 to 25 percent slopes	5.5	0.9
BeD	Berks channery silt loam, 15 to 25 percent slopes	5.3	0.9
AhC	Allegheny silt loam, 8 to 15 percent slopes	1.5	0.3
GlC	Gilpin silt loam, 8 to 15 percent slopes	0.1	0.0
Total		581.0	100.0

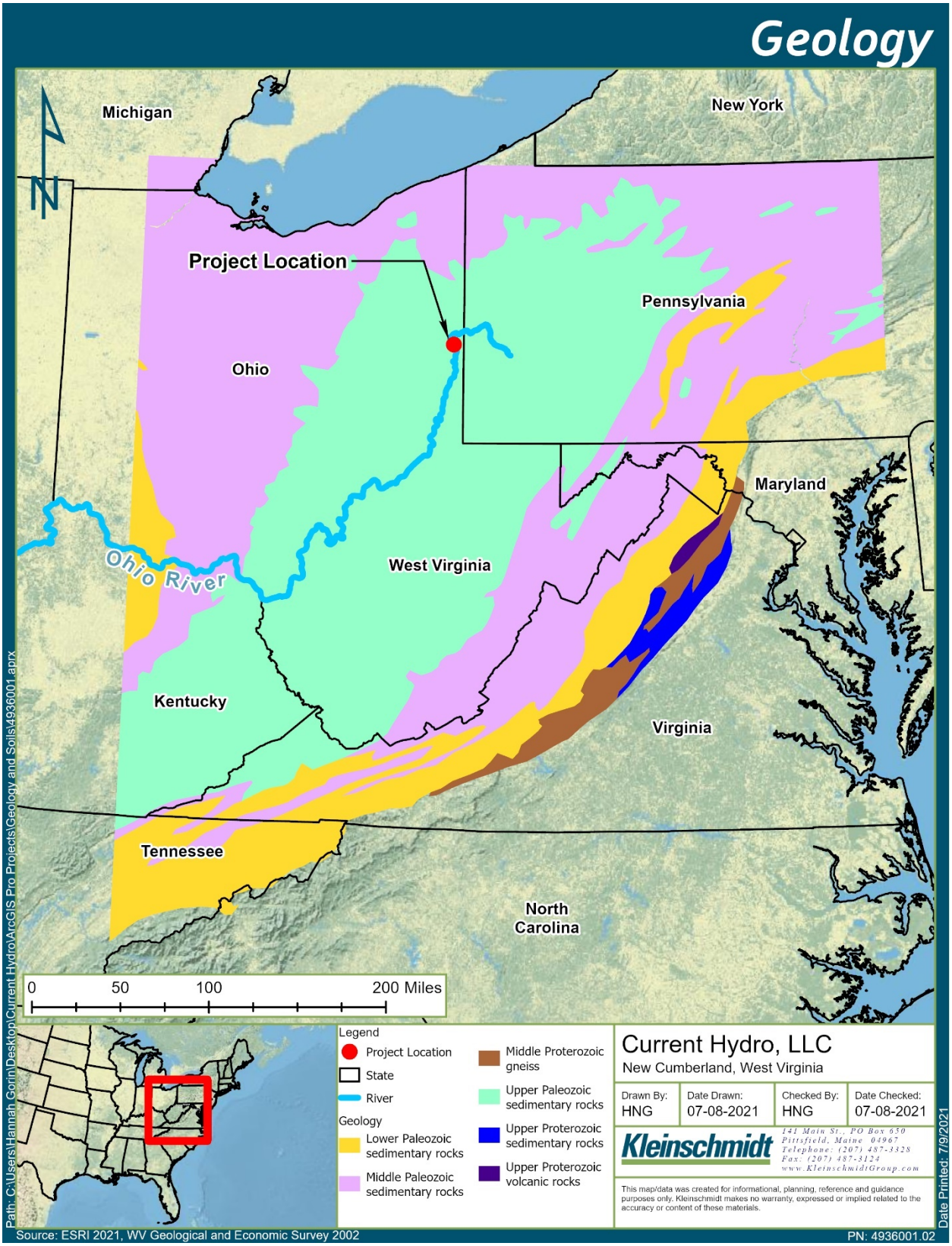
Figure 5.3 Area Soil Types



5.1.3 Bedrock Geology

Bedrock in the Project Vicinity is dated to the Paleozoic Era, further broken down into the Pennsylvanian. Bedrock in this era consists of cyclic sequences of sedimentary rocks, such as sandstone, shale, clay, coal, and limestone (WVGES, 2011) (Figure 5.4).

Figure 5.4 Project Geology



5.1.4 Reservoir Shoreline and Streambank Conditions

Upstream of the New Cumberland Locks and Dam, the left, West Virginia shoreline of the river becomes very steep with occasional bedrock outcrops. Upstream along this left bank, slopes range from 25 to 80 percent. The right shoreline is comprised primarily of gravelly deposits that extend to the river's edge. Limited bank erosion is visible along this section of the shoreline, and sections of shoreline upstream of the New Cumberland Locks and Dam have been protected with riprap.

5.1.5 Erosion

Current Hydro Project 19, LLC proposes to operate the Project as run-of-river, and as such, there is little potential for operation of 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

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

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

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2021. Web Soil Survey. [Online] URL: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

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 54.4 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 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.

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 in dam 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), Dashields (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 New Cumberland Project Location in the Ohio River Drainage Area

5.2.2 Streamflow, Gage Data, Flow Statistics, and Climate

Weather statistics are recorded at multiple points in the Ohio River drainage, including at a weather station 30 river miles downstream of the Project near the Pike Island Lock and Dam. 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 U.S. Geological Survey (USGS) stream gage is located at the upper pool of the New Cumberland Lock and Dam. This gage (03110685) records gage height. 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 New Cumberland Lock and Dam for the period of 1960-2020. The minimum, mean, and maximum flows during this period were 3,326 cfs, 40,662 cfs, and 422,076 cfs, respectively (Table 5.3). 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 New Cumberland Project Flow Data for a Period of 1960-2020

CFS	Mean	Min	Max
Jan	53,290	6,189	422,076
Feb	58,590	6,959	280,028
Mar	73,297	8,488	341,908
Apr	63,589	12,041	275,284
May	46,036	7,146	198,610
Jun	30,467	4,773	386,848
Jul	21,224	4,178	214,574

CFS	Mean	Min	Max
Aug	16,249	3,811	129,872
Sept	17,741	4,104	359,356
Oct	20,736	3,326	130,748
Nov	35,198	3,516	235,039
Dec	52,606	4,732	253,568
Annual	40,662	3,326	422,076

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 18th 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 (National Oceanic and Atmospheric Administration [NOAA], USACE, United Stated Environmental Protection Agency [USEPA], USFWS, and United States Geological Survey [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°F 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 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).

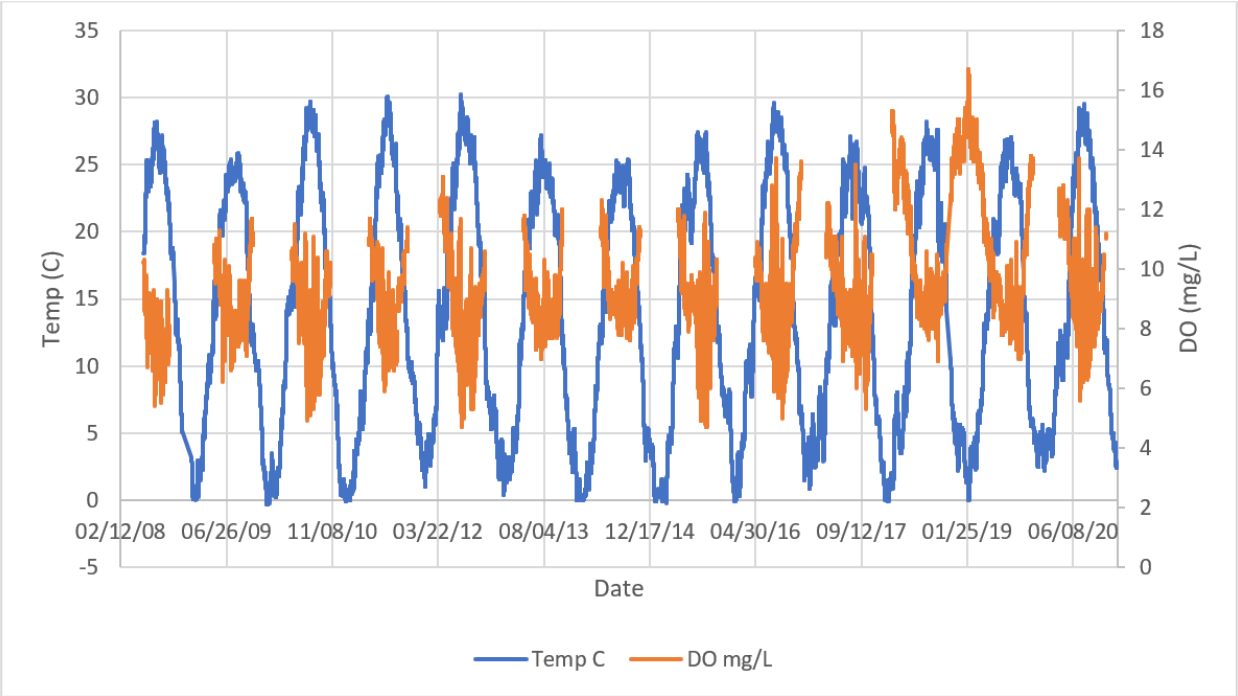
Table 5.4 Ohio River Water Temperature Criteria

Month	Period Average (°F)	Instantaneous Maximum (°F)
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 23 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

Applied Climate Information System (ACIS). 2021. xmACIS2 multistation; Pike Island Weather Station.

Ohio Environmental Protection Agency (OHEPA). 2021. OAC Chapter 3745-1 Water Quality Standards. 3745-1-32 Ohio River Standards. [Online] URL: https://www.epa.ohio.gov/dsw/wqs/index. Accessed June 1, 2021.

Ohio River Valley Water Sanitation Commission (ORSANCO). 2021. Water Quality Parameters: Dissolved Oxygen. [Online] URL: https://www.orsanco.org/data/dissolved-oxygen/.

Pennsylvania Department of Conservation and Natural Resources (PDCNR). 2021. Ohio River Basin Fact. [Online] URL: http://dcnr.pa.gov/cs/groups/public/documents/document/dcnr_20031262.pdf. Accessed June 1, 2021.

Pennsylvania Department of Environmental Protection (PDEP). 2006. A Short Review of Pennsylvania Water Law [Online] URL: http://files.dep.state.pa.us/Water/BSDW/WaterAllocation/water_law_review_022806.pdf. Accessed, June 2, 2021.

U.S. Environmental Protection Agency (USEPA). 2014. Multi-Temporal Land Use Generation for the Ohio River Basin. [Online] URL: https://nepis.epa.gov/Adobe/PDF/P100L2A2.pdf. Accessed June 2, 2021.

United States Geological Survey (USGS). 2021. Current Water Data. USGS Gage 0308600 and 03107500.

West Virginia Department of Environmental Protection (WVDEP). 2021. Notice of Final Filing and Adoption of a Legislative Rule Authorized by the West Virginia Legislature. Efiled 4/22/2021.

5.3 Fish and Aquatic Resources

5.3.1 Aquatic Resources and Habitats

5.3.1.1 Fish Species, Management and Habitats

There have been numerous fish surveys conducted along the Ohio River, including in the New Cumberland Lock and Dam Pool. In total there are 67 species of fish known to occur within this area (Table 5.5). The Pennsylvania Fish & Boat Commission (PFBC) pool data is a compilation of several years of surveys and reports presence data only. The Ohio River Valley Water Sanitation Commission (ORSANCO) conducted annual pool surveys during 2004 and 2005 in the New Cumberland Pool (ORSANCO 2004, 2005, 2006a). ORSANCO has been conducting electrofishing surveys annually throughout the Ohio River mainstem since 1991. The mainstem fish population data suggests that there are approximately 124 species found throughout the Ohio River.

The 2005 survey within the New Cumberland pool, immediately upstream of the proposed Project location collected 50 taxa of fish representing 10 different families. The most predominant species were freshwater drum and gizzard shad accounting for 28.8 percent and 23.6 percent of the total catch, respectively. The most abundant game fish species was smallmouth bass, accounting for 5.1 percent of the total catch, followed by sauger and channel catfish, accounting for 3.5 percent and 2.4 percent, respectively. Striped bass, white bass, and white perch represented 10.4 percent of the total catch, followed by perch and black bass/sunfish with 8.5 percent and 7.2 percent, respectively.

The most recent surveys done in the New Cumberland pool occurred in 2011, 2012 and 2017. During these survey years, 10,703 fishes were caught representing 67 species. The most abundant species identified was the Emerald Shiner (*Notropis atherinoides*) and the Channel Shiner (*Notropis wickliffi*), accounting for 20.8 percent and 18.4 percent of the total catch, respectively. The most abundant game fish species caught were Smallmouth bass accounting for 4.4 percent of the total catch, followed by Channel catfish and Sauger, accounting for 2.7 and 1.9 percent of total catch, respectively. Channel darter (*Percina copelandi*) are listed as a state threatened species in Pennsylvania and were found in the New Cumberland pool during all three survey years (n=85 in 2011, n= 56 in 2012 and n=1 in 2017) (PFBC, 2016). Additionally, One Tippecanoe darter (*Etheostoma tippecanoe*), which is listed as endangered in Pennsylvania, was caught during both the 2011 and 2012 survey year (PFBC, 2016).

No surveys indicated the presence of any native anadromous or catadromous species. No American eel were found in the navigational pools of New Cumberland L&D. Striped bass were found to be present in the Montgomery pool upstream. Striped bass are anadromous throughout their native range. They represent a non-native species to this system and were introduced by management agencies for the purpose of creating a recreational sport fishery (FERC, 1988). Striped bass have shown no signs of natural reproduction in the Ohio River.

Within West Virginia and Ohio, there are no state listed rare, threatened or endangered (RTE) fish species that occur in the Montgomery pool. Pennsylvania state listed rare, threatened, and endangered (RTE) fish species documented to occur in the Montgomery pool include the River shiner (*Notropis blennius*), which is listed as state endangered. The Longear sunfish, and Bigmouth buffalo are listed by Pennsylvania as protected (PFBC, 2016). No federally listed RTE fish species are known to occur in the upper Ohio River. The catadromous American eel has been noted as potentially occurring in the Ohio River Basin (FERC, 1988). However, while this species is known to occur in the upper Ohio River (PFBC, 2011), no documentation has been cited that this species has been found within the vicinity of the Project. Fish species that were surveyed in the Upper Ohio River are listed below in Table 5.5.

Table 5.5 Fish species surveyed in the upper Ohio River

Common Name	Scientific Name
Antherinopsidae (Silversides)	
Brook Silverside	*Labidesthes sicculus*
Catostomidae (Suckers)	
Black buffalo	*Ictiobus niger*
Black redhorse	*Moxostoma duquesnii*
Golden redhorse	*Moxostoma erythrurum*
Highfin carpsucker	*Carpoides velifer*
Northern hog sucker	*Hypentelium nigricans*
Quillback	*Carpoides cyprinus*
River carpsucker	*Carpoides carpio*
River redhorse	*Moxostoma carinatum*
Silver redhorse	*Moxostoma anisurum*
Smallmouth buffalo	*Ictiobus bubalus*
Smallmouth redhorse	*Moxostoma breviceps*
Centrarchidae (Sunfishes)	

Common Name	Scientific Name
Bluegill	*Lepomis macrochirus*
Black crappie	*Pomoxis nigromaculatus*
Greensunfish	*Lepomis cyanellus*
Largemouth bass	*Micropterus salmoides*
Longear sunfish	*Lepomis megalotis*
Orangespotted sunfish	*Lepomis humilis*
Pumpkinseed	*Lepomis gibbosus*
Rock bass	*Ambloplites rupestris*
Smallmouth bass	*Micropterus dolomieu*
Spotted bass	*Micropterus punctualatus*
Warmouth	*Lepomis gulosus*
White crappie	*Pomoxis annularis*
Clupeidae (Herrings & Shads)	
Gizzard shad	*Dorosoma cepedianum*
Skipjack herring	*Alosa chrysochloris*
Cyprinidae (Minnows)	
Bluntnose minnow	*Pimephales notatus*
Central stoneroller	*Campostoma anomalum*
Channel shiner	*Notropis wickliffi*
Common carp	*Cyprinus carpio*
Emerald shiner	*Notropis atherinoides*
Ghost shiner	*Notropis buchanani*
Golden shiner	*Notemigonus crysoleucas*
Goldfish	*Carassius auratus*
Mimic shiner	*Notropis valucellus*
River shiner	*Notropis blennius*
Rosyface shiner	*Notropis rubellus*
Sand shiner	*Notropis stramineus*
Shoal chub	*Macrhybopsis hyostoma*
Silver chub	*Macrhybopsis storeriana*
Spotfin shiner	*Cyprinella spiloptera*
Spottail shiner	*Notropis hudsonius*
Striped shiner	*Luxilus chrysocephalus*
Esocidae (Pikes)	
Muskellunge	*Esox masquinongy*
Tiger muskellunge	*Esox lucius x Esox masquinongy*
Hiodontidae (Mooneyes)	

Common Name	Scientific Name
Goldeneye	*Hiodon alosoides*
Mooneye	*Hiodon tergisus*
Fundulidae (Topminnows)	
Banded killifish	*Fundulus diaphanus*
Ictaluridae (Bullhead Catfishes)	
Channel catfish	*Ictalurus punctatus*
Flathead catfish	*Pylodictis olivaris*
Leuciscidae (True Minnows)	
Western blacknose dace	*Rhinichthys obtusus*
Streamline chub	*Erimystax dissimilis*
Lepisosteidae (Gar)	
Longnose gar	*Lepisosteus osseus*
Moronidae (Temperate Basses)	
Hybrid striped bass	*Morone chrysops x Morone saxatilis*
White bass	*Morone chrysops*
White perch	*Morone americana*
Percidae (Perches)	
Banded darter	*Etheostoma zonale*
Bluebreat darter	*Etheostoma camurum*
Channel darter	*Percina copelandi*
Fantail darter	*Etheostoma flabellare*
Greenside darter	*Etheostoma benniodes*
Johnny darter	*Etheostoma nigrum*
Logperch	*Percina caprodes*
Rainbow darter	*Etheostoma caeruleum*
River darter	*Percina shumardi*
Sauger	*Sander canadensis*
Saugeye	*Sander canadensis x Sander vitreus*
Tippecanoe darter	*Etheostoma tippecanoe*
Variegate darter	*Etheostoma variatum*
Walleye	*Sander vitreus*
Yellow perch	*Perca favescens*
Percopsidae	
Trout-Perch	*Percopsis omiscomaycus*
Polyodontidae (Paddlefishes)	
Paddlefish	*Polyodon spathula*

Common Name	Scientific Name
Sciaenidae (drums)	
Freshwater drum	*Aplodinotus grunneins*

5.3.2 Habitat

The aquatic habitat in the Ohio River is mostly open water, which is channelized and relatively deep. More rapid moving water can be found downstream of the dams located along the river. The most diverse fish habitat and assemblages can be found in the tailwaters of the dams, with the impoundments and pools inhabiting more of a warm water lake-like fishery (FERC, 1998). There is a lack of habitat diversity in many of the pools of the Ohio river which results in little spatial variation of the fish communities except in the dam tailwaters where velocities are higher. The warm water fish assemblage lacks any diadromous species, and there is little to no seasonal or temporal variations in fish communities. Some species may temporarily relocate to cooler waters with higher velocities and higher DO concentrations during the summer low flow period (FERC, 1988).

Habitat diversity is limited along the river which results in lacking spatial variation for other aquatic species communities. Mussel and benthic macroinvertebrate species rely on habitat criteria such as water depths, velocities, and substrates. These parameters vary between the mid-channel to shore and near tributaries and islands, with the mid channel habitat along the river remaining uniform (FERC, 1988).

The Ohio River is the second largest river system in the United States based on annual discharge, draining a watershed area greater than 200,000 square miles across 15 states. When the Ohio River reaches its confluence with the upper Mississippi River in Cairo, Illinois, it is a low-gradient system classified by EPA as a great river (Flotemersch et al. 2006). There are twenty run-of-river hydroelectric dams along the 981 miles of the Ohio River that regulate the flow of water (PFBC, 2011). The Ohio River has a low gradient and relatively slow water velocities because of its navigational modifications. The aquatic habitat is primarily channelized, deep, open water. Stretches of rapid moving water occur below the dam discharges and around obstructions such as islands. There are only a few islands that exist on the river.

The Montgomery L&D upstream pool supports predominantly a warm water fish community, with habitat for other species contained to the dam tailwaters. The New Cumberland pool has species like Montgomery such as silver redhorse, river chub, and

stoneroller that were introduced in the 1980's (USFWS, 1986). Pool habitats created by dams are considerably deeper and have less complexity than the instream habitats free flowing throughout same river. The pools are lake like with low water velocity flow patterns generally uniform across the deep main navigation channel with shallow back channels (PFBC, 2011). Instream habitat has been improved by the placement of boulder and cobble-sized rock riprap to protect river shorelines and other manmade structures, such as bridges and dams. The industrialized shorelines are lined with bulkhead structures, including walls of corrugated metal sheet piling, wood railroad ties, concrete blocks, buried barges, limestone-filled Gabion baskets, and corrugated metal mooring cells which may also provide habitat. (Junk et al., 1989). The turbulent hydraulics directly below dams and eddies adjacent to shorelines or behind obstructions provide habitat for many important game fish species, including walleye and sauger. Scoured plunge pools are often created by the turbulent flow conditions downstream of the dams, which can create shallow gravel/cobble bar habitats where scour material is deposited further downstream (FERC, 1988).

The Montgomery Pool upstream is recognized as an ecologically significant area (FERC, 1988). Its shallow water areas and wetlands provide spawning, feeding and cover for many fish species. There are no islands in the Montgomery Pool, and the Beaver River is the only major tributary with shallow-water habitat too. The Montgomery Embayment, a 17-acre embayment and wetland along the northern shore approximately 500 feet upstream of the Project Site, is considered high quality habitat for many fish including largemouth bass, spotted bass, walleye in summer, and sunfishes (FERC, 1988). There are four islands in the New Cumberland Pool. Aquatic backwater areas range from about 15 to 70 acres each totaling about 180 acres. The perimeters of Georgetown and Phyllis Islands are important fish habitats, classified as Resource Category I by the USFWS (USFWS, 1986). Along these islands and in the backchannels, underwater and overhanging coverage is in abundance. The Little Beaver River enters downstream of Georgetown Island and it provides shallow-water fish habitat. Other significant tributaries with fish habitat at their mouths include Yellow Creek and Little Yellow Creek. (FERC, 1988).

5.3.3 Essential Fish Habitat

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

5.3.4 Benthic Macroinvertebrates and Freshwater Mussels

Throughout history, the Ohio River Basin was known to inhabit as many as 297 freshwater mussel species. That number has since declined with 46 of those 297 freshwater mussels on the endangered list. Several freshwater mussels have also become extinct. During the mid to late 1900s freshwater mussel populations experienced serious declines due to pollution and habitat alterations, including channel deepening for navigation dams. The loss of host fish species that are necessary to complete the mussel life cycle and competition from invasive mussel species have also contributed to population declines (PFBC, 2011). Today, the Ohio River is known habitat to 116 of North America's native freshwater mussel species.

Freshwater mussels play an important role as ecological engineers through their water filtration processes. The spread of non-native species, particularly zebra mussels, has led to the loss of several of these native mussels, resulting in decreases in water quality and ecosystem degradation. Given the historical habitat modifications and pollution of the Ohio River, mussel populations and species diversity remain depressed. Since 1960, the PFBC has documented seventeen mussel species in the Ohio River in the vicinity of the Montgomery L&D Pool upstream of the Project. A list of these species is provided in Table 5.6. Pennsylvania and West Virginia have active restoration and protection programs for mussel populations, including stocking in West Virginia, and the West Virginia Department of Natural Resources (WVDNR) reports that some populations are re-establishing in the state. No data specific to populations on the Ohio was identified in the New Cumberland L&D area.

Table 5.6 Freshwater mussels in the Montgomery Lock and Dam area

Common Name	Scientific Name
Black sandshell	*Ligumia recta*
Deertoe	*Truncilla truncate*
Fat mucket	*Lampsilis siliquoidea*
Fawnsfoot	*Truncilla donaciformis*
Flat floater	*Anodonta suborbiculata*
Fluted-shell	*Lasmigona costata*
Fragile papershell	*Leotodea fregilis*
Giant floater	*Pyganodon grandis*
Mapleleaf	*Quadrula*
Mucket	*Actinonaias legamentia*
Paper pondshell	*Utterbackia imbecillis*

Common Name	Scientific Name
Pin healspitter	*Potamilus atatus*
Spike	*Elliptio dilatata*
Threehorn wartyback	*Obliquaria reflexa*
Three-ridge	*Amblema plicata*
Wabash pigtoe	*Fusconaia flava*
White healspitter	*Lasmigona complanta*

Baseline macroinvertebrate data in the project vicinity extends from Emsworth to New Cumberland and is based on the most recent surveys made by the Ohio River Valley Sanitation Commission (ORSANCO, 2015). Studies were conducted for Emsworth in 2012 Dashields in 2013, Montgomery in 2010, 2011 for New Cumberland in 2011, Pike Island in 2012.

ORSANCO has given several locations in the Ohio River a macroinvertebrate index score (OR Min Score) to provide a condition rating for that location in the river. The information was provided by ORSANCO and is summarized in Table 5.7.

Table 5.7 Macroinvertebrate Index Score

Lock and Dam	River Mile	OR Min Score	Condition Rating
Dashields	6.7	24.31	Fair
Dashields	7.1	34.11	Good
Dashields	7.3	40.01	Very Good
Dashields	7.6	28.46	Fair
Montgomery	30.7	36.67	Good
Montgomery	34.2	12.07	Poor
New Cumberland	47	60.00	Excellent
New Cumberland	49.4	58.32	Excellent
New Cumberland	52.3	43.67	Very Good
New Cumberland	52.5	47.15	Very Good

5.3.5 References

Flotemersch et al (2006) Concepts and Approaches for the Bioassessment of Non-wadeable Streams and Rivers.

Junk et al. (1989). An Extension of the Flood Pulse Concept, Hydrological Processes.

Pennsylvania Fish & Boat Commission (2011). Run of The River Dams Pennsylvania Fish & Boat. Port of Pittsburgh Commission. 2011. New Cumberland Locks and Dam. [Online] URL: http://www.lrp.usace.army.mil/nav/nc.htm. Accessed December 2011.

Pennsylvania Fish & Boat Commission (2016). http://www.fishandboat.com/stocked.htm.

Federal Energy Regulatory Commission. (1988). Hydroelectric Development in the Upper Ohio River Basin Final Environmental Impact Statement. FERC Docket No. EL8519114.

U.S. Fish and Wildlife Service (1986) Planning Aid Report Fish and Wildlife Resources of the Upper Ohio River Region 5 State College Pennsylvania 16 pp plus appendices.

5.4 Upland Wildlife and Botanical Resources

Current Hydro Project 19, LLC has reviewed the results of previous study efforts and will contact the WVDNR, USFWS, and other agencies and stakeholders to identify any new information that is available related to the Project's wildlife and botanical resources. During the development of the FERC Environmental Impact Statement (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.

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 FERC EIS 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 5.8). 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 approximately 60 different species of mammals known to exist in Ohio, all of which have the potential to exist in the general Project area. Table 5.8 provides a summary of common mammals that may be present within the Project vicinity (ODNR 2021).

Table 5.8 Species of Mammals in Ohio

Common Mammalian Species to Occur in Ohio	
Carnivores	
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)	
Rodents	
Eastern Chipmunk	White-Footed Deermouse
Thirteen-Lined Ground Squirrel	Allegheny Woodrat
Eastern Gray Squirrel	Meadow Vole
Eastern Fox Squirrel	Prairie Vole
Red Squirrel	Southern Bog Lemming
Southern Flying Squirrel	Common Muskrat
Woodchuck (Groundhog)	Brown Rat
American Beaver	House Mouse
Eastern Harvest Mouse	Woodland Jumping Mouse
North American Deermouse	Meadow Jumping Mouse
Bats	
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

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

5.4.6 Avian Species

Each year, approximately 200 species of birds use the lands and surrounding 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. Table 5.9 provides a summary of migratory bird species that may be present within the Project vicinity (ODNR 2012).

Table 5.9 Migratory Birds in Project Area

Migratory Birds with Potential to Occur in the Project Area			
Common Name	**Scientific Name**	**Season**	**Status**
Bald Eagle	*Haliaeetus leucocephalus*	Year-round	Bird of conservation concern
Black-billed Cuckoo	*Coccyzus erythropthalmus*	Breeding	Bird of conservation concern
Blue-winged Warbler	*Vermivora pinus*	Breeding	Bird of conservation concern
Canada Warbler	*Wilsonia canadensis*	Breeding	Bird of conservation concern
Cerulean Warbler	*Dendroica cerulea*	Breeding	Bird of conservation concern
Henslow's Sparrow	*Ammodramus henslowii*	Breeding	Bird of conservation concern

Migratory Birds with Potential to Occur in the Project Area			
Common Name	**Scientific Name**	**Season**	**Status**
Kentucky Warbler	*Oporornis formosus*	Breeding	Bird of conservation concern
Least Bittern	*Ixobrychus exilis*	Breeding	Bird of conservation concern
Louisiana Waterthrush	*Parkesia motacilla*	Breeding	Bird of conservation concern
Peregrine Falcon	*Falco peregrinus*	Breeding	Bird of conservation concern
Pied-billed Grebe	*Podilymbus podiceps*	Breeding	Bird of conservation concern
Prairie Warbler	*Dendroica discolor*	Breeding	Bird of conservation concern
Prothonotary Warbler	*Protonotaria citrea*	Breeding	Bird of conservation concern
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Breeding	Bird of conservation concern
Short-eared Owl	*Asio flammeus*	Wintering	Bird of conservation concern
Upland Sandpiper	*Bartramia longicauda*	Breeding	Bird of conservation concern
Willow Flycatcher	*Empidonax traillii*	Breeding	Bird of conservation concern
Wood Thrush	*Hylocichla mustelina*	Breeding	Bird of conservation concern
Worm Eating Warbler	*Helmitheros vermivorum*	Breeding	Bird of conservation concern

5.4.7 Reptiles

Table 5.10 provides a summary of reptile species that may be present within the Project vicinity (ODNR 2008; ODNR 2021; Conant 1952).

Table 5.10 Reptile Species in Project Area

Common Reptiles to Inhabit Lands within Ohio	
Turtles	
Eastern Musk Turtle	Snapping Turtle
Spotted Turtle	Eastern Box Turtle
Blanding's Turtle	Northern Map Turtle
Ouachita Turtle	Midland Painted Turtle

Common Reptiles to Inhabit Lands within Ohio	
Red-Eared Slider	Eastern Spiny Softshell
Midland Smooth Softshell	Wood Turtle
Lizards and Skinks	
Eastern Fence Lizard	Little Brown Skink
Common Wall Lizard	Common Five-Lined Skink
Broad-Headed Skink	
Non-venomous Snakes	
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	
Venomous Snakes	
Northern Copperhead	Eastern Massasauga
Timber Rattlesnake	

5.4.8 Amphibians

Table 5.11 provides a summary of amphibian species that may be present within the Project vicinity. (ODNR 2012a; MSU 2010).

Table 5.11 Amphibian Species in the Project Area

Common Amphibians to Inhabit Lands within Ohio	
American Toad	Bullfrog
Blue-Spotted Salamander	Cope's Gray Treefrog
Cave Salamander	Eastern Spadefoot
Eastern Cricket Frog	Four-Toed Salamander
Eastern Tiger Salamander	Gray Treefrog
Fowler's Toad	Green Salamander

Common Amphibians to Inhabit Lands within Ohio	
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 5.12 provides a summary of butterfly and skipper species that may be present within the Project vicinity (ODNR 2009).

Table 5.12 Butterfly and Skipper Species in the Project Vicinity

Common Butterflies and Skippers to Inhabit Lands within Ohio	
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
Hackberry	Grizzled Skipper
Karner Blue	Harvester

Common Butterflies and Skippers to Inhabit Lands within Ohio	
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 5.13 provides a summary of common insect, spider, and invertebrate species that may be present within the Project vicinity. (ODNR 2012b).

Table 5.13 Insects, Spiders, and Invertebrates in the Project Vicinity

Common Insects, Spiders, and other Invertebrates to Inhabit Lands within Ohio	
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 5.14 provides a summary of botanical species that may be present in these habitats and within the Project vicinity.

Table 5.14 Botanical Species in the Project Vicinity

Species	Scientific Name
Silver Maple	*Acer saccharinum*
American Sycamore	*Platanus occidentalis*
Cottonwood	*Populus*
Black Willow	*Salix nigra*
Slippery Elm	*Ulmus rubra*
Pin Oak	*Quercus palustris*
River Birch	*Betula nigra*
Sweet Gum	*Liquidambar styraciflua*
Hickory	*Carya*
Hackberry	*Celtis*
Black Locust	*Robinia pseudoacacia*
American Elm	*Ulmus americana*
Green Ash	*Fraxinus pennsylvanica*
Box Elder	*Acer negundo*

Species	Scientific Name
Pawpaw	*Asimina triloba*
Buckeye	*Aesculus glabra*
Black Walnut	*Juglans nigra*
Spicebush	*Lindera benzoin*
Virginia Creeper	*Parthenocissus quinquefolia*
Poison Ivy	*Toxicodendron radicans*
Dogwood	*Cornus*
Black Elderberry	*Sambucus*
Wingstem	*Verbesina alternifolia*
Touch-Me-Not	*Mimosa pudica*
White Snakeroot	*Ageratina altissima*

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 5.15 below provides a summary of common invasive nonindigenous wildlife 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 wildlife communities and habitats.

Table 5.15 Common Plant Species of Ohio

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

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 5.16 below provides a summary of common invasive nonindigenous plant species found in Ohio. The species presented in Table 5.16 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 5.16 Common Invasive Non-Indigenous Plant Species of Ohio

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

5.4.16 References

Conant 1952: The Reptiles of Ohio, University of Notre Dame Press, Notre Dame, Indiana 2nd Edition, R. Conant February 2, 1952, Retrieved July 8, 2021. https://archive.org/stream/reptilesofohio05cona/reptilesofohio05cona_djvu.txt

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.

FERC 1991: Federal Energy Regulatory Commission - Summit Pumped Storage Hydroelectric Project P- 9423, Norton, Ohio: Final Environmental Impact Statement, January 18, 1991.

iNaturalist 2021: Invasive Species of Ohio, Accessed June 16, 2021. https://www.inaturalist.org/guides/3789?taxon=1.

MSU 2010: Potential Impact of Human Transportation on Amphibian and Reptile Populations Montclair State University, Department of Biology & Molecular Biology, Fourth Passaic River Symposium. C. Soman, J. Xu, and M. Wu June 22, 2010.

ODNR 2008: Ohio Department of Natural Resources – Reptiles of Ohio: Field Guide, Retrieved July 8, 2021. https://ohiodnr.gov/static/documents/wildlife/backyard-wildlife/Pub%205354_Reptiles%20of%20Ohio%20Field%20Guide.pdf

ODNR 2009: Ohio Department of Natural Resources – Butterflies and Skippers of Ohio: Field Guide, Retrieved July 8, 2021. https://issuu.com/angelc7/docs/butterflies_and_skippers_of_ohio_-_

ODNR 2012a: Ohio Department of Natural Resources – Amphibians of Ohio: Field Guide, Retrieved July 8, 2021. https://ohiodnr.gov/static/documents/wildlife/backyard-wildlife/Amphibians%20of%20Ohio%20Field%20Guide%20pub348.pdf

ODNR 2012b: Ohio Department of Natural Resources – Common Spiders of Ohio: Field Guide, Retrieved July 8, 2021. https://ohiodnr.gov/static/documents/wildlife/backyard-wildlife/Common%20Spiders%20of%20Ohio%20Field%20Guide%20pub5140.pdf

ODNR 2021: Ohio Department of Natural Resources – Species and Habitats: Species Guide Index – Mammals, Retrieved July 22, 2021. https://ohiodnr.gov/wps/portal/gov/odnr/discover-and-learn/safety-conservation/about-ODNR/wildlife/species-guide

ODNR 2017: Ohio Department of Natural Resources – Invasive Species in Ohio: Invasive Terrestrial Plants, Retrieved July 18, 2021. https://ohiodnr.gov/wps/portal/gov/odnr/discover-and-learn/plants-trees/invasive-plants

Snyder et al. 2004: An Overview of Nonindigenous Plant Species in New Jersey. D. Snyder and S. Kaufman. NJDEP, Division of Parks and Forestry, Office of Natural Lands Management, Natural Heritage Program, Trenton, NJ. 107 pages.

USFWS 2017: U.S. Fish and Wildlife Service, Ohio River Islands National Wildlife Refuge - Wildlife & Habitat, Accessed July 2021 https://www.fws.gov/refuge/ohio_river_islands/wildlife_and_habitat/index.html

USFWS 2020: 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

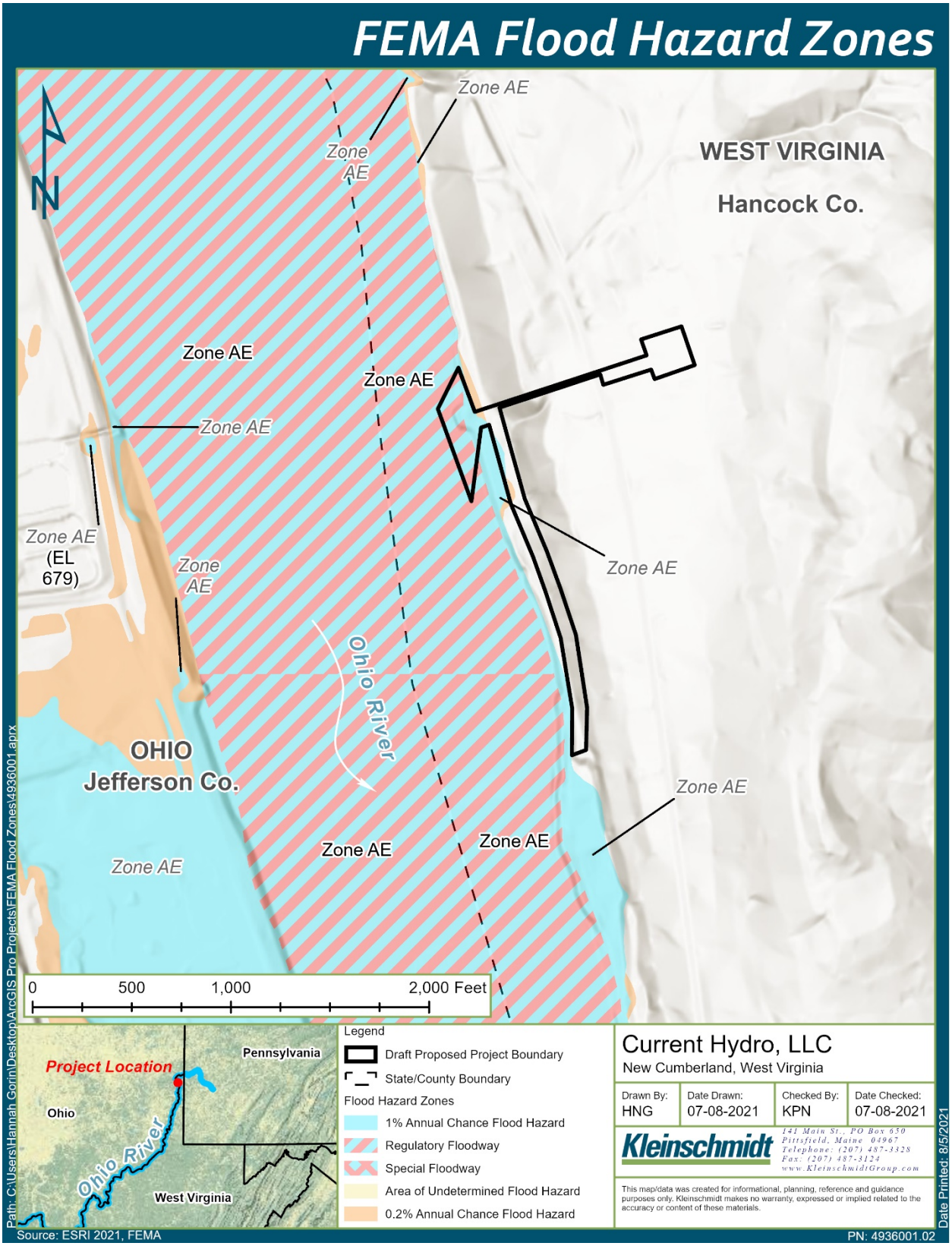
5.5 Shoreline Wildlife and Botanical Resources

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 (FEMA 2006a; FEMA 2006b; FEMA 2006c; FEMA 2015).

Figure 5.7 FEMA Flood Zones



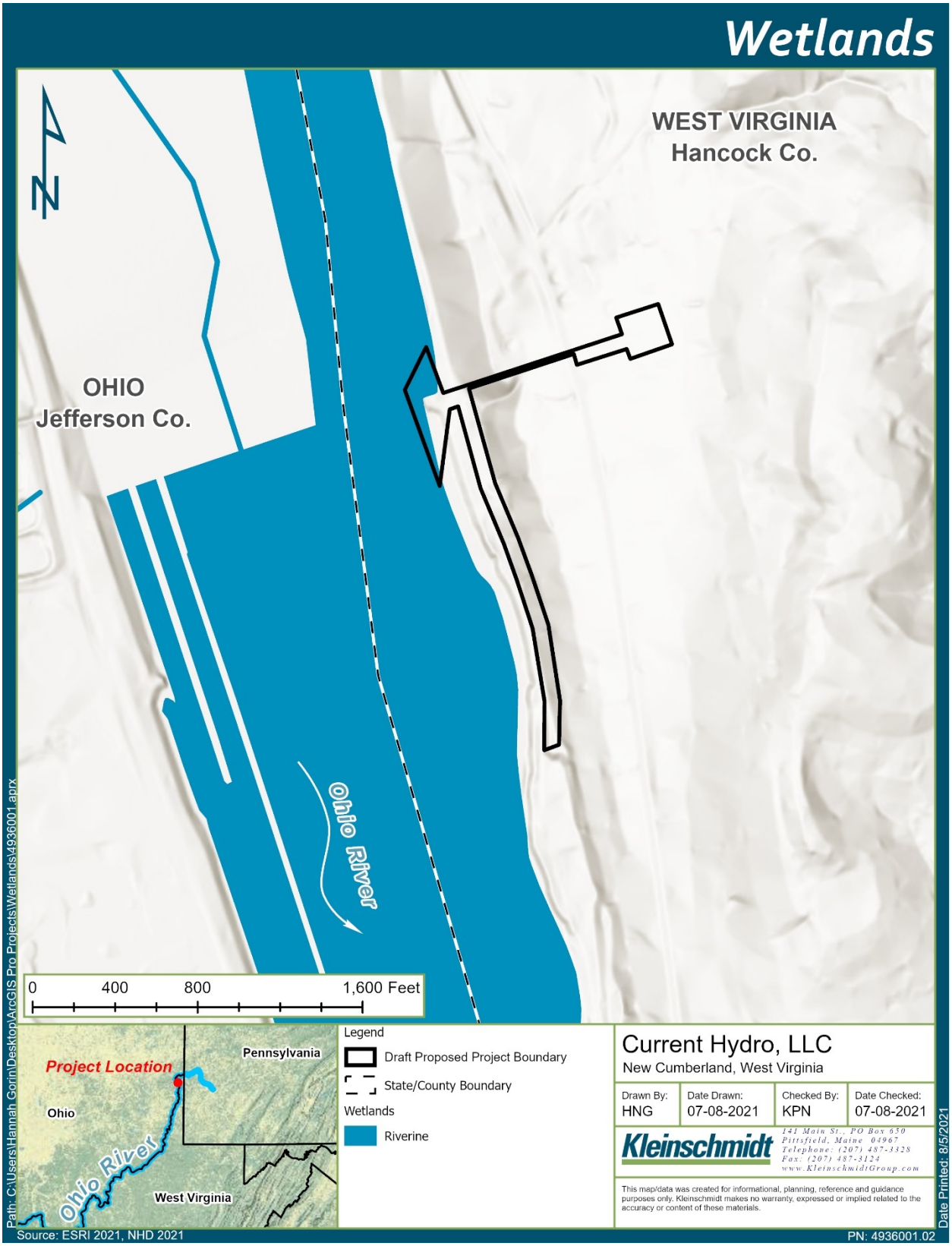
5.5.1.2 Wetlands

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. Only riverine wetlands (R2UBH) were identified as being within any portion 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 2017).

Figure 5.8 Wetlands



5.5.1.3 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).

5.5.2 Riparian and Littoral Species and Habitats of the Project Area and Vicinity

5.5.2.1 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 ground water. 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 greater than 50 percent crown closure (ODNR 2007).

5.5.2.2 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).

5.5.3 References

Cowardin 1979: USFWS Classification of Wetlands and Deepwater Habitats of the United States, Cowardin et al. https://www.fws.gov/wetlands/documents/classification-of-wetlands-and-deepwater-habitats-of-the-united-states.pdf

FEMA 2006a: Federal Emergency Management Agency - Belmont County, Ohio FEMA FIRM Floodplains Map Panel 114 of 456 Map # 39013C0114E, Retrieved January 20, 2017. https://msc.fema.gov/portal/downloadProduct?filepath=/39/P/Firm/39013C0114E.png&productTypeID=FINAL_PRODUCT&productSubTypeID=FIRM_PANEL&productID=39013C0114E

FEMA 2006b: Federal Emergency Management Agency - Belmont County, Ohio FEMA FIRM Floodplains Map Panel 112 of 456 Map # 39013C0112E, Retrieved January 20, 2017. https://msc.fema.gov/portal/downloadProduct?filepath=/39/P/Firm/39013C0112E.png&productTypeID=FINAL_PRODUCT&productSubTypeID=FIRM_PANEL&productID=39013C0112E

FEMA 2006c: Federal Emergency Management Agency - Jefferson County, Ohio FEMA FIRM Floodplains Map Panel 362 of 375 Map # 39081C0362D, Retrieved January 20, 2017. https://msc.fema.gov/portal/downloadProduct?filepath=/39/P/Firm/39081C0362D.png&productTypeID=FINAL_PRODUCT&productSubTypeID=FIRM_PANEL&productID=39081C0362D

FEMA 2015: Federal Emergency Management Agency - Flood Zones Definitions. http://www.fema.gov/flood-zones

ODNR 2007: Ohio Department of Natural Resources – Division of Wildlife, Ohio's Wild Wetlands!, Retrieved July 8, 2021. https://ohiodnr.gov/static/documents/wildlife/education/Ohios%20Wetlands%20PW.pdf

NRCS 2001: Natural Resource Conservation Service - Wildlife Habitat Management Institute Wetland Mammals: Fish and Wildlife Habitat Management, Leaflet Number 21, March 2001 - http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_010045.pdf

ODNR 2013: Ohio Department of Natural Resources – Ohio & The national Wetlands Inventory, August 2013, Retrieved July 2021. http://www.aswm.org/pdf_lib/mapping_2013/ohio.pdf

UCMP 2004: University of California Museum of Paleontology - The Freshwater Biome: Ponds and Lakes, Accessed July 2021. http://www.ucmp.berkeley.edu/exhibits/biomes/freshwater.php

USDA 1996: United States Department of Agriculture - Riparian Areas Environmental Uniqueness, Functions, and Values: RCA Issue Brief #11 August 1996 http://www.nrcs.usda.gov/wps/portal/nrcs/detail/nj/technical/cp/cta/?cid=nrcs143_014199

USFWS 1985: National Wetlands Inventory - Wetlands of New Jersey, July 1985. http://www.fws.gov/wetlands/Documents%5CWetlands-of-New-Jersey.pdf

USFWS 2017: United States Fish and Wildlife Service - National Wetlands Inventory, Wetlands Mapper V2, Retrieved July 2021.

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 vicinity of the Project area within Hancock County, West Virginia 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 ODNR. 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 (ODNR 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 and Jefferson Counties using the Environmental Conservation Online System (ECOS) (USFWS 2021b). Federally listed species that may be present in the Project area, based on known or expected distributions, are listed in Table 5.17. 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 5.17 Federally Listed Species that May Occur in Project Area

Common Name	Scientific Name	Federal Status	County
Northern long-eared bat	*Myotis septentrionalis*	Threatened	Hancock and Jefferson
Indiana bat	*Myotis sodalist*	Endangered	Hancock and Jefferson
Bald Eagle	*Haliaeetus leucocephalus*	Protection Under Bald and Golden Eagle Protection Act	Hancock and Jefferson

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 10ºC 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 feet in height with a wingspan of 6-8 feet. 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 feet in diameter and 3 feet 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 State Listed Species

The ODNR's searchable database was utilized to generate a list of state listed animal species that are known or likely to occur within Jefferson County. A total of 49 Ohio state listed species may be present in the county (ODNR 2021) (Table 5.18).

Table 5.18 Ohio State Species of Concern That May Be Found in Jefferson County

Common Name	*Scientific Name*	Group	State Status
Eastern Hellbender	*Cryptobranchus alleganiensis*	Amphibian	Endangered
Four-toed Salamander	*Hemidactylium scutatum*	Amphibian	Endangered
Northern Harrier	*Circus hudsonius*	Bird	Endangered
Barn Owl	*Tyto alba*	Bird	Endangered
Sharp-shinned Hawk	*Accipiter striatus*	Bird	Endangered
Henslow's Sparrow	*Ammodramus henslowii*	Bird	Species of Concern
Grasshopper Sparrow	*Ammodramus savannarum*	Bird	Species of Concern
Eastern Whip-poor-will	*Anostomus vociferus*	Bird	Species of Concern
Common Nighthawk	*Chordeiles minor*	Bird	Species of Concern
Northern Bobwhite	*Colinus virginianus*	Bird	Species of Concern
Bobolink	*Dolichonyx oryzivorus*	Bird	Species of Concern
American Coot	*Fulica americana*	Bird	Species of Concern
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Bird	Species of Concern
Vesper Sparrow	*Pooecetes gramineus*	Bird	Species of Concern
Cerulean Warbler	*Setophaga cerulea*	Bird	Species of Concern
Long-eared Owl	*Asio otus*	Bird	Special Interest
Brown Creeper	*Certhis americana*	Bird	Special Interest
Common Raven	*Corvus corax*	Bird	Special Interest
Purple Finch	*Haemorhous purpureus*	Bird	Special Interest
Blackburnian Warbler	*Setophaga fusca*	Bird	Special Interest
Magnolia Warbler	*Setophaga magnolia*	Bird	Special Interest
Bell's Vireo	*Vireo bellii*	Bird	Special Interest
Blue-headed Vireo	*Vireo solitarius*	Bird	Special Interest
Riffle Snaketail	*Ophiogomphus carolus*	Dragonfly	Endangered
Goldeye	*Hiodon alosoides*	Fish	Endangered
Ohio Lamprey	*Ichthyomyzon bdellium*	Fish	Endangered
Tippecanoe Darter	*Etheostoma Tippecanoe*	Fish	Endangered

Common Name	*Scientific Name*	Group	State Status
Channel Darter	*Percina copelandi*	Fish	Endangered
River Darter	*Percina shumardi*	Fish	Endangered
American Eel	*Anguilla rostrata*	Fish	Endangered
Allegheny Crayfish	*Faxonius obscurus*	Fish	Species of Concern
Muskellunge	*Esox masquinongy*	Fish	Species of Concern
Longnose Dace	*Rhinichthys cataractae*	Fish	Species of Concern
Black Bear	*Ursus americanus*	Mammal	Endangered
Big Brown Bat	*Eptesicus fuscus*	Mammal	Species of Concern
Silver-haired Bat	*Lasionycteris noctivagans*	Mammal	Species of Concern
Red Bat	*Lasiurus borealis*	Mammal	Species of Concern
Hoary Bat	*Lasiurus cinereus*	Mammal	Species of Concern
Woodland Vole	*Microtus pinetorum*	Mammal	Species of Concern
Little Brown Bat	*Myotis lucifugus*	Mammal	Species of Concern
Woodland Jumping Mouse	*Napaeozapus insignis*	Mammal	Species of Concern
Tri-colored Bat	*Perimyotis subflavus*	Mammal	Species of Concern
Southern Red-backed Vole	*Clethrionomys gapperi*	Mammal	Extirpated
Northern Long-eared Bat	*Myotis septentrionalis*	Mammal	Endangered
Black Sandshell	*Ligumia recta*	Mollusk	Endangered
Threehorn Wartyback	*Obliquaria reflexa*	Mollusk	Endangered
Queensnake	*Regina eptemvittata*	Reptile	Species of Concern
Eastern Box Turtle	*Terrapene carolina*	Reptile	Species of Concern

5.6.7 Rare, Threatened, Endangered and Special Status Botanical Species

There are no known occurrences of rare, endangered, and special status (RTE) botanical species near or within the project boundary.

5.6.8 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 (Table 5.19) (USFWS 2021a).

Table 5.19 USFWS IPaC Migratory Bird List with Potential to Occur at Project

Common Name	Scientific Name	Status[1]
Black-billed cuckoo	*Coccyzus erythropthalmus*	BCC Rangewide (CON)
Black-capped Chickadee	*Poecile atricapillus practicus*	BCC-BCR
Bobolink	*Dolichonyx oryzivorus*	BCC Rangewide (CON)
Prairie Warbler	*Dendroica discolor*	BCC Rangewide (CON)
Wood Thrush	*Hylocichla mustelina*	BCC Rangewide (CON)

[1]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

5.6.9 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.

5.6.10 References

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

Ohio Department of Natural Resources (ODNR). 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). 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. Accessed August 6, 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 two largest Ohio communities in the New Cumberland pool are East Liverpool and Wellsville. Facilities at the New Cumberland L&D and at Kennedy Park upstream in Newell, WV include 426 acres of recreation land, 24 picnic sites, 4 launch lanes, and 4 park lots. Recreational opportunities near the proposed Project generally include boat ramps/marinas, fishing, and community parks/ballfields. Those within roughly a mile of the Project area are described below.

On the eastern side of the New Cumberland Project much of the land is owned by Hancock County, with the remainder being privately owned. The USACE owns the Lock and Dam on the Ohio side of the river. The land on the east side of the Project and the river is dominated by woodlands and forest, with a small amount of residential land mixed in. The USACE lock facility land is on the western side of the river. Adjacent to the western side of the Project, the land is mostly urban and industrial near the village of Stratton, Ohio.

5.7.2 Existing and Future Recreation Needs

As of April 2021, the Statewide Comprehensive Outdoor Recreation Plan (SCORP) went into effect. The 2020-2025 SCORP document draft is currently in public review period (WV Development Office 2021). The goal of SCORP is to work with organizations such as the Northern Panhandle Resource Conservation and Development (NPRCD), the National Park Service (NPS), the Land and Water Conservation Fund program (LWCF), and the public to provide plans for park renovations, expansions to promote active lifestyles, innovate communities, attract, and retain visitors to the area, develop trailheads or preserve other natural areas to impact community health objectives.

5.7.3 Park and Recreation Areas within the Project Area

There are no National Historic trails in the vicinity of the New Cumberland Project area. There are also no National Forests in proximity to the Project. The Project itself is located at the USACE New Cumberland Lock and Dam and is a federal facility owned by the USACE. The state owned and managed lands in the vicinity of the Project include Hillcrest, located approximately 2 miles northeast. Tomlinson Run state park is located approximately 1.5 miles northeast of the Project area.

5.7.4 Fishing and Hunting

There are several fishing opportunities in the New Cumberland area and across the river in Stratton, OH that are accessible to residents and visitors. The New Cumberland Lock and Dam is a popular angling area for locals, but the lock side is restricted access due to the presence of the USACE facilities.

According to recreation use surveys conducted by the WVDNR, the New Cumberland Pool has the highest rate of fish caught and kept per water acre than any other pool surveyed. The most popular shoreline fishing areas on the Ohio river shore are the Little Yellow Creek (River Mile (RM) 47), Jethro Run (RM 45), East Liverpool (RM 42 and 44), and Yellow Creek (RM 50). On the West Virginia shore of the river the most popular fishing spot is Chester at RM 43. Another popular fishing area for West Virginia shore anglers is Tomlinson Run state park which is located on Veterans Boulevard in New Cumberland. Other popular areas for boat fishing include River Mile 49 near Wellsville, River Mile 45 near Newell, WV, and River Mile 51 below Yellow Creek (FERC 1988).

The shooting and hunting area located closest to the Project site in Hancock County is the Hillcrest Wildlife Management Area (WMA). Situated over 2 miles northeast of the Project site, beyond Tomlinson Run State Park. Hillcrest WMA consists of 2,212 acres and is owned by the WVDNR. and the primary hunt species consist of deer, mourning dove, grouse, pheasant, rabbit, and squirrel. Hunting is a popular recreational activity throughout West Virginia and in the neighboring states of Pennsylvania and Ohio, and other hunting opportunities exist in areas further outside the proposed Project Area.

5.7.5 Boating

Boat access to the Ohio River in Hancock County, Virginia consists of the following a boat ramp on State Route 2 at the New Cumberland Fire Department. This ramp consists of a concrete 2-lane ramp, an asphalt parking lot large enough for 46 cars and courtesy docks. The ramp is owned by the New Cumberland Volunteer Fire Department but is leased by the WVDNR.

There is a boat ramp at the Chester City Park also off State Route 2 in the City of Chester. This ramp consisting of a concrete 2-lane ramp and an asphalt parking lot large enough for 40 cars. The ramp is owned by the City of Chester and is leased by WVDNR.

Boating access within Hancock County also includes non-Ohio river locations including a boat ramp at Tomlinson Run Lake that consists of a concrete boat ramp. The lake has a

maximum depth of approximately 17 feet and an average depth of 4.5 feet. It is a popular fishing spot, and night fishing is not permitted. Facilities for camping (with permit), picnicking and swimming are also available in the park and rental boats are available.

5.7.6 References

Federal Energy Regulatory Commission (FERC). 1988. Final Environmental Impact Statement, docket No. ELSS-19-114, September 1988

West Virginia Development Office. West Virginia Statewide Comprehensive Outdoor Recreation Plan (2020-2025). Available Online: https://wvcad.org/assets/files/resources/Land%20and%20Water%20Conservation%20Fund/WV-SCORP%20DRAFT.pdf Accessed: August 6, 2021.

West Virginia Department of Commerce. Land and Water Conservation Fund. Available Online: https://commerce.wv.gov/boards-commissions/land-and-water-conservation-fund/ https://www.bhbdc.com/about/ Accessed: August 6, 2021.

5.8 Aesthetic Resources

5.8.1 Visual Character of the Project Vicinity

The New Cumberland 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 shoreline in the proposed project vicinity along the eastern bank of the Ohio River is mostly comprised of undeveloped shoreline, and terrestrial habitats include a diverse mix of hardwood bottomlands, riparian lowlands, wetlands, sloughs, islands, and agricultural land. Development in the area includes the USACE locks and the community of Stratton, Ohio. The existing lock and dam development is located on the western side of the river, opposite the project area. The New Cumberland locks and dam consists of a 1,315-foot dam that is 64 feet high and includes a main lock and an auxiliary lock. The adjacent W.H. Sammis generation plant, located in Stratton, is characterized by tall stacks, with white, coal fired steam during operation.

The only known resource with a scenic designation within the Stratton area of Jefferson County 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). The route of the Ohio River Scenic Byway adjacent to the Project area was bridged, or "decked", by a major construction project in the 1980's. Specifically, a $426 million air quality control system was installed at the adjacent Sammis Power Facility. Due to space constraints, this large piece of equipment was placed in front of the Sammis Power Facility on a deck that was constructed over four lanes of Ohio State Route 7. The deck is more than 300 yards long.

5.8.2 Visual Character of Project Lands and Waters

The Stratton community, located on the western side of the river opposite of the project site, may have some views of the project. These views would be distant and may be somewhat blocked by the intervening locks and dams and by the existing decking system at the Sammis Power Facility. On the West Virginia side of the river, where the proposed project is proposed, there is a viewing platform on the hillside above the river, proximate to a new 911 Call Center.

Historically, the region has centered around coal mining. The region is encompassed by the Eastern Marcellus Shale field. New Cumberland 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 Village of Stratton and the City of New Cumberland, which are part of Jefferson County, Ohio and Hancock County, West Virginia, respectively.

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).

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).

The current New Cumberland Locks and Dam replaced old Locks and Dams 7, 8, and 9, which consisted of manually operated wooden wicket dams constructed near the beginning of the 20th century. Construction of the locks was completed in 1959, with completion of the dam following in 1961 (USACE 2021).

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.

There are no known historical sites within the proposed FERC Project boundary. A review of national register places for Hancock County, West Virginia yielded two listed properties in New Cumberland:

Table 5.20 National Register

Historic Name and ID#	Address	County	Municipality	Status	Date
First National Bank Graham Building (00001312)	100 N. Chester St	Hancock	New Cumberland	Listed	11/2/2000
Marshall House (01000263)	1008 Ridge Ave.	Hancock	New Cumberland	Listed	3/12/2001

Source: WV Department of Arts, Culture and History 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

Jefferson County Chapter of the Ohio Genealogical Society (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

USACE 2021: United States Army Corps of Engineers – New Cumberland Locks and Dam, Accessed 8-6-2021. Pittsburgh District > Missions > Navigation > Locks and Dams > New Cumberland Locks & Dam (army.mil)

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

WV Department of Arts, Culture and History. 2021. Accessed August 6, 2021. Hancock County National Register (wvculture.org)

5.10 Socioeconomic

5.10.1 General Land Use Patterns

Hancock County is the smallest and northern most county in West Virginia. It is part of the Weirton-Steubenville, WVOH Metropolitan statistical area. Land use on the eastern side of the New Cumberland Project is mostly woodland and some small commercial and public facilities uses. Land use directly west of the Project is USACE lock facility. Surrounding the locks to the west of the river is urban land use mixed with industrial use including the Sammis Power Facility and industry in the town of Stratton, Ohio.

5.10.2 Population Patterns

Data from the 2019 United States Census Bureau reported an estimated 28,810 people living in Hancock County. Hancock has seen a decrease in population from an estimated 30,688 people in from 2010 Census data. Population in the county has an average density of 348.9 people per square mile (USCB 2019).

5.10.3 Household/Family Distribution and Income

The U.S. Census Bureau reports that in 2019 there were 12,678 households in Hancock County, with 2.3 persons per household. The median household income from 2015-2019 adjusted for 2019 dollars was $45,763. This is $22,940 less than the 2019 national median household income and $948 less than the 2019 median income of the state of West Virginia (USCB 2019). Approximately 12.5 percent of residents of Hancock County are living below the poverty line, which is over 3.5 percent lower than the poverty rate of West Virginia (USCB 2019).

5.10.4 Project Vicinity Employment Sources

The economy of Hancock County employs approximately 13,400 people with the largest industries being manufacturing (2,243 peoples), Healthcare and social assistance (1,993) and the retail market (1,731). The highest paying industrials in Hancock are Utilities ($83,833), mining, quarrying, and the Oil and Gas extraction industry ($61,902), following by hunting ($52,961) (USA Data, 2018).

5.10.5 References

Data USA. Hancock County, West Virginia. Available Online: https://datausa.io/profile/geo/hancock-county-wv#economy Accessed: August 6, 2021.

United States Census Bureau. Hancock County, West Virginia Quick Facts. Available Online: https://www.census.gov/quickfacts/fact/table/hancockcountywestvirginia/PST045219 Accessed: August 6, 2021.

5.11 Tribal Resources

5.11.1 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

5.11.2 Identification and Consultation with Tribes

Consultation conducted as part of a 2017 proposal to develop the nearby 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).

5.11.3 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 Area of Potential Effect (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 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.

5.11.4 References

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

OHS 2017: Historic American Indian Tribes of Ohio, Ohio Historical Society. Accessed July 6, 2021. http://www.rrcs.org/Downloads/Ohios historic Indians 38 pages.pdf

JeffCo 2015: Jefferson County Chapter of the Ohio Genealogical Society, Hodgen's Mound Cemetery. http://www.jeffcochapter.com/Townships.php?area=WarrenTownship&twp=187

Delaware 2016: The Delaware Nation, consultation communication. The Delaware Nation, NAGPRA/106 Department 31064 State Highway 281 Anadarko, OK 73005 Phone (405)247-2448 Fax (405) 247-8905

6.0 PRELIMINARY LISTNG OF POTENTIAL ISSUES, INFORMATIONAL NEEDS, AND MITIGATION BY RESOURCE

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

Current Hydro Project 19, LLC 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; the Applicant 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 the Applicant 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 New Cumberland. Minimum flow would be released in the Project's tailrace area to protect aquatic habitats when the Project is shut down. For trash racks Current Hydro Project 19, LLC 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 trashracks. USFWS expressed concern for future upstream and downstream American eel passage. Current Hydro Project 19, LLC 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, Current Hydro Project 19, LLC 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 West Virginia side of the River at the eastern 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 the West Virginia side of the River at the eastern end of the USACE dam. 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

As of April 2021, the Statewide Comprehensive Outdoor Recreation Plan (SCORP) went into effect. The 2020-2025 SCORP document draft is currently in public review period (WV Development Office 2021). The goal of SCORP is to work with organizations such as the Northern Panhandle Resource Conservation and Development (NPRCD), the National Park Service (NPS), the Land and Water Conservation Fund program (LWCF), and the public to provide plans for park renovations, expansions to promote active lifestyles, innovate communities, attract, and retain visitors to the area, develop trailheads or preserve other natural areas to impact community health objectives.

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 percent identified positive relationships between eDNA concentrations and abundance of the target species. To ensure species are detected Current Hydro Project 19, LLC will prepare a list of fish species found during previous fish surveys and verify with eDNA laboratories that the markers to detect the species are available. In addition, abundance and size information will also be acquired from the existing fisheries surveys.

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 and one below the dam in the APE. In addition, a third water quality logger will be placed a mile downstream of the APE. 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, 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 (feet)

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 Geographic Information Systems (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 review the Statewide Comprehensive Outdoor Recreation Plan and 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 Qualifying Federal and State or Comprehensive Waterway 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 health 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. 1982. Monongahela 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. 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.
16. 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.
17. 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.
18. 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.
19. 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.
20. 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.

21. West Virginia Department of Natural Resources. 1987. Guyandotte River Basin plan. Charleston, West Virginia.
22. 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.
23. 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.
24. 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.

12. 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 health 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.

6.4 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)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 Virginia54.
    - 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.

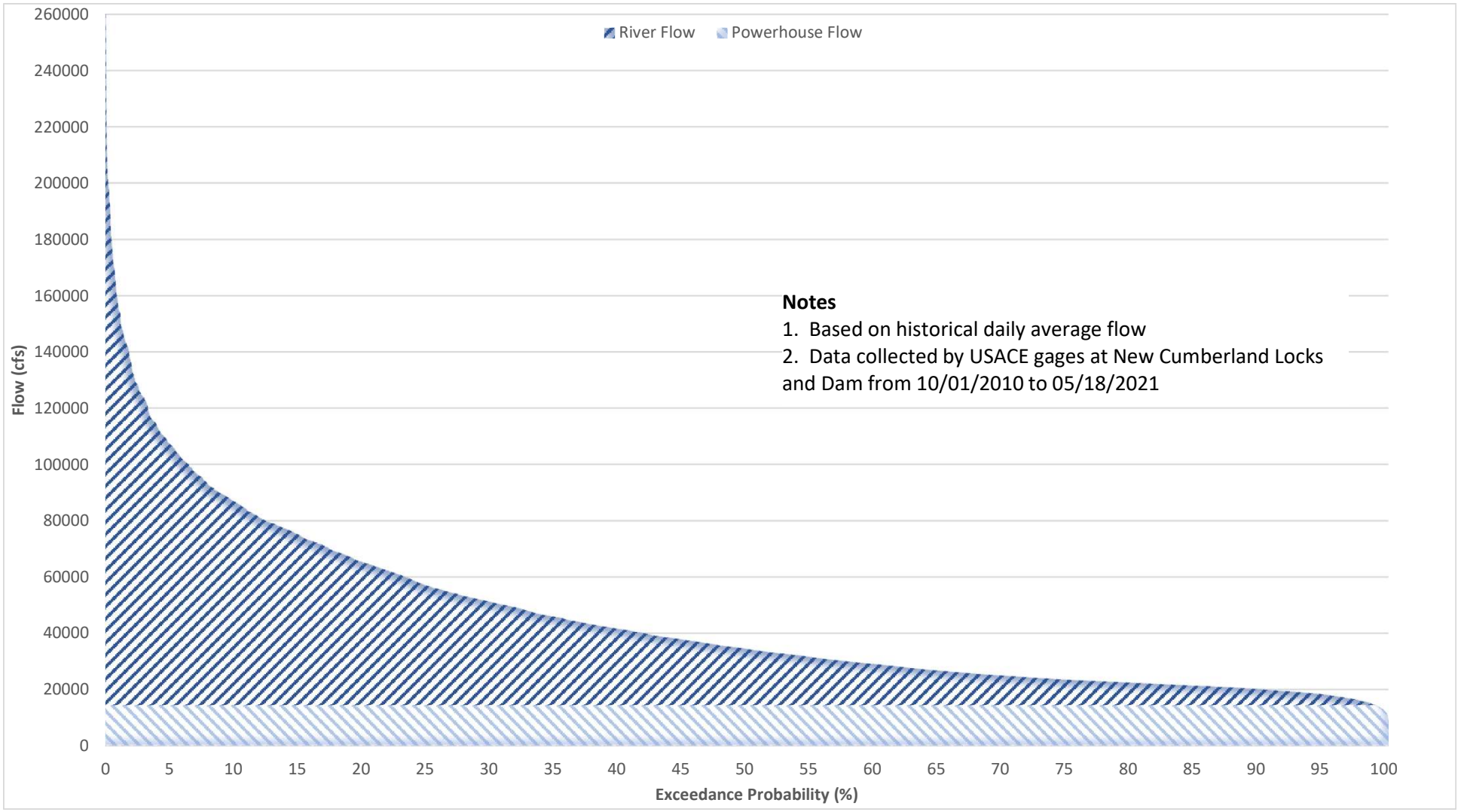
APPENDIX A

AGENCY CONSULTATION

Date	Project	Agency / Stakeholder	Agency/ Stakeholder Participants	Other participants	Type of Consultation	Summary of Consultation
1/5/2021	Pike and New Cumberland	USFWS	Richard McCorkle	Jan Borchert, Joel Herm, Norm Bishop	Informal Phone Call	Participants discussed the 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 to identify any major concerns the USFWS might have with such a proposal.
1/8/2021	Pike and New Cumberland	Kleinschmidt	Laura Cowan and Chris Tomichek	Jan Borchert, Joel Herm, Norm Bishop	Phone Calls and Email Exchanges	Partnership in licensing efforts and proposed study plan. Continuing engagement since January.
6/23/2021	Pike and New Cumberland	USFWS	Richard McCorkle, Janet Norman	Jan Borchert, Joel Herm, Norm Bishop, 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 and New Cumberland	USFWS	Richard McCorkle	Jan Borchert	Informal Phone Call	10-minute discussion of USFWS Qualified Freshwater Mussel Surveyors: https://www.fws.gov/northeast/pafo/pdf/Mussel_qualified_00082020.pdf
5/7/2021	New Cumberland	Norfolk Southern Railroad	Laura Hoag, Jason Wazelle, Scott Plum	Jan Borchert	Email Outreach	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 and New Cumberland	Edge Engineering & Science	Casey Swecker, USFWS Qualified Freshwater Mussel Surveyors		Informal Phone Call	Since 6/29/21 we've had multiple telephone calls and email exchanges to identify a practicable approach to a Mussel Survey and Aquatic Habitat Study in the vicinity of both projects.
3/11/2021	New Cumberland	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	New Cumberland	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	New Cumberland	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 and New Cumberland	FERC	John Smith and Janet Hutzel	Joel Herm, Jan Borchert, Norm Bishop	Informal Virtual Meeting	The applicant and FERC have been discussing coordination within FERC to manage both New Cumberland & Pike.

APPENDIX B

FLOW DURATION CURVES



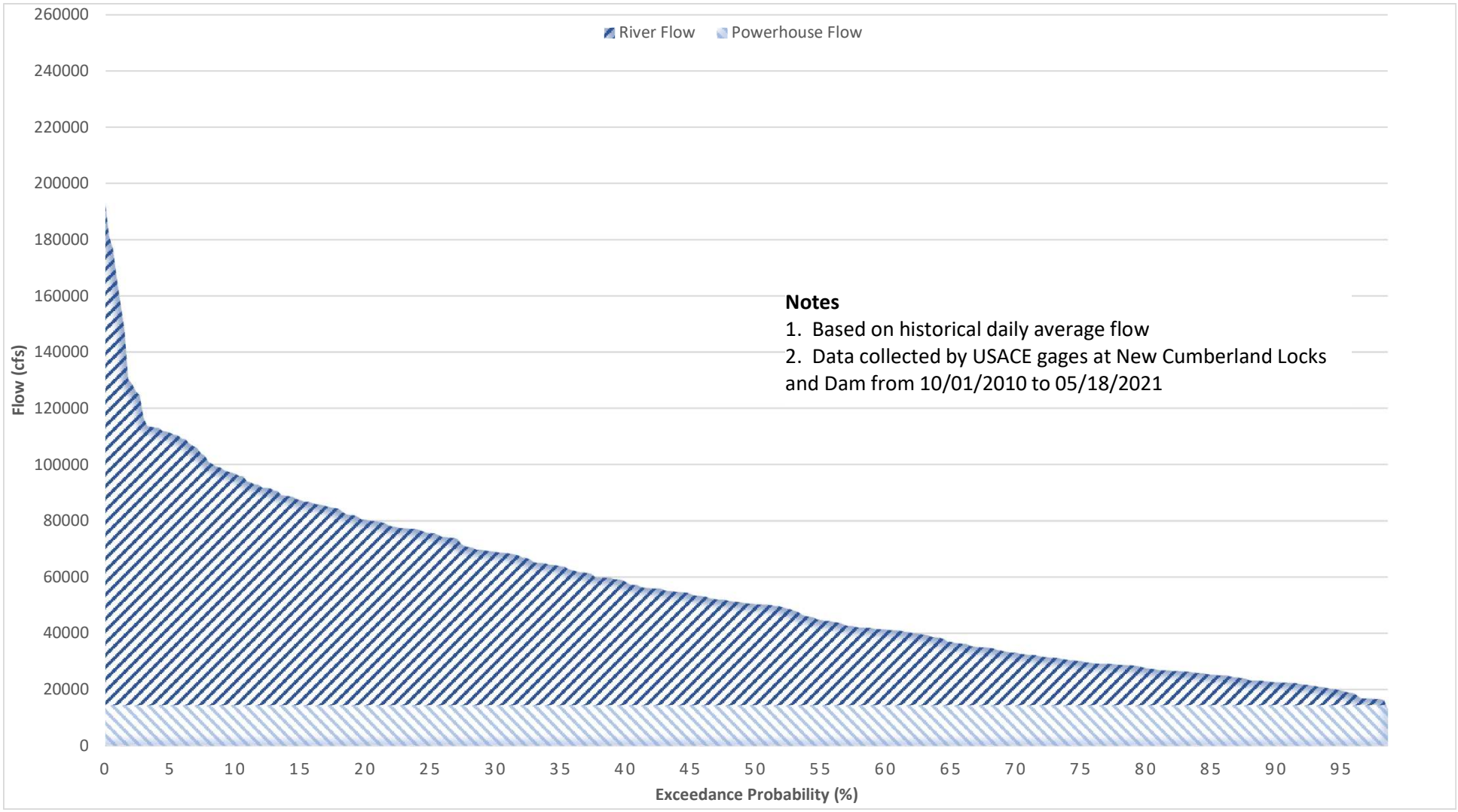
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 2: Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



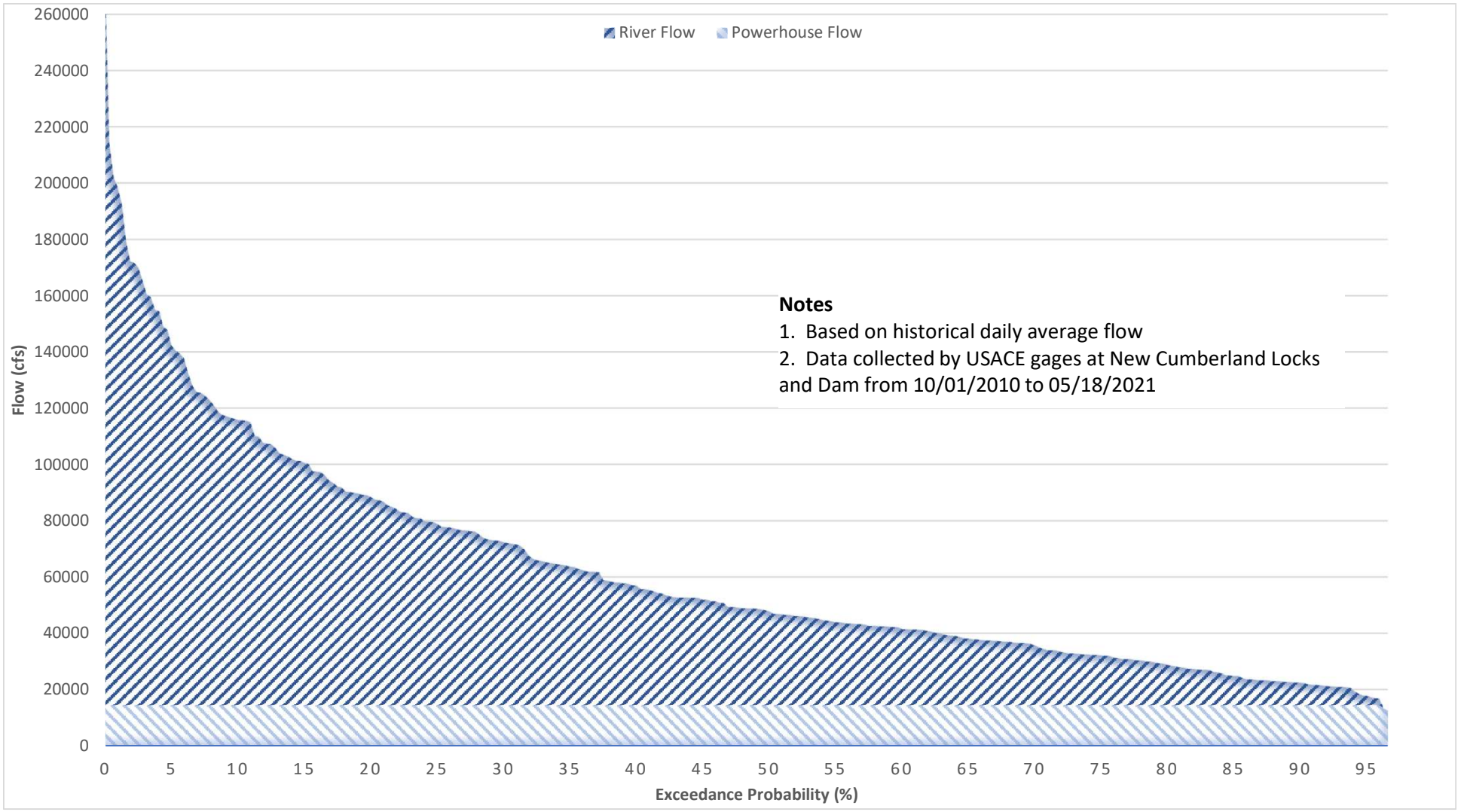
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 3: January Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



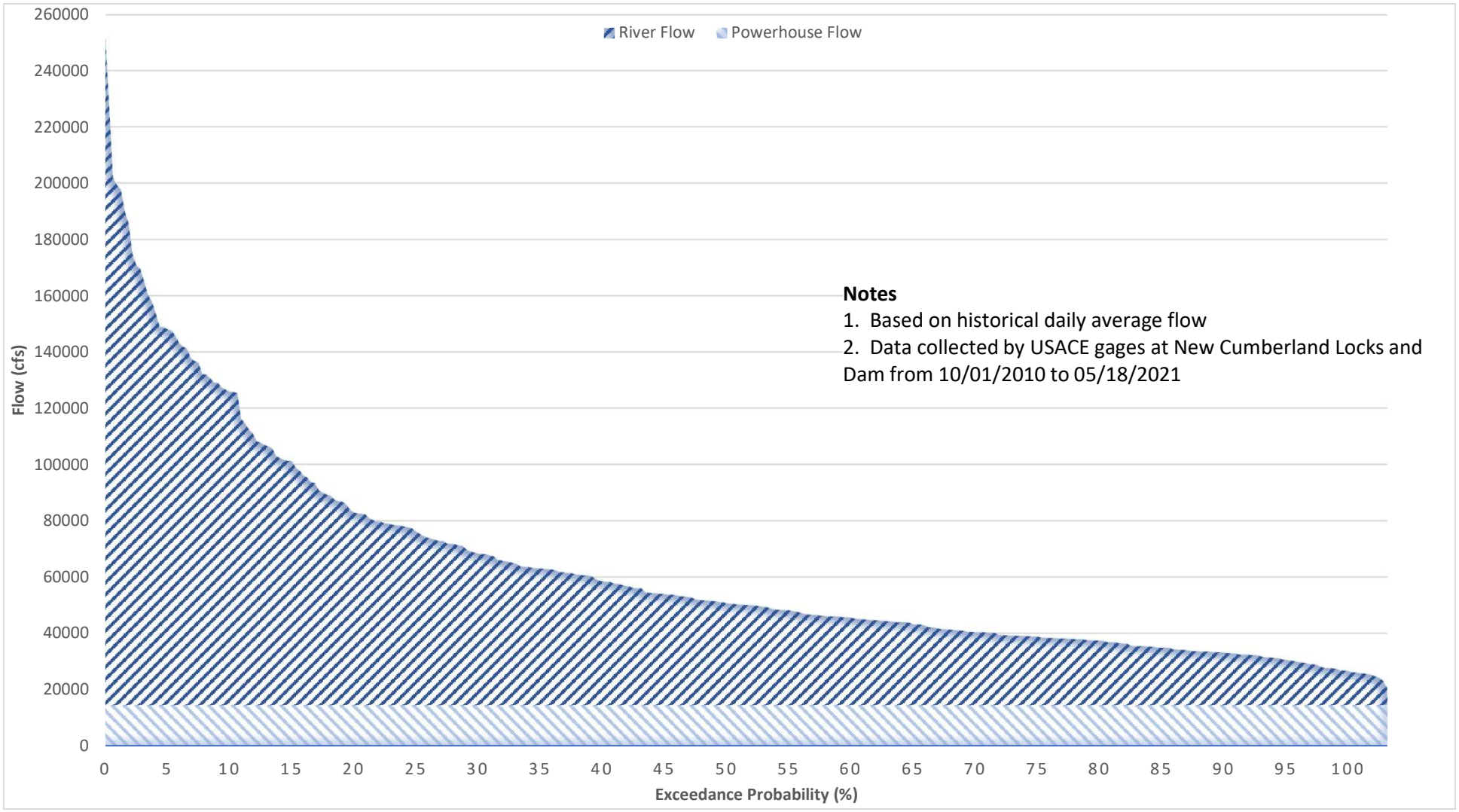
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 4: February Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



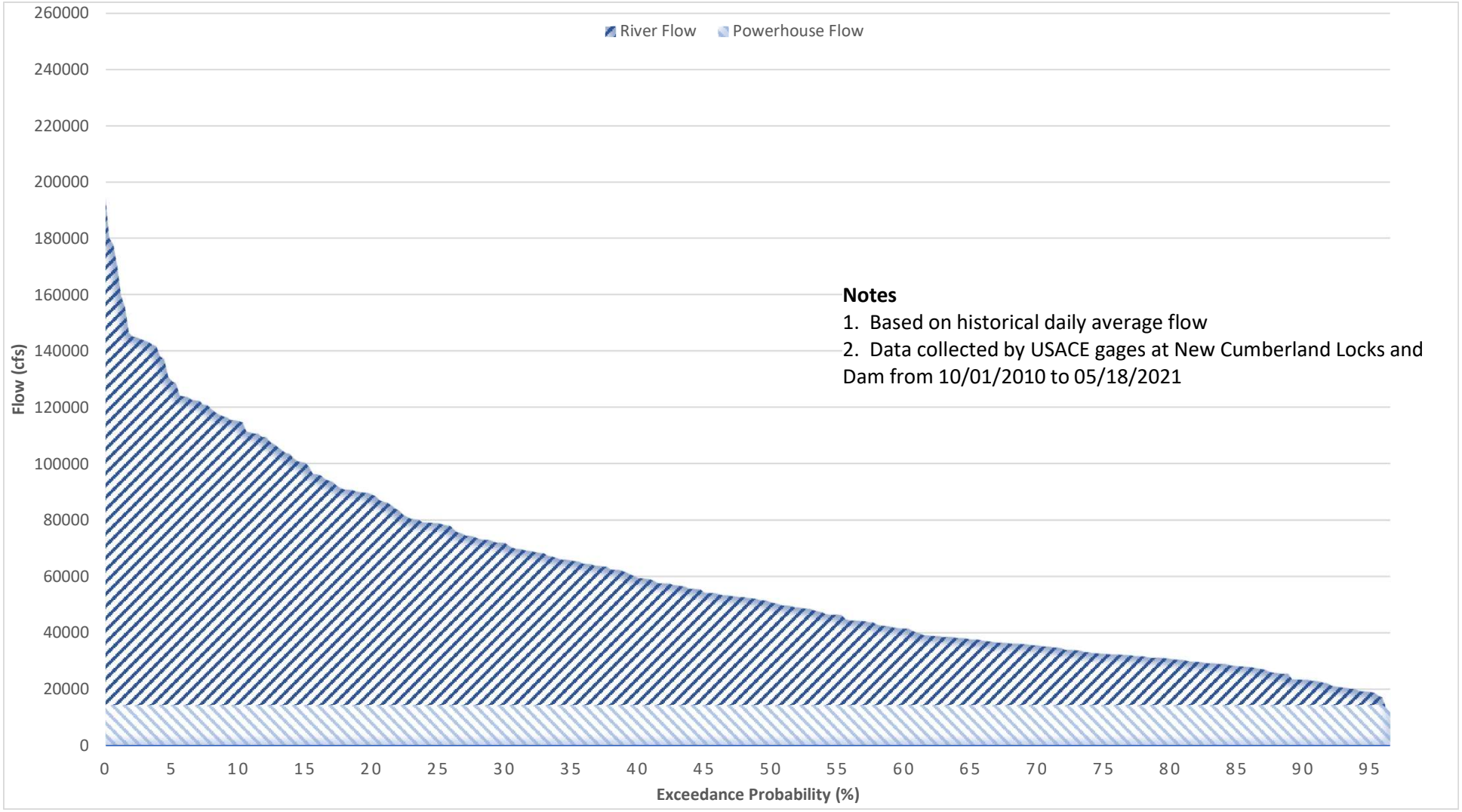
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 5: March Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



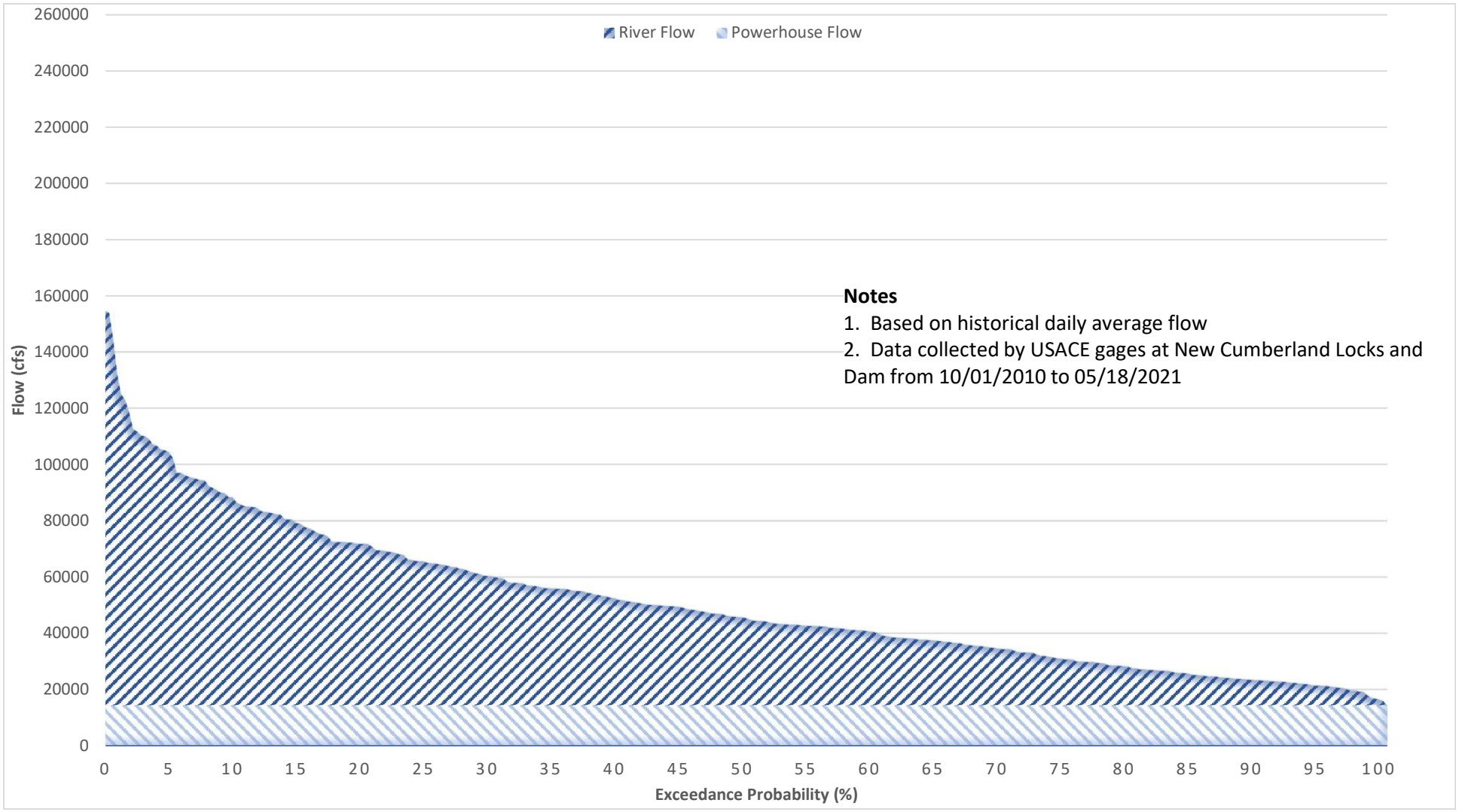
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 6: April Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



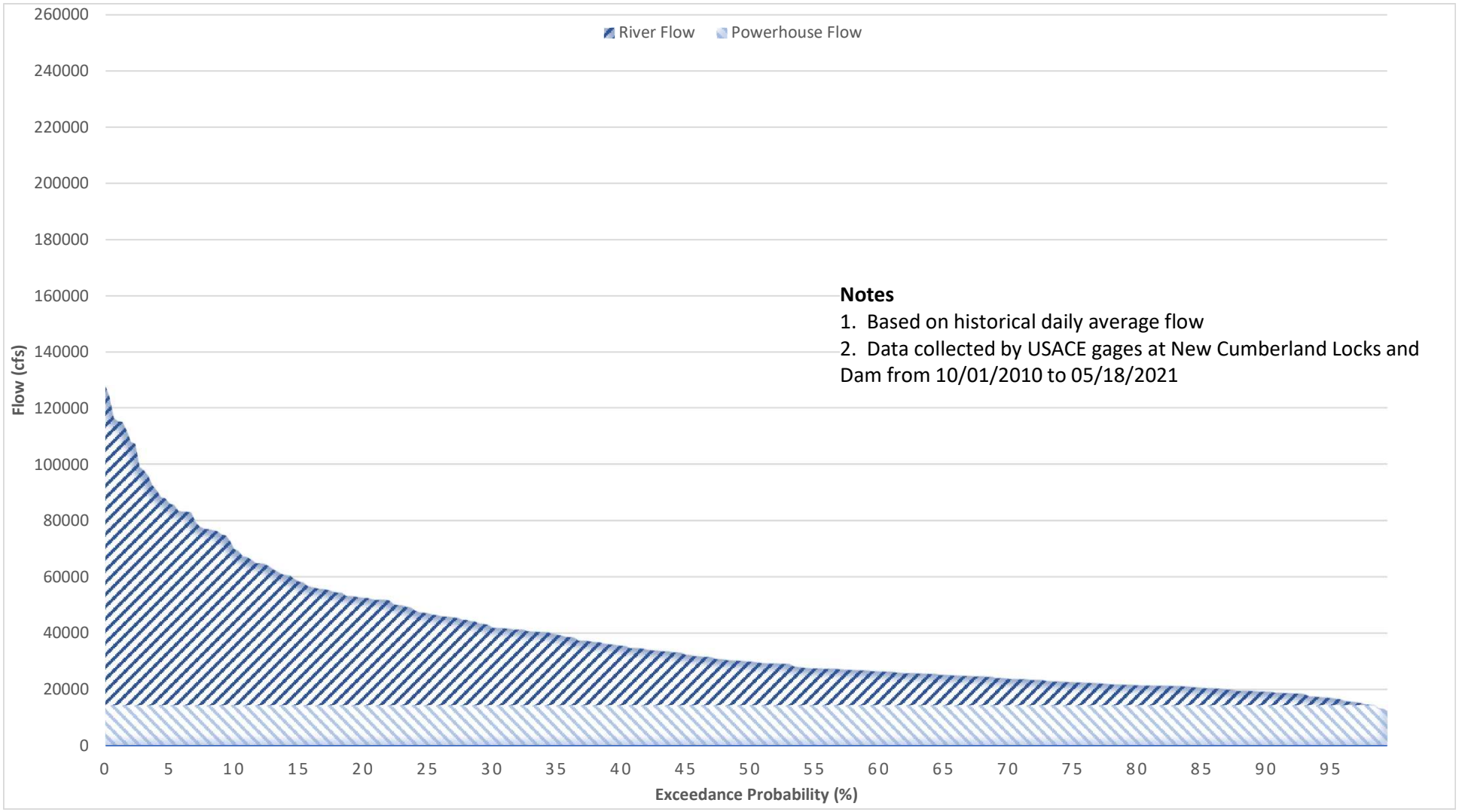
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 7: May Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



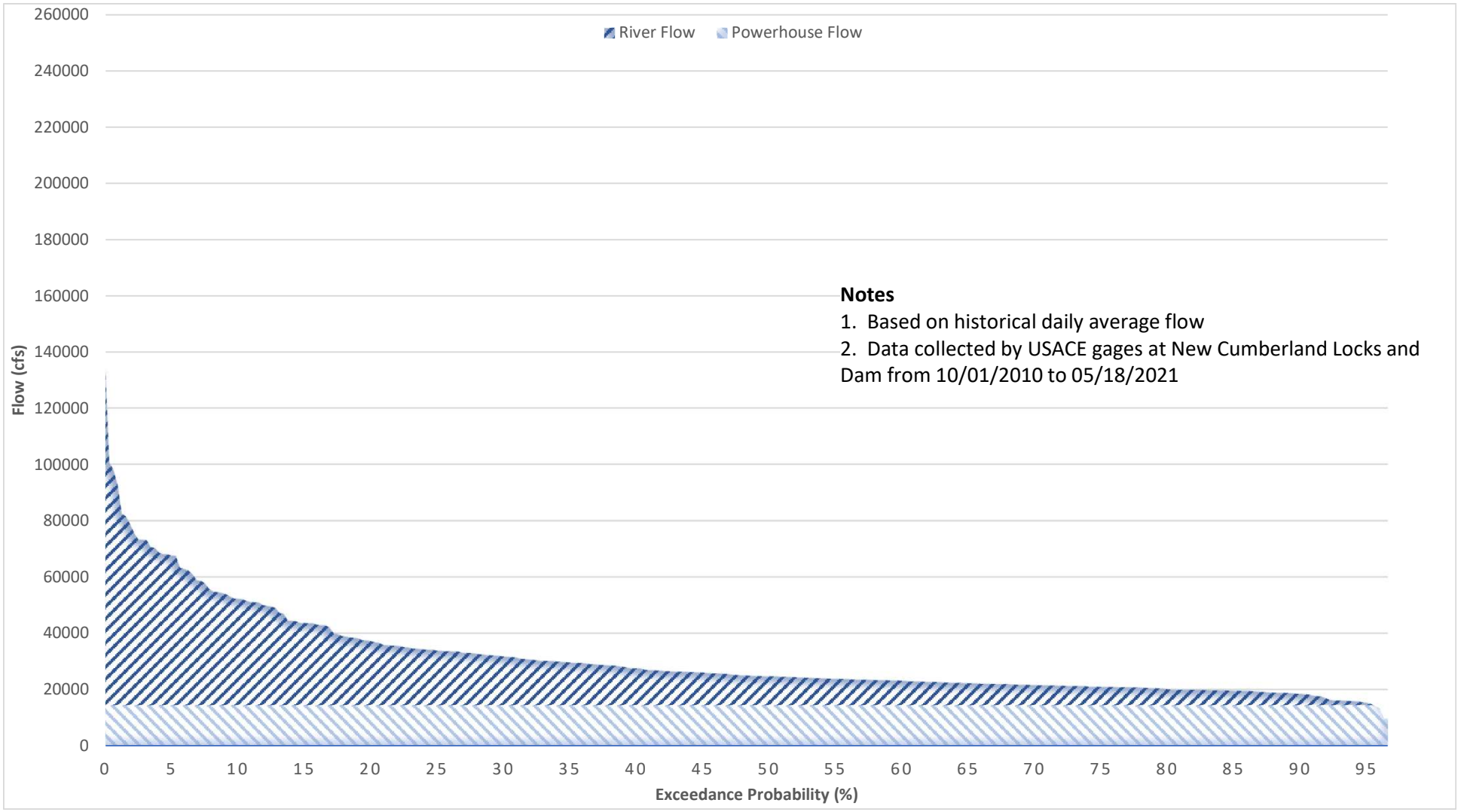
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 8: June Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



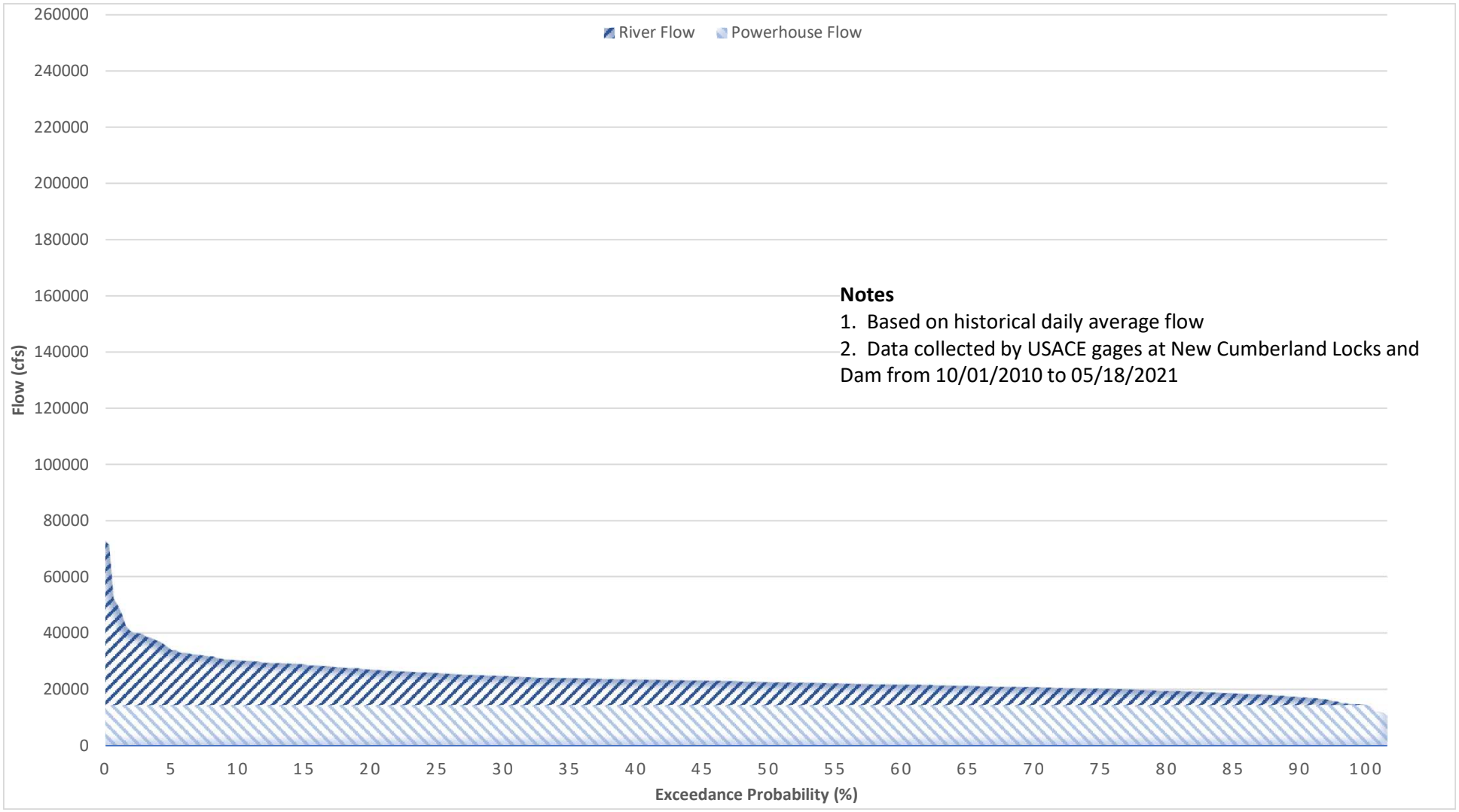
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 9: July Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



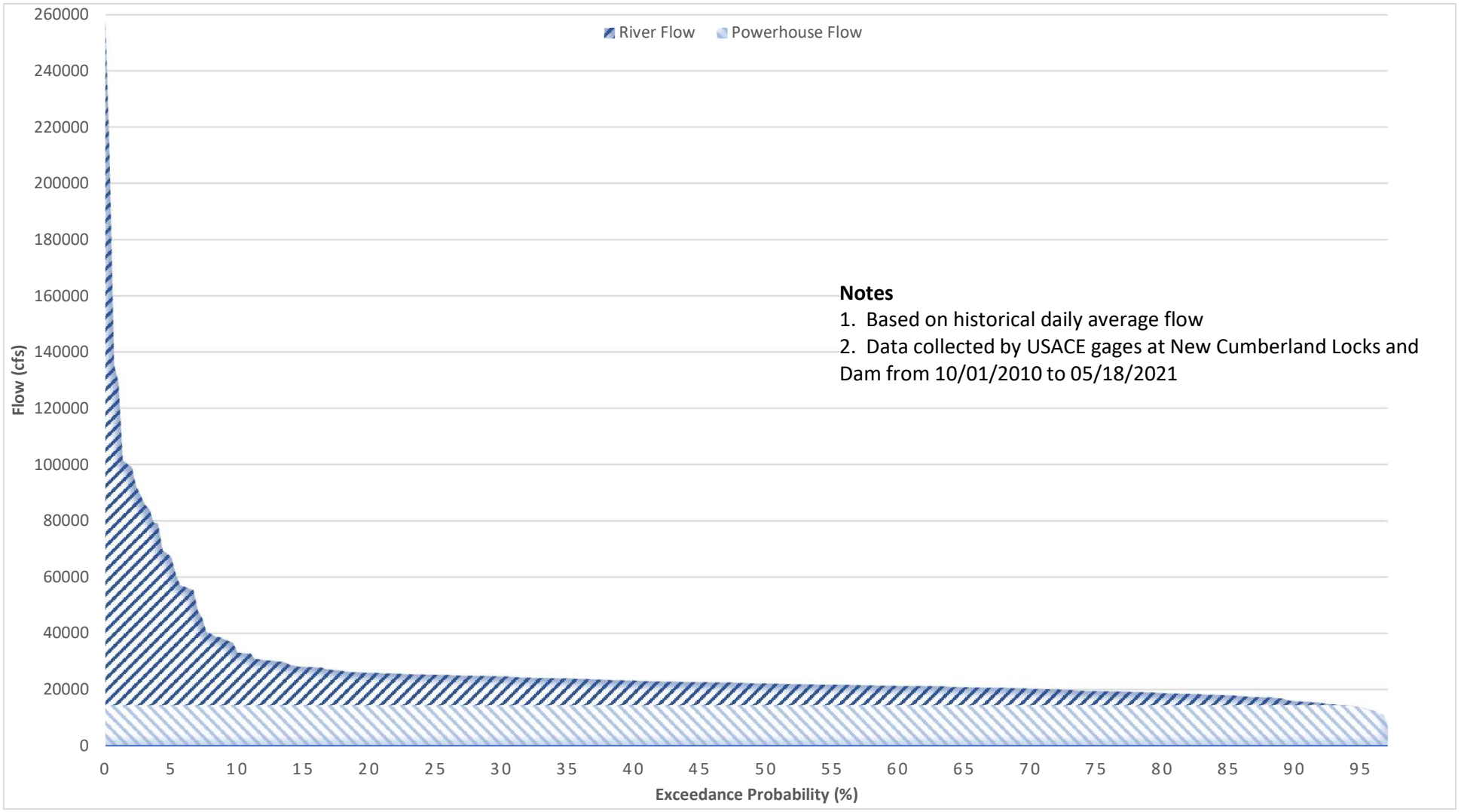
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 10: August Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



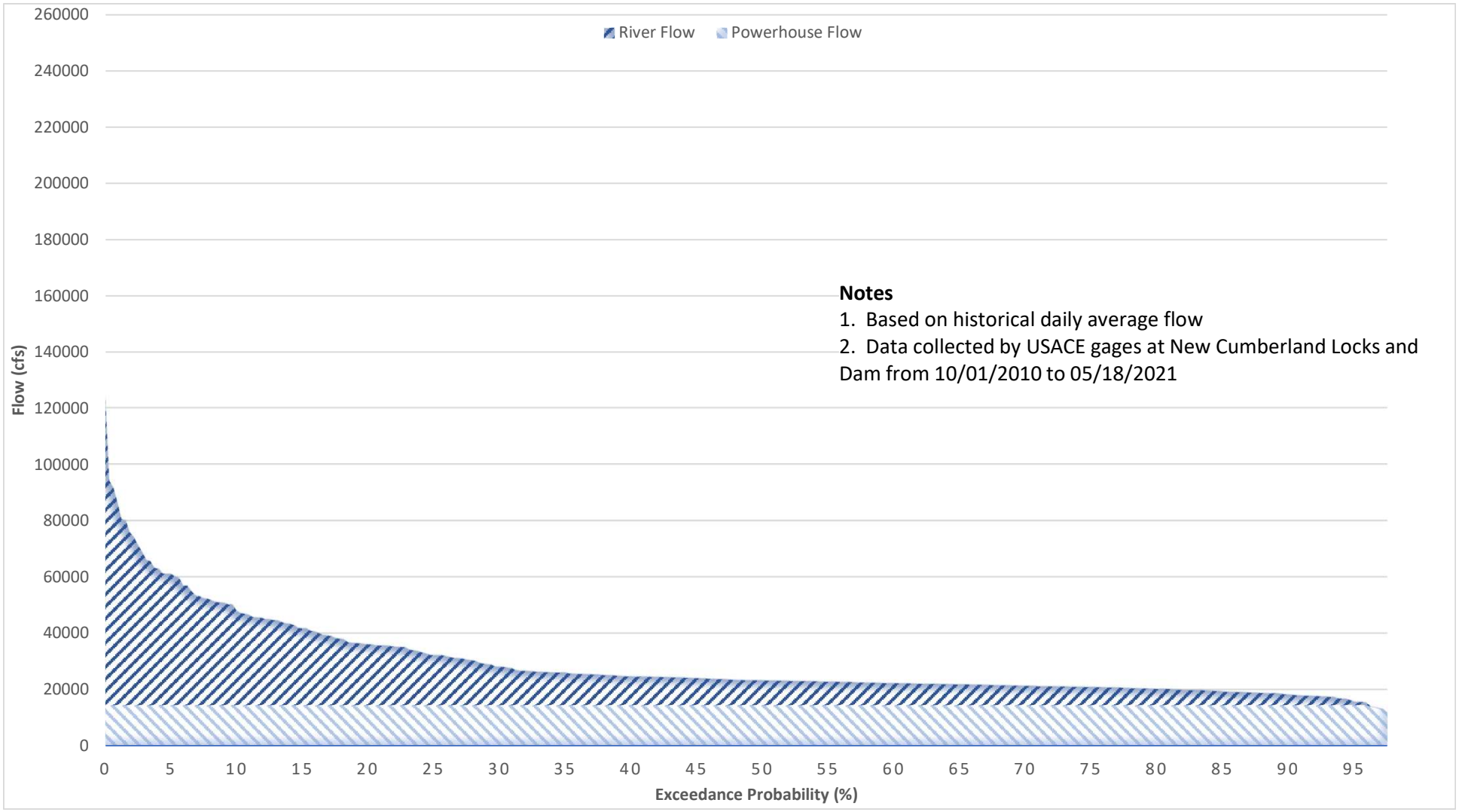
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 11: September Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



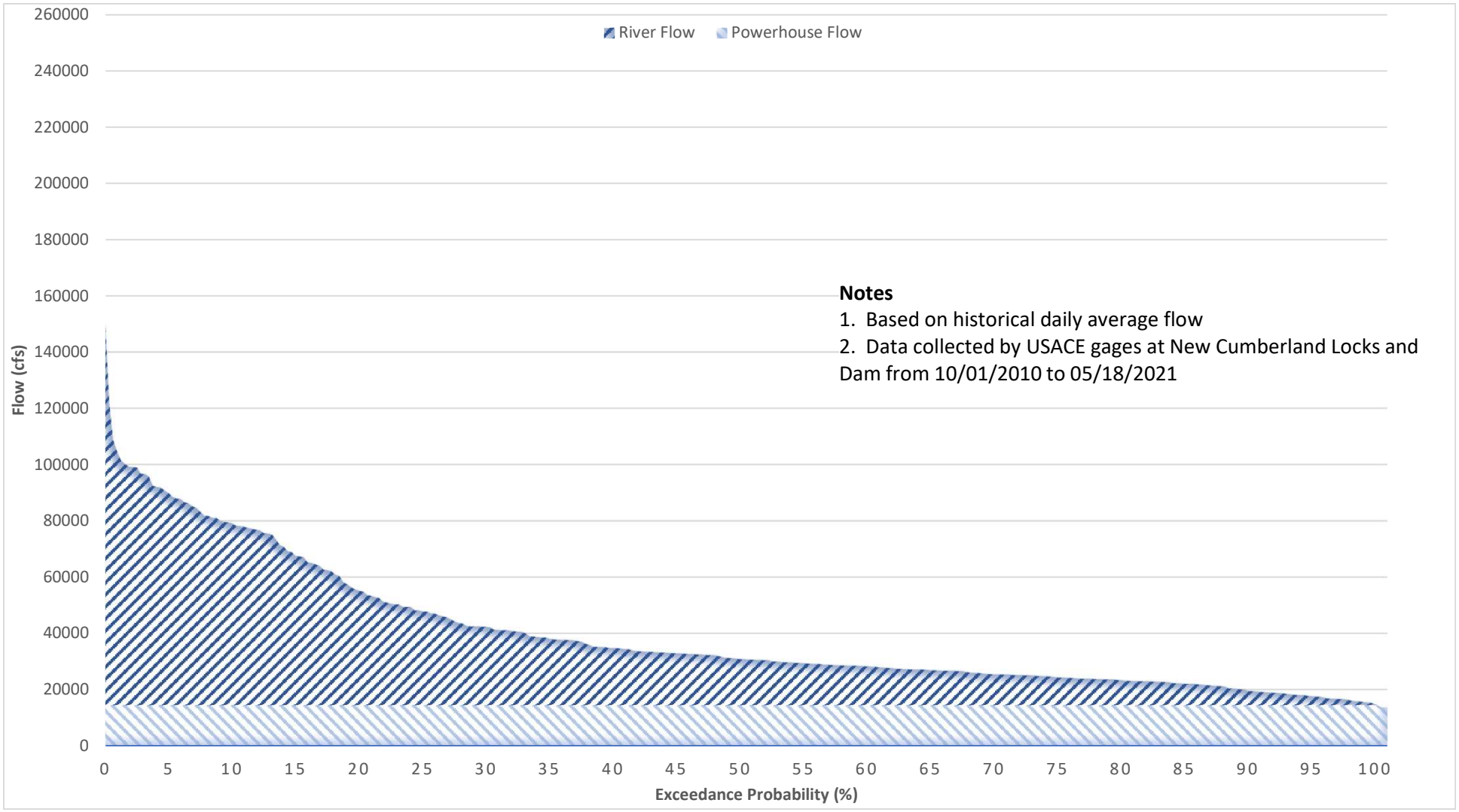
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 12: October Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



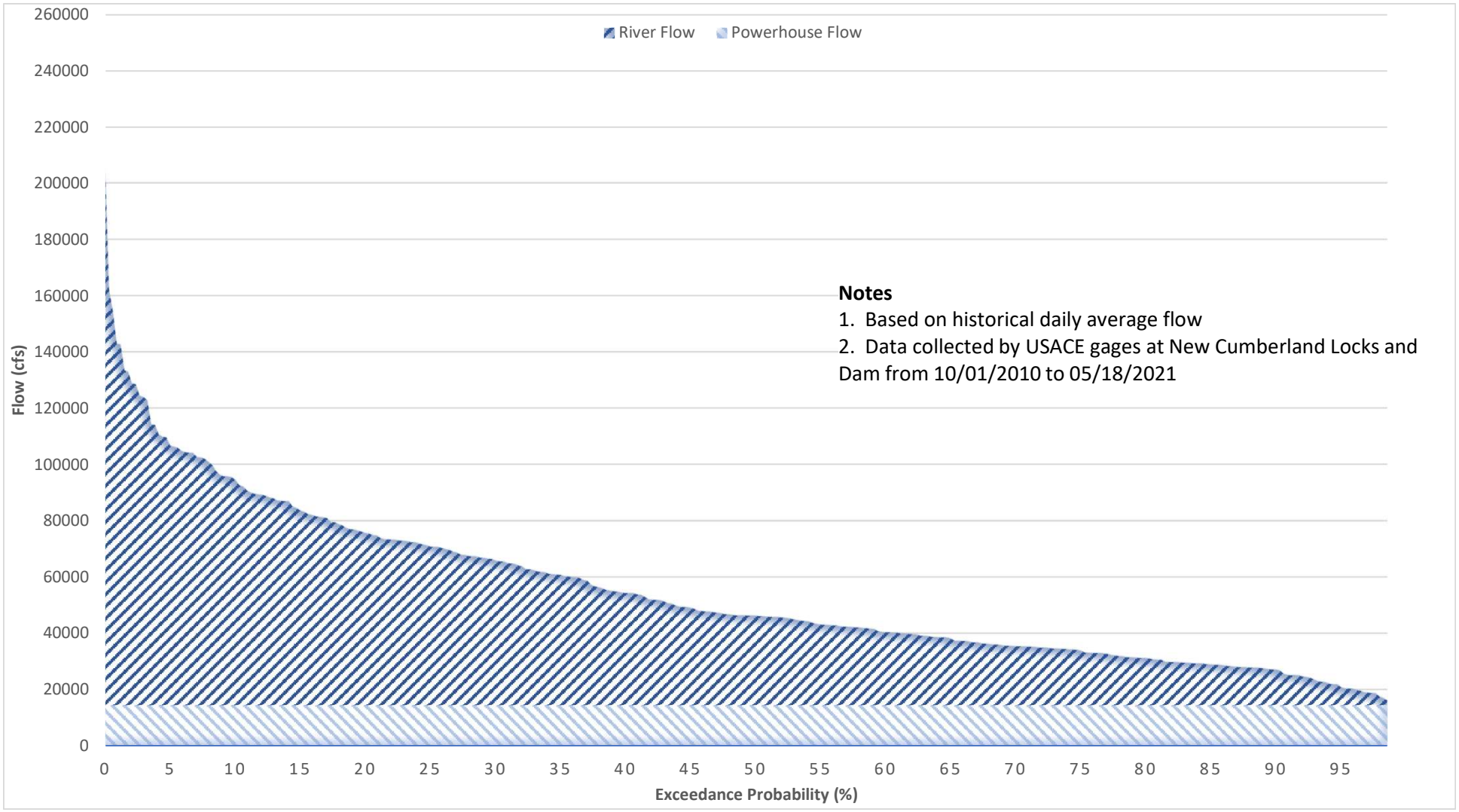
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 13: November Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez



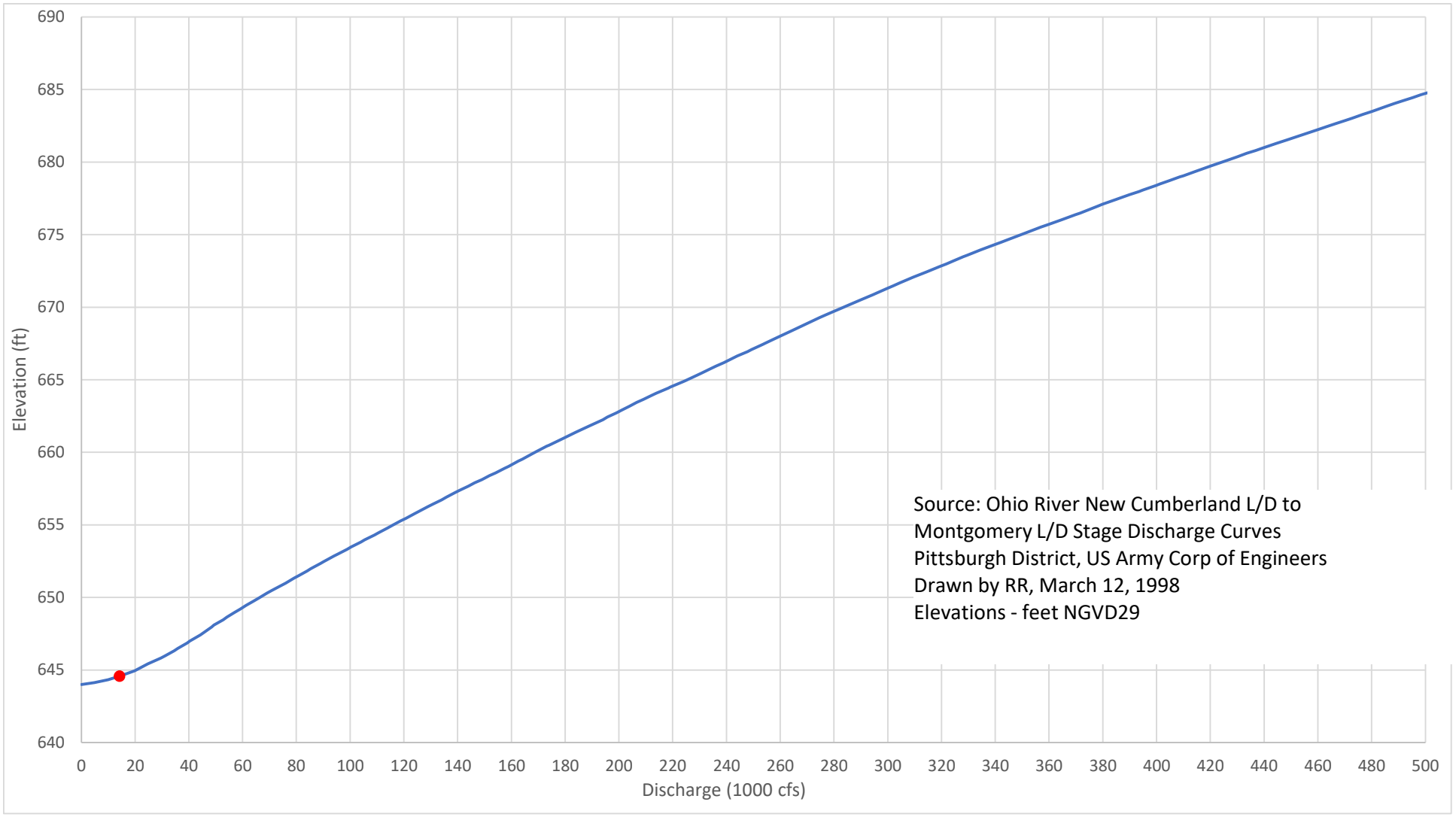
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 14: December Flow Duration Curve

Date: May 24, 2021

Prepared by: LMGonzalez

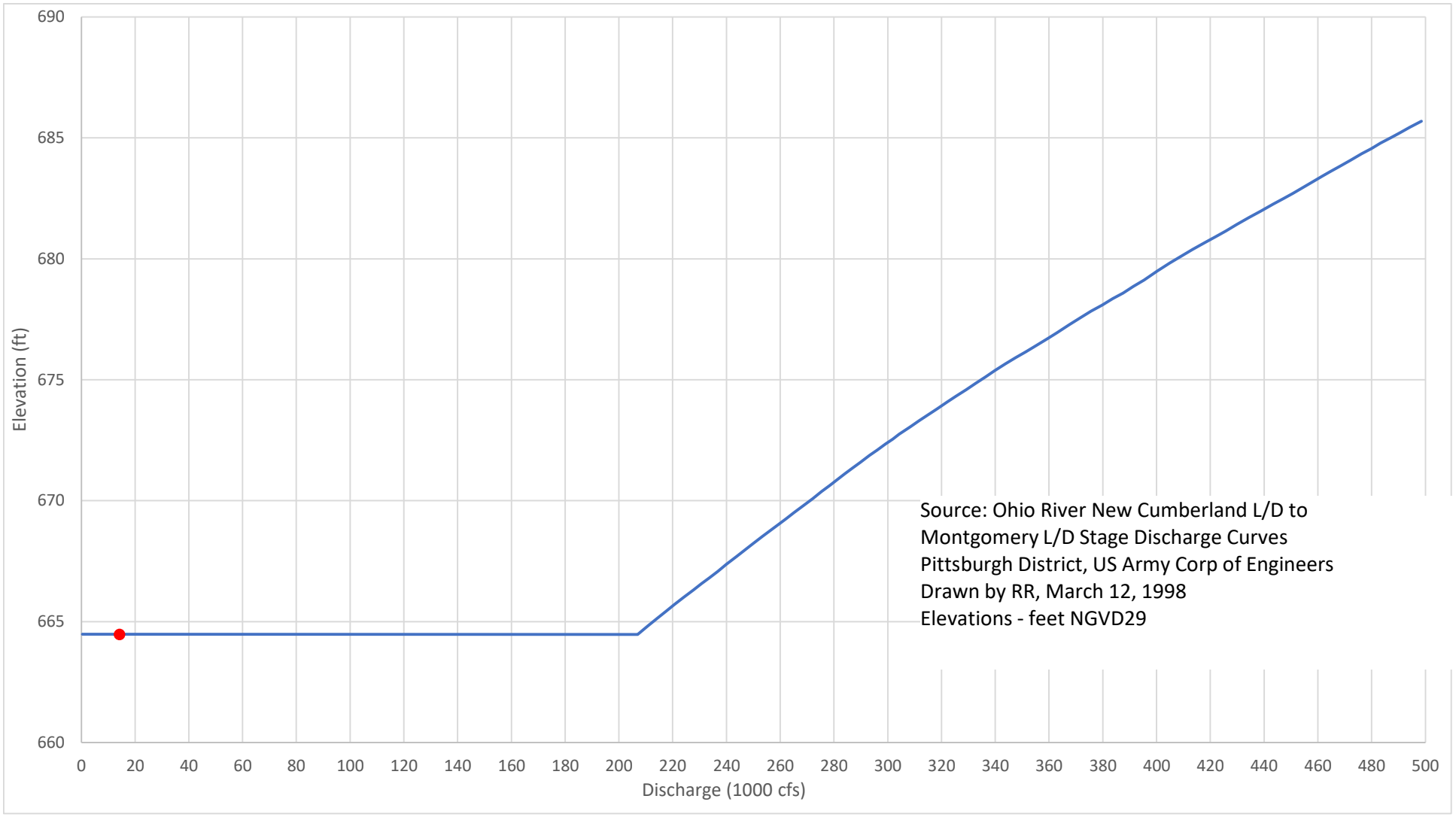


New Cumberland Locks and Dam

CURRENT HYDRO

Figure 15: Stage-Discharge Curve Lower Pool

Date: May 31, 2021
Prepared by: LMGonzalez



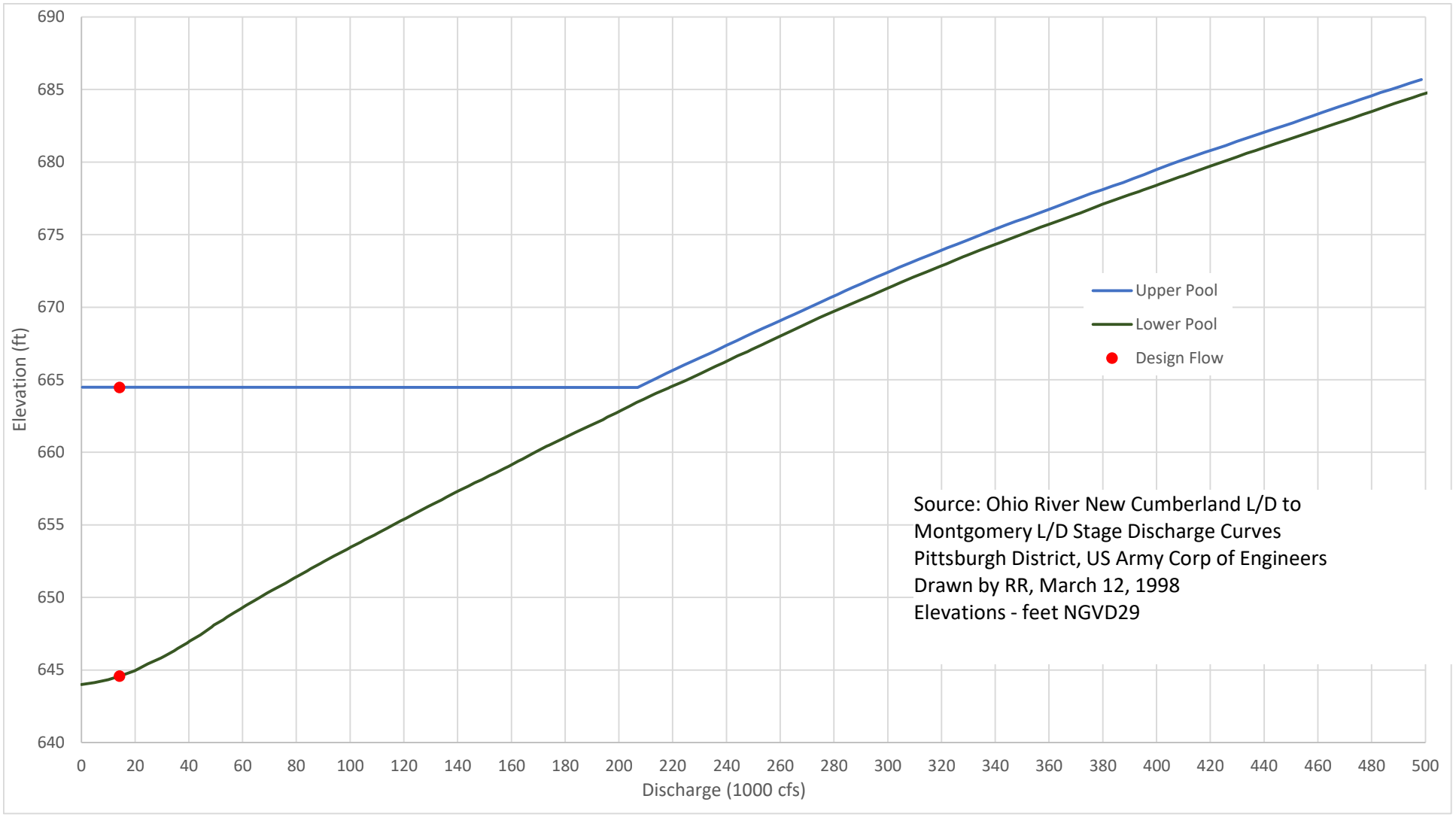
New Cumberland Locks and Dam

CURRENT HYDRO

Figure 16: Stage-Discharge Curve Upper Pool

Date: May 31, 2021

Prepared by: LMGonzalez



New Cumberland Locks and Dam

CURRENT HYDRO

Figure 15: Stage-Discharge Curve

Date: May 31, 2021
Prepared by: LMGonzalez