Lake Lynn Generation, LLC
c/o Eagle Creek Renewable Energy, LLC
7315 Wisconsin Avenue, Suite 1100W
Bethesda, Maryland 20814
240.482.2700

August 5, 2022

VIA E-FILING

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

Subject: Lake Lynn Hydroelectric Project (FERC No. P-2459)
Draft License Application

Dear Secretary Bose:

Lake Lynn Generation, LLC (Lake Lynn or Licensee), a subsidiary of Eagle Creek Renewable Energy, LLC (Eagle Creek), is the licensee and operator of the Lake Lynn Hydroelectric Project (Lake Lynn Project). The Lake Lynn Project is on the Cheat River, in Monongalia County, West Virginia, near the city of Morgantown, and in Fayette County, Pennsylvania, near the borough of Point Marion. The existing FERC license for the Lake Lynn Project expires on November 30, 2024. Lake Lynn intends to file an application for a new license with FERC on or before November 30, 2022. Lake Lynn filed a Notice of Intent to File a License Application (NOI), the Pre-Application Document (PAD), and a request to use the Traditional Licensing Process (TLP) for the Lake Lynn Project on August 29, 2019. FERC approved the Licensee's request to use the TLP on October 17, 2019.

In accordance with 18 CFR § §16.8(c)(4), Lake Lynn respectfully submits the Draft License Application (DLA) for filing with FERC. The DLA consists of the following draft technical exhibits and environmental report:

- Initial Statement;
- Exhibit A - Project Description;
- Exhibit B - Project Operation and Resource Utilization;
- Exhibit C - Construction History;
- Exhibit D - Statement of Cost and Financing;
- Exhibit E - Environmental Report;
- Exhibit F - General Design Drawings (Exhibit F to be filed with the FLA with FERC only as CEII under a separate cover);
- Exhibit G - Project Maps; and

- Exhibit H - Description of Project Management and Need for Project Power (Single Line Diagram filed as CEII).

Lake Lynn is providing electronic copies of the DLA to relevant resource agencies, tribes, non-governmental organizations, and other potential interested parties included on the attached distribution list. An electronic copy of the DLA can be downloaded from FERC's eLibrary system (https://elibrary.ferc.gov/eLibrary/search) by searching under docket number P-2459. The primary relicensing documents can also be downloaded from the Lake Lynn Project Relicensing website at: https://cheatlake.today/relicensing/.

Exhibit E discusses the results of the studies conducted in support of the relicensing and considers how the information and data collected during the studies address the issues that were raised by agencies and other relicensing participants, and how that data addresses the Licensee's proposal. In support of the proposed relicensing, Exhibit E evaluates the potential effects on environmental, recreational, and cultural resources that may occur as a result of continued Lake Lynn Project operation under a new license. As appropriate, Exhibit E includes the Licensee's preliminary proposals for the protection and mitigation of effects on, or enhancements to, resources that are associated with the continued operation of the Lake Lynn Project.

Certain information within the DLA, such as portions of Exhibit D and Exhibit H and Exhibit F, are still under development and will be filed with the Final License Application (FLA); the FLA filing date is November 30, 2022. In accordance with FERC regulations 18 CFR§16.8 (c)(4)(5), participants and Commission staff may submit comments to the Licensee regarding the DLA within 90 days following this filing, i.e., by November 3, 2022.

If you have any questions or require any additional information, please contact me at (804) 338-5110 or via e-mail at joyce.foster@eaglecreekre.com.

Sincerely,

Joyce Foster
Director, Licensing and Compliance

Attachment: Draft License Application for the Lake Lynn Hydroelectric Project

cc: Distribution List

Lake Lynn Generation, LLC
Lake Lynn Project (P-2459)
Distribution List (updated June 2022)

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The Honorable Shelley Capito
United States Senate
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Washington, DC 20510

The Honorable David McKinley
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The Honorable Pat Toomey
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The Honorable Bob Casey
United States Senate
393 Russell Senate Office Building
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The Honorable Guy Reschenthaler
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LAKE LYNN HYDROELECTRIC PROJECT

FERC NO. 2459

INITIAL STATEMENT

BEFORE THE
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

LAKE LYNN HYDROELECTRIC PROJECT
FERC PROJECT NO. 2459

APPLICATION FOR A MAJOR WATER POWER PROJECT

DRAFT INITIAL STATEMENT
(Pursuant to 18 CFR §4.51 and §4.32)

1. Lake Lynn Generation, LLC (Lake Lynn, Licensee or Applicant), a subsidiary of Eagle Creek Renewable Energy, LLC (Eagle Creek), herein applies to the Federal Energy Regulatory Commission (FERC or Commission) for a new license for the Lake Lynn Hydroelectric Project (FERC No. 2459) (Lake Lynn Project) as described in the attached exhibits. The current license for the Lake Lynn Project was issued on December 27,1994, and expires on November 30, 2024.

2. The location of the Lake Lynn Project is:

   State: West Virginia and Pennsylvania
   Counties: Monongalia County and Fayette County
   City: Morgantown (West Virginia)
   Towns: Borough of Point Marion (Pennsylvania)
   Body of Water: Cheat River

3. The exact name, address, and telephone number of the applicant are:

   Lake Lynn Generation, LLC
   7315 Wisconsin Avenue, Suite 1100W
   Bethesda, MD 20814
   (240) 482-2700

4. The exact name, address, and telephone number of each person authorized to act as agent for the applicant in this application are:

Jody Smet
Senior Vice President, Engineering and Regulatory Affairs
Lake Lynn Generation, LLC
7315 Wisconsin Avenue, Suite 1100W
Bethesda, MD 20814
Jody.Smet@eaglecreekre.com
(240) 482-2700

Joyce Foster
Director, Licensing and Compliance
Lake Lynn Generation, LLC
7315 Wisconsin Avenue, Suite 1100W
Bethesda, MD 20814
Joyce.Foster@eaglecreekre.com
(804) 338-5110

5. Lake Lynn Generation, LLC is a domestic corporation and is not claiming preference under section 7(a) of the Federal Power Act, 16 USCA §800.

6. The statutory or regulatory requirements of the state of West Virginia (WV) and the Commonwealth of Pennsylvania (PA), the states in which the Lake Lynn Project is located, which would, assuming jurisdiction and applicability, affect the Lake Lynn Project with respect to bed and banks, and to the appropriation, diversion and use of water for power purposes, and with respect to the right to engage in the business of developing, transmitting and distributing power, and in any other business necessary to accomplish the purposes of the license under the Federal Power Act are:

    a. Lake Lynn is a LLC registered to do business in WV and PA, and, as such, can engage in the activities set forth in its organizational documents, which includes the generation, transmission, and distribution of electricity from the Lake Lynn Project.

    b. Section 401 of the Federal Clean Water Act, 33 U.S.C § 1341, et. seq requires that any applicant for a federal license or permit to conduct an activity that will or may discharge into waters of the United States (as defined in the Clean Water Act) must present the federal authority with a certification from the appropriate state agency. Pursuant to W. Va. Code § 22-11-7a the West Virginia Department of Environmental Protection-Division of Water and Waste Management is the appropriate permitting agency designated to carry out the certification requirements prescribed in Section 401 of the Clean Water Act for waters of West Virginia. The Pennsylvania Department of Environmental Protection is the appropriate permitting agency designated to carry out the certification requirements prescribed in Section 401 of the Clean Water Act for waters of Pennsylvania.

    c. The Dam Control and Safety Act, W. Va. Code § 22-14-1, et. seq. is intended to provide for the regulation and supervision of dams to the extent necessary to

protect the public health, safety, and welfare. This Act makes it unlawful for any person to place, construct, alter, repair, remove, or abandon any dam in the state. The West Virginia Department of Environmental Protection manages dam safety certificate issuances as well as safety inspections.

d. W. Va. Code § 24-1-1, et. seq. Public Service Commission. Prohibits any public utility, person, or corporation from applying for or obtaining any franchise, license, or permit from any municipality or other governmental agency, except ordinary extensions of existing systems in the ordinary course of business, until it obtains a certificate of public convenience and necessity from the Public Service Commission. This section only applies to utility services furnished to the public. No such public service is being considered by Lake Lynn; this section has no current applicability to the Lake Lynn Project.

e. Water rights involved are merely the riparian rights appurtenant, under West Virginia law, to the various lands needed for dam site, flowage, and tailrace purposes.

The steps the applicant has taken, or plans to take, to comply with each of the laws cited above are:

a. Applicant has complied with the requirements of the laws of the state of West Virginia and the commonwealth of Pennsylvania with respect to the right to engage in the business of developing and transmitting power.

b. Section 401 of the Federal Clean Water Act 33 U.S.C § 1341, et. seq. The Applicant will apply to the West Virginia Department of Environmental Protection for Water Quality Certification pursuant to Section 401 of the Federal Clean Water Act and W. Va. Code § 22-11-7a, et. seq. A copy of the letter requesting certification will be filed with FERC within 60 days of filing the final license application.

c. W. Va. Code § 22-14-1, et. seq. Dam Control and Safety Act. No dam safety certificate or safety inspection is required as there will be no alteration of the dam or its facilities with this relicensing.

d. W. Va. Code § 24-1-1, et. seq. Public Service Commission. Lake Lynn generates, purchases, transmits, and distributes electric power and energy and complies with all state laws necessary for engaging in the business of an electric utility.

e. Lake Lynn has performed studies and ongoing monitoring associated with water quality, aquatic resources, terrestrial resources, wetlands, and recreation resources in support of the associated environmental analyses.

7. All existing Lake Lynn Project facilities are owned by Lake Lynn Generation, LLC.

   Lake Lynn Generation, LLC
   7315 Wisconsin Avenue, Suite 1100W
   Bethesda, MD 20814

   No Lake Lynn Project components are owned or operated by federal entities.

8. The Lake Lynn Project does not occupy any lands of the United States.

9. The Lake Lynn Project is an existing constructed project; no additional construction is proposed.

ADDITIONAL GENERAL INFORMATION PURSUANT TO 18 C.F.R. § 5.18 AND § 4.32

GENERAL INFORMATION

1. Lake Lynn Generation, LLC, possesses all proprietary rights necessary to construct, operate or maintain the Lake Lynn Project.
2. The name and mailing address of the counties in which any part of the Lake Lynn Project and any federal facilities that would be used by the Licensee are located:

   Monongalia County
   243 High Street
   Morgantown, WV 26505

   Fayette County
   61 East Main Street
   Uniontown, PA 15401

   There are no federal facilities used by the Lake Lynn Project.
3. The name and mailing address of every city, town, or similar local political subdivision in which any part of the project and any federal facilities that would be used by the project are located.

   The Lake Lynn Project is not located within any town or city. The Lake Lynn Project does not use any federal facilities and occupies no Federal lands.
4. The name and mailing address of every city, town, or similar local political subdivision that has a population of 5,000 or more people and is located within 15 miles of the project dam:

   City of Morgantown, West Virginia
   389 Spruce Street
   Morgantown, WV 26505

   City of Uniontown, Pennsylvania
   20 North Gallatin Avenue
   Uniontown, PA 15401

   Georges Township, Pennsylvania
   Municipal Building
   1151 Township Drive
   Uniontown, PA 15401

North Union Township, Pennsylvania
North Union Township Town Office
7 South Evans Station Road
Lemont Furnace, PA 15456

South Union Township, Pennsylvania
Supervisors Office
151 Township drive
Uniontown, PA 15401

5. There are no irrigation districts, drainage districts, or similar special purpose political subdivisions in which any part of the project is located or affected as outlined in 18 CFR §4.32l(a)(2)(iii)(A) and (B).
6. Every other political subdivision in the general area of the Lake Lynn Project that there is reason to believe would likely be interested in, or affected by, this notification:

   Borough of Point Marion, Pennsylvania
   426 Morgantown Street
   Point Marion, PA 15474

   Springhill Township
   198 Lake Lynn Road
   Lake Lynn, PA 15451

7. All Indian tribes that may be affected by the Lake Lynn Project:
   a. Federally recognized tribes:

      Delaware Nation
      Oklahoma Delaware Tribe of Indians
      Osage Nation

   b. Other Indian tribes, in the region, that may have an interest in the Lake Lynn Project:

      Absentee-Shawnee Tribe of Oklahoma
      Cayuga Nation
      Cherokee Nation
      Eastern Band of Cherokee Indians
      Eastern Shawnee Tribe of Oklahoma
      Oneida Indian Nation
      Oneida Indian Nation of Wisconsin
      Onondaga Nation

Seneca-Cayuga Tribe of Oklahoma
Seneca Nation of Indians
Shawnee Tribe
Stockbridge-Munsee Band of the Mohican Nation of Wisconsin
St. Regis Mohawk Tribe
Tonawanda Band of Seneca
Tuscarora Nation
United Keetoowah Band of Cherokee Indians in Oklahoma

See attached Lake Lynn Project mailing list for addresses.

8. For a license (other than a license under section 15 of the Federal Power Act) state that the applicant has made, either at the time of or before filing the application, a good faith effort to give notification by certified mail of the filing of the application to:
    a. Every property owner of record of any interest in the property within the bounds of the project, or in the case of the project without a specific boundary, each such owner of property which would underlie or be adjacent to any project works including any impoundments; and
    b. The entities identified in 2-7 of this section, as well as any other Federal, state, municipal or other local government agencies that there is reason to believe would likely be interested in or affected by such application.

This requirement does not apply because Lake Lynn is applying for a new license for an existing project under Section 15 of the Federal Power Act.

9. PURPA Benefits

The Applicant intends to exercise its rights under Section 210(e) of the Public Utility Regulatory Policies Act of 1978 (PURPA). The Lake Lynn Project is not located at a new dam or diversion. The Applicant reserves the right to exercise any additional rights available to it under PURPA in the future.

SUBSCRIPTION

[***To be signed for Final License Application***]

This Application for New License for the Lake Lynn Project, FERC Project No. 2459, is executed in the State of Maryland, Montgomery County, by Jody Smet, Senior Vice President, Engineering and Regulatory Affairs, 7315 Wisconsin Avenue, Suite 1100W, Bethesda, MD 20814, who, being duly sworn, deposes and says that the contents of this application are true to the best of her knowledge or belief and that she is authorized to execute this application on behalf of Lake Lynn Generation, LLC. The undersigned has signed this application this ____ day of _____, 2022.

LAKE LYNN GENERATION, LLC

By: _____

Jody Smet, Senior Vice President, Engineering and Regulatory Affairs

VERIFICATION

Subscribed and sworn to before me, a Notary Public of the State of Maryland this ____ day of _____, 2022.

_____
(Notary Public)

My Commission expires _____.

SEAL

LAKE LYNN HYDROELECTRIC PROJECT

FERC NO. 2459

EXHIBIT A

PROJECT DESCRIPTION

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1.0 GENERAL PROJECT DESCRIPTION

Lake Lynn Generation, LLC (Lake Lynn or Licensee) is the licensee, owner, and operator of the Lake Lynn Hydroelectric Project (Lake Lynn Project). The Lake Lynn Project is located on the Cheat River in Monongalia County, West Virginia and Fayette County, Pennsylvania, approximately 10 miles northeast of Morgantown, West Virginia. The Lake Lynn Project is located about 3.7 miles upstream of the confluence with the Monongahela River. Figure 1 provides the general location of the Lake Lynn Project. A map of the Lake Lynn Project boundary is provided in Exhibit G.

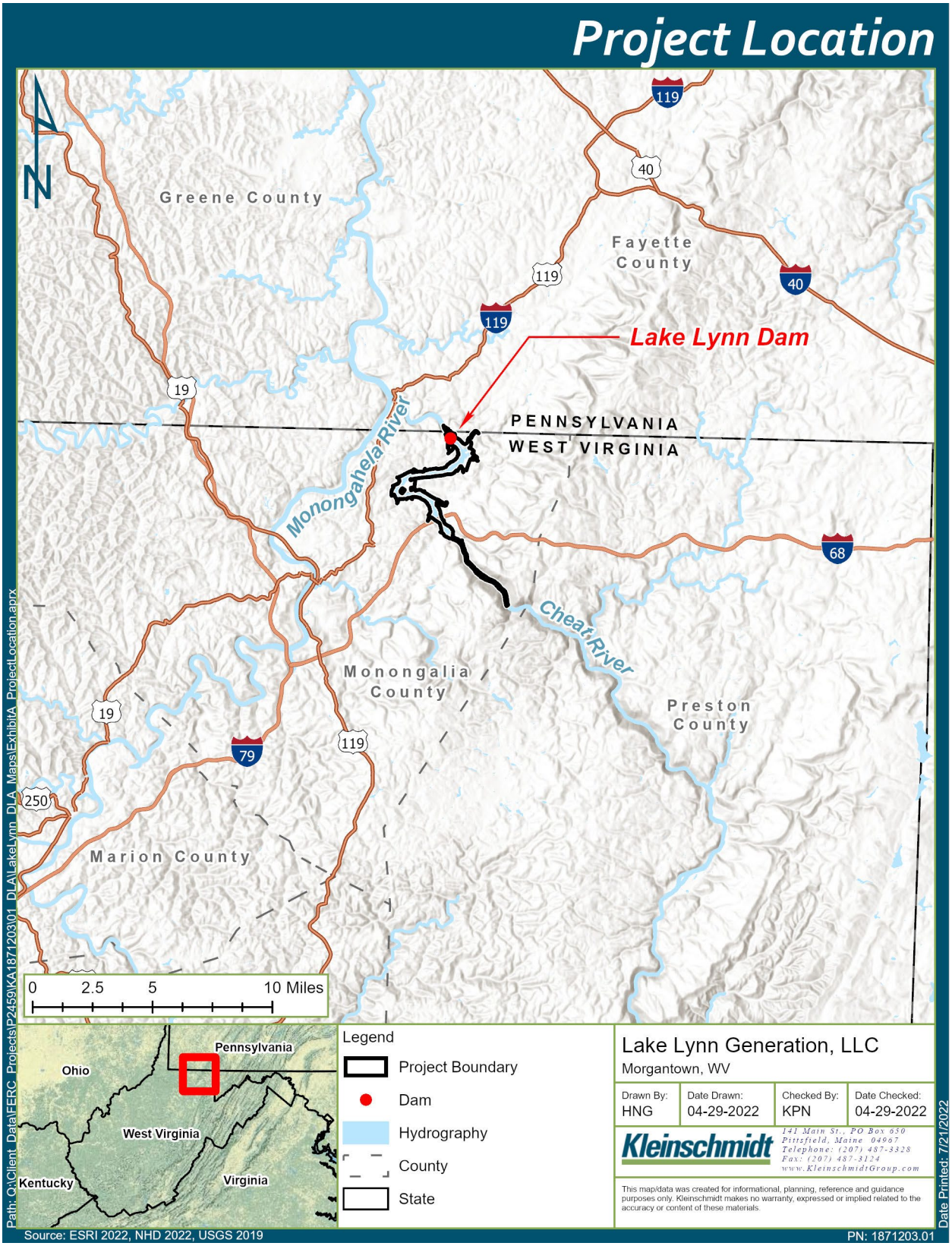

Figure 1 Lake Lynn Project Location

2.0 PROJECT STRUCTURES (18 CFR SECTION 4.51(B)(1))

2.1 Project Structures

2.1.1 Dam (18 CFR Section 4.51(b)(1))

The Lake Lynn Project dam includes a 125-foot-high by 1,000-foot-long concrete gravity-type dam with a 624-foot-long spillway controlled by 26 Tainter gates, each 17 feet high by 21 feet wide. The minimum flow at the dam is 212 cubic feet per second (cfs), or inflow, whichever is less. During extremely low flow periods, the Licensee provides an absolute minimum flow of 100 cfs.

2.1.2 Intake and Conveyance System (18 CFR Section 4.51(b)(1))

The intake facility is equipped with a log boom and trash racks. Eight 12-foot by 18-foot gated penstocks of reinforced concrete convey water from the intake to the Lake Lynn Project powerhouse.

2.1.3 Impoundment (18 CFR Section 4.51(b)(2))

The Lake Lynn Project impoundment is approximately 13-miles-long and has a normal maximum surface area of 1,729 acres. The maximum impoundment elevation is 877 feet NGVD, with a normal full pool elevation of 870 feet NGVD.[1] The impoundment has a normal maximum storage capacity of 72,300 acre-feet at 870 feet NGVD and a normal minimum storage capacity of 51,100 acre-feet at 857 feet.

2.1.4 Generating Equipment (18 CFR Sections 4.51(b)(1) and 4.51(b)(3))

The Lake Lynn Project powerhouse, built in 1926, is integral with the dam and located on the east bank of the Cheat River. The Lake Lynn Project powerhouse is made of brick and is approximately 72-feet-wide by 165-feet-long by 68-feet-high. The powerhouse contains four identical Francis generating units with a total rated capacity of 51.2 megawatts (MW). In 2018, the Licensee completed a turbine replacement and upgrade of Unit 2.

[1] National Geodetic Vertical Datum.

2.1.5 Transmission Facilities (18 CFR Sections 4.51(b)(4))

The Lake Lynn Project has a substation that adjoins the powerhouse. The Lake Lynn Project has two transformers and dual 800-foot-long, 138 kV transmission lines. Exhibit H, Appendix H-1, contains the single-line diagram for Lake Lynn Project.

See Table 1 for a Lake Lynn Project components summary table. See Figure 2 for the location of Lake Lynn Project facilities.

Table 1 Project Components List

General Information	
Capacity	51.2 MW
Impoundment	
Normal Surface Area	1,729 acres
Length of Impoundment	13 miles
Normal Full Pool Elevation	870 feet NGVD
Maximum Impoundment Elevation	877 feet NGVD
Normal Minimum Storage Capacity	51,100 acre-feet at 857 feet NGVD
Normal Maximum Storage Capacity	72,300 acre-feet at 870 feet NGVD
Dam	
Layout	Concrete gravity-type
Height	125 feet
Length of Dam	1,000 feet
Minimum Flow at Dam	212 cfs, or inflow, whichever is less During extremely low flow periods, the Licensee provides an absolute minimum flow of 100 cfs
Spillway Length	624 feet controlled by 26 Tainter gates
Spillway Crest Elevation	863 feet
Intake	
Intake Construction	Reinforced concrete with vertical steel racks
Powerhouse	
Year Built	1926
Construction Type	Brick
Dimensions	72-feet-long by 165-feet-wide by 68-feet-high
Turbines	
Number	4
Type	Francis turbine units connected to generators
Rating	17,325 kw
Turbine Design Capacity	23,700 HP

General Information	
Total Hydraulic Capacity	9,700 cfs
Maximum Hydraulic Capacity	9,700 cfs (total)
Minimum Hydraulic Capacity	1,100 cfs
Average Annual Generation	126,639 megawatt hours (MWh) (2009-2018)
Switchyard/Transmission Lines	
	The Lake Lynn Project has two transformers and above ground, dual 800 foot-long, 138-kilovolt (kV) transmission lines which connect the powerhouse to the substation.

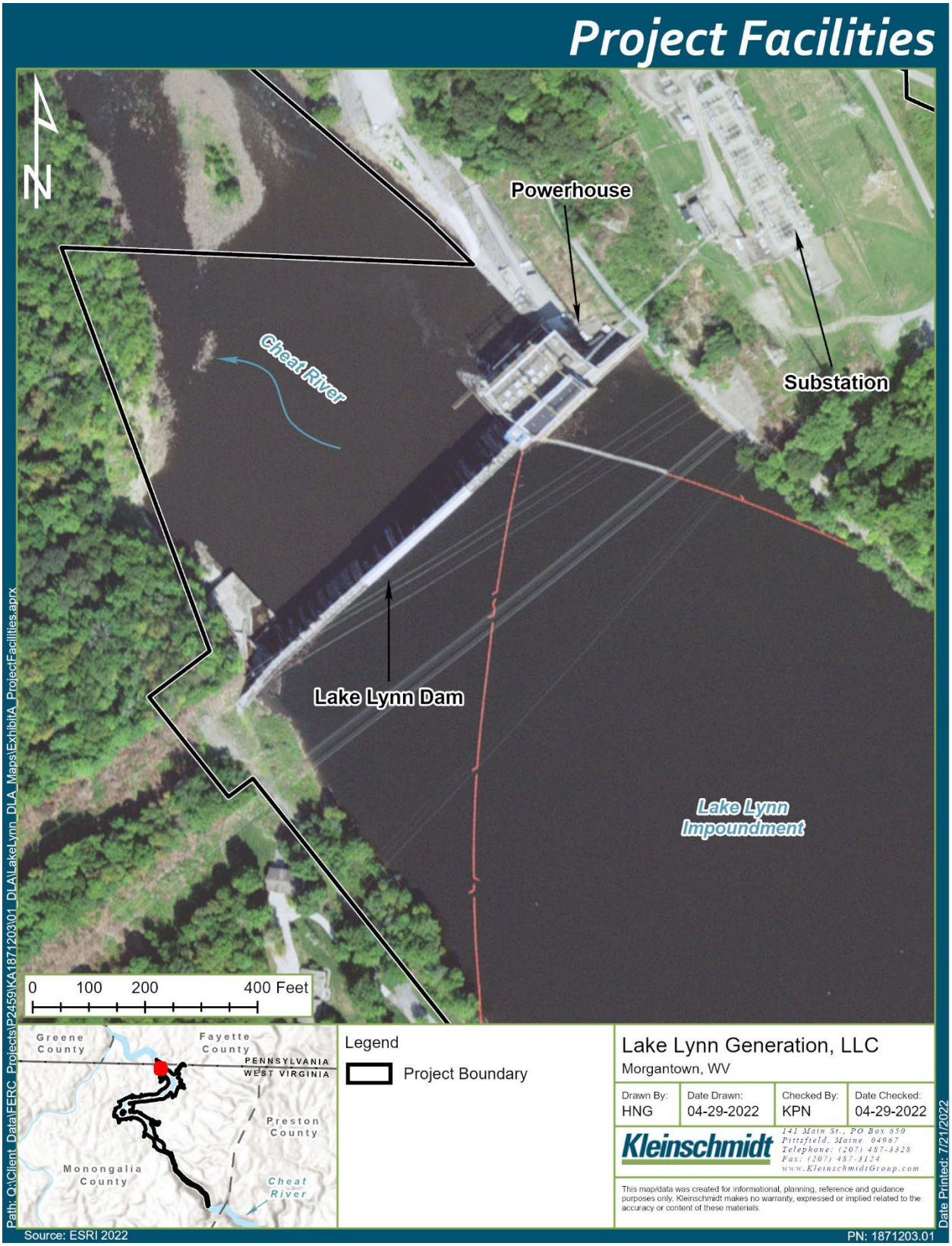

Figure 2 Location of Lake Lynn Project Facilities

3.0 LANDS OF THE UNITED STATES (18 CFR SECTION 4.51(B)(6))

There are no lands of the United States within the Lake Lynn Project boundary.

LAKE LYNN HYDROELECTRIC PROJECT

FERC NO. 2459

EXHIBIT B

PROJECT OPERATION AND RESOURCE UTILIZATION

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1.0 PROJECT OPERATION (18 CFR SECTION 4.51(C)(1))

1.1 Project Operational Control

Lake Lynn Generation, LLC (Lake Lynn), typically operates the Lake Lynn Hydroelectric Project (FERC No. 2459) (Lake Lynn Project) as a dispatchable peaking hydroelectric facility with storage capability. The facility's ponding capability varies by season and allows for peaking. The Lake Lynn Project produces a long-term average generation of 140,352 megawatt hours (MWh) of clean electricity annually, which is enough energy to power 13,495 homes (ECRE 2022). The current FERC license requires that the Lake Lynn Project is operated to maintain Cheat Lake water levels between 868 feet and 870 feet NGVD[1] from May 1 through October 31, between 857 feet and 870 feet from November 1 through March 31, and between 863 feet and 870 feet from April 1 through April 30. The current FERC License requires Lake Lynn release a minimum flow of 212 cubic feet per second (cfs) from the dam with an absolute minimum flow of 100 cfs regardless of inflow.

1.2 Annual Plant Factor

The average annual plant factor is determined using the following equation:

$$\frac{\text{Average Annual Output}}{\text{Licensed Capacity x 8,760 hrs/yr}} = \text{Avg. Annual Plant Factor}$$

The Lake Lynn Project currently has a gross average annual energy production of approximately 144,741 MWh per year based on the period 2012 to 2021, and an annual plant factor of approximately 32.3 percent based on its current FERC authorized capacity of 51.2 megawatts (MW).

1.3 Project Operation During Adverse, Mean, and High Water Years.

1.3.1 Normal Operation

The Lake Lynn Project is operated as a dispatchable peaking hydroelectric facility with storage capability. The facility's ponding capability varies by season and allows for peaking. The current FERC License requires that the Licensee operate the Lake Lynn Project to maintain Cheat Lake between 868 and 870 ft NGVD from May 1 through

[1] National Geodetic Vertical Datum of 1929.

October 31, between 857 and 870 ft from November 1 through March 31, and between 863 ft and 870 ft from April 1 through April 30, each year. The current FERC License requires the Licensee release a minimum flow of 212 cfs from the dam with an absolute minimum flow of 100 cfs regardless of inflow. A minimum flow of 212 cfs is released at all times either through powerhouse units or Tainter gates no. 12 and 13.

Since 2021, Lake Lynn is operated remotely from the control center located in Tennessee. In accordance with Lake Lynn procedures, the inflow forecasting is completed by Lake Lynn staff daily.

1.3.2 Operations During High Flows

Lake Lynn personnel monitor the USGS Parson gauge located upstream of the dam, and four rainfall data gauges to assist in the preparation for any high flow or flood event. The minimum, average or maximum anticipated flood is determined from this gauge data, and the operations of the dam are adjusted accordingly.

A local flood stage alert is issued after 30 Tainter gate operations have been completed, with the expectation of minor localized flooding. The Springhill Township Supervisor, Gray's Landing Lock & Dam and are notified at 31 operations. The Operator then notifies the Universal Security of 1st, 2nd, 3rd, and 4th stage alerts at 51, 81, 101, and 141 gate operations, respectively. The Operator notifies the supervisor when Parsons gauge reaches 13.0 feet or at 3rd stage alert. The instructions in the Emergency Action Plan are carried out by Lake Lynn personnel in the event of flood conditions. The EAP is also activated when tailwater reaches an elevation of 808± ft.

Two of the 26 Tainter gates (nos. 12 and 13) may be remotely operated about ½ ft. to satisfy the minimum flow requirement of 212 cfs. These gates can be fully opened from the control room. Eight of the Tainter gates (nos. 6-13) are operated by fixed electrically powered hoists. The remaining eighteen Tainter gates (nos. 1-5 and 14-26) are manually operated by movable electrically powered hoists (mules). Thirty gate operations of 1.5' for gates 6-13 are local manual. After 37 gate operations the mules have to be moved. The minimum advance notice of flood warnings is 2 to 3 hours.

2.0 ESTIMATED ENERGY PRODUCTIONS AND DEPENDABLE CAPACITY (18 CFR SECTION 4.51(C)(2))

2.1 Project Hydrology

The Cheat River basin encompasses portions of Monongalia, Preston, Tucker, Randolph, and Pocahontas counties in West Virginia, Fayette County in Pennsylvania, and a small part of Garrett County, Maryland. The Cheat River basin is approximately 100 miles long and has an average width of about 15 miles with a total drainage area of 1,411 square miles (FERC 1995). The Cheat River is the second largest tributary to the Monongahela River with the Youghiogheny being the largest (Allegheny 1991).

The United States Geological Survey (USGS) operates river gaging stations on the Cheat River in West Virginia and Pennsylvania near the Lake Lynn Project (Table 1).

Table 1 USGS Gages on the Cheat River Upstream of the Lake Lynn Project

USGS Gage Number	Gage Name	Location	Drainage Area	Coordinates
USGS Gage 03070260	Albright Gage	Cheat River, upstream of the Lake Lynn project boundary at Albright, West Virginia	1,046 square miles	39°29′41″ 79°38′41″
USGS Gage 03069500	Parsons Gage	Cheat River, furthest upstream from the Lake Lynn Project at Parsons, West Virginia	718 square miles	39°07′17.6″ 79°40′31.9″

Source: USGS 2022a, c

Notes: In accordance with License Articles 404 and 407 of the existing FERC License and the Project Minimum Release Flow Gauging Plan (Lake Lynn 2014 and Lake Lynn 2015), the Licensee uses water surface elevations from the Lake Lynn gage to calculate flows in the Cheat River downstream of the dam.

Inflow data to the Lake Lynn Project was estimated using flow data from a combination of the active USGS gages located upstream, including USGS Gage No. 03070260 Cheat River at Albright, WV, and USGS Gage No. 03070500 Big Sandy Creek at Rockville, WV (USGS 2022a,b). USGS Gage 03070260 is approximately 27 river miles upstream of the Lake Lynn dam with a drainage area of 1,046 square miles. Big Sandy Creek is a tributary that joins the Cheat River approximately 15 river miles upstream of the Lake Lynn dam. USGS gage 03070500 is approximately 5 river miles upstream of the confluence with

Cheat River on Big Sandy Creek with a drainage area of 200 square miles. For the inflow estimation, daily average flow data from USGS Gage 03070260 was prorated (factor of 1.078) to where Big Sandy Creek joins the Cheat River. The prorated flow data for Big Sandy Creek (proration factor =1.04) was then added to this. The resulting flow data was then prorated (factor of 1.053) from Big Sandy Creek to the Lake Lynn dam. The period of record used was January 1, 2011, to December 31, 2021. Monthly mean, minimum, and maximum inflows at the Lake Lynn Project are provided in Table 2. Monthly and annual flow duration curves are provided in Appendix B-1.

Table 2 Monthly average, minimum, and maximum inflow at the Lake Lynn Project (January 1, 2011, to December 31, 2021)

Month	Average (cfs)	Minimum (cfs)	Maximum (cfs)
January	4,282	728	31,958
February	5,845	565	30,934
March	5,556	802	55,858
April	5,190	792	31,567
May	4,457	514	31,100
June	2,520	202	23,742
July	2,079	151	41,994
August	1,457	139	33,546
September	1,511	81	33,051
October	1,758	83	11,705
November	2,830	403	30,655
December	4,790	711	36,917
Annual	3,511	81	55,858

Source: USGS 2022a,b

Peak streamflow statistics are available at two USGS gages upstream of the Lake Lynn Project. Peak streamflow data are available at the Albright gage from December 1997 through March 1, 2021. During this period, a peak streamflow of 49,800 cfs occurred on July 29, 2017 (USGS 2022a). Peak streamflow data are available at the Parsons gage from 1913 through 2021 (USGS 2022c). During this period, a peak streamflow of 170,000 cfs occurred on November 5, 1985.

2.2 Average Annual Energy Generation and Dependable Capacity

For the period 2012 to 2021, the average annual energy output of the Lake Lynn Project is 144,741 MWh. Annual and monthly gross generation for the period 2012 to 2021 is

provided in Table 3. The Licensee is an independent power producer and currently delivers all power generation directly to PJM Interconnection, LLC, a regional transmission organization (RTO), that coordinates the movement of wholesale electricity. For the most recent periods, the Lake Lynn Project's dependable capacity amount was [to be provided in the Final License Application] MW for the summer period and [to be provided in the Final License Application] MW for the winter period.

Table 3 Lake Lynn Project Gross Generation by Month (MWh) 2012-2021

Month	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10-YR AVERAGE
January	18,676	17,890	11,468	8,898	6,593	24,499	11,795	16,636	16,002	9,257	14,171
February	12,717	14,288	18,089	9,984	21,701	13,235	22,257	19,416	17,878	8,967	15,853
March	16,416	16,647	14,124	24,096	11,582	19,043	11,894	8,873	16,002	9,056	14,773
April	5,181	17,753	10,511	21,587	10,689	21,448	17,022	12,029	20,615	8,543	14,538
May	15,388	12,661	11,833	2,621	23,497	14,873	20,514	14,064	13,805	10,452	13,971
June	879	8,771	5,620	12,393	7,918	5,953	11,218	10,048	3,899	6,046	7,275
July	3,504	8,314	2,351	10,885	5,251	10,158	3,394	10,690	774	1,583	5,690
August	18,676	17,890	11,468	8,898	6,596	24,499	11,795	1,053	1,665	705	10,325
September	12,717	14,288	18,089	9,984	21,701	13,235	22,257	78	1,944	4,079	11,837
October	16,416	16,647	14,124	24,096	11,582	19,043	11,894	1,082	1,125	1,538	11,755
November	5,181	17,753	10,511	21,587	10,689	21,448	17,022	3,193	7,115	1,954	11,645
December	15,388	12,661	11,833	2,621	23,497	14,873	20,514	14,693	12,994	0	12,907
Annual Total	141,139	175,563	140,021	157,650	161,296	202,307	181,576	111,855	113,818	62,180	144,741

2.3 Area-Capacity Curves

Figure 1 provides the area capacity curves for the Lake Lynn Project.

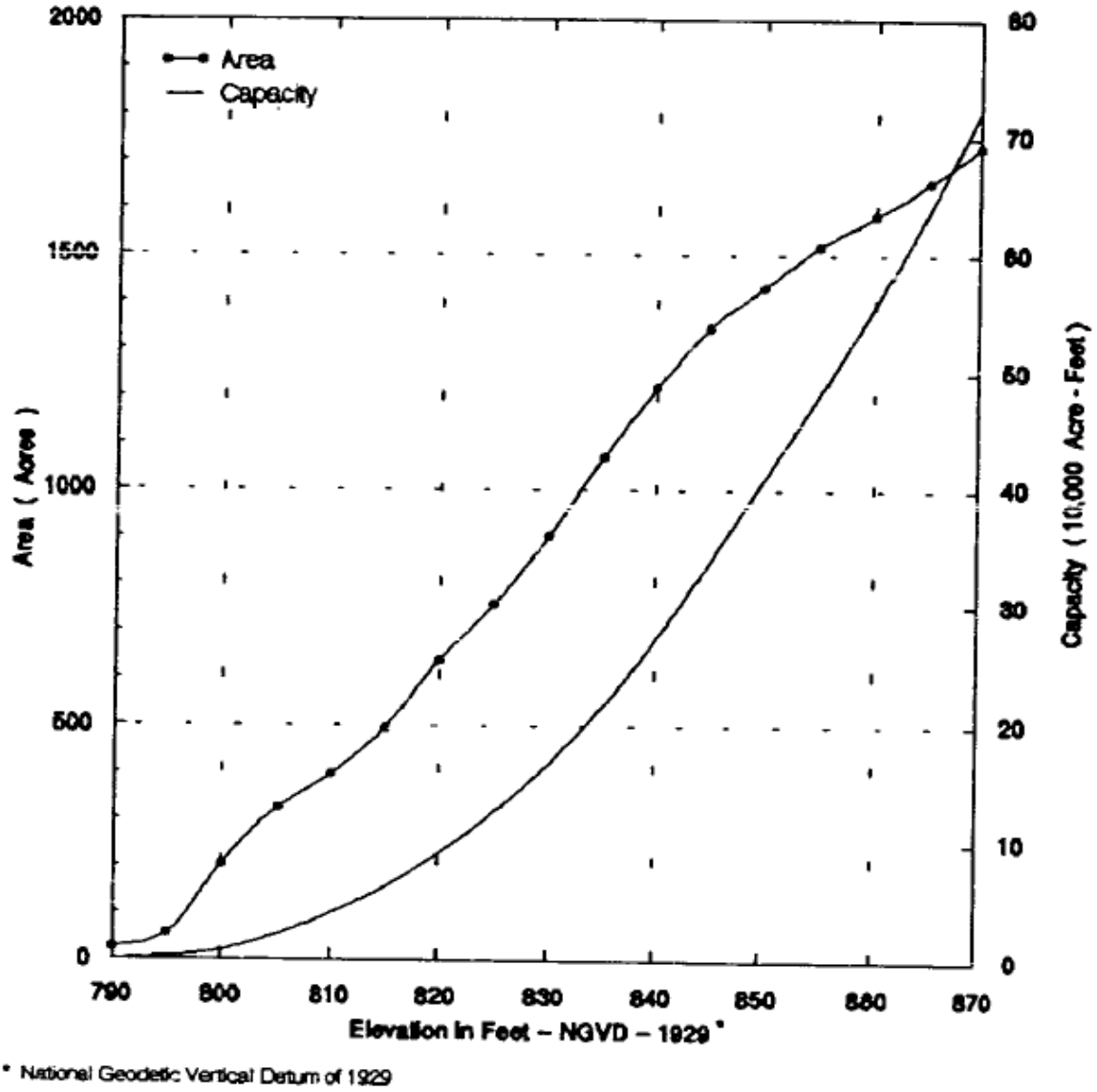


Figure 1 Lake Lynn Area Capacity Curve

2.4 Estimated Hydraulic Capacity

Table 4 provides the maximum and minimum hydraulic capacities for the Lake Lynn Project's turbines. The total maximum hydraulic capacity is 10,768 cfs.

Table 4 Lake Lynn Project Hydraulic Capacity

Unit	Minimum Hydraulic Capacity (cfs)	Maximum Hydraulic Capacity (cfs)
Unit 1	400	2,700
Unit 2	775	2,668
Unit 3	400	2,700
Unit 4	400	2,700
Total	1,975	10,768

2.5 Tailwater Rating Curves

The normal tailwater elevation at the Lake Lynn Project

Normal tailwater elevation ranges from approximately 782.2 ft. at minimum flow of 100 cfs to approximately 789.0 ft. at 4 powerhouse units (90%). Figure 2 illustrates the tailwater rating curve for the Project.

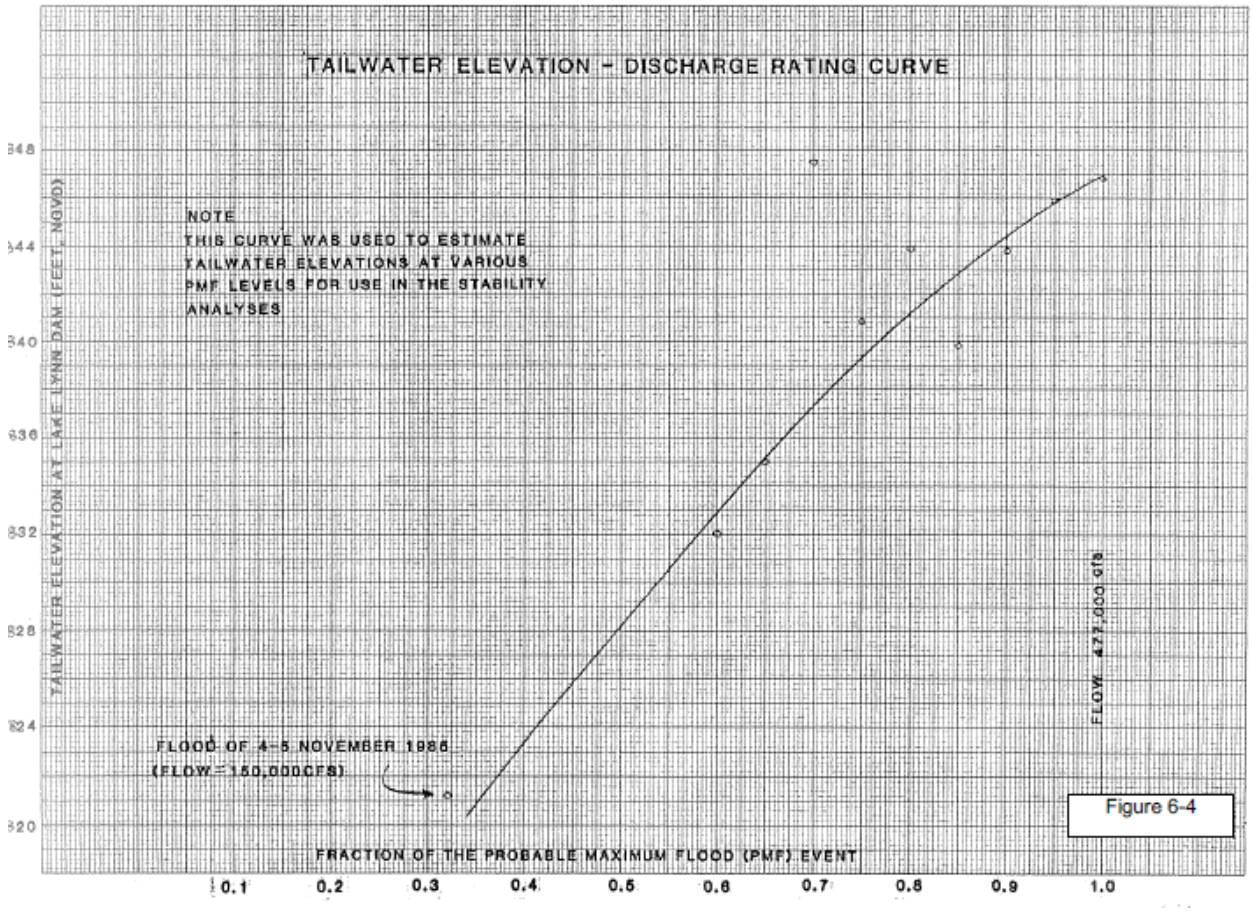


Figure 2 Lake Lynn Tailwater Rating Curve

2.6 Power Plant Capability vs. Head

Figure 3 provides a curve of the estimated plant capability as a function of head for the Lake Lynn Project.

Figure 3 Lake Lynn Project Estimated Plant Capability vs Head [to be provided in the Final License Application]

3.0 UTILIZATION OF PROJECT POWER (18 CFR SECTION 4.51(C)(3))

As a wholesale seller of generated electricity, Lake Lynn sells the electricity generated from the Lake Lynn Project The Licensee is an independent power producer and currently delivers all power generation directly to PJM Interconnection, LLC, a regional transmission organization (RTO), that coordinates the movement of wholesale electricity. PJM Interconnection is a voluntary association whose members include not only traditional electric utilities, but independent power producers that are participating in the competitive wholesale electricity marketplace. As an RTO, PJM operates a wholesale electricity market that spans all or part of Delaware, Illinois, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia. Acting as a neutral, independent party, PJM operates electricity "spot markets" in which generators sell and utilities or electricity providers buy energy for immediate delivery.

4.0 PLANS FOR FUTURE DEVELOPMENT (18 CFR SECTION 4.51(C)(4))

Lake Lynn has no future development plans proposed as part of this relicensing proceeding.

5.0 REFERENCES

Allegheny Power Service Corporation (Allegheny). 1991. Lake Lynn Hydro Station FERC Project No. 2459 – Final Federal Energy Regulatory Commission License Application. Available online: http://elibrary.ferc.gov:0/idmws/file_list.asp?document_id=1421832. Accessed: June 4, 2019.

Eagle Creek Renewable Energy (ECRE). 2022. Facilities. Available online at: https://www.eaglecreekre.com/facilities/operating-facilities/lake-lynn. Accessed May 3, 2022.

Federal Energy Regulatory Commission (FERC). 1995. Order Issuing New License to Continue to Operate/Maintain 51.2 Megawatt Lake Lynn Hydroelectric Project P-2459. Available online: http://elibrary.ferc.gov:0/idmws/doc_info.asp?document_id=7809. Accessed: June 6, 2019.

Lake Lynn Generation, LLC. 2014. Lake Lynn Hydro Station – FERC Project No. 2459 Minimum Release Flow Gauging Plan – License Article 407. Available online: http://elibrary.ferc.gov:0/idmws/doc_info.asp?document_id=14394453. Accessed: June 5, 2019.

Lake Lynn Generation, LLC. 2015. Lake Lynn Hydro Station – FERC Project No. 2459 Article 407 Minimum Release Flow Gauging Plan (Updated). July 28, 2015.

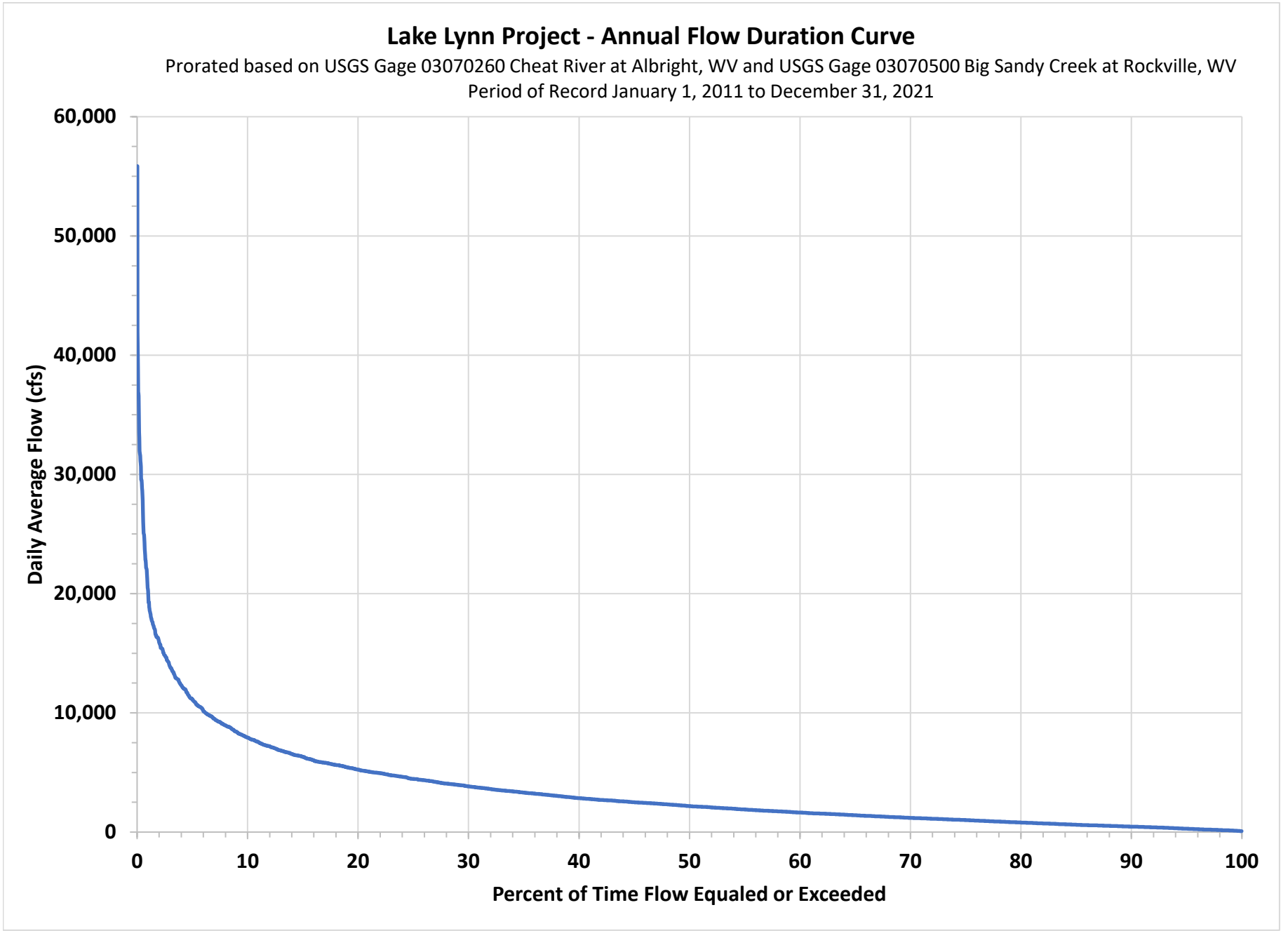
United States Geologic Survey (USGS). 2022a. USGS 03070260 Cheat River at Albright, West Virginia. Available online: https://waterdata.usgs.gov/usa/nwis/uv?03070260. Accessed: April 27, 2022.

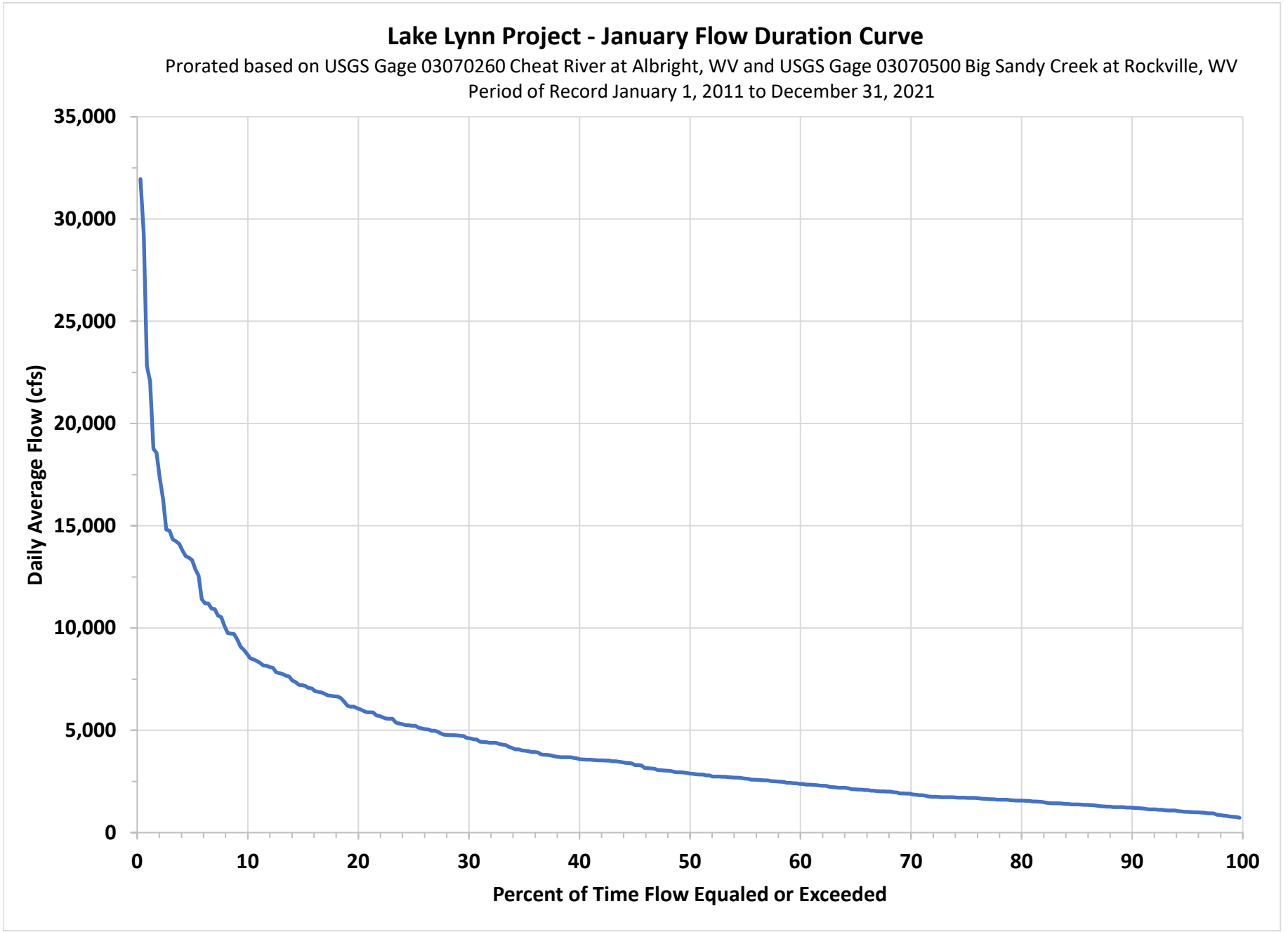
United States Geologic Survey (USGS). 2022b. USGS 03070500 Big Sandy Creek at Rockville, WV. Available online: https://waterdata.usgs.gov/usa/nwis/uv?03070500. Accessed April 27, 2022.

USGS. 2022c. USGS 03069500 Cheat River near Parsons, West Virginia. Available online: https://waterdata.usgs.gov/usa/nwis/uv?03069500. Accessed: April 27, 2022.

APPENDIX B-1

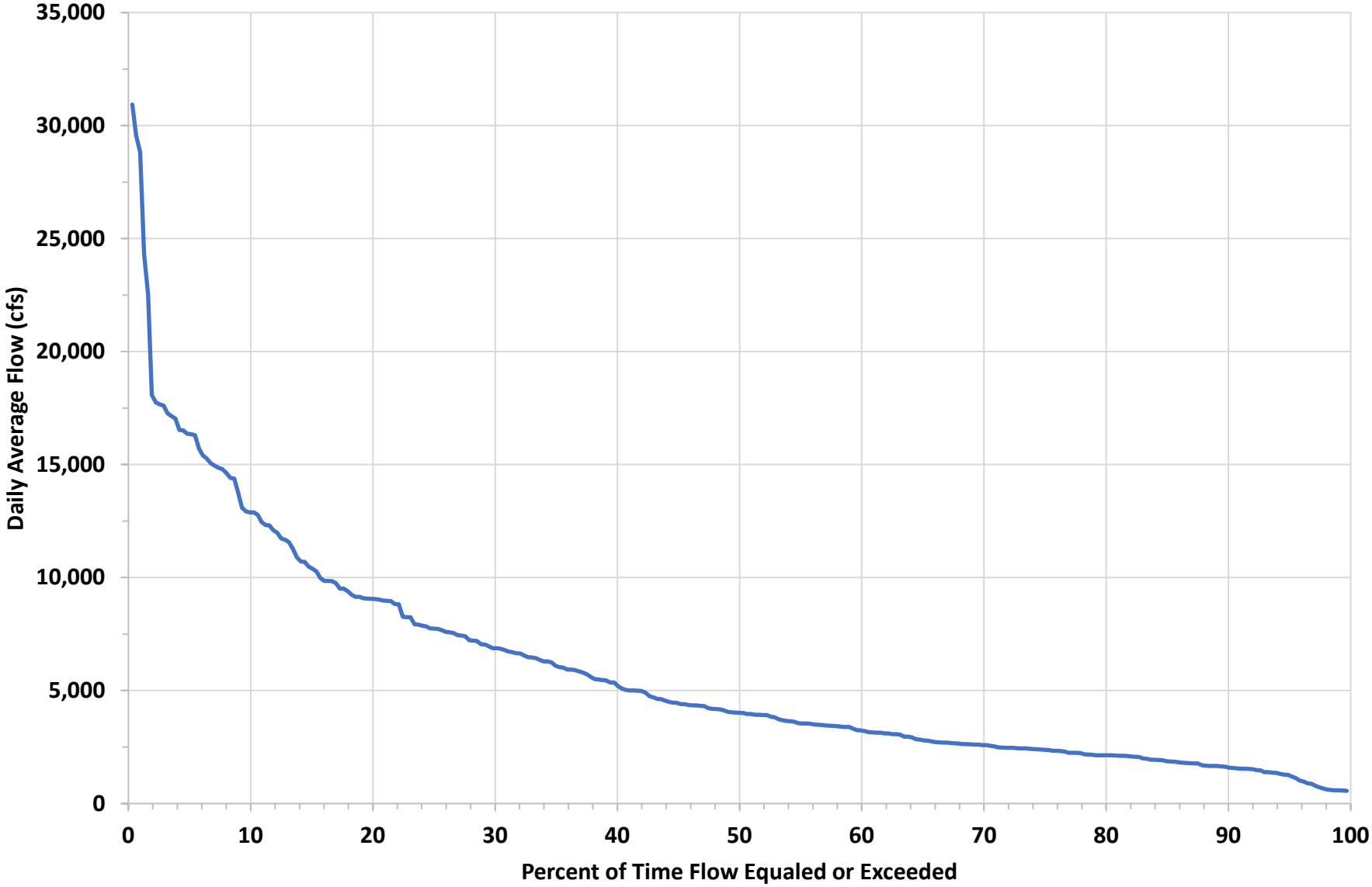
FLOW DURATION CURVES

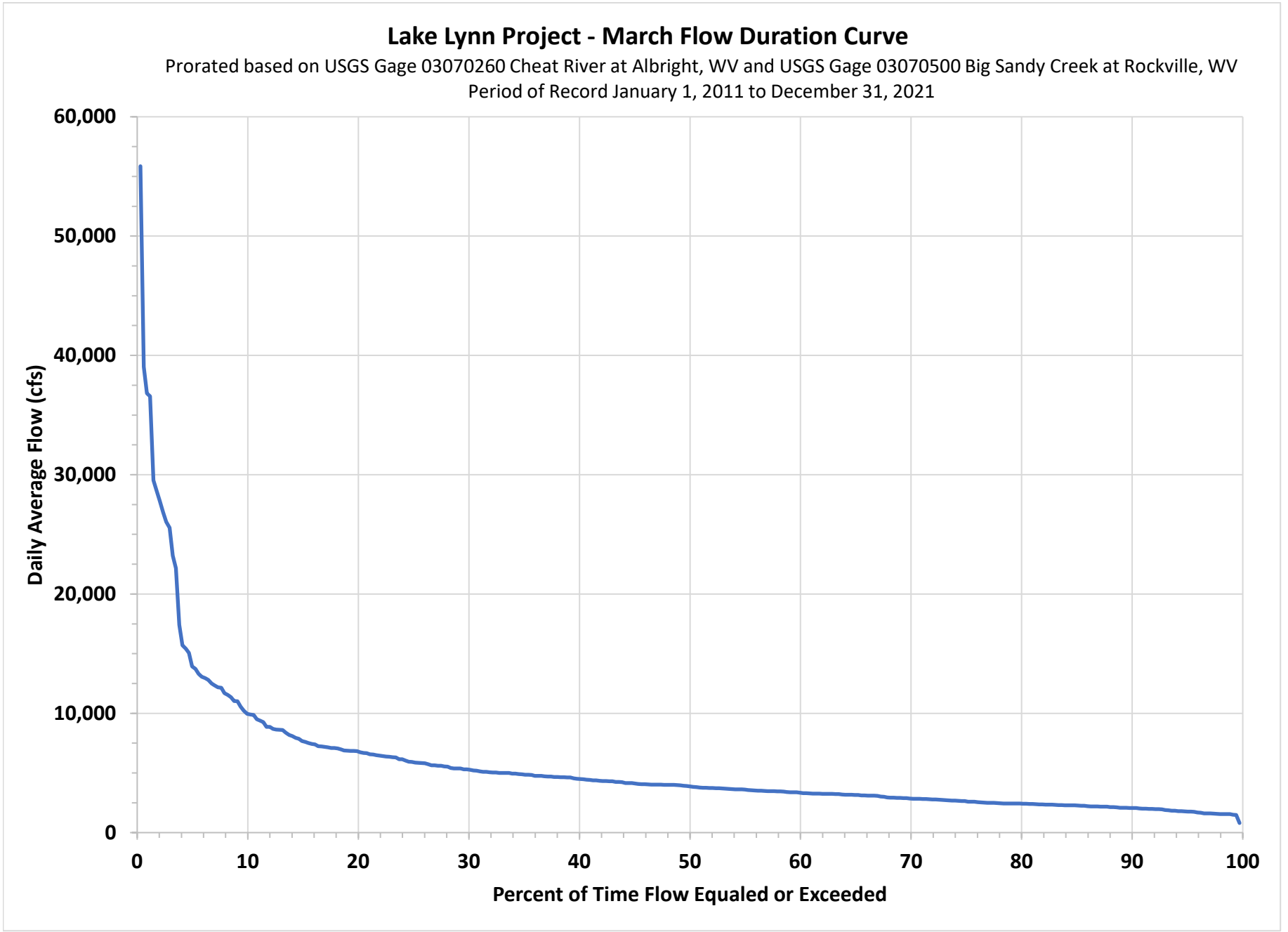

Lake Lynn Project - Annual Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
60,000
50,000
40,000
30,000
20,000
10,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded

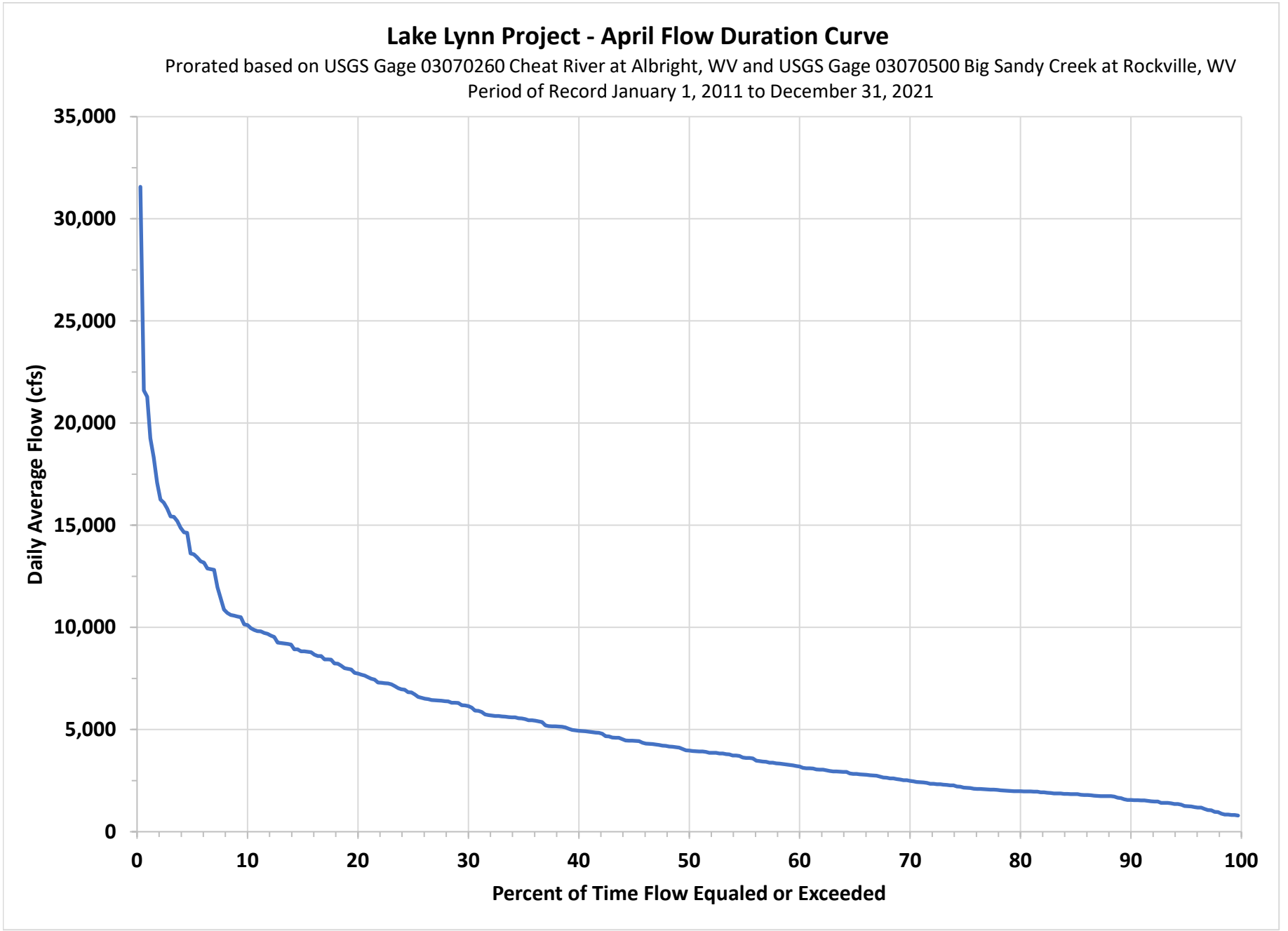

Lake Lynn Project - January Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded

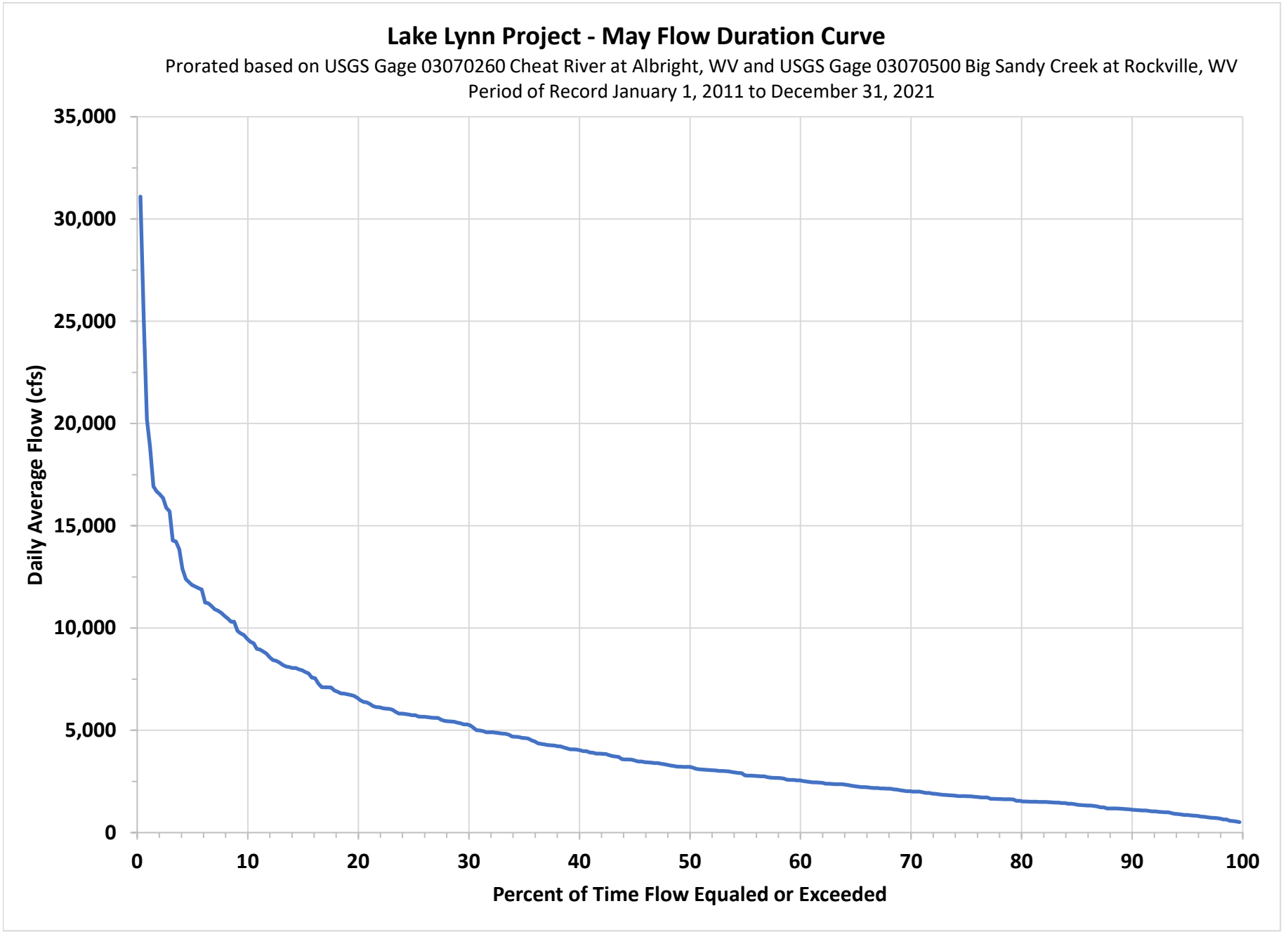
Lake Lynn Project - February Flow Duration Curve

Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021



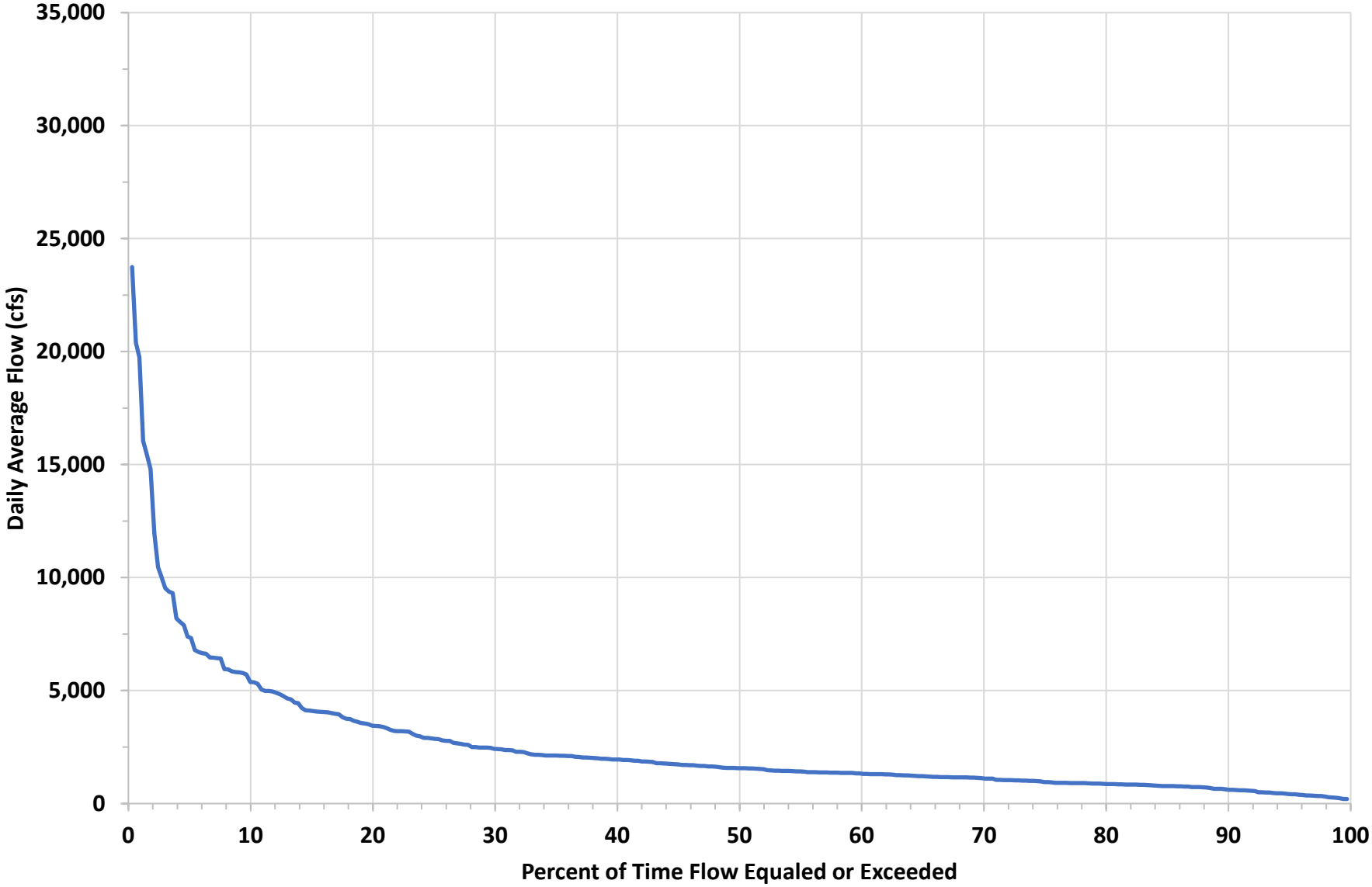

Lake Lynn Project - March Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
60,000
50,000
40,000
30,000
20,000
10,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded


Lake Lynn Project - April Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded


Lake Lynn Project - May Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded

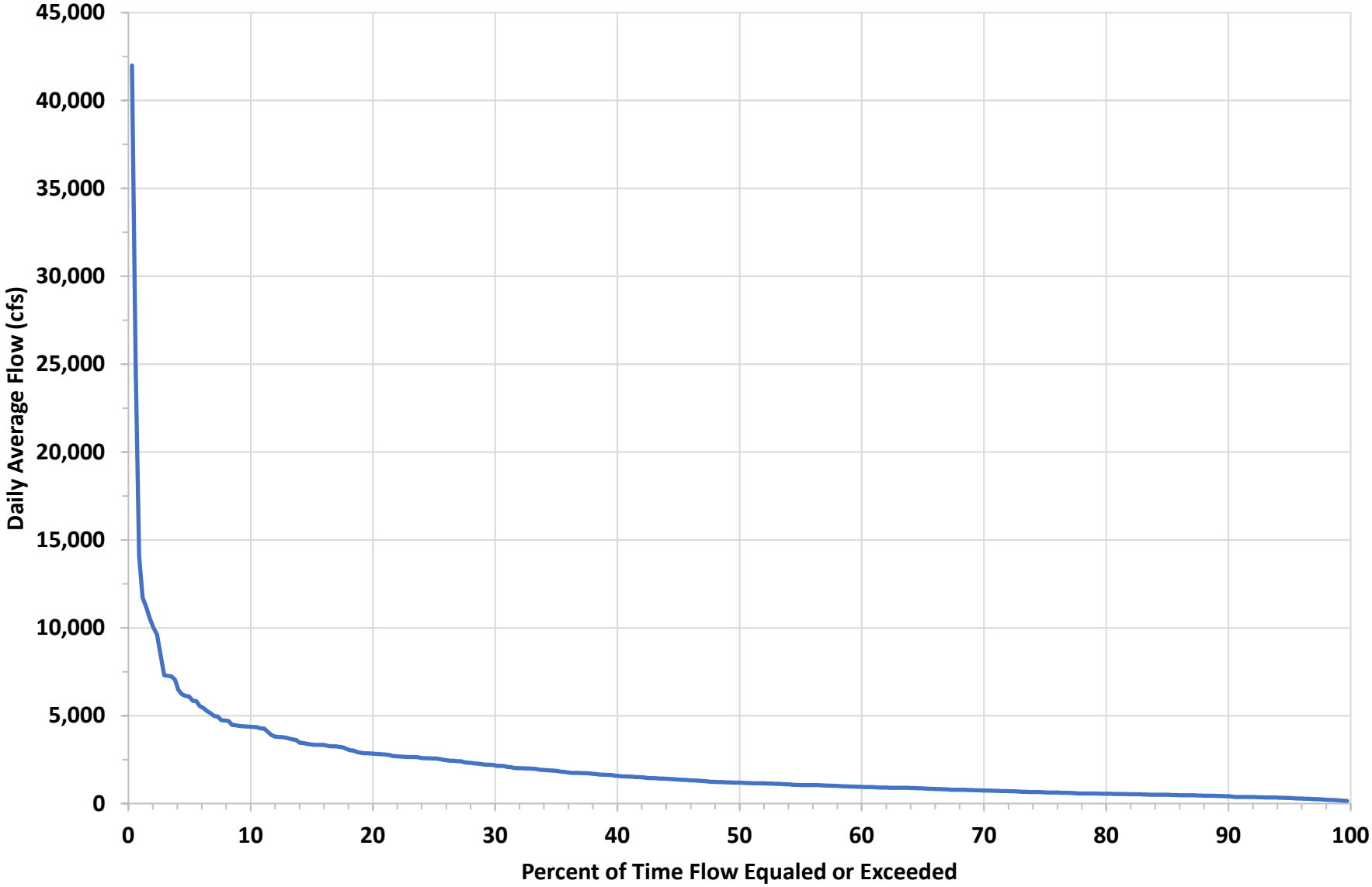
Lake Lynn Project - June Flow Duration Curve

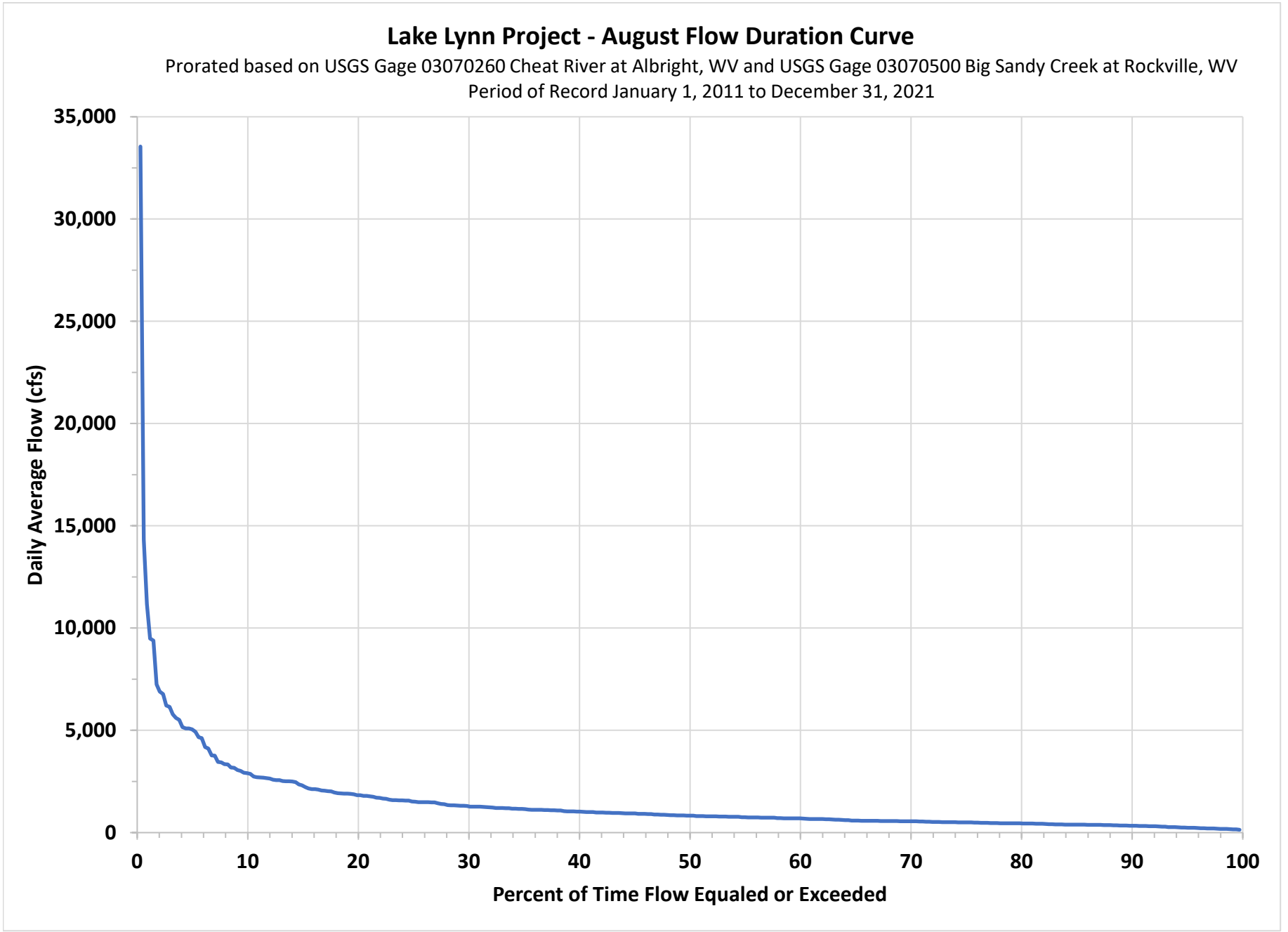
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021

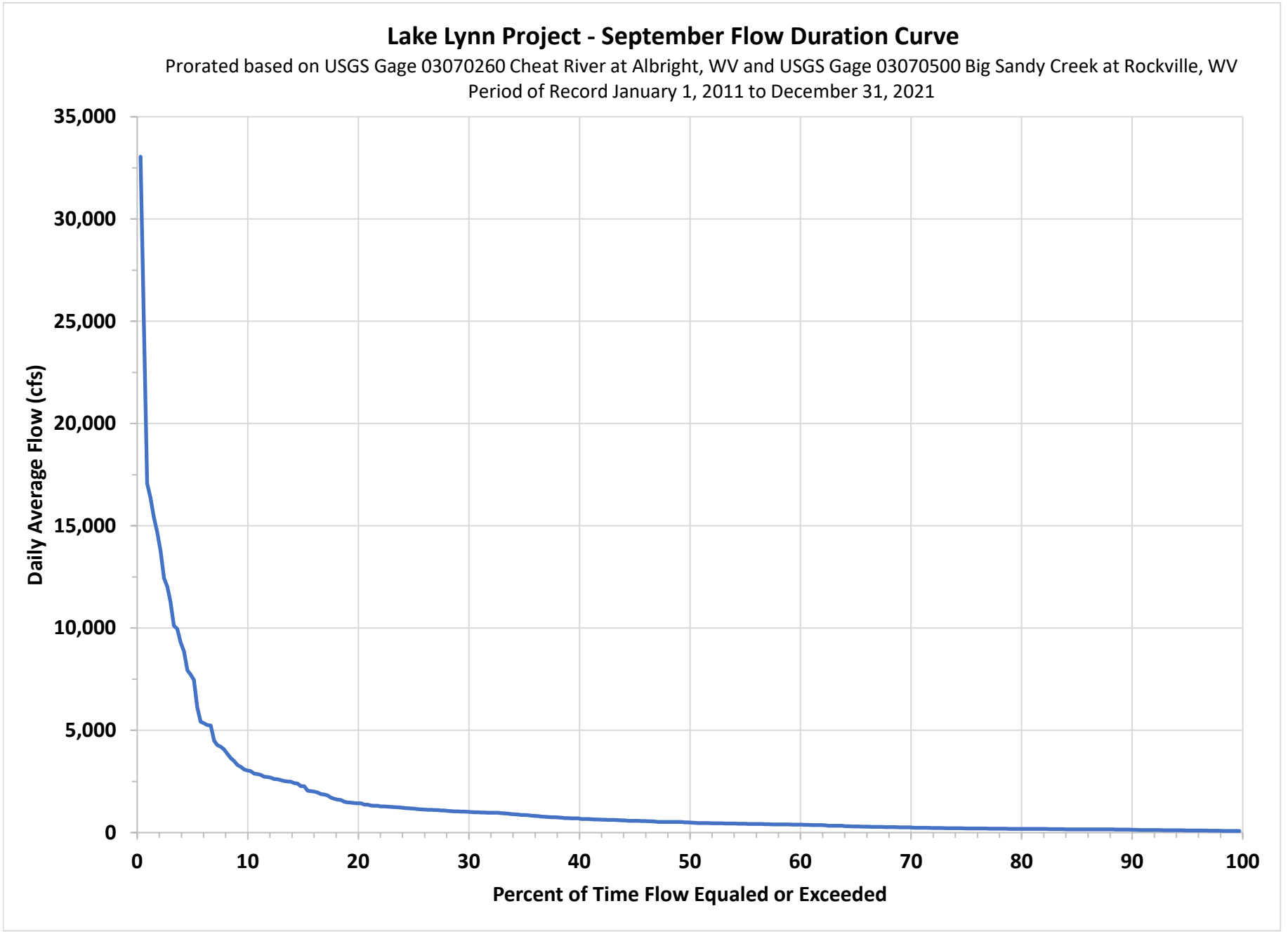


Lake Lynn Project - July Flow Duration Curve

Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021

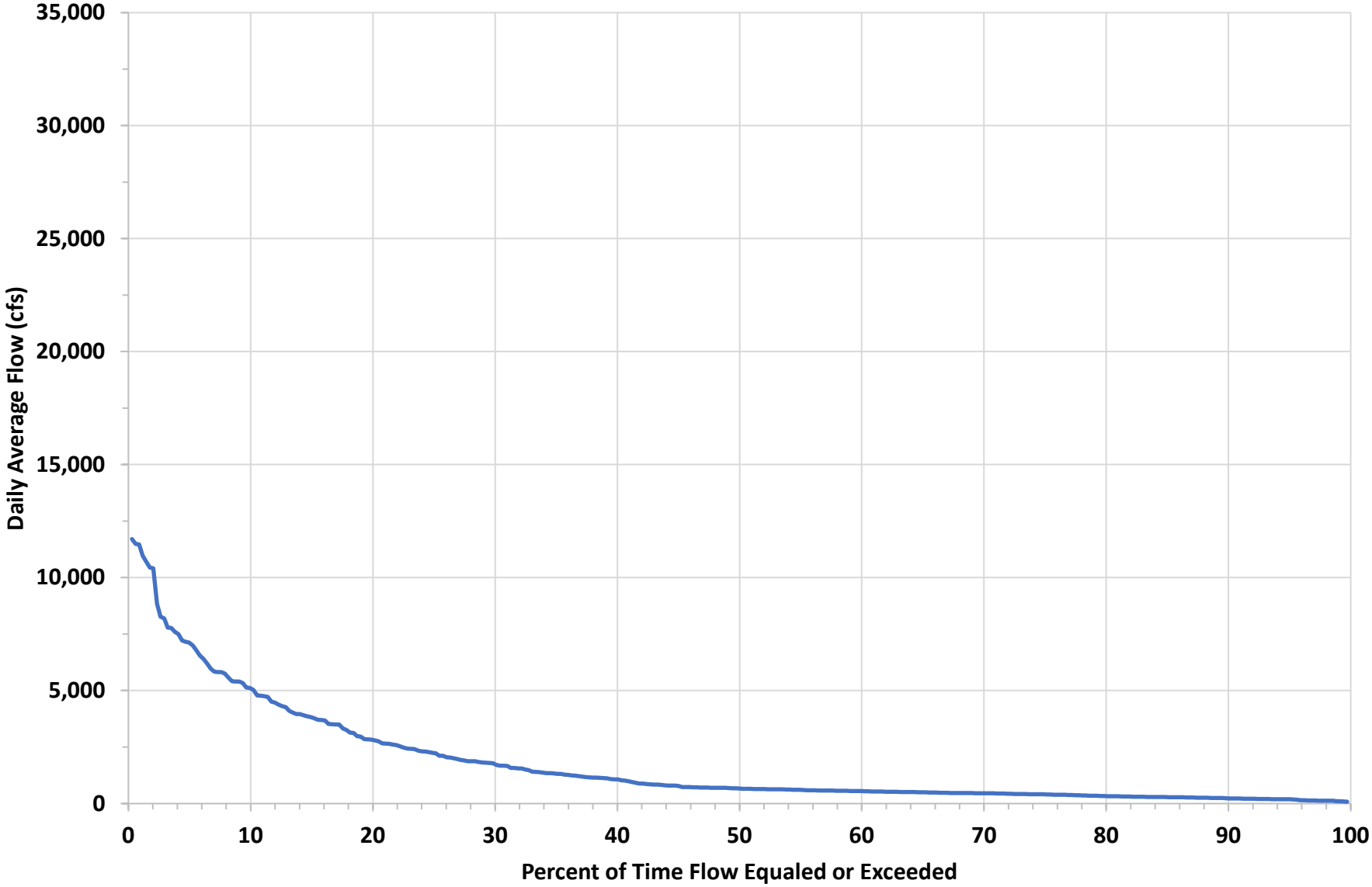


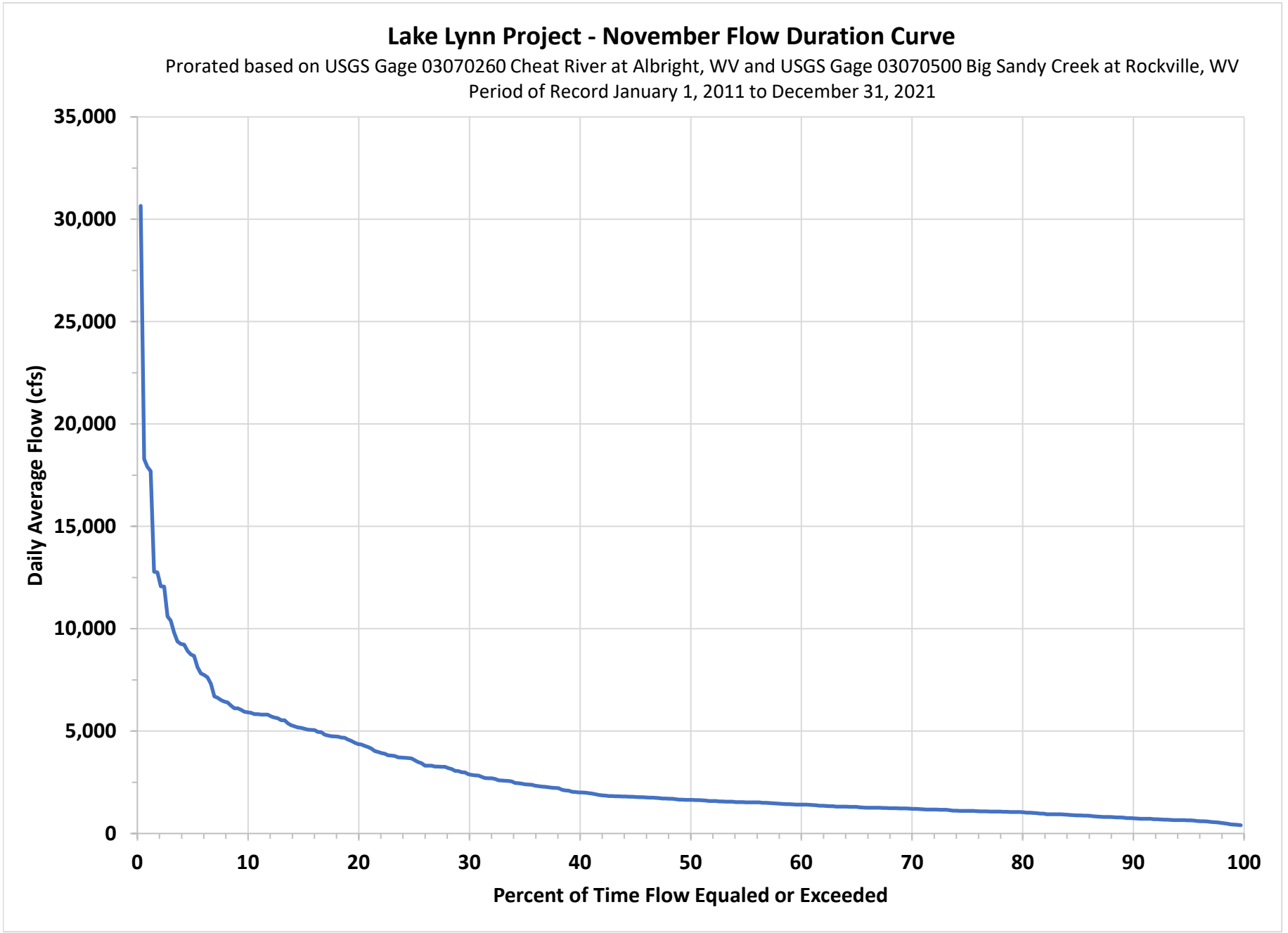

Lake Lynn Project - August Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded

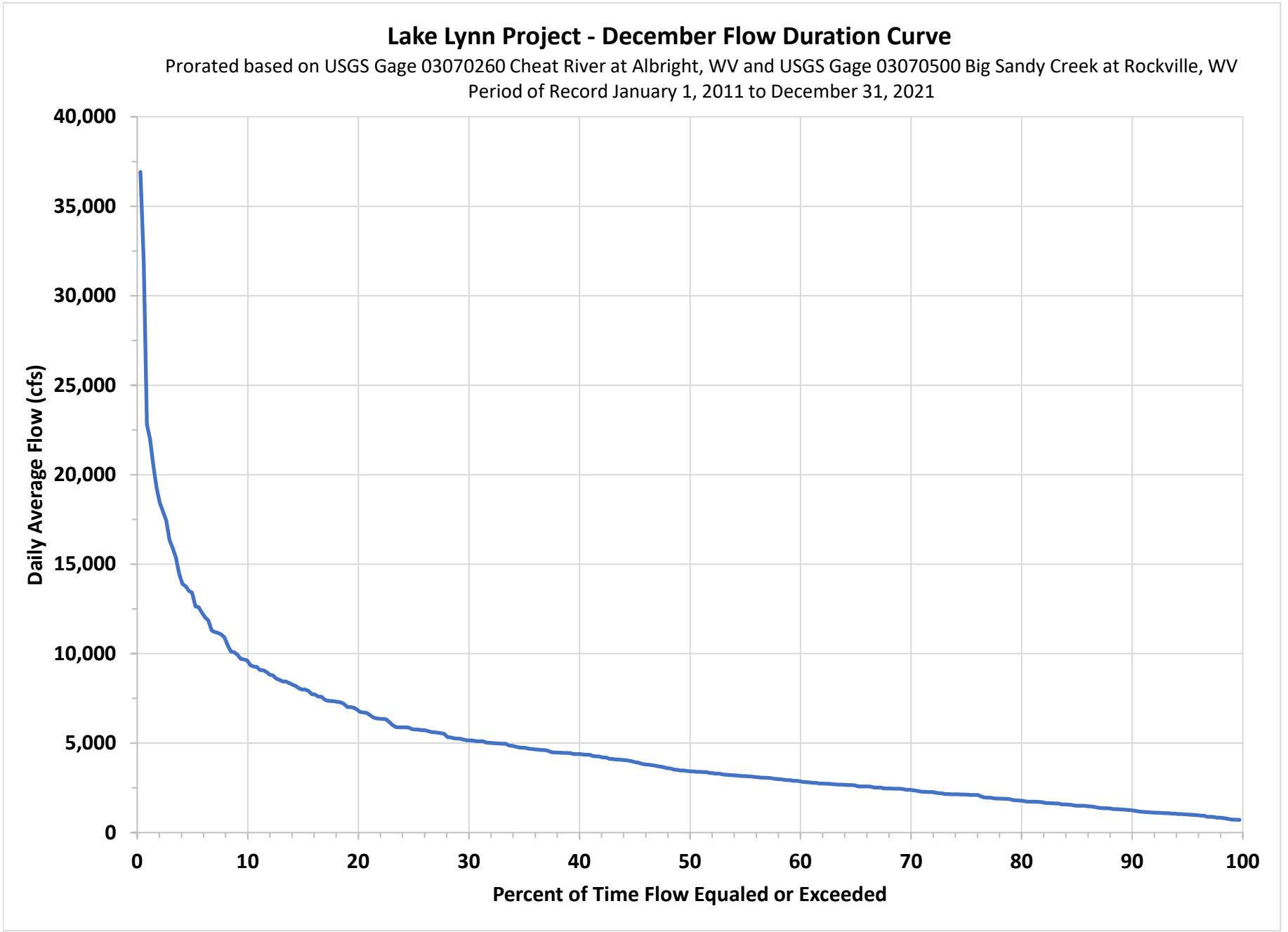

Lake Lynn Project - September Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded

Lake Lynn Project - October Flow Duration Curve

Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021




Lake Lynn Project - November Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded


Lake Lynn Project - December Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded

LAKE LYNN HYDROELECTRIC PROJECT

FERC NO. 2459

EXHIBIT C

CONSTRUCTION HISTORY

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1.0 CONSTRUCTION HISTORY

Construction of Lake Lynn began in 1912. Work on the dam was stopped in 1913 with/construction beginning again in 1925. During the period between 1912 and 1913, the following areas of the dam were constructed: the east bulkhead between stations 8+91 and 10+13; the powerhouse substructure between stations 7+55.5 and 8+91; a portion of the Trash Chutes between sections 7+11 and 7+55.5; and varying parts of the spillway between stations 6+64 and 7+11. Construction was suspended on account of financial and war conditions. When construction was resumed in 1925, the earlier work was incorporated into the completed structure. The first unit was placed in operation on May 31, 1926.

Subsequent to the first safety inspection report, sixteen 705-kip post-tensioned anchors were installed through the east bulkhead to improve stability in this section. As the result of subsequent stability analyses, 75 additional rock anchors were installed in 1990. These anchors were installed in the west bulkhead, spillway, and east bulkhead sections and ranged in capacity from approximately 550 kips to 2040 kips.

Table 1 provides a summary of the construction history at the Project.

Table 1 Summary of Construction History at the Lake Lynn Project

Year(s)	Activity
1912-1913	Construction of east bulkhead, a portion of powerhouse substructure and trash chutes
1925-1926	Construction of remainder of project
1926	Construction of protection for the west bank
1951	Two 48" low level outlet valves were embedded with concrete, and the low level outlet tunnels were filled with concrete.
1953	Height of east and west bulkheads increased, and length extended into the abutments
1956	Concrete repairs made to tailrace east retaining wall and the wall extending downstream from the baffle wall
1961	Wall in the log sluice section at the west end of the dam was replaced with a reinforced concrete wall Significant repairs to the concrete surfaces of the spillway were made in the early 1960's.
1972	A total of 16 post-tensioned anchors were installed in the east bulkhead.

Year(s)	Activity
1978 and 1988	West abutment grout bags installed.
1990	A total of 75 post tensioned anchors were installed in the east bulkhead, spillway and west bulkhead as required to make the structures stable for the PMF.
2004-2006	Extensive Tainter gate remediations were performed to replace corroded members with significant section loss. All Tainter gate chains were replaced and the gate hoists upgraded.
2007	Reinstated six spillway deck expansion joints.
2011-2012	Removal of the trash gate house and replacement of the two trash bay gates with a hydraulic cylinder operated wider trash gate. Removal of the center sluice wall. Installation of west upstream trash boom.
2018	Turbine replacement and upgrade of turbine unit 2

2.0 PROJECT SCHEDULE OF NEW DEVELOPMENT

The Lake Lynn Project is an existing development, and no new construction or modification of any project structures is proposed at this time.

LAKE LYNN HYDROELECTRIC PROJECT

FERC NO. 2459

EXHIBIT D

STATEMENT OF COSTS AND FINANCING

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1.0 ORIGINAL COST OF EXISTING UNLICENSED FACILITIES

This section is not applicable to the Lake Lynn Hydroelectric Project (Lake Lynn Project) because Lake Lynn Generation, LLC (Lake Lynn or Licensee) is not applying for an initial (original) license.

2.0 ESTIMATED AMOUNT PAYABLE UPON TAKEOVER PURSUANT TO SECTION 14 OF THE FEDERAL POWER ACT

Under Section 14(a) of the Federal Power Act (FPA), the federal government may take over any project licensed by the Federal Energy Regulatory Commission (FERC or Commission) upon the expiration of the original license. The Commission may also issue a new license in accordance with Section 15(a) of the FPA. If such a takeover were to occur upon expiration of the current license, the Licensee would have to be reimbursed for the net investment, not to exceed fair value, of the property taken, plus severance damages. To date, no agency or interested party has recommended a federal takeover of the Lake Lynn Project pursuant to Section 14(a) of the FPA.

2.1 Fair Value

The fair value of the Lake Lynn Project is dependent on prevailing power values and license conditions, both of which are currently subject to change. The best approximation of fair value would likely be the cost to construct and operate a comparable power generating facility. Because of the high capital costs involved with constructing new facilities and the increase in fuel costs associated with operation of such new facilities (assuming a fossil fueled replacement), the fair value would be considerably higher than the net investment amount. If a takeover were to be proposed, the Licensee would calculate fair value based on then-current conditions.

2.2 Net Investment

The FPA defines "net investment" as the original cost, plus additions, minus the sum of the following items (to the extent that such items have been accumulated during the period of the license from earnings in excess of a fair return on such investment): (a) unappropriated surplus; (b) aggregate credit balances of current depreciated accounts; and (c) aggregate appropriations of surplus or income held in amortization, sinking fund, or similar reserves.

The net book investment for the Lake Lynn Project is approximately ***[to be provided in the final license application]*** as of the end of 2021.

2.3 Severance Damages

Severance damages are not clearly defined in the FPA or its implementing regulations and many principles applicable in determining this component of takeover compensation are uncertain and can only be estimated. However, Lake Lynn believes that potential severances inflicted by a takeover of the Lake Lynn Project would be significant. Therefore, given the challenges of estimating damages associated with severance, Lake Lynn is reserving the right to provide the Commission with such an estimate should the Commission consider a federal takeover of the Lake Lynn Project.

3.0 ESTIMATED COST OF NEW DEVELOPMENT

3.1 Land and Water Rights

The Licensee is not proposing to expand land or water rights as a consequence of this license application.

3.2 Cost of New Facilities

The Licensee is not proposing any capacity related developments for the Lake Lynn Project.

4.0 ESTIMATED AVERAGE ANNUAL COST OF THE PROJECT

The estimated average annual cost of the Lake Lynn Project is approximately ***[to be provided in the final license application]***. This estimate includes local, state, and federal taxes, depreciation and amortization, and operation and maintenance expenses.

4.1 Capital Costs

Capital costs are based on a combination of funding mechanisms that may include contributions from Lake Lynn parent company, debt issuances, revolving credit lines, cash from operations, or other sources of funding. In 2021, the capital cost was approximated to be [***to be provided in the final license application***] percent of the annual cost.

4.2 Taxes

In 2021, Lake Lynn paid approximately ***[to be provided in the final license application]*** in local, state, and federal taxes.

4.3 Depreciation and Amortization

In 2021, the annualized composite rate of depreciation for the Lake Lynn Project was approximately ***[to be provided in the final license application]*** percent.

4.4 Operation and Maintenance Expenses

The estimated annual operation and maintenance expenses at the Lake Lynn Project in 2021 were approximately ***[to be provided in the final license application]***.

4.5 Costs of Proposed Environmental Measures

The Licensee is evaluating the need for protection, mitigation, or enhancement measures (PME). If the Licensee proposes any PME measures, estimated costs of proposed PME measures will be provided in the ***final license application***.

5.0 ESTIMATED ANNUAL VALUE OF PROJECT POWER

The estimated value of power for the Lake Lynn Project will be provided in the ***final license application***.

6.0 SOURCES AND EXTENT OF FINANCING

Capital projects are financed using cash flow from operations and as necessary, additional debt obligations, or equity injections. Based on the value of Lake Lynn Project power described in Section 5, *Estimated Annual Value of Project Power,* the Lake Lynn Project will have adequate financial resources to meet the costs of operations for the term of the new license.

7.0 COST TO DEVELOP THE LICENSE APPLICATION

The estimated cost to prepare the application for a new license for the Lake Lynn Project is approximately ***[to be provided in the final application]***.

8.0 ON-PEAK AND OFF-PEAK VALUES OF PROJECT POWER

The on-peak and off-peak values of power generated by the Lake Lynn Project will be provided in the ***final license application***.

9.0 ESTIMATED AVERAGE ANNUAL INCREASE OR DECREASE IN GENERATION DUE TO CHANGE IN PROJECT OPERATIONS

Lake Lynn is proposing to operate the Lake Lynn Project as currently licensed during the next license term. Therefore, estimates of the average annual increase or decrease in generation or the value of Lake Lynn Project power are not applicable at this time.

LAKE LYNN HYDROELECTRIC PROJECT

FERC NO. 2459

EXHIBIT E

ENVIRONMENTAL EXHIBIT

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LIST OF PHOTOS

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 Project Overview

Lake Lynn Generation, LLC (Lake Lynn, Licensee, or Applicant), a subsidiary of Eagle Creek Renewable Energy, LLC (Eagle Creek), is the owner and operator of the Lake Lynn Hydroelectric Project (FERC No. 2459) (Lake Lynn Project). The current Federal Energy Regulatory Commission (FERC or Commission) license for the Lake Lynn Project was issued on December 27,1994 and expires on November 30, 2024. Lake Lynn must file its final license application (FLA) for a new license with FERC no later than November 30, 2022.

The Lake Lynn Project is located on the Cheat River in Monongalia County, West Virginia and Fayette County, Pennsylvania, approximately 10 miles northeast of Morgantown, West Virginia. The Lake Lynn Project is located about 3.7 miles upstream of the confluence with the Monongahela River. Figure 1 provides the general location of the Lake Lynn Project. The Lake Lynn Project does not use any federal facilities and occupies no Federal lands. The Lake Lynn Project is not located within any town or city.

The Lake Lynn Project is operated as a dispatchable peaking hydroelectric facility with storage capability. The Lake Lynn Project generating capacity is 51.2 MW.

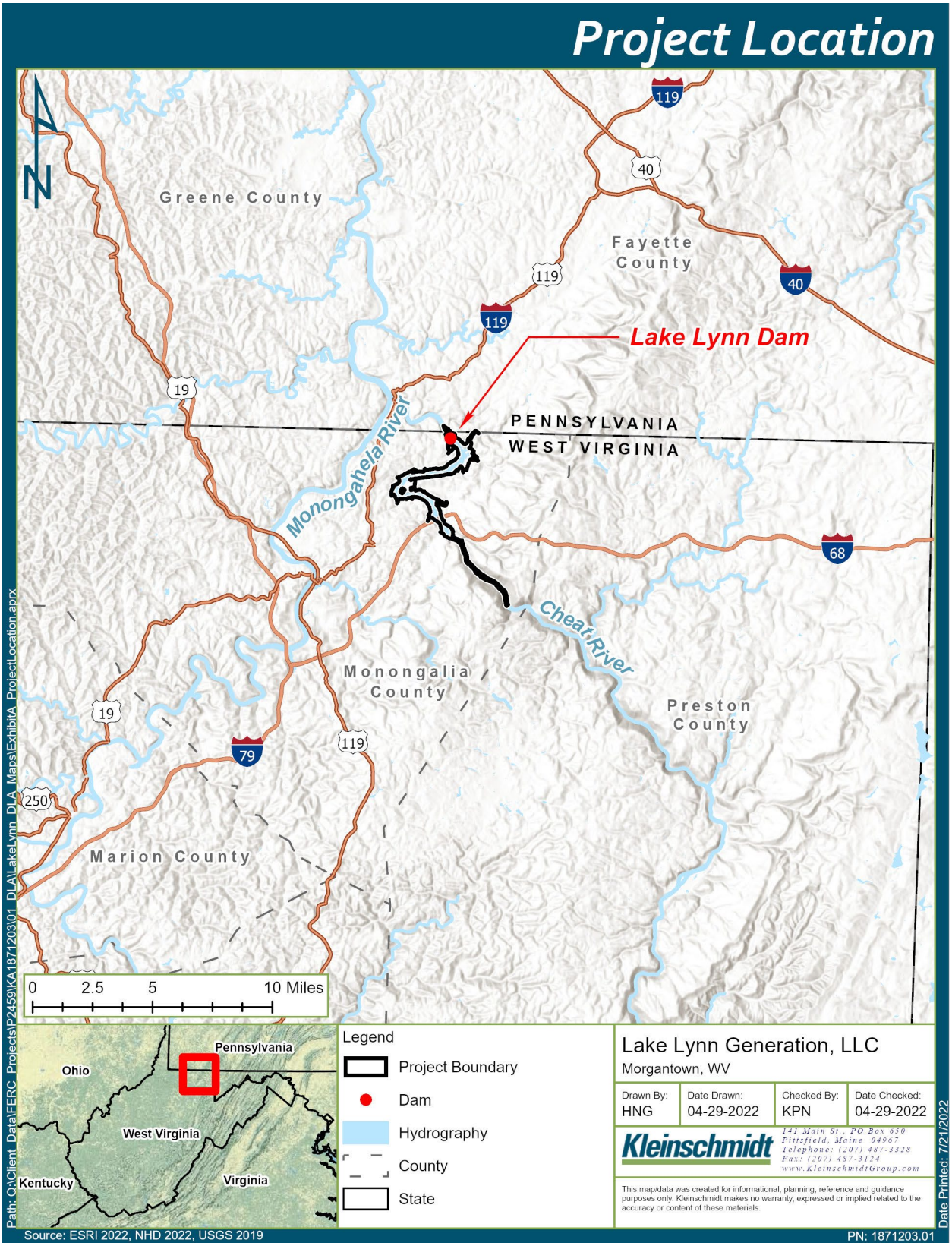


Figure 1 Location of the Lake Lynn Project

1.2 Pre-Filing Consultation Summary

1.2.1 Stage 1 Consultation

On August 29, 2019, Lake Lynn filed a Notification of Intent (NOI), a Pre-application Document (PAD), and requested to use the Traditional Licensing Process (TLP) and designation as the non-federal representative for purposes of consultation under Section 7 of the Endangered Species Act (ESA) and Section 106 of the National Historic Preservation Act (NHPA). On October 17, 2019, FERC granted approval for Lake Lynn to use the TLP, and authorization for Lake Lynn to act as non-federal representative for ESA and Section 106 NHPA consultation.

Lake Lynn published notice of the NOI and PAD in the *Herald Standard* and *The Dominion Post*, two daily newspapers of general circulation in Monongalia County, West Virginia and Fayette County, Pennsylvania. On November 21, 2019, pursuant to 18 CFR § 16.8(b)(3), Lake Lynn provided written notice to FERC and the Lake Lynn Project Distribution List of its Joint Meeting and Site Visit for the relicensing of the Lake Lynn Project. In accordance with the requirements of 18 CFR.§ 16.8(i), Lake Lynn published notice of the Joint Meeting and Site Visit in the *Herald-Standard* (a daily newspaper of general circulation in Fayette County, Pennsylvania) and *The Dominion Post* (a daily newspaper of general circulation in Monongalia County, West Virginia).

Lake Lynn held a Joint Meeting and site visit for the Lake Lynn Project on December 12, 2019. The purpose of the meeting was to: (1) provide information about the Lake Lynn Project and licensing process; (2) solicit information regarding the existing environmental resources associated with the Lake Lynn Project and data that may need to be obtained; and (3) obtain agency and stakeholder opinions regarding the Lake Lynn Project and its potential effect on existing resources.

1.2.2 Stage 2 Consultation

Appendix A provides copies of consultation and comments received from agencies and stakeholders [to be provided in the Final License Application].

Lake Lynn initiated the relicensing process in August 2019 by filing a Notice of Intent (NOI) and Pre-Application Document (PAD). At the same time, Lake Lynn requested FERC approval to use the Traditional Licensing Process (TLP). FERC approved the use of the TLP in October 2019, and in accordance with FERC regulations, Lake Lynn held a Joint Meeting

and Site Visit in December 2019. Following the Joint Meeting and Site Visit, resource agencies and other stakeholders were afforded the opportunity to comment on the PAD and to request resource studies that they deemed were needed to evaluate Project impacts on natural, cultural and recreational resources.

In response to the NOI/PAD filing and the Joint Meeting and Site Visit, Lake Lynn received written comments and study requests from the U.S. Fish and Wildlife Service (USFWS), West Virginia Division of Natural Resources (WVDNR), Cheat Lake Environment and Recreation Association (CLEAR), Friends of the Cheat (FOC), Monongahela River Trails Conservancy (MRTC), and individual residents in the local community.

Based on the comments received, Lake Lynn developed and distributed a draft Study Plan to the resource agencies and stakeholders on April 15, 2020 for review. Lake Lynn held a conference call/meeting on April 24, 2020 to review and discuss the draft Study Plan. The draft Study Plan was revised based on the discussions and a revised Study Plan was distributed to resource agencies and stakeholders and then finalized and distributed in September 2020 to include changes to the mussel survey as a result of the development for a survey plan for the mussel survey.

The draft study reports for the Desktop Fish Entrainment Assessment, Tailwater Mussel Survey, and Recreation Site Enhancement Feasibility and Assessment were provided to the relicensing stakeholders in January 2021, January 2021, and July 2021, respectively. In addition, the annual shoreline erosion surveys, annual water quality monitoring reports, the Aquatic Habitat Enhancement and Monitoring Aquatic Biomonitoring Plan (submitted as part of the Aquatic Biomonitoring Plan annual report) and the American Eel Environmental DNA Sampling (submitted as part of the Aquatic Biomonitoring Plan annual report) were provided to the relicensing stakeholders upon filing with FERC.

Table 1 Summary of Studies Completed

Study Name	Date Completed
Desktop Fish Entrainment Assessment	January 2021
Tailwater Mussel Survey	December 2020
Recreation Site Enhancement Feasibility and Assessment	June 2021
American Eel Environmental DNA Sampling	September 2021
Streamflow Data Collaboration	September 2020
Aquatic Biomonitoring Plan: Aquatic Habitat Enhancement and Monitoring	December 2020

Study Name	Date Completed
Aquatic Biomonitoring Plan: Angler Creel Survey	Ongoing (to be completed December 2022)
Shoreline Classification and Aquatic Habitat Mapping	2021 (results will be used for development of Shoreline Management Plan)

1.2.3 Purpose of and Comments on the Draft License Application

The purpose of this Environmental Exhibit is to describe: (1) the existing and proposed project facilities, project lands, and waters; (2) existing and proposed project operations and maintenance, including protection, mitigation, and enhancement (PME) measures for each resource area potentially affected by the relicensing; and (3) to provide a draft analysis of the effects of the proposed relicensing on each environmental resource. Lake Lynn proposes to continue to operate the Lake Lynn Project under existing conditions, no new facility construction is proposed, and proposed PME measures are provided in Section 3.2.2, *Proposed Environmental Measures*.

This DLA is being provided to interested stakeholders for review and comment with stakeholder comments due within 90 days of the filing of this DLA. Lake Lynn will address stakeholders' comments on the DLA, as appropriate, during preparation of the FLA, which will be filed with FERC on or before November 30, 2022.

2.0 STATUTORY AND REGULATORY REQUIREMENTS

2.1 Federal Power Act

Issuance of a new license for the Lake Lynn Project is subject to requirements under the Federal Power Act (FPA) and other federal statutes. Requirements applicable to this DLA are summarized in the following sections.

2.1.1 Section 18 Fishway Prescriptions

Under Section 18 of the FPA, the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) have the authority to prescribe fishways at federally regulated hydropower projects. Currently there are no fish passage facilities or prescriptions at Lake Lynn Project. No preliminary prescriptions have been filed by either agency. Following the filing of the FLA, fishway prescriptions, if any, would be filed within 60 days after FERC's Notice for Acceptance and Ready for Environmental Analysis (REA) Notice in accordance with 18 CFR §4.34(b).

2.1.2 Section 4(e) Conditions

Section 4(e) of the FPA requires that any license issued by FERC for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. The Lake Lynn Project does not encompass any federal lands; therefore, these conditions do not apply.

2.1.3 Section 10(j) Recommendations

Under Section 10(j) of the FPA, FERC must consider recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the Lake Lynn Project prior to issuing the new license. FERC would include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. No preliminary Section 10(j) recommendations have been provided by state fish and wildlife agencies to date.

2.2 Section 401 of the Clean Water Act

Section 401 of the Federal Clean Water Act (CWA), 33 U.S.C § 1341, et. seq requires that any applicant for a federal license or permit to conduct an activity that will or may discharge into waters of the United States (as defined in the CWA) must present the federal authority with a certification from the appropriate state agency. Pursuant to W. Va. Code § 22-11-7a the West Virginia Department of Environmental Protection (WVDEP) is the appropriate permitting agency designated to carry out the certification requirements prescribed in Section 401 of the CWA for waters of West Virginia under delegated authority from the U.S. Environmental Protection Agency (USEPA). The Pennsylvania Department of Environmental Protection (PADEP) is the appropriate permitting agency designated to carry out the certification requirements prescribed in Section 401 of the CWA for waters of Pennsylvania under delegated authority from the USEPA. Lake Lynn would request WQC from the WVDEQ and PADEP, as appropriate, in accordance with 18 CFR §4.34(b) within or before 60 days of FERC's issuance of notice of acceptance of the FLA and REA notice.

2.3 Endangered Species Act

The ESA (19 United States Code [USC] § 1536(c)), as amended, provides a program for the conservation of threatened and endangered plants and animals and their habitats in which they are found. The lead federal agencies for implementing ESA are the USFWS and the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. Section 7 of the ESA requires federal agencies, in consultation with the USFWS and/or NOAA to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. On October 17, 2019, FERC granted Lake Lynn designation as the FERC's non-federal representative for carrying out information consultation pursuant to Section 7 of the ESA. The endangered Indiana bat (*Myotis sodalis*), the threatened northern long-eared bat (*Myotis septentrionalis*), the threatened flat-spired three-toothed snail (*Triodopsis platysayoides*), and the candidate monarch butterfly (*Danaus plexippus*) have potential to occur within the project area. See additional discussion in Section 4.8, *Rare*, *Threatened, and Endangered Species*.

2.4 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with NOAA Fisheries on actions that may adversely affect Essential

Fish Habitat (EFH). EFH is only applicable to federally managed commercial fish species that live at least one component of their lifecycle in marine waters. All fish in the Cheat River are freshwater species that are not managed commercially; therefore, there is no designated EFH in the Lake Lynn project area.

2.5 Coastal Zone Management Act

Under section 307 (c)(3)(A) of the Coastal Zone Management Act (CZMA), FERC cannot issue a license for a project within or affecting a states' coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

The Lake Lynn Project is not located within a Coastal Zone and, therefore, is not subject to the CZMA.

2.6 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA), as amended, requires FERC to consider the effect of its undertakings on historic properties. Historic properties are any prehistoric or historic districts, sites, buildings, structures, Traditional Cultural Properties (TCP), and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the NRHP. FERC initiated consultation under Section 106 with federally recognized Indian tribes, including the Osage Nation, the Delaware Nation, and the Delaware Tribe of Indians, by letters dated June 27, 2019. On October 17, 2019, FERC granted Lake Lynn designation as its non-federal representative for executing information consultation pursuant to Section 106 of the NHPA. Lake Lynn consulted with the West Virginia State Historic Preservation Office (WVSHPO), the Pennsylvania State Historic Preservation Office (PASHPO) and the tribes that may have an interest in the Lake Lynn Project regarding the relicensing via the distribution of the NOI, PAD. On June 19, 2019, the Cherokee Nation stated that the Lake Lynn Project is outside their Area of Interest and deferred to federally recognized tribes that may have an interest in the area. On July 10, 2019, Delaware Nation stated that the location of the proposed Lake Lynn Project does not endanger cultural or religious sites of interest and requested to be contacted within 24 hours if any artifacts are discovered. No other tribes have responded to the information request. Lake Lynn consulted with the WVSHPO, PASHPO and the tribes that may have an interest in the Lake Lynn Project on a draft Study Plan.

No study requests or comments related to cultural resources or historic structures were received. This DLA is being distributed to the WVSHPO, PASHPO and the tribes that may have an interest in the Lake Lynn Project relicensing. Concurrent with filing this DLA, Lake Lynn is submitting a formal Project review request to the WVSHPO and PASHPO.

2.7 Wild and Scenic Rivers and Wilderness Acts

Section (7) of the Wild and Scenic Rivers Act requires federal agencies to decide as to whether the operation of a hydropower project under a new license would unreasonably diminish the scenic, recreational, and fish and wildlife values present in the designated area. The Wilderness Act of 1964 established a National Wilderness Preservation System. There are no nationally designated wild and scenic rivers or wilderness areas within the Lake Lynn boundary or in the vicinity of the Lake Lynn Project.

3.0 PROPOSED ACTIONS AND ALTERNATIVES

3.1 No-Action Alternative

The no-action alternative means that the Lake Lynn Project would continue to operate as authorized by the current license. Existing facilities would remain in place and existing PME measures would continue, but there would be no additional protection or enhancement of resources as described below. If the Lake Lynn Project were to operate as in the past, Lake Lynn would continue to produce energy in the present manner. The no-action alternative represents the baseline Lake Lynn Project energy production and environmental conditions for comparison with the applicant's proposed action.

3.2 Applicant's Proposed Action

3.2.1 Proposed Project Facilities and Operations

The Licensee is proposing no modifications to the existing Lake Lynn Project facilities. The existing dam, powerhouse, generating equipment, and other appurtenant features are all well maintained, in good working order, and no changes are required or proposed to these facilities that are outside the normal maintenance practices or ongoing FERC safety requirements.

As described in Exhibit B, Lake Lynn proposes to operate the Lake Lynn Project as a dispatchable peaking hydroelectric facility with storage capability. The facility's ponding capability varies by season and allows for peaking. The Lake Lynn Project has four identical Francis generating units with a total rated capacity of 51.2 MW. The Licensee is proposing no changes to the way in which the Lake Lynn Project is currently operated.

Lake Lynn is proposing to remove approximately 10 acres of land that are not required for Lake Lynn Project purposes.

3.2.2 Proposed Environmental Measures

Lake Lynn proposes the following PME measures:

- Develop a water quality monitoring plan for the new license term that monitors the DO and water temperature from April 1 through October 31 each year at the reservoir water quality monitoring station and the tailwater monitoring site.

- Continue to provide public recreation access to the Lake Lynn Project at the existing Lake Lynn Project recreation facilities.
- Develop a new Recreation Plan for the new license term within one year of license issuance in consultation with USFWS, WVDNR, PFBC, WVDEP, PADEP, Monongalia County, Fayette County, CLEAR, FOC, and MRTC that would be informed by the results of the Recreation Site Enhancement Feasibility and Assessment and include a review and update of the Recreation Plan every 10 years.
- Remove the water-accessible nature viewing area across from Cheat Haven from the Project boundary and to no longer designate this area as a nature viewing area.
- Develop a shoreline management plan (SMP) within one year of license issuance in consultation with USFWS, WVDNR, WVDEP, PADEP, PFBC, Monongalia County, Fayette County, West Virginia SHPO, Pennsylvania SHPO, CLEAR, and FOC,
- There are no specific proposed PME measures for cultural resources, however, Lake Lynn would continue to consult with appropriate SHPOs prior to any ground-disturbing activities at the Lake Lynn Project.

4.0 ENVIRONMENTAL ANALYSIS

4.1 Analysis of Proposed Action

Exhibit E includes a review of existing resource information as well as an analysis of anticipated effects of project operations relative to current conditions (e.g., No-Action Alternative) and Lake Lynn's proposed action. This analysis considers geographic, temporal, and cumulative scopes, as appropriate.

4.1.1 Geographic Scope

The geographic scope of the analysis defines the physical limits or boundaries of the proposed action's effect on the resources. Because the proposed action has the potential to affect the resources differently, the geographic scope for each resource varies. Generally, for upland based resources such as wildlife and land use, the geographic scope is limited to those lands within the project boundary. For aquatic resources and those affected by flow discharges and water levels, the geographic scope generally includes the impoundment and tailwater for a distance downstream to a point where flow effects are attenuated.

4.1.2 Temporal Scope

Based on the potential term of a new license, the temporal scope analyzed is up to 40 years into the future, with focus on how reasonably foreseeable future actions affect resources. The discussion of historical information is limited to available information for the resource areas.

4.1.3 Cumulative Effects

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) (Section 1508.7), a cumulative effect is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Lake Lynn has not identified any resource which has the potential to be cumulatively affected by the operations and maintenance of the Lake Lynn Project.

4.2 General Description of the River Basin

4.2.1 General Description of Watershed

The Lake Lynn Project is located on the Cheat River in Monongalia County, West Virginia, and Fayette County, Pennsylvania (Figure 2). The Cheat River is an 84-mile-long tributary of the Monongahela River. The Monongahela River is approximately 128 miles long, flows from south to north, and is located in northcentral West Virginia and southwestern Pennsylvania. The Monongahela River watershed (HUC 050200) is approximately 7,340 square miles (USACE 2012). The Lake Lynn Project is approximately 3.7 miles upstream of the confluence of the Cheat River with the Monongahela River in Point Marion, West Virginia.

The Cheat River originates within the Monongahela National Forest in Parsons, West Virginia, at the confluence of Shavers Fork and Black Fork (Figure 2). Shavers Fork is an 88.5-mile-long river which begins in northcentral Pocahontas County at Thorny Flat, the highest peak of Cheat Mountain, and generally flows north-northwest through Randolph and Tucker counties. Black Fork is a short stream about 4 miles in length formed by the confluence of the Dry Fork and the Blackwater River in the town of Hendricks. Black Fork then flows northwest through the towns of Hambleton and Parsons, West Virginia, where it joins with Shavers Fork to create the Cheat River. The Cheat River flows north until it joins the Monongahela River in Point Marion, Pennsylvania. The Cheat River watershed (HUC 05020004) is approximately 100 miles long with an average width of approximately 15 miles and a drainage area of 1,426 square miles. The average elevation of the watershed is approximately 2,270 feet above mean sea level (WVDEP 2013).

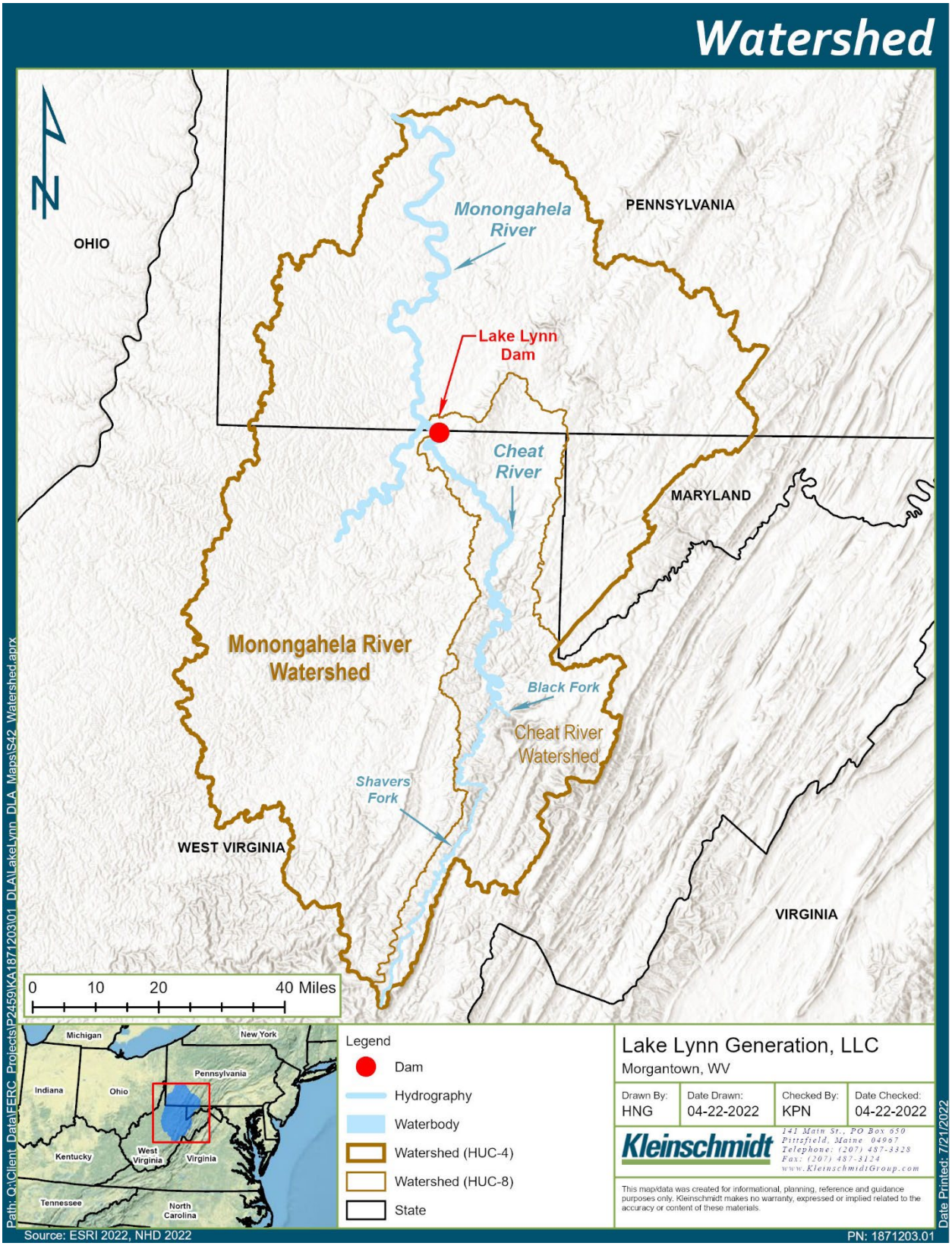


Figure 2 Overview of the Cheat River Watershed

4.2.2 Topography

The Cheat River basin topography is characterized by mountainous ridges and deep, wide valleys. The Cheat River basin spans across three geographic ecoregions, the Central Appalachian Forest, the Cumberland and Southern Ridge Valley, and the Western Allegheny Plateau. The majority of the Cheat River basin (54 percent) is within the Central Appalachian ecoregion, which is known for its mountainous terrain, cooler climate, and biologically diverse habitat (WVDEP 2013). In the Central Appalachian Forest ecoregion, the Cheat River basin meanders through the Western Allegheny Mountains, the Northern High Allegheny Mountains, and the Southern High Allegheny Mountains. The elevation of the basin ranges from 1,800 feet in Preston County, West Virginia, to 4,800 feet in Pocahontas County, West Virginia, deep within the Monongahela National Forest (LSA 2022a).

Nearly 45 percent of the river basin is within the Cumberland and Southern Ridge Valley (CSRV) ecoregion, characterized by its parallel mountain ridgelines and lowland valleys (WVDEP 2013). The Cheat River basin lies within the Cumberland Mountains, a subregion of the CSRV, which stretches from the southern part of West Virginia to Tennessee. The area is characterized as extremely rugged, mountainous terrain ranging from 570 feet to over 4,400 feet in elevation (LSA 2022b). Approximately 1 percent of the basin lies within the Western Allegheny Plateau ecoregion, which is characterized by rounded hills and wide fertile valleys of mixed oak forests and agricultural lands (WVDEP 2013). This ecoregion spans from east to west and includes areas of New York, northwestern West Virginia, western Pennsylvania, and eastern Ohio (LSA 2022c).

4.2.3 Climate

The Monongahela River watershed has a humid continental climate which is characteristic of mid-latitude temperate regions. This climate is characterized by variable weather patterns and four seasons with large temperature variations due to the position between polar and tropical air masses. Dominant airflow patterns are from the west most of the year. During the summer, low pressure cyclonic systems dominate with southern winds and heavy precipitation. From June through November, northeasterly moving hurricanes and tropical storms occasionally produce heavy rains and winds in the region (USACE 2012).

The climate of the Cheat River watershed is characterized by relatively cold winters and moderately hot, showery summers. The average annual temperature at the Morgantown Municipal Airport (approximately 6 miles southwest of the Lake Lynn dam) from 2012 to 2021 was 55°F with a range of 53°F to 56°F (NRCC 2022). The monthly mean temperature ranged from 32°F in January to 75°F in July. The average annual total precipitation was 44 inches and ranged from 35 inches to 55 inches. The monthly mean precipitation ranged from 2.2 inches in November to 5.5 inches in July (NRCC 2022).

4.2.4 Land and Water Use

The Monongahela River is controlled and maintained for navigation by the United States Army Corps of Engineers (USACE) via a series of nine locks and dams (FERC 2016). Four of these dams (Opekiska, Hildebrand, Morgantown in West Virginia, and Point Marion in Pennsylvania) are located upstream of the Cheat River confluence with the Monongahela River. The other five dams (Grays Landing, Maxwell, Charleroi, Locks and Dam 3, and Braddock) are all located downstream of the confluence in Pennsylvania (USACE 2012).

Rivers in the Monongahela River basin, including the Cheat River, were historically used for wastewater assimilation from mining and gas extraction, treated industrial and municipal wastewater, and storm water discharge (PFBC 2011). Due to historical mining activities, these rivers have displayed severe water pollution issues. However, with the introduction of water pollution controls over the past fifty years, these rivers have experienced improved water quality (PFBC 2011).

Today, the Cheat River is primarily used for hydroelectric power generation, wildlife and aquatic habitat, public water supply, and recreation, such as fishing and whitewater kayaking. The Cheat River is the drinking water source for the towns of Parsons, Rowlesburg, Kingwood, and Albright in West Virginia (FOC 2022a).

The only other dam on the Cheat River is at the Albright Power Station dam, approximately 24 river miles (RM) upstream of the Lake Lynn dam. The dam provided the cooling water supply for the power station. The Albright Power Station was decommissioned in 2012, and the dam is under consideration for removal (FOC 2022b).

Land use in the Cheat River basin is dominated by forested area (86 percent), while 8 percent of the land cover is classified as developed, 5 percent is planted/cultivated area, and less than 1 percent is defined as impervious surface area (WVDEP 2013). The watershed is sparsely populated and very rural. The tributaries that form Black Fork, the

principal tributary to the Cheat River, rise in sparsely settled mountainous terrain, much of which is part of the Monongahela National Forest. Additionally, the watershed encompasses portions of the following state and federal public lands:

- *Wildlife Management Areas*: Beaver Dam (37,674 acres), Blackwater (58,978 acres), Cheat (80,771 acres), Little Indian Creek (1,036 acres), Otter Creek (68,782 acres), Potomac (139,786 acres), and Snake Hill (3,092 acres);
- *State Parks*: Blackwater Falls (446 acres), Canaan Valley (6,014 acres), and Cass Scenic Railroad (11 miles long);
- *State Forest*: Coopers Rock (12,747 acres);
- *National Forest*: Monongahela (900,000 acres); and
- *National Wildlife Refuge*: Canaan Valley.

4.2.5 References

Federal Energy Regulatory Commission (FERC). 2016. Multi-Project Environmental Assessment for Hydropower License: Opekiska Lock and Dam Hydroelectric Project, FERC Project No. 13753-002 and Morgantown Lock and Dam Hydroelectric Project, FERC Project No. 13762-002, West Virginia; Point Marion Lock and Dam Hydroelectric Project, FERC Project No. 13771-002, Grays Landing Lock and Dam Hydroelectric Project, FERC Project No. 13763-002, Maxwell Locks and Dam Hydroelectric Project, FERC Project No. 13766-002, Monongahela Locks and Dam 4 Hydroelectric Project, FERC Project No. 13767-002, Pennsylvania. September 2016.

Friends of the Cheat (FOC). 2022a. Watershed Profile. Available online: https://www.cheat.org/about/watershed-profile/. Accessed April 20, 2022.

Friends of the Cheat (FOC). 2022b. Albright Power Dam Removal Project. Available online: https://www.cheat.org/our-work/watershed-restoration/albright-power-dam-removal-project/. Accessed April 20, 2022.

Land Scope America (LSA). 2022a. Central Appalachian Forest Ecoregion. Available online: http://www.landscope.org/explore/natural_geographies/ecoregions/Central%20Appalachian%20Forest/. Accessed: April 20, 2022.

Land Scope America (LSA). 2022b. Cumberlands and Southern Ridge and Valley Ecoregion. Available online: http://www.landscope.org/explore/natural_geographies/ecoregions/Cumberlands%20and%20Southern%20Ridge%20and%20Valley/. Accessed: April 20, 2022.

Land Scope America (LSA). 2022c. Western Allegheny Plateau Ecoregion. Available online: http://www.landscope.org/explore/natural_geographies/ecoregions/Western%20Allegheny%20Plateau/Western%20Allegheny%20Plateau%20Ecoregion/. Accessed: April 20, 2022.

Northeast Regional Climate Center (NRCC). 2022. NOWData. Available online: http://www.nrcc.cornell.edu/wxstation/nowdata.html. Accessed: April 26, 2022.

Pennsylvania Fish and Boat and Commission (PFBC). 2011. Three Rivers Management Plan: A Strategy for Managing Fisheries Resources of the Allegheny, Monongahela and Ohio Rivers. Prepared by Pennsylvania Fish and Boat Commission, Bureau of Fisheries, Fisheries Management Division Area 8, Somerset, Pennsylvania. Available online: https://www.fishandboat.com/Fish/Fisheries/ThreeRivers/Documents/ThreeRiversMgmtPlan.pdf. Accessed: April 20, 2022.

United States Army Corps of Engineers (Pittsburgh District) (USACE). 2012. Monongahela River Watershed Initial Watershed Assessment. September 2011, Revised February 2012. Pg. 23-24. Available online: https://www.lrp.usace.army.mil/Portals/72/docs/HotProjects/signed%20IWA_final_revised%20FEB12%20public%20comments%20incorporated.pdf. Accessed: April 20, 2022.

West Virginia Department of Environmental Protection (WVDEP). 2013. West Virginia Watersheds: A Closer Look. Available online: https://dep.wv.gov/WWE/wateruse/WVWaterPlan/Documents/WatershedACloserLookNovember2013.pdf. Accessed: April 20, 2022.

4.3 Geological and Soil Resources

4.3.1 Affected Environment

The Lake Lynn Project is within the Paleozoic – Pennsylvanian geological region, which formed 299-318 million years ago. Specifically, the project vicinity is a mix of Conemaugh Group, Quaternary Alluvium, Pottsville Group, Allegheny Formation, Monongahela Group, and Greenbrier Group. These geological features vary among types but are predominantly cyclical sequences of red and grey shale (mostly non-marine), siltstone, and sandstone, with thin limestones, and coal (SGMC 2017). Thin limestone, shales, and a variety of coals are widely distributed within the project vicinity.

The existing topography around the Cheat Lake shoreline is relatively steep with areas of bedrock and large cobbles. The local bedrock consists primarily of sandstone and shale. Much of the bedrock is covered with alluvium composed of sand, gravel, silt, and clay. Several outcrops are located along shoreline, including very high cliffs. Relief in the area is on the order of 300 to 400 feet, with the Cheat River flowing between relatively steep slopes on either side, rising from 870 feet to about 1,200 feet (Lake Lynn 2021). Level land in the project boundary is limited to Cheat Lake Park and along a terraced area near the Sunset Beach Marina (Lake Lynn 2021).

Based on a review of the United States Department of Agriculture Natural Resources Conservation Service's (NRCS) Web Soil Survey, the predominant soil types within the project area are loamy with mixed stony and silty components (NRCS 2022). Within the project boundary, most of the area is water (approximately 85.6 percent) with the remaining soils comprising the remaining 14.4 percent. Specifically, the most common soil types within the project area include Dekalb very stony loams, 15-35 percent and 35-65 percent slopes (DdE and DdF); Culleoka-Westmoreland silt loams, 35-65 percent slopes (CwD); Gilpin silt loam, 35-65 percent slopes (GaF); and Dekalb channery loams (DaC, DaD, and DaE). Although some variation exists between these soil types, they are typically found along steep slopes, ridgetops, hillsides, and stream terraces. Water capacity varies from low to moderate, and permeability varies from rapid (i.e., DdE and DdF) to moderate (i.e., CwD and GaF). However, all these soil types have medium to rapid runoff potential and are high-erosion hazard soils. These soil types are at high risk of runoff and severe erosion, particularly in bare earth or unprotected areas. The establishment of vegetative cover for soil protection along the shoreline of the Cheat Lake is difficult because of the

soils' low fertility, reservoir elevation fluctuation, and wave action along the shoreline from wind or watercraft.

In accordance with Article 402 of the existing FERC license, the Licensee has conducted shoreline erosion surveys of the entire Cheat Lake Shoreline every 3 years since 1995 to identify new areas of erosion along the Cheat Lake shoreline. Since 1995, the Licensee has also conducted annual erosion surveys of the Cheat Lake Park shoreline extending from the Cheat Lake dam to the Cheat Haven Peninsula. A total of 19 shoreline erosion monitoring stations where historical erosion has been observed were visually inspected during the most recent annual shoreline erosion survey conducted in 2021. Since 2018, active annual erosion has been minimal as discussed in the 2018, 2019, 2020, and 2021 annual shoreline erosion survey reports. In 2021, three of the 19 survey stations exhibited moderate erosion and one additional station was added during the survey.

4.3.2 Environmental Effects

4.3.2.1 Effects of the Proposed Action

The current FERC license requires that the Licensee release a minimum flow of 212 cfs from the dam with an absolute minimum flow of 100 cfs regardless of inflow. The Lake Lynn Project is operated as a dispatchable peaking hydroelectric facility with storage capability. The facility's ponding capability varies by season and allows for peaking. During the recreation season, fluctuations in lake level are maintained from 868 ft to 870 ft which help alleviates extreme wave action. There are no proposed changes to the existing operation of the hydroelectric facility. As such, geological conditions, soils, and shoreline erosion are expected to remain on current trends as identified in the annual shoreline erosion reports. The most recent shoreline erosion survey report (2021) concluded that the three stations that exhibited moderate erosion as compared to 2020 were in an area of low wind fetch along a narrow portion of the reservoir and that the change was likely due to boat traffic. Wave action from wind and watercraft are anticipated to continue to be a contributing factor to the shoreline erosion within the Project boundary.

During the prefiling consultation, WVDNR requested the Licensee conduct a reservoir sedimentation study at areas that have demonstrated an affinity for a build-up of sediment (i.e., Sunset Beach Marina) and develop a plan to monitor and address any sedimentation issues. In addition, CLEAR requested that the Licensee continue monitoring and remediation of the ongoing shoreline erosion. Rather than conducting a

new study, Lake Lynn proposed in its Study Plan to continue conducting the shoreline erosion surveys rather than conducting a new study which was not warranted due to the results of recent shoreline erosion surveys. In addition, in 2019, Lake Lynn conducted a bathymetric survey in the vicinity of the Sunset Beach Marina public boat launch and excavated the area in 2020 to maintain the functionality of the public boat launch.

Lake Lynn does not anticipate soil or geologic resources to be adversely affected by the proposed action. Lake Lynn will maintain the Sunset Beach Marina public boat launch. Lake Lynn is also proposing to develop a Shoreline Management Plan (as discussed in Section 4.9.2.1) that would manage shoreline activities within the Lake Lynn Project boundary. Although Lake Lynn cannot control upland activities outside the Lake Lynn Project boundary, the development of a Shoreline Management Plan that clearly outlines allowed activities and procedures for granting permission for shoreline activities will help manage shoreline activities that could cause shoreline erosion. The Licensee proposes to discontinue the shoreline erosion surveys required under the existing FERC license.

4.3.2.2 Effects of the No-Action Alternative

Under the no-action alternative, Lake Lynn would continue to operate the Lake Lynn Project under the terms and conditions of the current license. Thus, the no-action alternative would include the existing facilities and current operation as described in Section 3.0. Under the no-action alternative, the licensee would not receive a new FERC license and would continue to operate the Lake Lynn Project under the existing license requirements. The effects of the proposed action on soil and geological resources would be minimal under the no-action alternative.

4.3.3 Unavoidable Adverse Effects

Minor amounts of sedimentation and erosion may occur after implementation of PME measures related to shoreline and erosion management. However, PME measures are intended to reduce the effects of operations and any necessary on-site maintenance activities on erosion and sedimentation.

4.3.4 References

Lake Lynn Generation, LLC (Lake Lynn). 2021. 2021 Annual Shoreline Erosion Survey Report. Accession No.: 202112235039.

State Geologic Map Compilation (SGMC); Horton, John D. 2017. The State Geologic Map Compilation Geodatabase of the Conterminous United States: U.S. Geological Survey data release DOI: 10.5066/F7WH2N65.

United States Department of Agriculture Natural Resources Conservation Service (NRCS). 2022. Web Soil Survey. Available online: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed: June 6, 2019.

4.4 Water Resources

4.4.1 Affected Environment

Water Quantity, Storage, and Use

The Cheat River watershed has a drainage area of approximately 1,426 square miles. The drainage area at the Lake Lynn dam is approximately 1,411 square miles (FERC 1995). The Cheat River is the second largest tributary to the Monongahela River (Allegheny 1991). Inflow data to the Lake Lynn Project was estimated using flow data from a combination of the active USGS gages located upstream, including USGS Gage No. 03070260 Cheat River at Albright, West Virginia, and USGS Gage No. 03070500 Big Sandy Creek at Rockville, West Virginia (USGS 2022a,b). USGS Gage 03070260 is approximately 27 river miles upstream of the Lake Lynn dam with a drainage area of 1,046 square miles. Big Sandy Creek is a tributary that joins the Cheat River approximately 15 river miles upstream of the Lake Lynn dam. USGS gage 03070500 is approximately 5 river miles upstream of the confluence of Big Sandy Creek and the Cheat River with a drainage area of 200 square miles. To estimate inflow, the Licensee prorated daily average flow data from USGS Gage 03070260 (factor of 1.078) to where Big Sandy Creek joins the Cheat River. The prorated flow data for Big Sandy Creek (proration factor=1.04) was then added to this. The resulting flow data was then prorated (factor of 1.053) from Big Sandy Creek to the Lake Lynn dam. The period of record for the inflow analysis was January 1, 2011, to December 31, 2021. Flow duration curves are provided in Appendix B.

The annual mean inflow from 2011 to 2021 to the Lake Lynn Project was 3,511 cfs with the monthly mean inflow ranging from 1,457 cfs in August to 5,845 cfs in February (Table 2). The daily average minimum flows observed during this time period occurred in late September to early October 2019. The daily average maximum flow of 55,858 cfs occurred on March 1, 2021.

Table 2 Monthly average, minimum, and maximum inflow to the Lake Lynn Project (January 1, 2011, to December 31, 2021)

Month	Average (cfs)	Minimum (cfs)	Maximum (cfs)
January	4,282	728	31,958
February	5,845	565	30,934
March	5,556	802	55,858
April	5,190	792	31,567
May	4,457	514	31,100
June	2,520	202	23,742
July	2,079	151	41,994
August	1,457	139	33,546
September	1,511	81	33,051
October	1,758	83	11,705
November	2,830	403	30,655
December	4,790	711	36,917
Annual	3,511	81	55,858

Source: USGS 2022a,b

The Cheat River in the Lake Lynn Project area is used for hydroelectric power generation, recreation, wastewater assimilation, and aquatic and wildlife habitat. There are no active water withdrawals located within the project boundary. The Cheat River at the Lake Lynn Project is not used for irrigation or domestic water supply, and there are no other known entities with water rights within the Lake Lynn project boundary.

The WVDEP issues individual National Pollution Discharge Elimination System (NPDES) permits to both publicly and privately-owned wastewater treatment facilities. The Licensee has a general NPDES permit that covers sewerage systems at the Lake Lynn Recreational Facility, Cheat Lake Park (Information System ID WVG551086) (USEPA 2022). Other NPDES discharges into Lake Lynn Project waters are listed in Table 3.

Table 3 NPDES discharges into Cheat Lake

Permit Holder	Information System ID Number
SCL, PSD, LLC Summit at Cheat Lake	WV0105945
Emma Kaufman Camp	WVG550032
Morgantown Utility Board Cheat Lake (POTW)	WV0083071

Source: USEPA 2022.

4.4.1.1 Water Quality

4.4.1.1.1 Water Quality Standards

The Cheat River upstream of Cheat Lake and Cheat Lake are classified by the state of West Virginia as Category A (Water Supply, Public), Category B (Aquatic Life, Trout Waters), and Category C (Water Contact, Recreation). Trout waters are defined as "*waters which sustain year-round trout populations*" (WVDEP 2022a). In West Virginia, Cheat Lake is managed as a cool water lake. WVDEP defines cool water lakes as "*lentic water bodies that have a summer hydraulic residence time greater than 14 days and are managed by WVDNR for the support of cool water fish species, such as walleye and trout*" (WVDEP 2022a). Water quality standards applicable to these West Virginia classifications are summarized in Table 4 and Table 5.

Table 4 Selected West Virginia Water Quality Standards Applicable to Cheat Lake

Parameter	Human Health		Aquatic Life
	Category A: Water Supply, Public	Category C: Water Contact, Recreation	Category B2: Trout Waters
Dissolved Oxygen	No less than 5 mg/l at any time	No less than 5 mg/l at any time	No less than 7 mg/L in spawning areas, and no less than 6 mg/L at any time
Temperature	N/A	N/A	No heated effluents will be discharged in the vicinity of spawning areas. Maximum temperatures for cold waters are expressed in Table 4.
pH	No values below 6.0 nor above 9.0. Higher values due to photosynthetic activity may be tolerated.	No values below 6.0 nor above 9.0. Higher values due to photosynthetic activity may be tolerated.	No values below 6.0 nor above 9.0. Higher values due to photosynthetic activity may be tolerated.

Source: WVDEP 2022a

Table 5 Maximum Temperatures for Category B2 Trout Waters

	Daily Mean (°F)	Hourly Maximum (°F)
October-April	50	55
September and May	58	62
June-August	66	70

Source: WVDEP 2022a

The Cheat River in Pennsylvania, which includes the reach of river from the West Virginia-Pennsylvania border immediately downstream of the Lake Lynn tailrace to the confluence with the Monongahela River, is designated and protected as Warm Water Fishes (WWF) aquatic life habitat. This designation focuses on the maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat (PA Code 2022). Water quality standards applicable to the Cheat River downstream of the Lake Lynn dam are summarized in Table 6.

Table 6 Pennsylvania Water Quality Standards Applicable to the Cheat River downstream of the Lake Lynn dam

Parameter	WWF Designation
Dissolved Oxygen (mg/l)	7-day average 5.5 mg/l; minimum 5.0 mg/l.
Temperature	Maximum temperatures in the receiving water body January 1-31: 40 °F February 1-29: 40 °F March 1-31: 46 °F April 1-15: 52 °F April 16-30: 58 °F May 1-15: 64 °F May 16-31: 72°F June 1-15: 80 °F June 16-30: 84 °F July 1-31: 87 °F August 1-15: 87 °F August 16-30: 87 °F September 1-15: 84 °F September 16-30: 78 °F October 1-15: 72 °F October 16-31: 66 °F November 1-15: 58 °F November 16-30: 50 °F December 1-31: 42 °F
pH	From 6.0 to 9.0 inclusive

Source: PA Code (2022)

4.4.1.1.2 Water Quality Data

In accordance with License Article 405, the Licensee developed and implements a plan to continuously monitor dissolved oxygen, pH, water temperature, and conductivity in the reservoir, in the Project tailrace, and downstream of Grassy Run and other tributaries from

April 1 through October 31 annually and submits an annual report to FERC and the resource agencies (Figure 3).

In accordance with License Article 406, as amended, the Licensee must report any deviations of DO below the 5 mg/L standard in the tailrace to FERC and the resource agencies within 5 days of the deviation and must file an annual monitoring report. The Licensee has developed a standard operating procedure for low DO conditions that describes the steps to be taken to mitigate low DO levels in the tailrace. These procedures include opening spill gates to increase flow in the tailwater and reducing generation when DO levels approach the DO standard of 5 mg/L.

Water quality data from 2008 to 2018 are summarized in Table 7, and data for 2019 and 2020 are summarized in Table 8. Periods of low DO levels were generally found in the late summer and early fall for most years, particularly at the reservoir site.

Table 7 Ranges of water quality data collected from April 1 to October 31 of 2008 to 2018 at the Lake Lynn Project.

Monitor/Gage	Water Temperature (°C)	pH	DO (mg/L)	Specific Conductance (µS/m at 25°C)
Reservoir (USGS Gage No. 03071590 Stewartstown Gage)	3.2 - 26.7	6.4 - 7.3	1.0 - 12.8	48 - 205
Tailrace (USGS Gage No. 03071605 Davidson Gage)	3.5 - 27.4	6.3 - 7.4	3.4 - 14.0	52 - 178
Downstream (USGS Gage No. 03071690 Nilan Gage)	6.0 – 27.2	5.3 – 7.4	3.1 – 13.0	54 - 217

In 2019, the daily minimum DO concentration in the reservoir was below 5 mg/L from late July to late October (Table 8). In the tailrace, the DO concentration was below 5 mg/L on August 28, September 9 to 19, September 22 to October 2, and several days in October (October 4-6, 9, 16, 18, 21, 22). The Licensee reported these excursions and consulted with the resource agencies to identify options to mitigate the low DO. The Licensee ceased generation and obtained a temporary variance from FERC to reduce the headpond elevation to increase flows downstream (FERC 2019, LLG 2020a). The excursions below the standard in 2019 were attributed to low inflow conditions because of a lack of precipitation. At the downstream site, the daily minimum DO concentration was below 5

mg/L in late June, several days throughout July and August, and most days in September and October. pH was in attainment with standard at all three sites in 2019.

In 2020, the daily minimum DO in the reservoir was below the standard from mid-July to early September (excluding August 9), in late September, and several days in October (Table 8). There were two short-term (less than two hours) deviations of DO below the standard in the tailrace (July 30 and August 29). In accordance with the standard operating procedures for low DO conditions, changes made to operations quickly resulted in DO concentrations in the tailrace increasing to over the 5 mg/L standard (LLG 2020b,c, LLG 2021a). At the downstream site, the daily minimum DO concentration was below 5 mg/L on several days from July to mid-September. pH was in attainment with standard at all three sites in 2020.

Table 8 Ranges of water quality data collected in 2019 and 2020 at the Lake Lynn Project.

Monitor/Gage	Daily Average Water Temperature (°C)	Minimum, Maximum pH	Daily Minimum DO (mg/L)	Daily Average Specific Conductance (µS/m at 25°C)
Reservoir (USGS Gage No. 03071590 Stewartstown Gage)	7.7 – 29.1	6.2, 8.2	0.0 – 11.2	43 -180
Tailrace (USGS Gage No. 03071605 Davidson Gage)	8.2 – 27.4	6.3, 8.2	3.5 – 11.8	80 – 1,018
Downstream (USGS Gage No. 03071690 Nilan Gage)	1.9 – 24.3*	6.6, 7.5**	2.4 – 10.5	134 – 795*

*Data for 2020 only. **Data for April 5-May 21 2020 only.

In 2021, at the reservoir site, the daily average water temperatures ranged from 6.4°C to 25.3°C with an average of 18.4°C (Table 9,Figure 4). The daily minimum DO ranged from 0.8 mg/L to 11.6 mg/L, with an average of 6 mg/L. The DO concentration was below 5 mg/L from July 20 through the end of August, from September 27 to October 6 and occasionally from October 19 through the end of October (Figure 4). The reservoir pH ranged from 8.1 to 9.6 with an average of 8.8; daily maximum pH levels were above the standard from late August through September (Figure 5). The daily average conductivity ranged from 47 to 138.1 µS/cm (Table 9, Figure 6)

At the tailwater monitoring station, the daily average water temperature ranged from 7.4°C to 25.6°C, with an average of 17°C (Table 10, Figure 7). Daily minimum DO levels in the tailwater ranged from 4 mg/L to 13.1 mg/L with an average of 8.4 mg/L. The daily

minimum DO concentration was below the 5 mg/L standard on August 11 to 14 and August 16, which was likely due to an equipment malfunction, on August 20 and 30, and on September 1 (LLG 2021b, LLG 2022) (Figure 7). The daily average pH level ranged from 6.0 to 7.4 with an average of 6.4 and was in attainment with the standard throughout the study (Figure 8).

The downstream monitoring station had daily minimum DO levels ranging from 1.9 mg/L and 10.4 mg/L (Table 11). The daily minimum DO was below 5 mg/L on several days from late June through October (Figure 9). The pH ranged from 5.9 to 7, with an average of 6.4 (Figure 10).

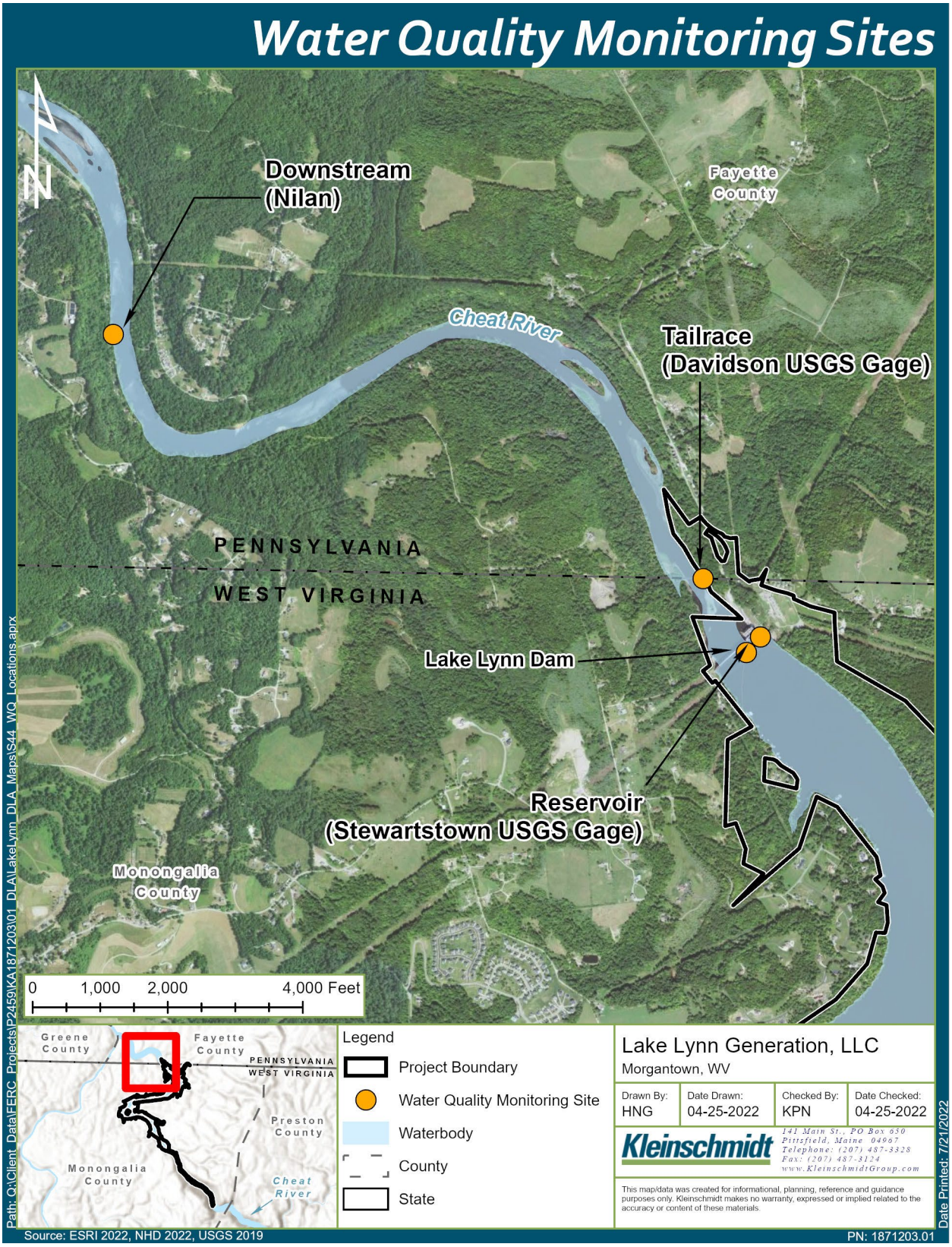


Figure 3 Water quality monitoring stations at the Lake Lynn Project

Table 9 Water quality data statistics from the Lake Lynn Reservoir monitoring site, April 1 to October 31, 2021

Statistic	Daily average pH	Daily Minimum DO (mg/L)	Daily Average Water Temperature (°C)	Daily Average Conductivity (µS/cm)
Minimum	8.1	0.8	6.4	47
Maximum	9.6	11.6	25.3	138.1
Mean	8.8	6.2	18.4	90.1

Table 10 Water quality data statistics from the Lake Lynn Tailrace monitoring site, April 1 to October 31, 2021

Statistic	Daily Average pH	Daily Minimum DO (mg/L)	Daily Average Water Temperature (°C)
Minimum	6.0	4.0	7.4
Maximum	7.0	13.1	25.6
Mean	6.4	8.4	17.0

*Data for conductivity was erroneous and not included in the annual report.

Table 11 Water quality data statistics from the Lake Lynn Downstream monitoring site, April 1 to October 31, 2021.

Statistic	Daily Average pH	Daily Minimum DO (mg/L)
Minimum	5.9	1.9
Maximum	7.0	10.4
Mean	6.4	5.9

*Data for temperature and conductivity was erroneous and not included in the annual report.

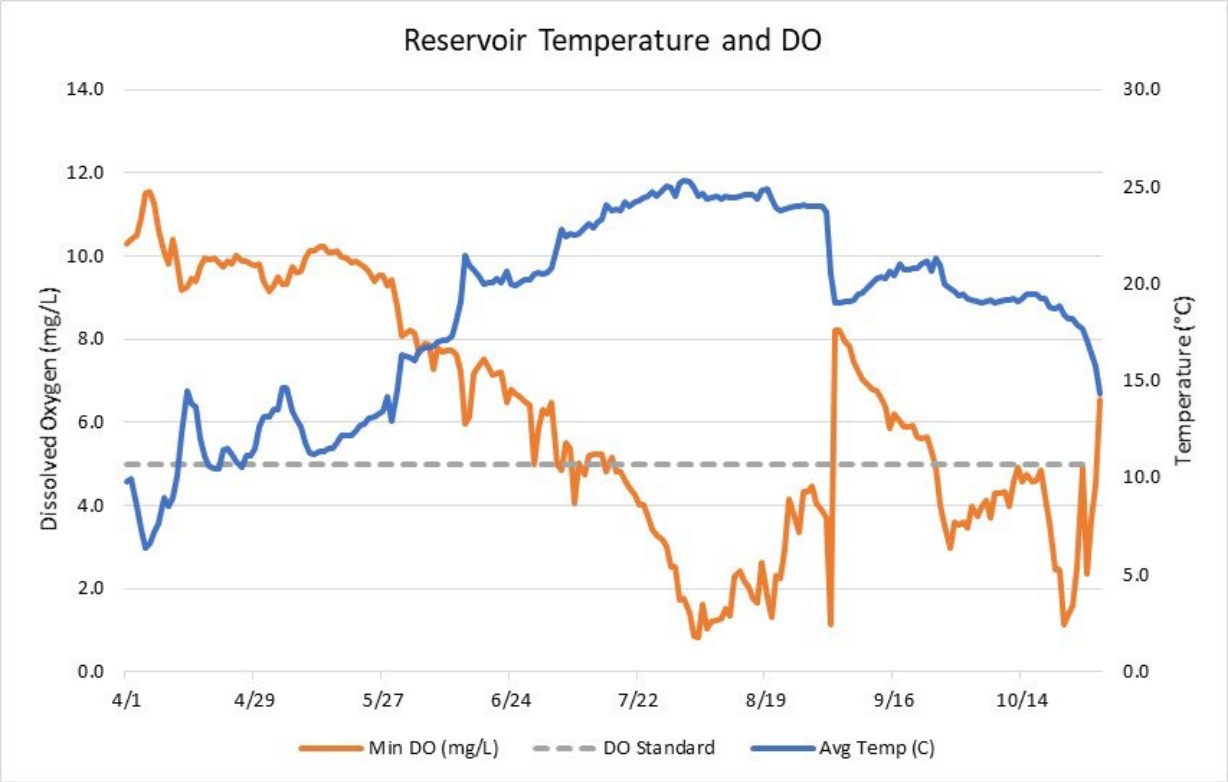


Figure 4 Daily minimum DO and daily average water temperature at the reservoir monitoring site, April 1 to October 31, 2021.

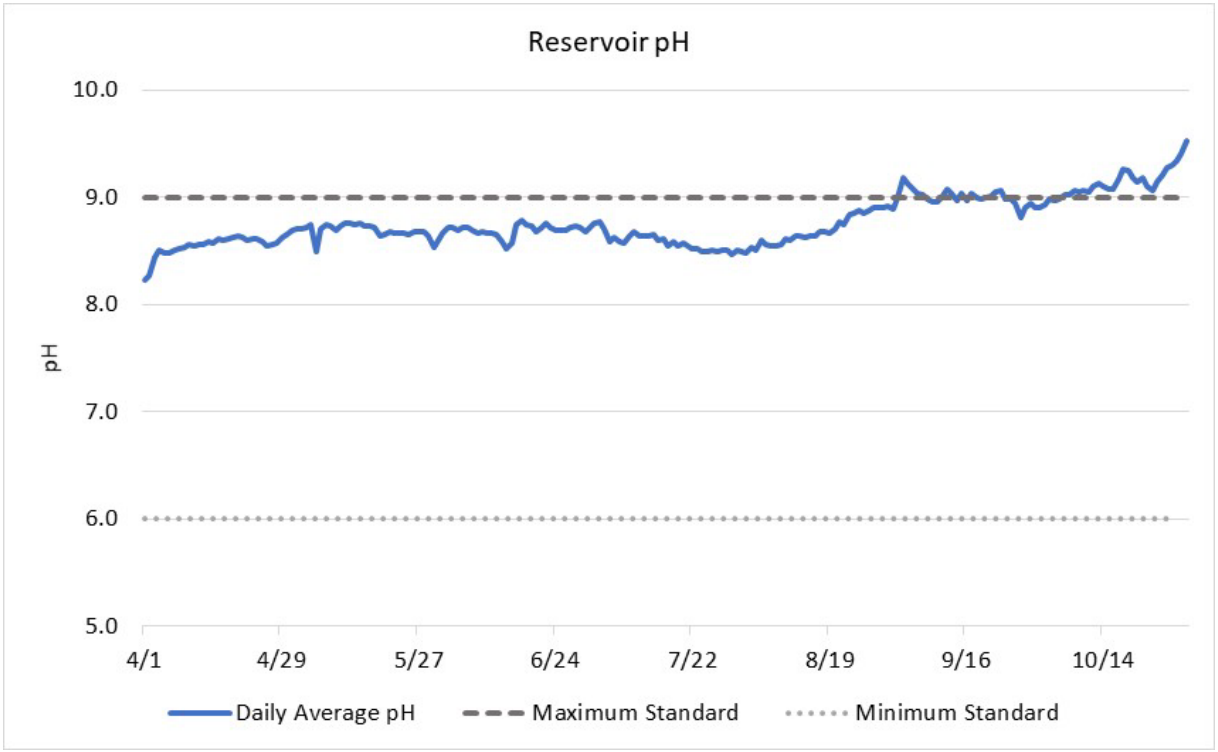


Figure 5 Daily average pH at the reservoir monitoring site, April 1 to October 31, 2021.

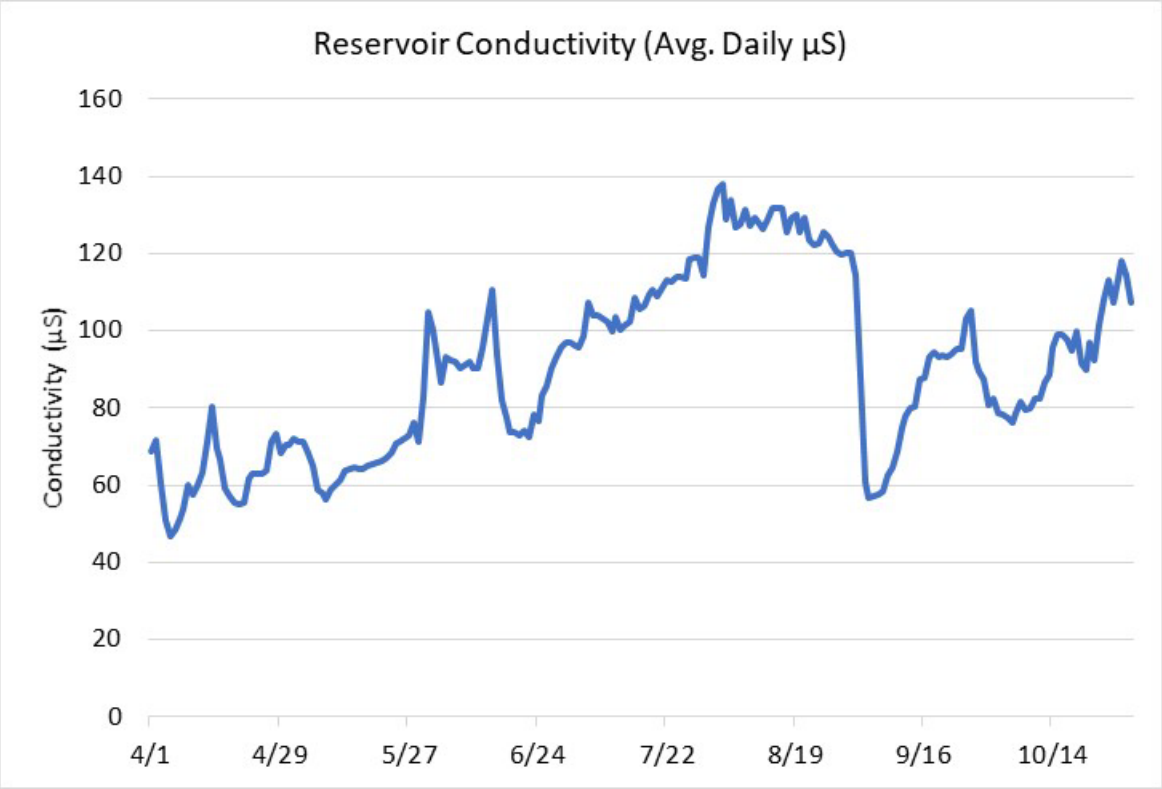


Figure 6 Daily average conductivity at reservoir monitoring site, April 1 to October 31, 2021.

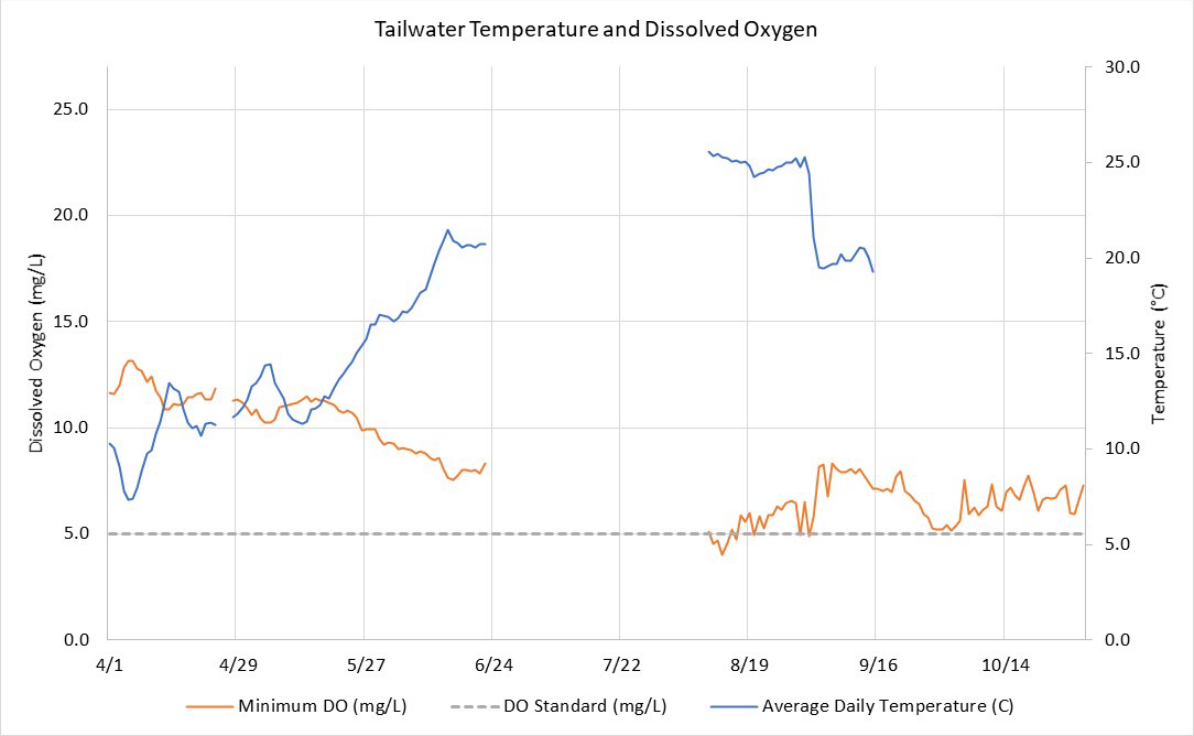


Figure 7 Daily minimum DO and daily average water temperature at the tailwater monitoring site, April 1 to October 31, 2021.

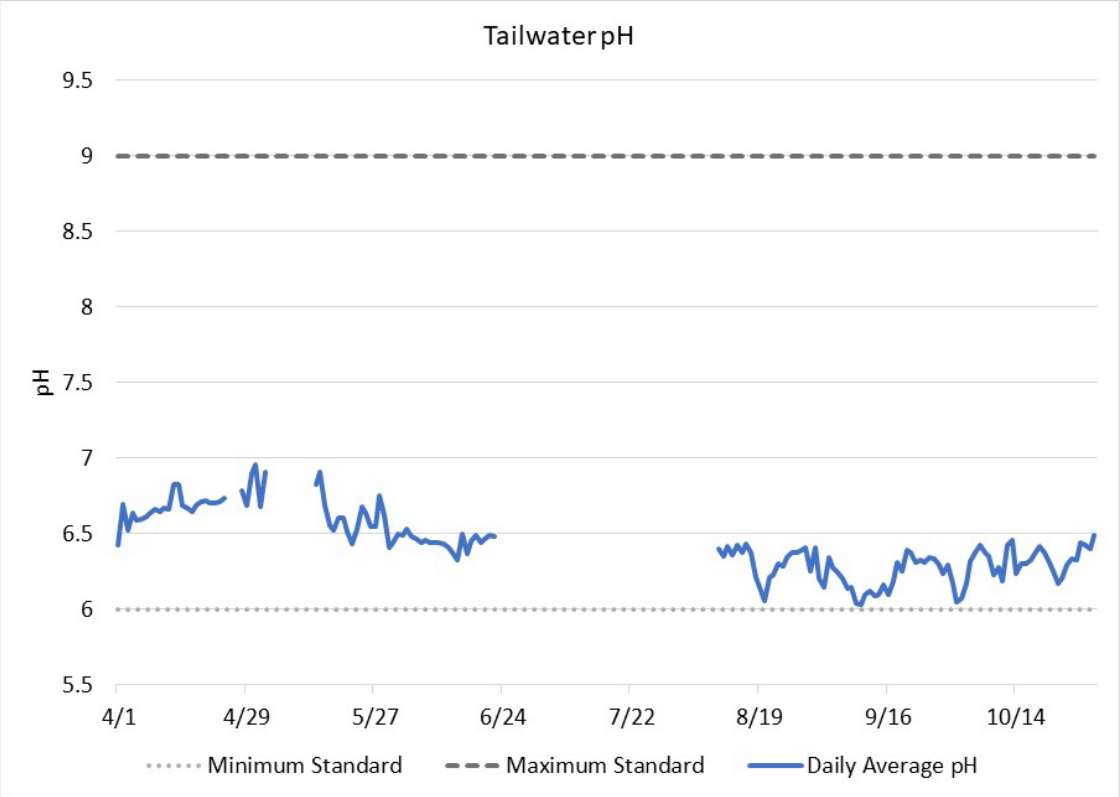


Figure 8 Daily average pH at the tailwater monitoring site, April 1 to October 31, 2021.

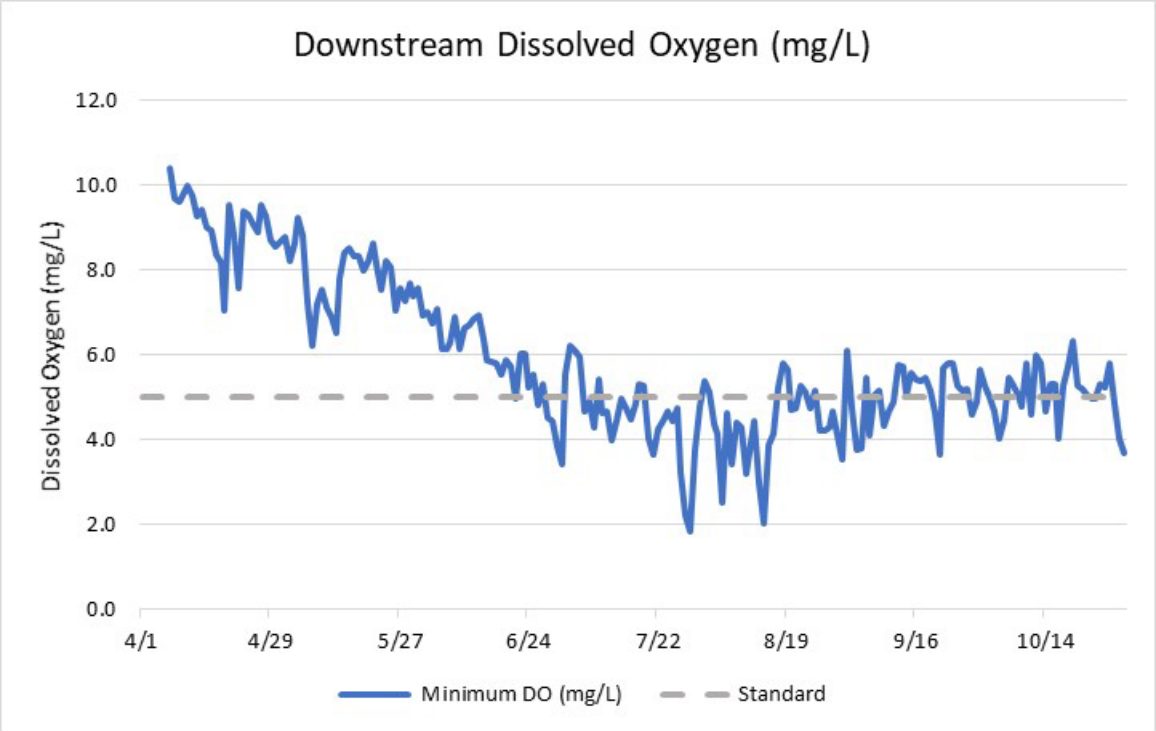


Figure 9 Daily minimum DO at the downstream monitoring site, April 1 to October 31, 2021.

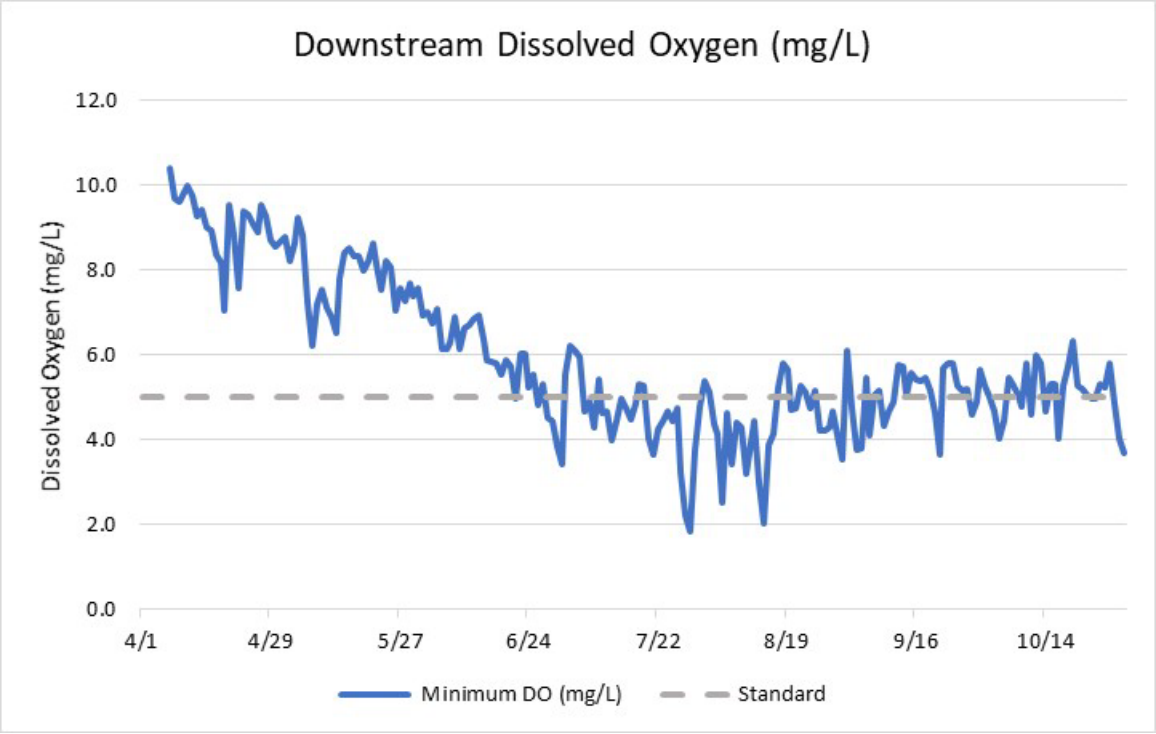


Figure 10 Daily average pH at the downstream monitoring site, from April 1 to October 31, 2021.

The WVDEP conducts spot measurements during several months each year (ranges from 6 to 12 months depending on year) downstream of the Lake Lynn dam (Station Code MC-0001-3.5) (WVDEP 2022b). DO, temperature, pH, and conductivity data for 2009 to 2021 is summarized in Table 12. The DO concentration ranged from 5.3 mg/L to 15.4 mg/L in 2009 to 2018 and from 5.6 mg/L to 14.0 in 2019 to 2021 and was above the 5 mg/L standard. pH was in attainment with the standard in 2019 to 2021.

Table 12 WVDEP water quality data collected downstream of the Lake Lynn dam, 2008 to 2021.

Parameter	2009-2018	2019-2021
Dissolved Oxygen (mg/L)	5.3 – 15.4	5.6 – 14.0
Water Temperature (ºC)	0.2 – 27.0	1.6 – 27.8
pH	5.5 – 8.1	6.0 – 7.2
Conductivity (µS/m)	1 – 166	73 – 168

Source: WVDEP 2022b

4.4.2 Environmental Effects

4.4.2.1 Effects of the Proposed Action

The Licensee is proposing to continue to operate the Lake Lynn Project as currently licensed with no changes to project facilities and will continue to provide the existing seasonal elevations and minimum flows downstream of the dam. As such, the proposed action is not expected to adversely affect water quantity in the Lake Lynn Project area as compared to existing conditions. The proposed modification to the Lake Lynn Project boundary is not anticipated to affect water quantity or water quality.

The Licensee proposes to prepare a new water quality monitoring plan for the new license term that includes the stations and parameters that can be affected by Project operations. The Licensee proposes that the new water quality monitoring plan would include monitoring of dissolved oxygen (DO) and water temperature from April 1 through October 31 each year at the reservoir water quality monitoring station and the tailwater monitoring site only. The downstream monitoring site is at USGS Gage No. 03071690 Nilan, approximately 2.6 RM downstream of the Lake Lynn dam, and downstream of Grassy Run. Since this station is downstream of Grassy Run, water quality monitoring at this station is impacted by Grassy Run and other factors outside the control of the Licensee.

The Licensee closely monitors tailrace DO levels and has developed standard operating procedures to adjust operations to mitigate low DO concentrations. These procedures include limiting or reducing generation and opening additional spill gates to increase flow downstream. Lake Lynn is proposing to continue to follow those procedures. In 2019, Lake Lynn consulted with the resource agencies and received a temporary variance from FERC to draw down the reservoir to 865 ft during a period of low DO levels in an effort to mitigate the low tailrace DO conditions. In 2020, when DO levels started to decrease, Lake Lynn consulted with the agencies again and received support for pursuing a similar variance. Lake Lynn is proposing that the new license allow the reservoir to be drawn down to 865 ft during period of low DO levels in an effort to mitigate low tailrace DO levels.

Existing water quality conditions at the Lake Lynn Project are anticipated to continue under the proposed action. Periods of low DO concentrations (e.g., less than the 5 mg/L standard) are expected to be minimal because the operational changes implemented (e.g.,

reducing generation, opening spill gates) have been consistently shown to quickly improve DO concentrations in the tailrace (e.g., LLG 2020b,c; LLG 2021b). Lake Lynn's proposal to implement the procedures (draw the reservoir down to 865 ft) obtained via a temporary variance in 2019 would provide flexibility to further mitigate low tailrace DO conditions.

4.4.2.2 Effects of the No-Action Alternative

The effects of the no-action alternative mimic the anticipated effects of the proposed action because the Licensee is proposing no changes to existing facilities or operations.

4.4.3 Unavoidable Adverse Effects

The proposed action and PME measures (i.e., continued operation and relicensing of the Lake Lynn Project and standard operating procedures to mitigate low DO values) are not expected to result in unavoidable adverse effects to water quantity and water quality resources in the project area.

4.4.4 References

Allegheny Power Service Corporation (Allegheny). 1991. Lake Lynn Hydro Station FERC Project No. 2459 – Final Federal Energy Regulatory Commission License Application.

Federal Energy Regulatory Commission (FERC). 1995. Order Issuing New License to Continue to Operate/Maintain 51.2 Megawatt Lake Lynn Hydroelectric Project P-2459.

Federal Energy Regulatory Commission (FERC). 2019. Order Granting Temporary Variance of Article 403. Lake Lynn Generation, LLC Project No. 2459-266. Issued September 24, 2019.

Lake Lynn Generation, LLC (LLG). 2020a. 2019 Annual Water Quality Monitoring Report for the Lake Lynn Hydroelectric Project (P-2459). Submitted to FERC April 16, 2020.

Lake Lynn Generation, LLC (LLG). 2020b. Lake Lynn Hydroelectric Project (FERC No. P-2459) License Article 406 Notification of Deviation from Tailrace Dissolved Oxygen Standard Occurring on July 30, 2020. Submitted to FERC August 4, 2020.

Lake Lynn Generation, LLC (LLG). 2020c. Lake Lynn Hydroelectric Project (FERC No. P-2459) License Article 406 Notification of Deviation from Tailrace Dissolved Oxygen Standard Occurring on August 29, 2020. Submitted to FERC September 2, 2020.

Lake Lynn Generation, LLC (LLG). 2021a. 2020 Annual Water Quality Monitoring Report for the Lake Lynn Hydroelectric Project (P-2459). Submitted to FERC March 29, 2020.

Lake Lynn Generation, LLC (LLG). 2021b. Lake Lynn Hydroelectric Project (FERC No. P-2459) License Article 406 Notification of Deviation from Tailrace Dissolved Oxygen Standard Occurring on August 29, 2020. Submitted to FERC September 1, 2021.

Lake Lynn Generation, LLC (LLG). 2022. 2021 Annual Water Quality Monitoring Report for the Lake Lynn Hydroelectric Project (P-2459). Submitted to FERC March 29, 2022.

Pennsylvania Code. (2022). Chapter 93 Water Quality Standards. Available online: http://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/025/chapter93/chap93toc.html&d=reduce. Accessed: May 2, 2022.

United States Environmental Protection Agency (USEPA). 2022. Envirofacts. FRS Facility Query. Available online: https://www.epa.gov/frs/frs-query#facility. Accessed: April 20, 2022.

United States Geologic Survey (USGS). 2022a. USGS 03070260 Cheat River at Albright, West Virginia. Available online: https://waterdata.usgs.gov/usa/nwis/uv?03070260. Accessed: April 27, 2022.

United States Geologic Survey (USGS). 2022b. USGS 03070500 Big Sandy Creek at Rockville, WV. Available online: https://waterdata.usgs.gov/usa/nwis/uv?03070500. Accessed April 27, 2022.

West Penn Power Company (WPPC). 1995. Water Quality Monitoring Plan for Lake Lynn Hydro Station FERC Project No. 2459-005. Issued October 6, 2995.

West Virginia Department of Environmental Protection (WVDEP). 2022a. Title 47, Series 2 Water Quality Standards. Available online: https://apps.sos.wv.gov/adlaw/csr/readfile.aspx?DocId=55099&Format=PDF. Accessed: April 20, 2022.

West Virginia Division of Environmental Protection (WVDEP). 2022b. Ambient Water Quality Data Report – Chart. Available online: https://apps.dep.wv.gov/dwwm/wqdatac/. Accessed: May 2, 2022.

4.5 Fish and Aquatic Resources

4.5.1 Affected Environment

Aquatic Habitat – Cheat Lake

Cheat Lake is approximately 13 miles long with a surface area of 1,729 acres and a volume of about 72,000 acre-feet at a full pool elevation of 870 feet NGVD. The Lake Lynn impoundment is approximately 950 feet wide immediately upstream of the Lake Lynn dam, narrowing to 300 feet at the upstream end, with a maximum width of approximately 2,500 feet. The Licensee operates the Lake Lynn Project as a dispatchable peaking facility which allows for storage capability. Impoundment elevations are maintained between 868 to 870 feet NGVD from May 1 to March 31, between 857 to 870 feet from November 1 through March 31, and between 863 to 870 feet from April 1 to April 30. Additionally, the licensee is required to release a minimum flow of 212 cfs from the dam, with an absolute minimum of 100 cfs regardless of inflow.

The licensee worked with WVDNR and West Virginia University (WVU) to document the distribution and relative abundance of aquatic habitat in Cheat Lake as part of the 2018-2020 Aquatic Biomonitoring Plan. Aquatic vegetation provides habitat for fish and aquatic organisms, yet historically Cheat Lake has had limited aquatic vegetation (Smith and Welsh 2015) The study identified 22 areas of significant aquatic vegetation in Cheat Lake. Overall, aquatic vegetation was found to be limited in Cheat Lake.

WVDNR and WVU conducted studies in 2019 and 2020 to evaluate aquatic habitat in Cheat Lake with an emphasis on yellow perch spawning and water level fluctuation. During the study, 40 artificial habitat structures were deployed at two sites on Cheat Lake in 2019 and 2020. The structures were monitored for egg masses during the spring spawning period. Habitat variables and water quality were recorded at the sites during the study. A complete report was developed by Welsch et al. (2020) and provided to FERC and the stakeholders as part of the 2020 Annual Biomonitoring Report. Researchers found that yellow perch in Cheat Lake spawn in nearshore habitat, in a variety of depths or distances from the shore. Deepwater spawning reduces the effects of lake level drawdowns on egg dewatering, yet less available habitat was noted in deeper water.

Yellow perch spawning periods were identified as March 21 to April 16 in 2019 and March 21 to April 11 in 2020. The lake level typically does not reach the minimum lake elevations permitted during March or April, therefore, although the potential for egg dewatering is high, the actual percent of eggs dewatered is lower than the rates documented with artificial habitat during the study (Welsh and Matt 2020).

4.5.1.1 Cheat River (Downstream of Cheat Lake)

The Lake Lynn Project boundary extends downstream approximately 656 feet from the Lake Lynn dam. The Cheat River flows approximately 3.6 RM from the Lake Lynn dam until joining the Monongahela River near Point Marion, Pennsylvania. The Cheat River downstream of the Lake Lynn dam is comprised of two distinct aquatic habitat reaches. From the Lake Lynn dam to approximately 1.2 miles downstream, the Cheat River is a riffle-run complex, composed of a heterogenous mixture of cobble, gravel, boulder, bedrock, and sand (Table 13, Photo 1). Downstream of the riffle-run complex, the Cheat River transitions into pool habitat until its confluence with the Monongahela River (Photo 2). Pool habitat substrate is composed mostly of cobble and gravel, with the most downstream reaches of the Cheat River transitioning to sand and silt (TRC 2020).

Table 13 Cheat River Substrate Summary during 2020 Mussel Survey

Site	State	% Substrate Composition								Total
		Br	Bo	Co	Gr	Sd	St	LWD	Vegetation	
1	WV	10	30	45	10	5	–	–	–	100
2	WV	5	25	40	20	10	–	–	–	100
3	PA	–	–	70	–	–	–	–	30	100
4	PA	–	–	45	30	25	–	–	–	100
5	PA	–	–	60	30	–	–	–	10	100
6	PA	–	5	55	25	–	–	–	15	100
7	PA	–	–	60	40	–	–	–	–	100
8	PA	–	–	40	35	–	–	5	20	100
9	PA	–	–	65	15	–	–	–	20	100
10	PA	–	–	75	15	–	–	–	10	100
11	PA	–	–	60	15	25	–	–	–	100
12	PA	–	–	–	–	55	35	10	–	100
Br= Bedrock, Bo= Boulder, Cb= Cobble, Gr= Gravel, Sd= Sand, St= Silt, LWD= Large Woody Debris										

Source: TRC 2020

Photo 1 Cheat River Habitat Directly Downstream of the Lake Lynn Dam during the 2020 Mussel Survey (TRC 2020)

Photo 2 Cheat River Pool Habitat Downstream of the Lake Lynn Dam during the 2020 Mussel Survey (TRC 2020)

During the 1970s water quality degradation was documented in the Cheat River due to acid mine drainage (AMD) discharged from abandoned or active coal mine operations. In 1994, an illegally sealed underground mine failed and discharged contaminated water directly into Muddy Creek (TRC 2020). AMD entered the Cheat River directly above Cheat Canyon and polluted the watershed. Effects of AMD were noted at multiple sites during the 2020 mussel survey completed as part of the relicensing (Photo 3) (TRC 2020).

Photo 3 Acid Mine Drainage (AMD) in the Cheat River Downstream of the Lake Lynn Dam during 2020 Mussel Survey (TRC 2022)

4.5.1.2 Fish and Aquatic Assemblages

The Cheat River watershed supports warm water and cool water fisheries. Important recreational fishery species include largemouth bass, smallmouth bass, trout, crappie, walleye, and channel catfish. The licensee has conducted biological monitoring in Cheat Lake and in the tailwater since 1997, in accordance with the current FERC License. Biological surveys were also conducted by WVDNR in 2005 and 2008 and by WVU in 2011, 2014, and 2015. Researchers assessed water quality, aquatic habitat, and aquatic communities (fish and benthic macroinvertebrates). Freshwater mussel, American eel eDNA, water quality monitoring and aquatic habitat studies have also been conducted in

the project area by the Licensee and other researchers. Table 14 summarizes the research efforts that have taken place in the project area since 1997. Aquatic resource quality has generally improved over the sampling period (Wellman et al. 2008).

Table 14 Summary of Cheat River and Cheat Lake Biomonitoring Activities from 1997 to 2020

Activity	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	18	'19	'20
Water Quality Monitoring (Cheat Lake)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Water Quality Monitoring (downstream of Cheat Lake)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fish community (Cheat Lake and embayments)	X	X			X				X			X			X			X	X					
Fish community (downstream of Cheat Lake)	X	X			X				X						X			X	X					
Benthic macroinvertebrates (downstream of Cheat Lake)	X	X			X				X			X			X			X	X					
Walleye population monitoring and stock assessment									X	X	X	X	X		X			X	X					
Adult Walleye Movement									X	X	X		X			X	X	X	X					
Aquatic vegetation mapping															X	X	X		X					
Bathymetric mapping (Cheat Lake)															X	X	X		X					
Artificial habitat enhancement and monitoring																						X	X	X
American Eel eDNA (downstream of Cheat Lake)																						X	X	X
Angler creel survey																								1
Freshwater mussel survey (Cheat River downstream of Cheat Lake)																								X

1 – the angler creel survey is taking place in 2020.

Lake Lynn Fisheries - WVDNR's 2005 and 2008 surveys were conducted in May and October and included nighttime boat electrofishing and gill netting. Sampling locations are shown in Figure 11 and Figure 12. WVU sampled the fish community in 2011, 2014, and 2015 with nighttime boat electrofishing and gill netting during the spring and fall seasons. In total, WVU collected 35 fish species and 8,338 individual fish. Most fish (7,499 individuals) were collected during nighttime boat electrofishing as compared to gill netting (839 individuals). Overall, species richness increased in the riverine zone of Cheat Lake, compared to previous studies. In prior studies in the riverine zone, species richness was as low as 8 species (1990), whereas an average of 23 species were collected during WVU's the 2011 to 2015 samples (Table 15). In addition to species richness, species abundance increased between 2011 and 2015 for sportfish and non-game species as compared to prior studies. The most abundant sportfish in Lake Lynn during the 2011 and 2014 sampling included bluegill, smallmouth bass, largemouth bass, yellow perch, and

channel catfish. The most abundant non-game species included the emerald shiner, mimic shiner, logperch, brook silverside, and gizzard shad (Smith and Welsh 2015).

In accordance with the 2021-2023 Biomonitoring Plan, the Licensee is conducting a creel survey (a sampling survey that targets recreational anglers) in 2022 to document recreational fishing effort and success. The initial study was planned for 2020, but was postponed due to the COVID-19 pandemic. The survey includes survey boxes and in-person creel surveys at six locations on Cheat Lake. Areas surveyed include Ices Ferry Bridge access, Edgewater Marina, Lakeside Marina, Sunset Beach Marina, Cheat Lake Park, and the Lake Lynn Project Tailwater Fishing Pier. The survey is collecting information through December 2022 including angler effort, fish harvest data for game fish species, and size distribution of game fish species.

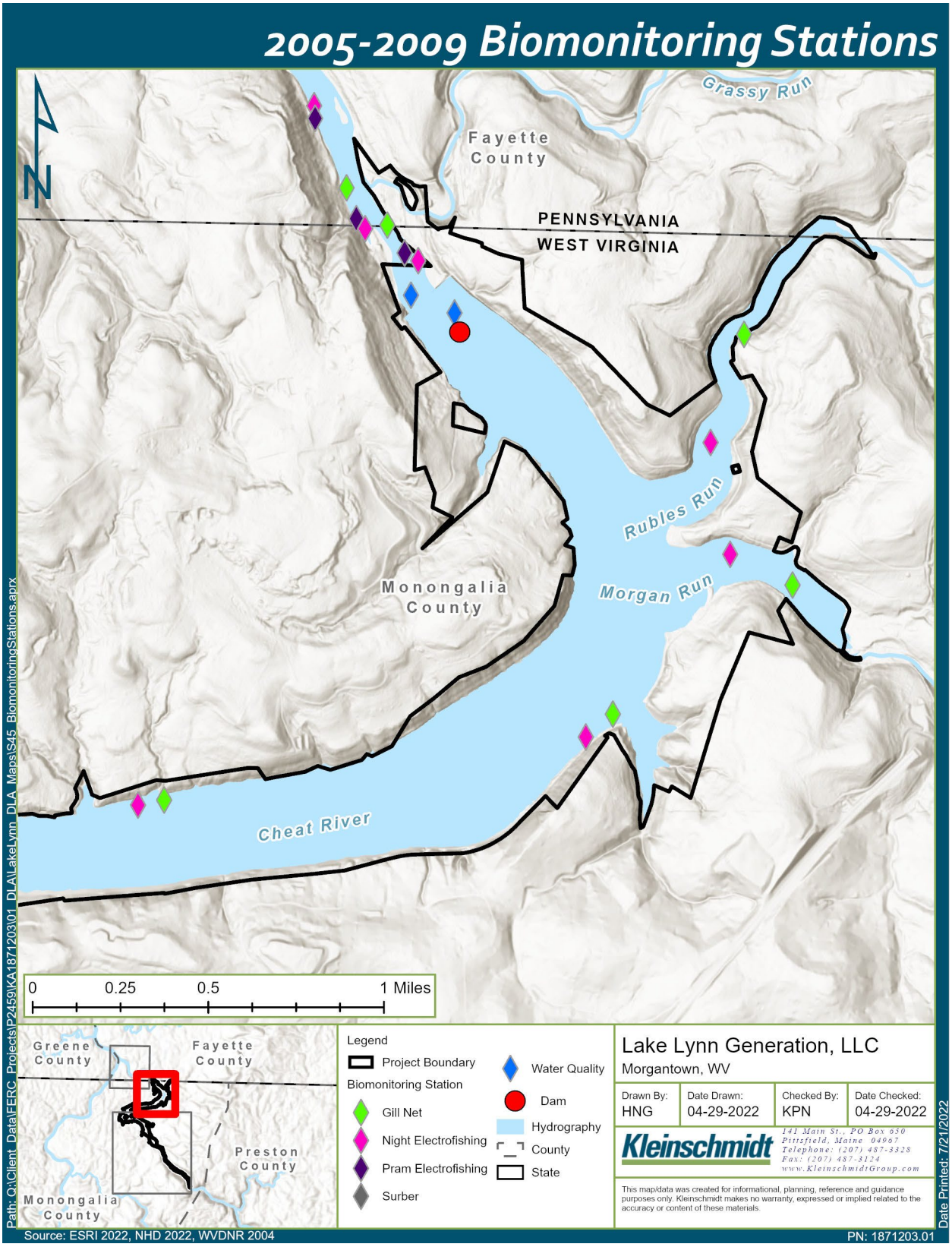


Figure 11 Fish Sampling Locations in Lake Lynn (2005, 2008, 2011, 2014, and 2015) (1 of 2).

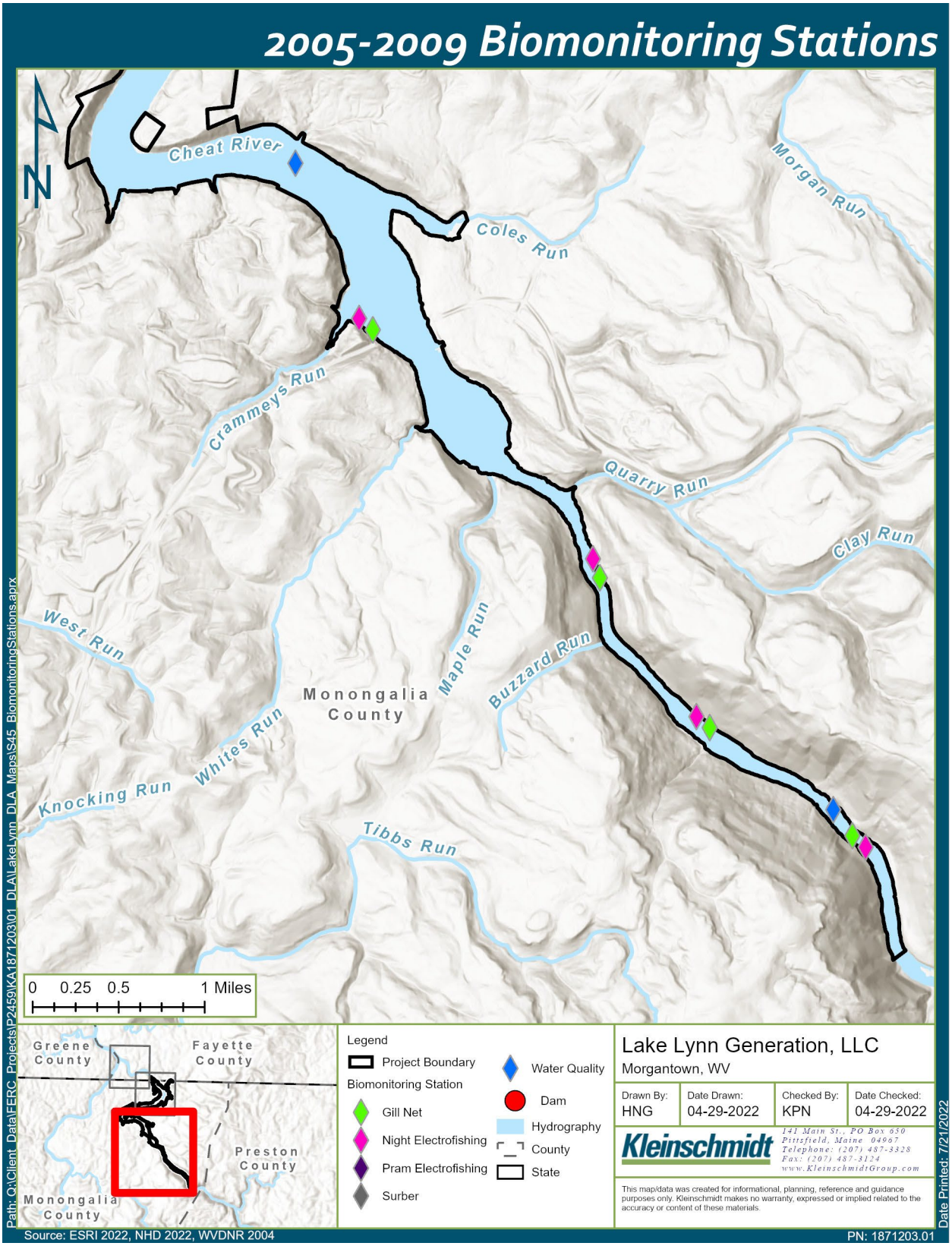


Figure 12 Fish Sampling Locations in Lake Lynn (2005, 2008, 2011, 2014, and 2015) (2 of 2).

Table 15 Temporal Trends in Fish Catch Per Unit Effort of Boat Electrofishing in the Lake Lynn Impoundment

	Boat Electrofishing								
Species	1990	1997	1998	2001	2005	2008	2011	2014	Grand Total
Banded Darter	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.50	0.11
Black Crappie	0.22	0.00	0.11	0.00	0.00	0.50	2.50	3.75	0.81
Bluegill	8.44	15.08	11.56	30.11	12.50	186.00	10.50	27.25	36.59
Bluntnose Minnow	0.22	0.00	0.00	9.11	10.50	14.25	7.75	0.75	5.38
Brook Silverside	4.00	5.00	4.89	11.33	6.00	37.25	11.25	5.75	10.58
Brown Bullhead	5.11	0.00	0.56	0.00	0.00	0.00	0.50	0.00	0.59
Common Carp	0.89	2.67	2.56	2.33	3.50	1.25	0.25	0.75	1.88
Emerald Shiner	7.11	21.67	20.56	25.67	5.00	7.25	125.50	22.25	29.30
Chain Pickerel	0.00	0.00	0.00	0.00	0.00	0.00	0.25	3.00	0.37
Channel Catfish	0.22	0.42	0.22	1.00	0.75	3.00	1.00	2.00	1.05
Channel Darter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.06
Gizzard Shad	0.00	0.00	0.22	2.44	1.00	0.75	5.75	0.00	1.31
Golden Redhorse	0.00	0.92	1.67	1.33	4.25	4.25	19.50	40.00	8.39
Golden Shiner	0.00	0.00	0.11	0.11	0.00	0.50	0.00	0.00	0.10
Greenside Darter	0.00	0.00	0.00	0.33	0.00	0.00	0.00	1.25	0.20
Green Sunfish	0.22	0.00	0.33	2.11	1.75	19.50	1.25	10.50	4.21
Flathead Catfish	0.00	0.25	0.33	0.00	0.25	0.00	0.00	0.25	0.14
Freshwater Drum	0.44	0.58	0.56	0.78	0.75	1.00	0.50	3.00	0.93
Hybrid Striped Bass	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.03
Hybrid Sunfish	1.56	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.19
Johnny Darter	0.00	0.00	0.11	0.44	0.00	3.25	0.00	1.75	0.67
Largemouth Bass	2.44	2.75	3.89	3.67	8.50	4.50	9.50	17.50	6.39
Logperch	0.00	1.42	3.33	3.11	10.75	1.50	2.25	14.00	4.52
Longnose Gar	0.00	0.00	0.00	0.22	0.00	0.50	0.25	1.25	0.27
Mimic Shiner	0.89	0.00	0.00	33.78	5.50	54.50	12.75	29.50	17.55
Northern Hogsucker	0.00	0.00	0.33	0.00	0.50	0.25	0.00	0.25	0.17
Northern Pike	0.22	0.08	0.22	0.11	0.75	0.00	0.00	0.00	0.17
Popeye Shiner	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.03
Pumpkinseed	4.67	1.75	2.33	1.22	0.50	3.75	0.50	0.50	1.81
Quillback	0.00	0.33	0.00	0.00	0.00	0.00	0.75	0.25	0.15
Rainbow Darter	0.00	0.00	0.22	0.00	0.00	0.00	0.00	2.50	0.32
River Carpsucker	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.04
Rock Bass	0.67	0.42	3.33	2.11	0.25	6.50	2.00	11.25	3.32
Rosyface Shiner	0.00	0.00	0.00	0.00	30.25	3.50	0.00	0.00	3.86
Sauger	0.00	0.67	2.44	1.78	1.75	1.50	4.25	4.50	2.17
Smallmouth Redhorse	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.06
Silver Redhorse	1.56	0.25	0.78	0.00	0.00	0.25	0.00	11.25	1.61
Silver Shiner	0.00	0.00	0.00	0.00	0.00	5.00	0.00	6.25	1.29
Smallmouth Bass	0.44	6.42	5.78	4.78	5.00	18.50	27.00	35.50	12.41
Spottail Shiner	0.22	1.67	1.00	0.00	0.00	0.00	0.00	0.25	0.41
Spotted Bass	0.22	0.75	0.00	1.00	2.25	4.75	3.25	8.75	2.45
Spotfin Shiner	0.22	0.00	0.00	0.67	7.25	9.00	0.50	0.25	2.08
Walleye	0.00	0.00	0.00	1.00	0.00	0.50	6.25	2.00	1.17
Warmouth	0.22	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.05
White Bass	0.00	0.00	0.00	0.00	0.00	0.00	3.50	0.00	0.40
White Sucker	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.03
White Crappie	0.00	0.33	0.00	0.67	0.00	0.00	0.00	0.00	0.15
Yellow Bullhead	0.44	0.08	0.11	0.33	0.00	0.00	0.00	0.50	0.18
Yellow Perch	9.56	7.92	24.22	14.00	1.75	0.25	1.25	22.75	11.25

Source: WVDNR 2004

Cheat River Fisheries - WVDNR conducted fisheries surveys in the Cheat Lake tailwater and in the Cheat River downstream of the dam in 2005 and 2008. The surveys consisted of nighttime boat electrofishing, tote barge electrofishing, and gill netting. Surveys took place during low water conditions in May and October. Eight tailwater survey stations and three river survey locations were established (Figure 13). Catch per unit effort (CPUE) was calculated as fish captured per hour of fishing effort. Tote barge electrofishing at tailwater stations targeted juvenile fish collection (Smith and Welsh 2015). In addition to the 2005 to 2009 samples, WVU sampled the Cheat Lake tailwater and in the Cheat River downstream of the dam in 2011 and 2014. The survey locations and methods were consistent with WVDNR's 2005 and 2008 surveys. Boat electrofishing and gill netting was conducted twice a year, whereas tote barge electrofishing was conducted three times a year.

During the 2011 and 2014 surveys in the Cheat River downstream of the Lake Lynn dam, WVU collected 3,352 fish consisting of 51 species. Fish abundance, which ranged from 1,825 in 2011 to 1,527 in 2014, was the highest since the biomonitoring program began. Species richness was also the highest in 2011 and 2014 since the biomonitoring program began (Table 16). Most fish were captured via boat electrofishing and tote barge electrofishing as compared to gill netting. WVU researchers captured six species during the 2011 and 2014 surveys for the fish time since the biomonitoring program began (channel darter, variegate darter, chain pickerel, popeye shiner, muskellunge, and striped shiner). The most abundant species sampled in the Cheat River included the emerald shiner, smallmouth bass, golden redhorse, mimic shiner, and channel catfish (Smith and Welsh 2015).

Table 16 Fish Species Richness for Cheat Lake Tailwater and Cheat River Summarized by Gear Type

		Species Richness							
Region	Gear	1990	1997	1998	2001	2005	2008	2011	2014
Cheat Tailwater	Night Boat Electrofishing	.	15	19	24	18	25	14	20
	Biomonitoring Gill Nets	.	8	15	13	14	14	9	5
	PRAM electrofishing	.	18	14	25	16	17	16	30
Cheat River	Night Boat Electrofishing	23	20	24	26	22	25	29	31
	Biomonitoring Gill Nets	17	7	14	10	16	17	16	11
TW & River	Night Boat Electrofishing	24	22	28	28	25	31	30	37
	Biomonitoring Gill Nets	17	11	19	16	19	20	19	12
	All gears	28	32	35	37	36	39	35	44

Source: WVDNR 2004

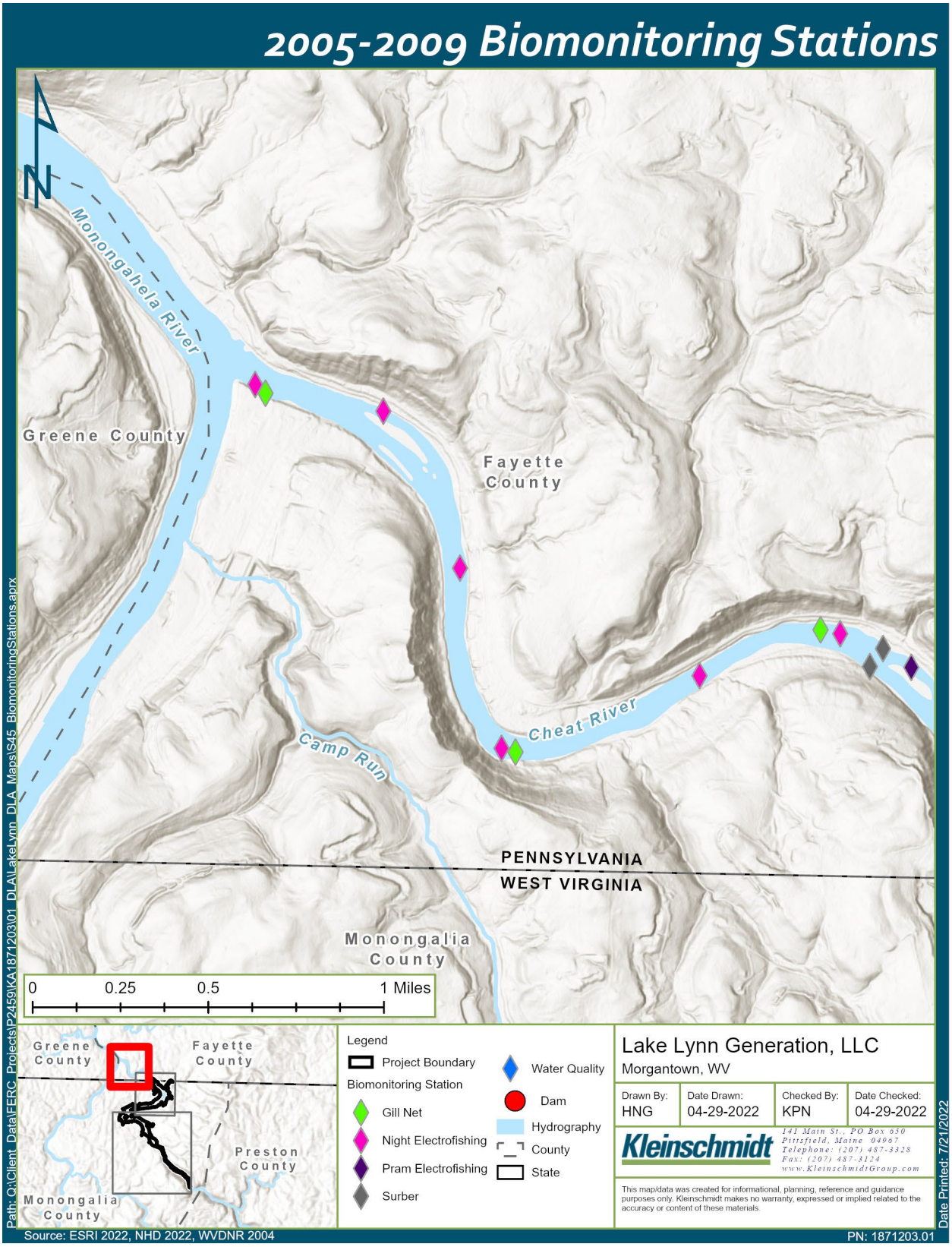


Figure 13 Tailwater and Cheat River fish sampling locations, 2005 and 2008; WVU fish sampling locations 2011 and 2014.

4.5.1.3 Essential Fish Habitat

There is no EFH in the vicinity of the Lake Lynn Project (NOAA 2022).

4.5.1.4 Diadromous Fish Species

No migratory fish species are reported from the Cheat River. As part of annual biomonitoring activities, the Licensee used environmental DNA (eDNA) techniques to monitor for the presence of American eel in the project tailwater area beginning in 2018. The Licensee collected 5 water samples from the tailwater area in August of 2018. American eel DNA was not detected in 2018 (TRC 2021). In 2019, the Licensee collected a total of 16 eDNA samples seasonally (March, June, August, and October) from the tailwater area (Figure 14). American eel DNA was not detected in 2019 (TRC 2021).

Figure 14 2019 American Eel eDNA Study Sites

The Licensee conducted a third phase of the American eel eDNA study in 2020 to detect yellow eels moving upriver. The objective of the third phase was to collect samples during

April, May, June and July, August, September of 2020 during daytime and nighttime hours. The Licensee collected samples at five sites in 2020: on July 29 (daytime), July 30 (nighttime), September 29 (nighttime), and October 29 (daytime), and in December. American eel DNA was not detected in 2020.

In 2021, the Licensee completed the fourth phase of the American eel eDNA study which included sampling from five study sites below the dam during the day and night on May 27, June 10, August 10, and September 8. Samples were processed using the modified filter extraction protocol identified by USFWS (USFWS 2022). All eDNA samples were negative for the presence of American eel markers from the May, June, and September sampling events (USFWS 2022). American eel eDNA was detected in samples collected during the daylight hours on August 10, 2021. Detection reflected a low quantity of American eel eDNA present due to amplification of limited number of replicates and lack of detection at the same sites less than four hours earlier during the night sampling event (USFWS 2022).

4.5.1.5 Benthic Macroinvertebrates

Benthic macroinvertebrate data were collected below the Lake Lynn dam on a regular basis between 1998 and 2015. During recent surveys (e.g., 2011 and 2014) samples were collected at three stations as established during the 2005 and 2008 biomonitoring program (see Figure 11 and Figure 12). These sites were sampled twice during each study year. The location of the samples was consistent with previous biomonitoring studies and relied on a standard Surber stream bottom sampler. Researchers collected 6,338 benthic macroinvertebrates during the 2011 and 2014 sampling. The caddisfly family *Hydropsychiidae* was the most abundant taxa documented in 2011 and 2014. Samples during 2011 and 2014 demonstrated greater taxa richness (29 taxa total) and taxa abundance than years prior. Additionally, several sensitive mayfly and stonefly taxa were collected during 2011 and 2014 (Smith and Welsh 2015). The studies demonstrated that macroinvertebrate abundance has increased and pollution-sensitive species that indicate good water quality (caddisfly, mayfly and stonefly taxa) were prevalent during the most recent surveys.

4.5.1.6 Freshwater Mussels

Freshwater mussels are sedentary organisms that use benthic habitats through their life cycle. They require areas with high oxygen content and a rich food source of organic

particles and micro-organisms (WVDNR 2003). The Cheat River historically supported 17 species of freshwater mussels (Ortmann 1919) (Table 17).

Table 17 Mussels Known Historically from the Cheat River

Common Name	Scientific Name	Regulatory Status
Mucket	*Actinonaias ligamentina*	--
Elktoe	*Alasmidonta marginata*	--
Threeridge	*Amblema plicata*	--
Cylindrical Papershell	*Anodontoides ferussacianus*	--
Purple Wartyback	*Cyclonaias tuberculate*	--
Spike	*Eurynia dilatate*	--
Longsolid	*Fusconaia subrotunda*	--
Plain Pocketbook	*Lampsilis cardium*	--
Wavyrayed Lampmussel	*Lampsilis fasciola*	--
Flutedshell	*Lasmigona costata*	--
Black Sandshell	*Ligumia recta*	--
Clubshell	*Pleurobema clava*	SE[1] & FE[2]
Round Pigtoe	*Pleurobema sintoxia*	--
Kidneyshell	*Ptychobranchus fasciolaris*	--
Pimpleback	*Cyclonaias pustulosa*	--
Creeper	*Strophitus undulates*	--
Rainbow	*Villosa iris*	--

[1] Federally Endangered

[2] State Endangered

Source: PFBC 2018

In 2020, the Licensee conducted a study to identify what freshwater mussel species, if any, occur within the Cheat River from the Lake Lynn dam downstream to the confluence with the Monongahela River. The Licensee developed the freshwater mussel study plan in consultation with WVDNR and PFBC. A draft freshwater mussel report was provided to the stakeholders on November 25, 2020 (Attachment D).

The study area included 12 discrete sites downstream of the Lake Lynn downstream to the confluence with the Monongahela River (Figure 15). The study survey techniques consisted of a qualitative timed search which were consistent with West Virginia protocol (WVDNR 2020). Survey sites were located in areas where suitable mussel habitat was identified. Survey methods included visually and tactilely searching for mussels while snorkeling. No live mussels were found during the survey, yet eight live Pink heelsplitters (native species) were observed at the confluence of the Cheat River and Monongahela River immediately downstream of the survey area limits. These mussels were assumed to be part of a mussel bed located within the Monongahela River. The Pink heelsplitter is not

a federal or state listed mussel species. Mussel habitat in the mussel survey area may be limited due to water quality degradation caused by AMD. Evidence of AMD was observed at multiple sites during the mussel survey (TRC 2020). Freshwater mussels are sensitive to poor water quality due to their lack of mobility. Substrate in the survey area was suitable for mussels, yet the water quality degradation, may prevent mussels from colonizing these areas (TRC 2020).

4.5.1.7 Fish Passage

There are no fish passage measures or facilities at the Lake Lynn Project.

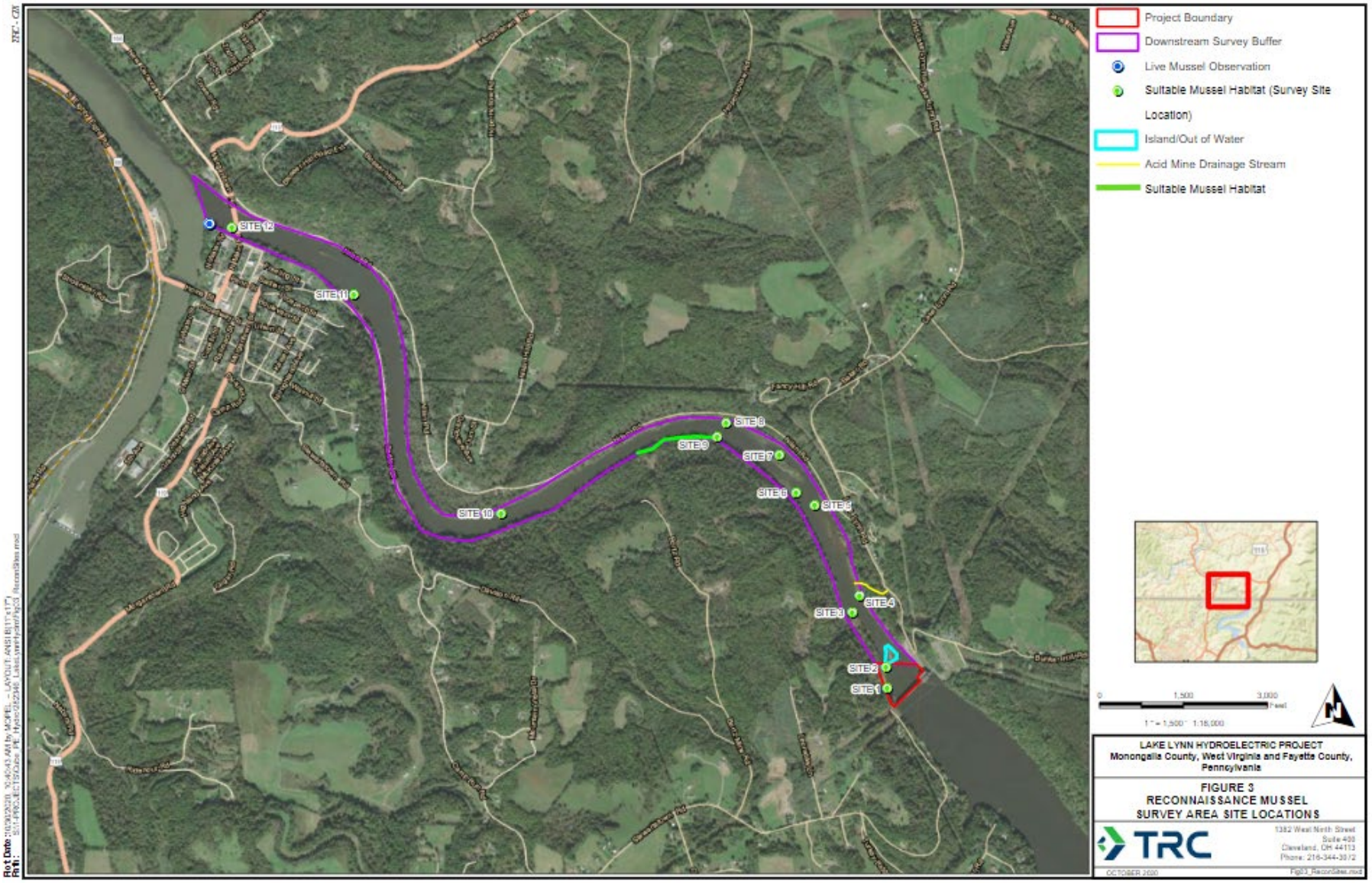


Figure 15 2020 Cheat River Mussel Survey Locations

4.5.1.8 Entrainment

Lake Lynn conducted a desktop Fish Entrainment Assessment at the Project (Normandeau Associates 2020). Community data for biological sampling conducted upstream of Lake Lynn in Cheat Lake documented 35 fish species between 2011 and 2015. Seven species were identified as representative of that community and were included in the desktop assessment of fish entrainment at the Project (bluegill, channel catfish, smallmouth bass, walleye, emerald shiner, golden redhorse, and gizzard shad). Life history information for the target fish species was reviewed and based on the available habitat requirements and behavioral responses to environmental conditions it was determined that gizzard shad are the target species most susceptible to entrainment at the Project. These fish may be present in the vicinity of the Project intakes and could be entrained. Entrainment of shad tends to peak in the fall and winter in reservoirs where they are abundant. The entrainment potential for the remaining target fish species is expected to be low given the lack of high quality aquatic habitat in the immediate vicinity of the intake structure coupled with the fact that none of the additional fish species are considered obligatory migrants. In general, entrainment for most of the target fish species considered during the evaluation is not anticipated to be high at Lake Lynn. Gizzard shad are the target species most likely to be seasonally entrained during periods of low water temperatures. However, due to their high burst speed swimming capability at all sizes, they are expected to have relatively low entrainment susceptibility during the warmer months of the year.

In the event individuals are entrained, the USFWS Turbine Blade Strike Analysis Tool was used to conduct assessments for fish lengths representative of the size range of target species with potential to fit through the existing rack spacing at Lake Lynn. The TBSA analysis produced a range of survival estimates for turbine survival through the four Francis units at the Project and were slightly higher for Units 1, 3, and 4 than for the recently modified Unit 2. Survival rates calculated for size classes representative of juvenile life stages (i.e., those less than or equal to six inches) ranged from 84-95%.

In addition to the qualitative evaluation for the seven target fish species, quantitative estimates of entrainment and entrainment survival were calculated. Density data available from the EPRI (1997) database was combined with estimated monthly generation volumes to calculate estimates of monthly entrainment for the seven target species. Annual entrainment estimates for species other than gizzard shad ranged from a low of 115 individuals (redhorse) to a high of 7,165 individuals (channel catfish). Three different sets of monthly entrainment density data were pulled from the EPRI (1997) database to

calculate estimates for gizzard shad entrainment at the Project and produced a wide range of estimates with the highest estimate over 14 million individuals entrained annually and a lowest estimate of 265 individuals entrained annually. Entrainment estimates for each target species were adjusted to reflect the predicted survival rates generated during the TBSA analysis for the Lake Lynn turbine units. The percentage of the annual entrainment expected to experience mortality was generally low, ranging from 11% of entrained individuals for bluegill to 35% of entrained individuals for redhorse. Similar to the observations for overall abundance, the estimates for the rate of entrainment mortality for gizzard shad varied from a low of 8% of entrained individuals to 34% of entrained individuals.

4.5.1.9 Fisheries Management

Several fisheries in the Cheat River watershed are managed for recreational opportunities, including the walleye and yellow perch fishery in Cheat Lake. Walleye were reintroduced to Cheat Lake from 1999 – 2002. Natural reproduction was not assessed until the 2005 biomonitoring surveys. From 2005 through 2009, walleye stocking assessments and walleye surveys were conducted by the Licensee in Cheat Lake as part of the biomonitoring program. WVDNR marked walleye with oxytetracycline for otolith identification prior to stocking. These marked fingerlings were stocked during the spring of 2005.

During the walleye assessment, otoliths were removed from appropriate-sized fish to determine if marks were present. Walleye collected from the Lake Lynn tailwater, and the Monongahela River were also assessed for marking (Smith and Welsh 2015). The studies suggest an occurrence and potential increase in natural reproduction during this time (Smith 2018). Age, growth, and diet metrics were also collected during WVNDR's stocking assessment surveys as was a separate channel catfish survey. WVDNR collected 764 fish from 2012 through 2015. Of these fish, 118 walleye were collected. The most abundant species included the channel catfish, white bass, walleye, and black crappie. Age analysis conducted on walleye suggested that female walleye reach maturity quickly, and reach large maximum sizes. Diet analysis found that yellow perch were present in 67 percent of Cheat Lake walleyes, suggesting that yellow perch are an important forage species for the walleye fishery (Smith and Welsh 2015).

Walleye movement and distribution data were collected by WVU from 2012 through 2015 in Cheat Lake using acoustic telemetry. Data was analyzed to understand trends

associated with spawning timing and locations, as well as non-spawning movement. Movement varied seasonally and was associated with environmental conditions. Elevated water temperatures in the spring were associated with pre-spawning movements. Spawning timing was determined to occur from mid-March through early April in Cheat Lake. Most spawning occurred in the uppermost part of Cheat Lake below the first riffle/run complex. Female walleye made post-spawn migrations during April, while males made post-spawn migrations during the following fall. Additionally, elevated river discharge and fluctuations in water temperatures were also associated with large non-spawning movements of walleye in Cheat Lake (Smith and Welsh 2015).

4.5.2 Environmental Effects

4.5.2.1 Effects of the Proposed Action

The proposed action (i.e., continued operation of the Lake Lynn Project as a dispatchable peaking facility with storage capability with existing minimum flow requirements) is not expected to adversely affect fish and aquatic resources in the Cheat River or in Cheat Lake. The Licensee is proposing no changes to operations and will maintain existing seasonal elevations and minimum flow requirements to maintain aquatic habitat in the impoundment and in the Cheat River downstream of the Lake Lynn Project. The licensee follows best practices for drawdown and refill regimes when maintenance drawdowns are required. The licensee consults with pertinent resource agencies regarding the timing and duration of periodic maintenance drawdowns. In the case of a drawdown, the licensee would continue to pass required minimum flows to protect downstream reaches.

The fisheries assemblage in Cheat Lake and the Cheat River has improved in species abundance and richness over recent years. Managed recreational fisheries such as the walleye fishery, have demonstrated an increase in natural reproduction. There is no EFH identified in the vicinity of the project, therefore continued operation will not adversely affect EFH. Additionally, due to the lack of historical and limited contemporary evidence of diadromous fish in the project area, the proposed action is not expected to adversely affect diadromous fish populations.

Water quality in the project area is adversely affected by AMD, which may affect aquatic organisms that lack mobility, such as freshwater mussels. AMD effects and overall water quality may be improving, as demonstrated by an improvement in macroinvertebrate communities. Overall macroinvertebrate abundance has increased, and sensitive species

(Mayfly and Stonefly taxa) were identified during the most recent surveys, which are indicators of good water quality.

The Licensee will continue to provide access for recreational fishing via a tailrace fishing area, Cheat Lake Park, and the public boat launch. These angling opportunities within the project area will be maintained by the Licensee as part of the proposed action.

4.5.2.2 Effects of the No-Action Alternative

The effects of the No Action Alternative mimic the anticipated effects of the proposed action because the licensee is proposing no changes to existing facilities or operations.

4.5.3 Unavoidable Adverse Effects

The proposed operation and relicensing of the Lake Lynn Project with operational PME measures (i.e., pond elevation restrictions, angling access, seasonal minimum flow requirements) is not expected to result in any unavoidable adverse effects to fish or aquatic resources.

4.5.4 References

National Oceanic and Atmospheric Administration (NOAA). 2022. Essential Fish Habitat. Available online: https://www.habitat.noaa.gov/protection/efh/efhmapper/. Accessed March 19, 2022.

Normandeau Associates. 2020. Lake Lynn Hydroelectric Project Desktop Fish Entrainment Assessment. December 2020.

Ortmann, A.E. 1919. A monograph of the naiades of Pennsylvania. Part III: Systematic account of the genera and species. Memoirs of the Carnegie Museum 8(1): xvi -385 + 21 plates.

Pennsylvania Fish and Boat Commission Division of Environmental Services (PFBC). 2018. A Guide to Pennsylvania's Freshwater Mussels. Available online: https://pa.fisheries.org/wp-content/uploads/2018/02/Mussel-ID-workshop-field-guide-2-9-18.pdf. Accessed: April 11, 2022.

Smith, D., and S. Welsh. 2015. Biological Monitoring of Aquatic Communities of Cheat Lake, and Cheat River Downstream of the Lake Lynn Hydro Station, 2011 – 2015. Division of Forestry and Natural Resources West Virginia University.

Smith, Dustin. 2018. Evaluation of a Re-established Walleye Population within a Hydropower Reservoir Recovering from Acidification. Graduate Theses, Dissertations, and Problem Reports.

TRC Companies, Inc. (TRC). 2021. Aquatic Biomonitoring Plan for the Lake Lynn Hydroelectric Project. January 2021.

TRC. 2020. Freshwater Mussel Reconnaissance Scoping Survey Report.

United States Fish and Wildlife Service (USFWS). 2022. qPCR analysis of eDNA filter samples collected in 2021 at Lake Lynn Dam Target species: American Eel (Anguilla rostrata)

Wellman, D., F. Jernejcic, and J. Hedrick. 2008. Biological monitoring of aquatic communities of Cheat Lake, and Cheat River downstream of the Lake Lynn Hydro Station, 2008.

Welsh, S. and K. Matt. 2020. An Evaluation of Artificial Habitat Structures in Cheat Lake with Emphasis on Yellow Perch Spawning and Water Level Fluctuations. West Virginia Cooperative Fish and Wildlife Research Unit.

West Virginia Division of Natural Resources (WVDNR). 2004. Biological Monitoring of Aquatic Communities of Cheat Lake, and Cheat River Downstream of the Lake Lynn Hydro-station, 2005 – 2009.

WVDNR. 2003. Freshwater Mussels. Available online: http://www.wvdnr.gov/Wildlife/Mussels.shtm. Accessed: May 20, 2019.

4.6 Wildlife Resources

4.6.1 Affected Environment

The Cheat River watershed occupies three geographic ecoregions including the Central Appalachian Forest, the Cumberland and Southern Ridge Valley (CSRV), and the Western Allegheny Plateau. Approximately 54 percent of the Cheat River basin is contained within the Central Appalachian ecoregion, which is characterized by rugged, mountainous terrain, cooler temperatures, and biologically diverse natural communities (WVDEP 2013). The Ridge and Valley ecoregion encompasses nearly 45 percent of the Cheat River watershed and is marked by a series mountain ridgelines and valleys. Only about 1 percent

of the watershed occurs within the Western Allegheny Plateau ecoregion. This ecoregion is comprised of rolling hills with wide valleys dominated by mixed oak forest and agricultural (WVDEP 2013). The Cheat River watershed is dominated by forested area (86 percent); the remaining land cover is classified as developed (8 percent), planted/cultivated (6 percent), and impervious surface area (<1 percent) (WVDEP 2013).

4.6.1.1 Wildlife Habitats

The natural communities (see section 4.7, *Botanical Resources*) within the Lake Lynn Project vicinity provides habitat for a variety of wildlife species, including over 200 resident and transient bird species, 50 mammal species, and 37 amphibian species with the potential to occur in the Lake Lynn Project area (WVDNR 2001, WVDNR 2003, PGC 2019, Marshall 2019, BBC 2014, and Sibley 2014).

4.6.1.2 Wildlife

4.6.1.2.1 Mammals

The Cheat River corridor potentially provides habitat to over 50 mammal species (WVDNR 2001, WVDNR 2003, and PGC 2019). Habitat within the project boundary is mostly aquatic with limited terrestrial habitat. Many of the mammalian wildlife species are likely use the riparian corridor for movement and foraging. While some mammals such as red fox, raccoon, Virginia opossum, gray squirrel, and striped skunk are likely common along the riparian corridors associated with the project boundary, larger mammal species such as black bear may be transient within the project boundary. Grasslands and agricultural areas are generally uncommon within the project boundary; however, several areas of open grassland and agriculture occur within the project vicinity. Mammals typically found in open areas or grassland habitats include eastern cottontail rabbits and rodents such as the meadow-jumping mouse. Several bat species may also use terrestrial habitat and manmade structures in and adjacent to the project boundary. Beaver, fisher, and river otter were eradicated in the past, but were reintroduced in the 1930s, 1969, and 1985, respectively (WVDNR 2001). Appendix C lists mammal species which may occur within a 5-mile radius of the project dam (WVDNR 2001, WVDNR 2003, and PGC 2019).

4.6.1.2.2 Amphibians and Reptiles

Reptiles and amphibian species may use different habitat types including riparian, woodlands, scrub-shrub, or grasslands and early successional areas. These species have

different habitat requirements depending on life stage or time of year. Amphibians and reptiles that may be found in wetland or aquatic habitat such as the open water impoundment or tributaries during one or more life stage include frogs, salamanders, and turtle species, as well as the northern water snake. These species use wetland and aquatic habitat for breeding, foraging, and protection. Species such as black ratsnake, spotted salamander, red spotted newt (eft form), and grey tree frog use forested areas, including riparian areas, for foraging, shelter, and feeding. Grasslands and agricultural areas may be used by the northern black racer, eastern American toad, and eastern garter snake (Alden et al., 1999, Marshall 2019). Appendix C lists resident amphibian species that could occur in Cheat River habitats within a 5-mile radius of the project dam.

4.6.1.3 Birds

There are over 200 resident and transient bird species found in the Cheat River corridor (BBC 2014, Sibley 2014). Habitats associated with the Lake Lynn Project, including the impoundment, tributaries, wetlands, and riparian areas, may provide breeding habitat, migratory stopovers, and wintering habitat for a variety of bird species. Bird species typically found along the shoreline of the impoundment may include belted kingfisher, song sparrow, bank swallow, and waterfowl such as the mallard duck and wood duck. Birds of prey such as bald eagle, osprey, red-tailed hawk, and barred owl may use many different habitat types on a seasonal basis including forests, scrub-shrub or early successional areas, wetlands, and open water (Stokes 1996). Appendix C lists bird species that may occur or use the habitat within a 5-mile radius of the project dam.

4.6.2 Environmental Effects

4.6.2.1 Effects of the Proposed Action

Lake Lynn is not proposing any changes to operations or to the Lake Lynn facilities (e.g., dam or powerhouse). The proposed action does not include any ground-disturbing activities; therefore, no adverse effects on wildlife resources are anticipated.

4.6.2.2 Effects of the No-Action Alternative

The effects of the no-action alternative mimic the anticipated effects of the proposed action because the Licensee is proposing no changes to existing facilities or operations.

4.6.3 Unavoidable Adverse Effects

Continued operation and relicensing of the Lake Lynn Project along with PME measures are not expected to have unavoidable adverse effects on wildlife resources.

4.6.4 References

Alden, P., B. Cassie, J.D.W. Kahl, E.A. Oches, H. Zirlin, and W.B. Zomlefer. 1999. National Audubon Society Field Guide to the Mid-Atlantic States. New York, NY. 447pp.

Brooks Bird Club (BBC). 2014. Birds of West Virginia Field Checklist. Available Online: https://wvdnr.gov/wp-content/uploads/2021/05/bird-checklist2.pdf. Accessed: April 19, 2022.

Marshall University (Marshall). 2019. Amphibians and Reptiles in West Virginia. Available online: https://www.marshall.edu/herp/WVHERPS.HTM. Accessed: April 18, 2022.

Pennsylvania Game Commission (PGC). 2019. Pennsylvania Mammal Atlas. Available online: http://www.pamammalatlas.com/. Accessed April 15, 2022.

Sibley, D.A. 2014. The Sibley Guide to Birds: Second Edition. Alfred A. Knopf, New York.March 2014. (as cited in Stantec 2019).

Stokes, D. and L. Stokes. 1996. Field Guide to Birds: Eastern Region. Boston, MA. pp. 471.

West Virginia Department of Environmental Protection (WVDEP). 2013. West Virginia Watersheds: A Closer Look. Available online: https://dep.wv.gov/WWE/wateruse/WVWaterPlan/Documents/WatershedACloserLookNovember2013.pdf Accessed: April 15, 2022.

West Virginia Division of Natural Resources (WVDNR). 2001. Mammals of West Virginia: A field Checklist. Available online: https://wvdnr.gov/wp-content/uploads/2021/05/mammalsbrochure.pdf. Accessed: April 15, 2022.

West Virginia Division of Natural Resources (WVDNR). 2003. Mammals of West Virginia. Available online: https://wvdnr.gov/plants-animals/mammals/. Accessed: April 15, 2022.

4.7 Botanical Resources

4.7.1 Affected Environment

4.7.1.1 Upland Botanical Resources

Geographic information system (GIS) analysis of NatureServe land cover data revealed that a majority of the landcover within 1 mile of the Lake Lynn Project boundary is forested habitat (Table 18, Figure 16). In addition to forested communities, other upland communities in the project vicinity include agricultural fields, developed-open space (e.g., golf course), and some residential areas (NatureServe 2009).

The most prominent forested botanical communities include the southern and central Appalachian cove forest and the south-central interior mesophytic forest accounting for over 41 percent of the overall area within 1 mile of the Lake Lynn Project boundary (over 46 percent of the terrestrial area). Other forested communities include northeastern interior dry-mesic oak forest, Allegheny-Cumberland dry oak forest and woodland, and Appalachian (hemlock)-northern hardwood forest. Appendix C lists botanical species that may occur within a 1 mile radius of the Lake Lynn Project boundary.

Table 18 Botanical Communities within 1 Mile of Lake Lynn Project Boundary

Botanical Community	% of Project Area
Southern and Central Appalachian Cove Forest	27.3
South-Central Interior Mesophytic Forest	14.1
Open Water	10.4
Developed-Open Space	9.4
Agriculture - Pasture/Hay	9.3
Northeastern Interior Dry-Mesic Oak Forest	8.9
Allegheny-Cumberland Dry Oak Forest and Woodland	6.5
Appalachian (Hemlock)-Northern Hardwood Forest	6.1
Developed-Low Intensity	2.9
Ruderal Forest	1.5
Agriculture - Cultivated Crops and Irrigated Agriculture	1.0
Total of "Other" Communities with less than 1% coverage	2.5
Total	**100.0**

Source: NatureServe 2009

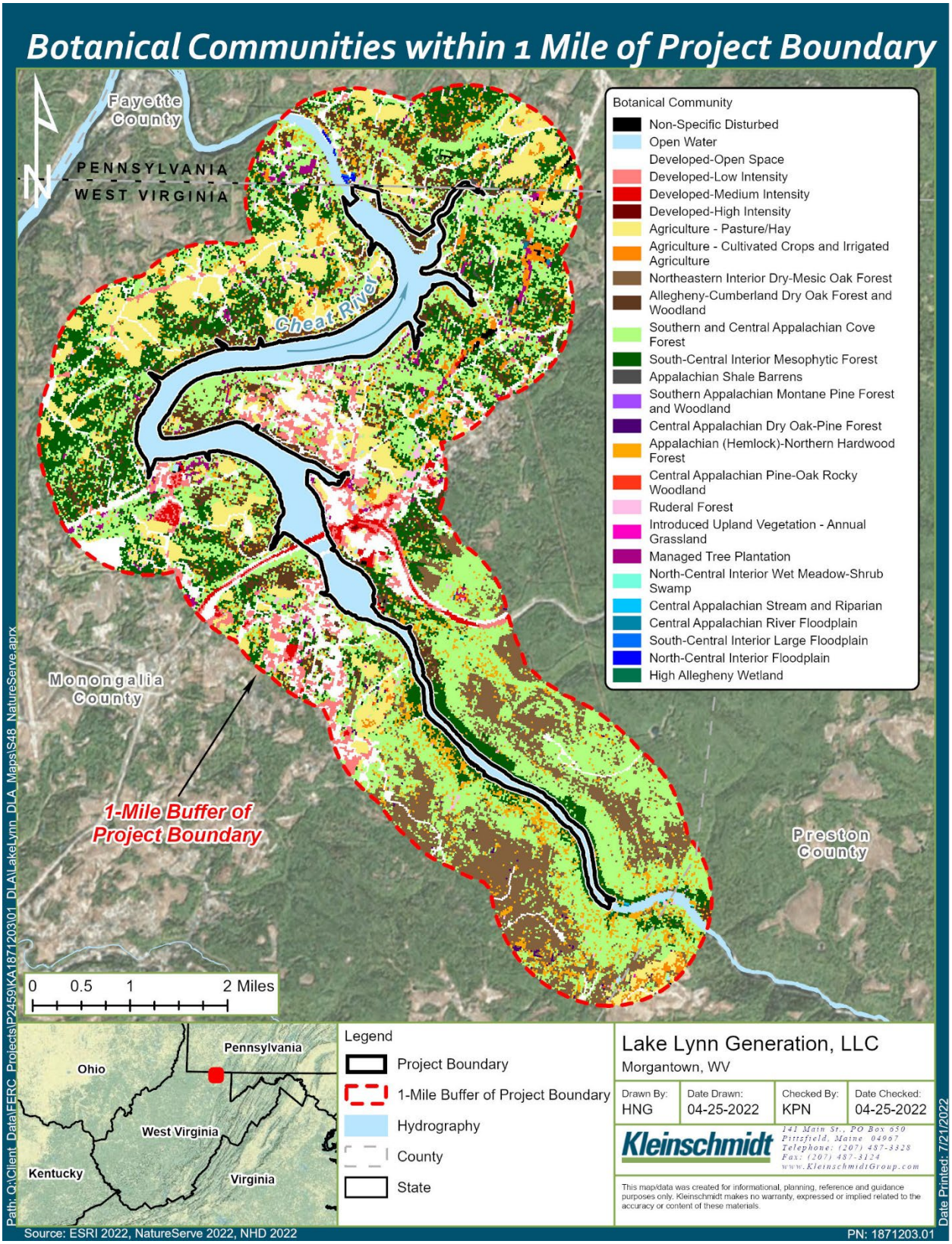


Figure 16 Botanical Communities within 1 Mile of Lake Lynn Project

Southern and Central Appalachian Cove Forest

The southern and central Appalachian cove forest is the most abundant vegetative community within 1 mile of the Lake Lynn Project boundary accounting for over 27 percent of the overall study area (Table 18, Figure 16). This forest is generally found in protected geographic positions with concave slopes that support moist conditions. This community may include a mosaic of acidic and "rich" coves, which are distinguished by differences in the herbaceous plant communities. The acidic cove is typically found on low slope positions, but can may be positioned farther up on north-facing, sheltered slopes. The soils of the acidic cove are less fertile, and the herbaceous layer is not as diverse. The rich cove is usually found on the lowest slope positions on high-fertility soils and have a higher diversity and density of herbaceous species. Dominant tree species include yellow poplar, American basswood, white ash, yellow buckeye, sweet birch, mountain magnolia, cucumber tree, mountain silverbell, black cherry, and eastern hemlock. Herbaceous species may include blue cohosh, Clayton's sweetroot, Canadian woodnettle, bloodroot, black cohosh, and Canadian white violet (NatureServe 2009).

South-Central Interior Mesophytic Forest

This forest community is similar to the southern and central Appalachian cove forest and is typically found on deep, enriched soils in sheltered landscape positions such as coves or lower topographic positions along slopes. The forest type is variable but is generally characterized by deciduous tree canopy and a rich herb layer with abundant spring ephemerals. Small streams often bisect this community. Common tree species include sugar maple, American beech, yellow poplar, American basswood, northern red oak, cucumber tree, black walnut, and eastern hemlock (NatureServe 2009).

Northeastern Interior Dry-Mesic Oak Forest

This oak dominated forest is typically found a low to mid elevations on flat to gently rolling landscapes. Soils are not strongly xeric but are generally acidic and comparatively nutrient poor. This forest community is typically characterized by a closed canopy; however, this community may also include patchy-canopy woodlands. Common canopy trees include northern red oak, white oak, black oak, scarlet oak, and hickory species (NatureServe 2009).

Allegheny-Cumberland Dry Oak Forest and Woodland

This forest type is generally characterized by a closed canopy of deciduous trees and occurs on infertile or acidic soils. Dominant overstory trees include white oak, southern red oak, swamp chestnut oak, and scarlet oak. Other species may include red maple, pignut hickory, and mockernut hickory (NatureServe 2009).

4.7.1.2 Wetlands, Riparian, and Littoral Habitat

Wetlands

Wetlands within the Lake Lynn Project boundary are primarily deep-water habitats (Figure 17). The most common wetland types within the project boundary are lacustrine (L1UBHh) and riverine wetlands (R3UBH, R3USC, R5UBH) associated with Cheat Lake and Cheat River (USFWS 2022). The riverine and the lacustrine wetlands are classified by the National Wetland Inventory (NWI) as having unconsolidated bottoms (L1UBHh, R3UBH, R5UBH) and unconsolidated shores (R3USC). Unconsolidated bottoms are characterized by the "*lack of large stable surfaces for plant and animal attachment*" while unconsolidated shores are characterized by "*substrates lacking vegetation except for pioneer plants that become established during brief periods when growing conditions are favorable*"(USGS 1992). Substrate of the riverine and lacustrine wetlands likely consist of cobble, gravel, sand, mud, or organic material. Palustrine wetlands are limited in size and quantity in the project boundary due to the steep banks and sloping topography surrounding Cheat Lake and Cheat River (Figure 17) (USFWS 2022). The NWI map includes a 0.3-acre palustrine forested wetland (PFO1A) at the southern end of the project boundary as well as several tributaries that feed into the Cheat River upstream and downstream of the Lake Lynn Project.

Riparian Habitat

Riparian habitat within the project area is a mix of wetlands, deciduous and mixed forest, and commercial and residential development as discussed in Section 4.7.1.1, *Upland Botanical Resources*. Dominant forest community types include southern and central Appalachian cove forest and the south-central interior mesophytic forest. Ruderal forests are also common riparian habitat. These early succession forests are often found in areas that have been disturbed by human activity such as the construction or maintenance of roads, trails, and buildings

Within the project area much of the riparian zone is intact, with some areas of residential development. These areas are commonly dominated by weedy or manicured herbaceous species and an underdeveloped shrub and tree canopy due to vegetation management.

Littoral Zone

The littoral zone is the transitional area between deep-water, aquatic habitat and terrestrial wetlands or uplands. Littoral habitats include those areas of a water body through which light penetrates resulting in primary productivity (Cowardian 1979). Within the Lake Lynn Project boundary, this zone is often unvegetated with a cobble-gravel, sand, mud, or organic bottom. The Licensee worked cooperatively with WVDNR and WVU to document the distribution and relative abundance of aquatic vegetation and to map aquatic vegetation in Cheat Lake. Twenty-two separate areas of aquatic vegetation were documented within the impoundment. These areas occur throughout the impoundment along shores and in coves or other areas with slower moving water (Figure 17) (Smith and Welsh, 2015). Aquatic vegetation was mostly found in depths ranging from 0.6 – 2.4 m (2-8 ft), but some moderate patches did extend into 10 ft of water. Ten species from five genera of aquatic vegetation were in Cheat Lake. The most common species found in dense abundance during the surveys included: brittle naiad (*Najas minor*), wild celery (*Vallisneria americana*), and curly-leaf pondweed *(Potamogeton crispus*). Although several areas of substantial aquatic vegetation growth were found in Cheat Lake, overall Cheat Lake has limited coverage of aquatic vegetation.

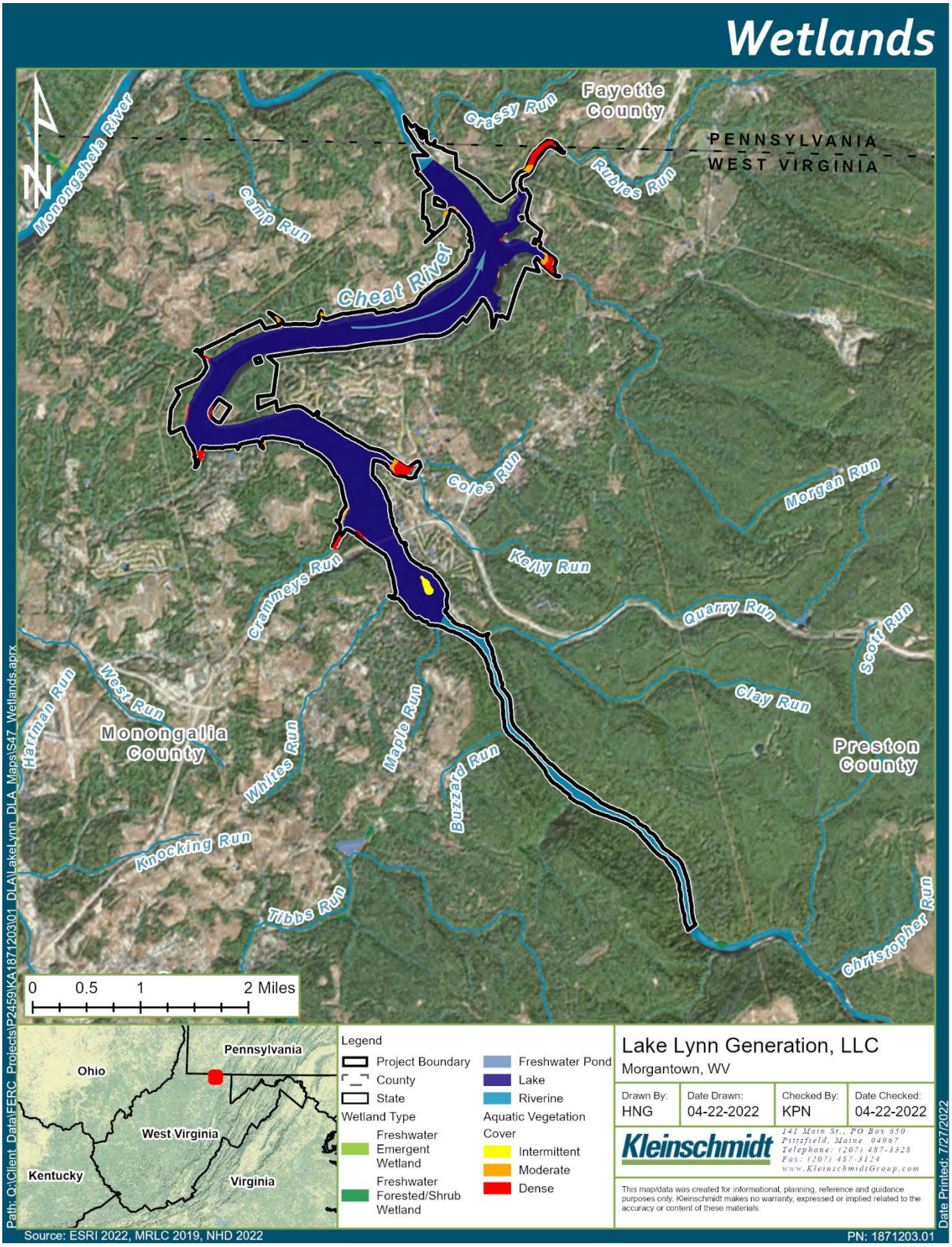


Figure 17 Wetlands within the Lake Lynn Project vicinity

4.7.2 Environmental Effects

4.7.2.1 Effects of the Proposed Action

The Licensee is not proposing any changes to the project operations or to the Lake Lynn project facilities (e.g., dam or powerhouse). The proposed action does not include any ground-disturbing activities. As such, the proposed action is not expected to adversely affect botanical communities in the project area.

4.7.2.2 Effects of the No-Action Alternative

The effects of the no-action alternative mimic the anticipated effects of the proposed action because the Licensee is proposing no changes to existing facilities or operations.

4.7.3 Unavoidable Adverse Effects

Continued operation and relicensing of the Lake Lynn Project as proposed are not expected to have unavoidable adverse effects on botanical or wetland resources.

4.7.4 References

Cowardin, L.M., V.C. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. United States Fish and Wildlife Service, Washington, D.C. 131 pp.

NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 06 February 2009.

Smith, D., and S. Welsh. 2015. Biological Monitoring of Aquatic Communities of Cheat Lake, and Cheat River Downstream of the Lake Lynn Hydro Station, 2011 – 2015. Division of Forestry and Natural Resources West Virginia University.

U.S. Geological Survey (USGS). 1992. Classification of Wetlands and Deepwater Habitats of the United Sates Available online at: http://www.fws.gov/wetlands/documents/classification-of-wetlands-and-deepwater-habitats-of-the-united-states.pdf. Accessed April 21, 2022.

United States Fish and Wildlife Service (USFWS). 2022. National Wetlands Inventory: Surface Waters and Wetlands. Available online: https://www.fws.gov/wetlands/data/mapper.html. Accessed: April 21, 2022.

4.8 Rare, Threatened, and Endangered Species

4.8.1 Affected Environment

Federal and applicable state databases were used to identify rare, threatened, and endangered (RTE) species that potentially occur at the Lake Lynn Project. The Pennsylvania Natural Heritage Program (PNHP) identified 17 RTE state listed species in the entire Cheat watershed on the environmental review list (PNHP 2019). A site-specific search on the publicly available PNHP database did not identify any state-listed species within the Lake Lynn project boundary (PNHP 2022). West Virginia does not have state threatened and endangered species legislation (WVDNR 2022). The USFWS's Information for Planning and Consultation (IPaC) identified the following federally listed species potentially occurring within the Lake Lynn project boundary: the endangered Indiana bat (*Myotis sodalis*), the threatened northern long-eared bat (*Myotis septentrionalis*), the threatened flat-spired three-toothed snail (*Triodopsis platysayoides*), and the candidate monarch butterfly (*Danaus plexippus*) (USFWS 2022a) (Table 19).

Table 19 Potentially Occurring Rare, Threatened, and Endangered Species in Project Area

Common Name	Scientific Name	Status
Mammals		
Indiana bat	*Myotis sodalis*	Federally endangered
Northern long-eared bat	*Myotis septentrionalis*	Federally threatened
Snails		
Flat-spired three-toothed snail	*Triodopsis platysayoides*	Federally threatened
Insects		
Monarch butterfly	*Danaus plexippus*	Candidate

Source: USFWS 2022a

There are no critical habitats located within the Lake Lynn project boundary (USFWS 2022a). General habitat information for these species is provided in Table 20

Table 20 Habitat Information of Federally Listed Species Potentially Occurring in Project Boundary

Family	Common Name	Scientific Name	Habitat
Vespertilionidae	Indiana bat	*Myotis sodalis*	Hibernates in caves and mines in winter, mostly in tight clusters. In summer, females form small maternity colonies in tree hollows and behind loose bark (USFWS 2022b).
Vespertilionidae	Northern long-eared bat	*Myotis septentrionalis*	Forested ridges appear favored over riparian woodlands. Hibernacula include caves and mines in winter, but may use crevices in walls or ceilings. Summer roosts include tree holes, birdhouses, or behind loose bark or shutters of buildings (USFWS 2022c).
Polygyridae	Flat-spired three-toothed snail	*Triodopsis platysayoides*	Only found in West Virginia, along Cheat River gorge. Lives in cracks and crevices in rocks. Prefers cool, moist, deep fissures and rock talus in spring to early summer (iNaturalist 2022).
Nymphalidae	Monarch butterfly	*Danaus plexippus*	For eastern North American populations, monarchs overwinter in oyamel fir tree roosts. Require milkweeds to lay eggs (USFWS 2022d).

The IPaC lists 15 migratory bird species that are of concern with the potential to occur within the project area (Table 21). USFWS uses the following status designations: BCC Rangewide (CON) are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the continental United States; BCC – BCR are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental United States; and Non-BCC Vulnerable are not BCC species in the project area but appear on the list because of the Eagle Act requirements (USFWS 2022).

Table 21 Potentially Occurring Migratory Bird Species

Common Name	Scientific Name	Status
Bald eagle	*Haliaeetus leucocephalus*	Non-BCC Vulnerable
Black-billed Cuckoo	*Coccyzus erythropthalmus*	BCC Rangewide (CON)
Black-capped chickadee	*Poecile atricapillus practicus*	BCC - BCR
Bobolink	*Dolichonyx oryzivorus*	BCC Rangewide (CON)
Canada warbler	*Cardellina canadensis*	BCC Rangewide (CON)
Cerulean warbler	*Dendroica cerulea*	BCC Rangewide (CON)
Eastern whip-poor-will	*Antrostomus vociferous*	BCC Rangewide (CON)
Golden eagle	*Aquila chrysaetos*	Non-BCC Vulnerable
Henslow's sparrow	*Ammodramus henslowii*	BCC Rangewide (CON)
Kentucky warbler	*Oporornis formosus*	BCC Rangewide (CON)
Northern saw-whet owl	*Aegolius acadicus*	BCC - BCR
Prairie warbler	*Dendroica discolor*	BCC Rangewide (CON)
Red-headed woodpecker	*Melanerpes erythrocephalus*	BCC Rangewide (CON)
Rusty blackbird	*Euphagus carolinus*	BCC - BCR
Wood thrush	*Hylocichla mustelina*	BCC Rangewide (CON)

In the PAD, Lake Lynn proposed to conduct presence/absence surveys for RTE species within the project area. USFWS provided comments regarding the federally listed species discussed in the PAD[1] and noted that no other federally proposed or listed species are known to exist in the project area. Lake Lynn did not perform the proposed presence/absence surveys because the USFWS noted the surveys were not warranted.

4.8.2 Environmental Effects

4.8.2.1 Effects of the Proposed Action

Lake Lynn is not proposing any changes to project operations and therefore, the proposed action is not expected to adversely affect RTE species. No studies were requested by the stakeholders and there are no specific proposed PME measures for RTE species. However, for any activities requiring clearing of trees, Lake Lynn would abide by seasonal tree clearing restrictions for bat species and only clear trees between November 1st – April 14th. Should tree clearing be required during the restricted time period (April 15th – October 31st), Lake Lynn would consult with the USFWS regarding removal needs.

[1] Four federally listed species were identified with the potential to occur in the project area in the PAD filed August 2019: Indiana bat, northern-long eared bat, flat-spired three-toothed snail, and running buffalo clover. USFWS delisted running buffalo clover in September 2021.

4.8.2.2 Effects of the No-Action Alternative

The effects of the no-action alternative mimic the anticipated effects of the proposed action because the Licensee is proposing no changes to existing facilities or operations.

4.8.3 Unavoidable Adverse Effects

Construction activities and timber management practices may cause short-term unavoidable adverse effects to the potentially occurring Indiana and northern long-eared bats. Following the USFWS guidance for timber management and implementing construction BMPs would minimize any potential effect on these listed species.

4.8.4 References

iNaturlist. 2022. Flat-spired Threetooth. Available online at: https://www.inaturalist.org/taxa/114430-Triodopsis-platysayoides#Habitat. Accessed April 14, 2022.

Pennsylvania Natural Heritage Program (PNHP). 2022. Conservation Explorer. Available online at: https://conservationexplorer.dcnr.pa.gov/content/map. Accessed April 14, 2022.

PNHP. 2019. Environmental Review List. Available online at: https://www.naturalheritage.state.pa.us/Species.aspx?msclkid=2d05c6e6c23e11ec851bb8f133e0f01e. Accessed April 14, 2022.

United States Fish and Wildlife Service (USFWS). 2022a. Information for Planning and Consultation. Available online at: https://ipac.ecosphere.fws.gov/location/RWZ3354YJFFRXHNP547E4HL3YE/resources. Accessed April 12, 2022.

USFWS. 2022b. *Myotis sodalis*. Available online at: https://www.fws.gov/species/indiana-bat-myotis-sodalis. Accessed April 14, 2022.

USFWS. 2022c. *Myotis septentrionalis*. Available online at: https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis. Accessed April 14, 2022.

USFWS. 2022d. *Danaus plexippus*. Available online at: https://www.fws.gov/species/monarch-danaus-plexippus. Accessed April 14, 2022.

West Virginia Division of Natural Resources (WVDNR). 2022. Rare, Threatened, and Endangered Species. Available online at: http://www.wvdnr.net/wildlife/endangered.shtm?msclkid=09124104b4e211eca71631d90cce2ad3. Accessed April 5, 2022.

4.9 Recreation and Land Use Resources

4.9.1 Affected Environment

4.9.1.1 Existing Recreation Facilities and Opportunities in the Project Boundary

As part of the previous relicensing Lake Lynn developed[2] a Recreation Plan for Lake Lynn Project, and in accordance with Article 417 of the existing FERC license, Lake Lynn is required to file a Recreation Plan update every 3 years. Lake Lynn filed the most recent update on March 31, 2021, which included: (1) a description of annual recreational use numbers collected in 2020; (2) a discussion of the adequacy of the Lake Lynn Project recreation facilities to meet recreation demand; (3) a description of the methodology used to collect all recreational use data; (4) a discussion of how the recreation needs are addressed if there is demonstrated need for additional facilities; and (5) documentation of agency consultation and agency comments on the update.

Lake Lynn Project recreation sites provide fishing, boating, nature viewing, picnicking, and hiking/biking opportunities. Existing Lake Lynn Project FERC-approved recreation sites are described in the following subsections and summarized in Table 22. Figure 18 depicts the locations of the Lake Lynn Project recreation sites.

Table 22 FERC-Approved Recreation Facilities at the Lake Lynn Project

Recreation Site Name	Recreation Amenities
Tailrace Fishing Area	100-foot-long concrete handicap accessible fishing platform, bank fishing opportunities, gravel parking area for approximately 22 vehicles, portable toilet, trash receptables
Cheat Lake Trail	4.5-mile-long hiking/biking trail (handicap accessible) consisting of northern and southern sections, parking at Substation Parking Area or Cheat Lake Park, bike rack, storm shelter, benches, interpretive historical signs, trash receptacle Substation Parking Area: gravel parking area for approximately 20

[2] Approved by FERC on April 11, 1997 - Order Modifying and Approving Recreation and Land Management Plan (79 FERC ¶ 62,017).

Recreation Site Name	Recreation Amenities
	vehicles, steps to the trail
Cheat Lake Park	Winter/car-top boat ramp with courtesy dock, 2 courtesy docks, swimming beach, 14 picnic tables including 4 in picnic area next to the beach, 8 day-use boat docks, playground area, 2 restroom facilities, 9 benches, security/maintenance station, 2,200 foot-long fishing platforms, 6 water fountains, access to the Cheat Lake Trail, interpretive historical signs, nature viewing area Upper Picnic Area: picnic loop with 29 drive-in picnic sites (each with parking for up to 2 vehicles) one of which includes handicapped accessible parking, 23 grills, 20 picnic tables, restroom building, 2 water fountains, 9 trash receptables, parking lot with 11 parking spaces (of which 2 are ADA accessible) Upper Parking Area: gravel parking area for approximately 50 vehicles, trash receptacle Overflow Parking Area: gravel parking is for approximately 30 vehicles Lower Parking Area: 6 Americans with Disabilities Act (ADA) parking spaces
Sunset Beach Marina Public Boat Launch	Public boat ramp, parking area for up to 85 vehicles with trailers, 2 portable toilets
Cheat Haven Peninsula Nature Viewing Area	Nature area, approximately 1.4-mile-long trail
Nature Viewing Area Across from Cheat Haven	Nature area accessible by boat only
Tower Run Nature Viewing Area	Pull-off parking for approximately 3 vehicles, nature area

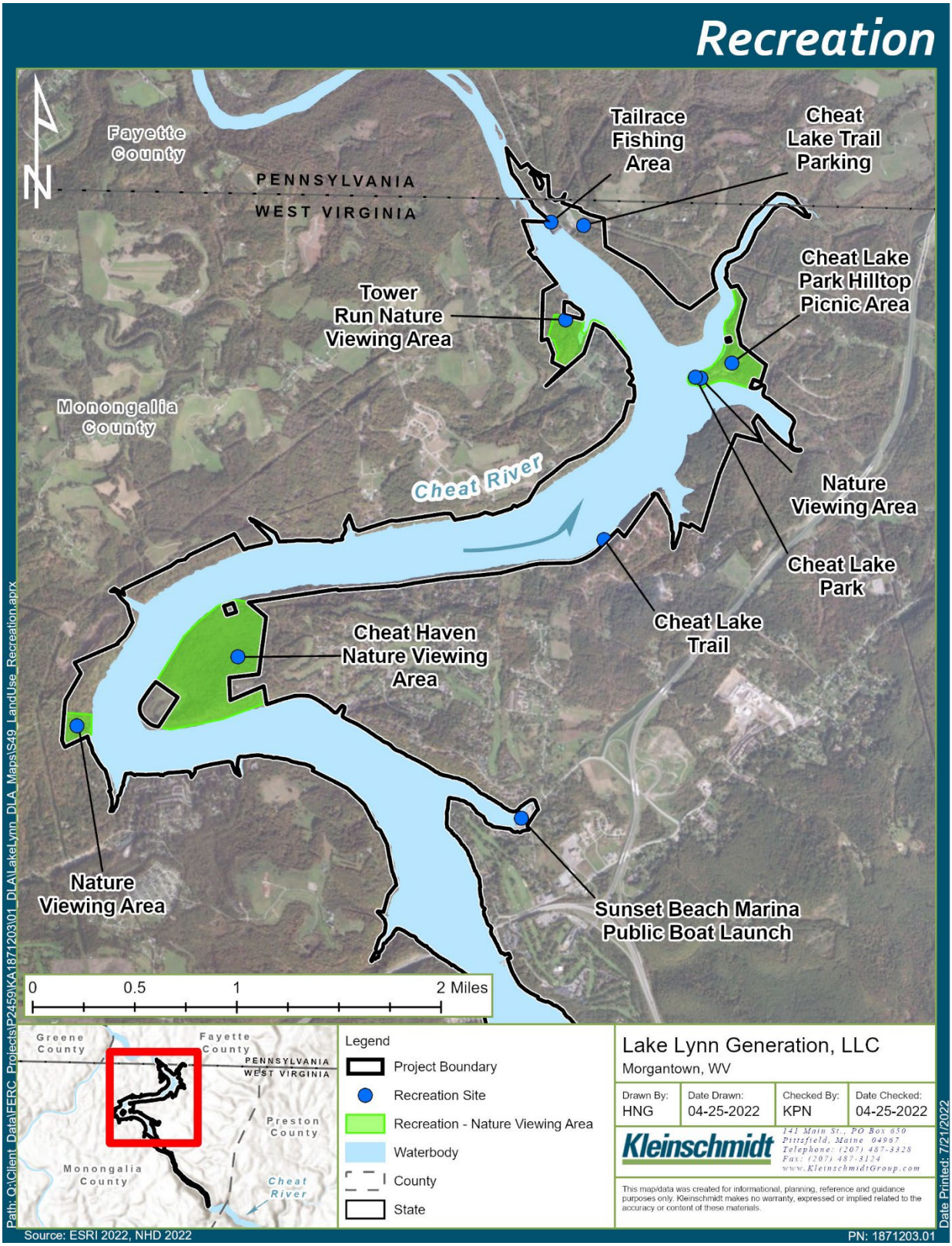


Figure 18 Lake Lynn Project Recreation Sites

4.9.1.1.1 Tailrace Fishing Area

The Tailrace Fishing Area (Photo 4) provides public access to the Lower Cheat River below the Lake Lynn Project dam for fishing. The site consists of a fishing platform[3] as well as bank fishing opportunities. Access to the fishing platform is provided from Lake Lynn Road along the river. A gravel parking area at the Tailrace Fishing Area can accommodate approximately 22 vehicles and includes two Americans with Disabilities Act (ADA) accessible spaces. Nighttime lighting is provided at both the fishing platform and parking area. An ADA compliant pedestrian ramp connects the parking area with the fishing platform. The fishing platform can accommodate approximately 20 anglers and has handrails constructed with barrier free cutouts to provide accessibility for persons with disabilities. An existing roadway provides easy foot access from the parking lot to the riverbank and a portable ADA accessible toilet is available at the stie. To enhance public safety, visual and audible alarms are present to provide notification of increased flow releases from the hydroelectric facility and warn the public to exit the water. In addition to the fishing platform, in September 2000 Lake Lynn installed eight rock pile structures to provide enhanced fish habitat in the first river mile downstream of the tailrace.

Photo 4 Tailrace Fishing Platform

[3] The fishing platform was closed January 2017 through July 2019 due to a concrete failure but has been reopened.

4.9.1.1.2 Cheat Lake Trail

The Cheat Lake Trail (Photo 5 and Photo 6) is a 4.5-mile hiking/biking trail that extends from a parking area near the Lake Lynn Project powerhouse to its southern terminus at the Cheat Haven Nature Viewing Area. The trail is 10-feet-wide, constructed of compacted limestone fines, and ADA accessible. The trail can be accessed from the Substation Parking Area or from Cheat Lake Park (the Upper or Lower Parking Areas). The trail consists of a northern portion and southern portion. The northern portion of the Cheat Lake Trail is approximately 1.4-miles-long and extends from the Substation Parking Area to Cheat Lake Park. The trail passes through Cheat Lake Park. The southern portion of the trail, which is 3.1-miles-long, starts at Cheat Lake Park and is accessed through a gate at Mannings Run. The gate allows Lake Lynn to close the southern portion of the trail at dusk during the recreation season and the winter months. Interpretive signs are installed at several historical sites along the Cheat Lake Trail. Additionally, there are mile-markers, every half-mile, along the length of the trail. Because of safety concerns, the trail may be temporarily closed if snow and/or ice are present or other hazardous conditions exist. Signs are posted on the Morgan Run Bridge to inform hikers of any trail closures.

Photo 5 Cheat Lake Trail – Over Northern Causeway from Cheat Lake Park

Photo 6 Cheat Lake Trail – Terminus

4.9.1.1.3 Cheat Lake Park

Cheat Lake Park (Photo 7 and Photo 8) is approximately 46 acres situated on a peninsula between the Rubles Run embayment and the Morgan Run embayment on Cheat Lake. Cheat Lake Park offers an abundance of recreation amenities including a winter/car-top boat ramp with courtesy dock, 2 courtesy docks, swimming beach, picnic tables, day-use boat docks, playground area, restroom facilities, benches, security/maintenance station, 2,200 ft long fishing platforms, water fountains, access to the Cheat Lake Trail, interpretive historical signs, and a nature viewing area. Within the park there are multiple parking areas to accommodate approximately 155 vehicles. Of those 155 parking spaces, 10 are ADA accessible.

Photo 7 Cheat Lake Park – Playground Area

Photo 8 Cheat Lake Park – Boat Launch

4.9.1.1.4 Sunset Beach Marina Public Boat Launch

Sunset Beach Marina is a free public boat launch and associated parking area located at on Cheat Lake. The parking area can accommodate approximately 60 boat trailers. This

public boat launch is available year-round when the lake level is above 865-feet NGVD. Lake Lynn maintains the surface elevation of Cheat Lake at certain levels throughout the year.

4.9.1.1.5 Wildlife and Nature Viewing Areas

In addition to the developed Lake Lynn Project recreation sites, four parcels of Lake Lynn Project lands have been designated as nature viewing areas (NVAs) by the Licensee. These areas are open for certain public recreation uses and there are no plans to develop these areas in the future. The first NVA is a 40-acre parcel between Morgan and Manning Run embayments. The second is the 140-acre Cheat Haven Peninsula, located at the end of the southern portion of the Cheat Lake Trail. There is a 1-mile trail through the Cheat Haven Peninsula NVA that was developed to reduce habitat destruction. This trail was constructed to proactively manage users walking through the NVA. There is also a 12-acre parcel of land across from the Cheat Haven Peninsula NVA that is only accessible by boat that has been designated as an NVA. The final NVA is located at Tower Run. This NVA is a 25-acre parcel that has a pull off with space for three vehicles to park.

4.9.1.2 Project Recreation Use and Capacities

In accordance with Article 417 of the current FERC License, the Licensee collected recreation data at the Lake Lynn Project from 2000 through 2020 and filed Recreation Plan updates summarizing recreation use every 3 years from 2003 through 2021. Generally, recreation use remained about the same over this 20-year monitoring period (LLG 2015, 2018, 2021).

Lake Lynn collected recreation use data during 2020 as part of the Recreation Plan update. Data collection included spot counts on 40 days at each of the recreation sites for a total of 560 spot counts, as well as obtaining data from the Sunset Beach marina. Spot counts were conducted on random weekday, weekend days, and holiday weekends during each season (spring, summer, fall, and winter) (for more details see 2021 Recreation Plan Update, LLG 2021).

Based on data collected, Lake Lynn estimated a total of 143,981 recreation days were spent at the Lake Lynn Project recreation sites in 2020 (LLG 2021). Overall, at all sites, recreation use was highest in the summer (53 percent), followed by spring (25 percent), and fall (14 percent) and lowest during the winter period (7 percent). Table 23 provides a

summary of estimated use at the primary recreation access sites (those with designated and/or on-site parking).

Table 23 Estimated Annual Use of Primary Sites in 2020

Recreation Site	Estimated Annual Use (2020)
Tailrace Fishing Area	5,156
Substation Parking Area	3,974
Cheat Lake Park Upper Picnic Area	723
Cheat Lake Park Upper Parking Area	89,748
Cheat Lake Park Lower Parking Area	13,524
Sunset Beach Marina	30,856
Total Annual Use	143,981

Source: LLG 2021

As part of the 2021 Recreation Plan update, Lake Lynn assessed the activities that recreationists participated in most frequently. It was noted that there were multiple activities in which recreationists participated in at the Lake Lynn Project. The most popular activities included walking, hiking, and jogging as they were observed at many of the Lake Lynn Project recreation sites. Other activities were popular at specific sites, such as:

Platform fishing

- Tailrace Fishing Area (83%)
- Day Use Boat Dock (33%)

Passive recreation (sightseeing, shoreline relaxation, bird watching, and photography

- Beach (59%)
- Day Use Boat Dock (36%)
- Lower Picnic Area (35%)
- Lower Parking Area (26%)

Motor boating

- Sunset Beach Marina (87%)

Spending time at the playground

- Playground (85%)

Non-motor boating

- Winter Boat Launch (51%)

Picnicking

- Lower Picnic Area (50%)

Swimming

- Beach (30%)

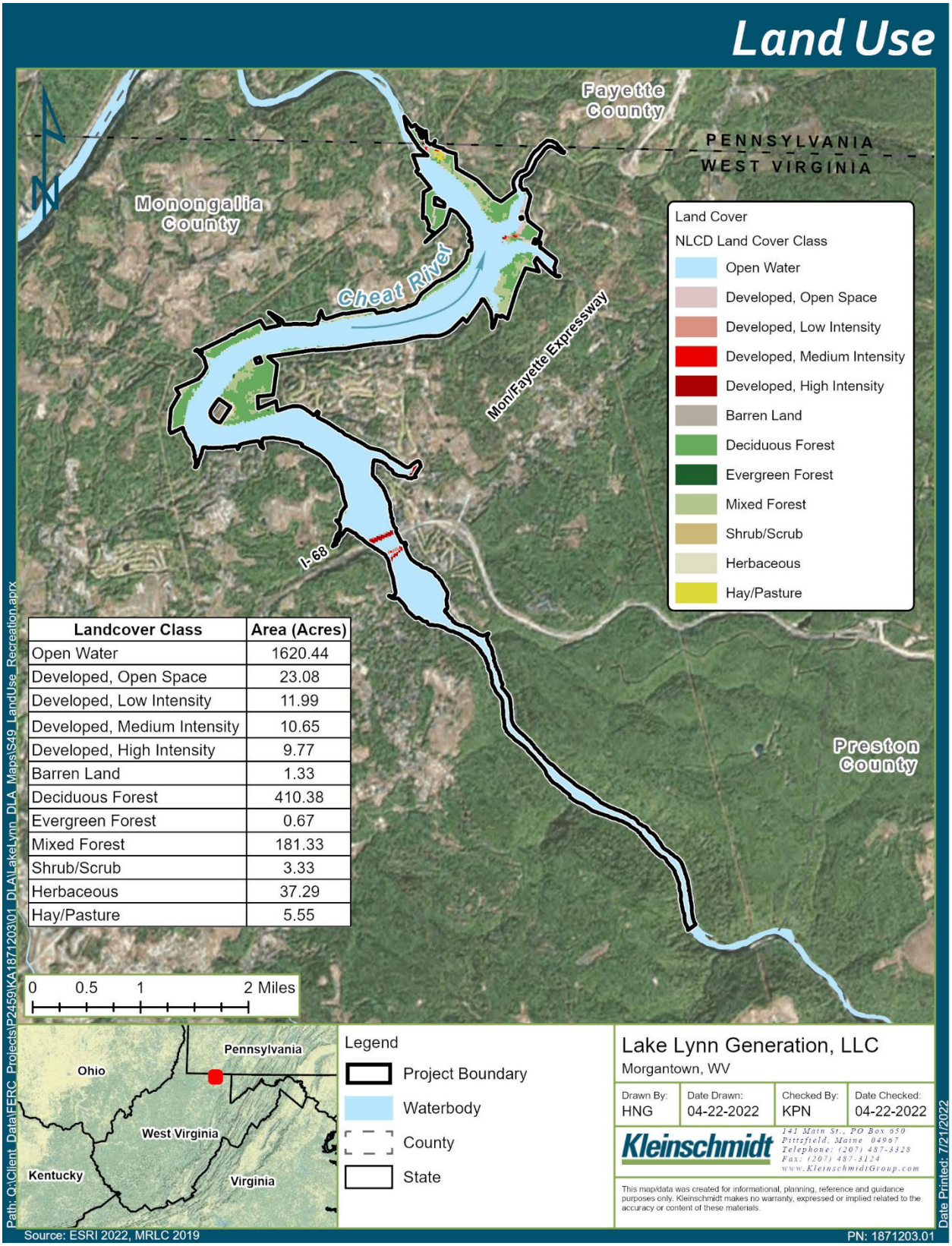
As part of the 2021 Recreation Plan update, Lake Lynn also assessed the capacity of the existing recreation facilities based on assessment of utilization of the available amount of parking at each site versus the average number of parking spaces that were occupied during surveys during weekends during each site's peak recreation season. Most of the Lake Lynn Project recreation facilities continue to be utilized at less than 50 percent of capacity. The Cheat Lake Park Lower Parking Area (76 percent) and Sunset Beach Marina (65 percent) were both over 50 percent of capacity. Based on the recreation site inventory, review of available facilities, annual use numbers generated in 2020 and the estimated capacity utilization rates, Lake Lynn determined that the existing recreation facilities, as operated, were adequate to meet the current demonstrated demand for recreation use at the Lake Lynn Project (LLG 2021).

4.9.1.3 Land Use and Management of Project Lands

Land use and land cover inside the Lake Lynn Project boundary and acreages for each are shown in Figure 19. The Lake Lynn Project boundary generally follows the normal full pool elevation of the impoundment, except for several nature viewing areas, and includes

certain lands immediately surrounding the Lake Lynn Project facilities including the dam, powerhouse, access roads, and appurtenant facilities.

The Licensee historically granted leases and permits ("privilege permits") for private recreation access to Lake Lynn Project lands and waters in accordance with the standard land use article in the FERC License. There are approximately 200 privilege permits around the Cheat Lake shoreline that allow permittees to install and maintain boat docks within their shoreline property. Each permit holder is responsible for the installation and maintenance of any boat docks and the property; however, permits must be approved by the Licensee prior to any improvements being conducted at a privilege permit site. Currently, the Licensee is not issuing any new permits for private piers or boat docks and will not issue any new permits until after relicensing.



Landcover Class	Area (Acres)
Open Water	1620.44
Developed, Open Space	23.08
Developed, Low Intensity	11.99
Developed, Medium Intensity	10.65
Developed, High Intensity	9.77
Barren Land	1.33
Deciduous Forest	410.38
Evergreen Forest	0.67
Mixed Forest	181.33
Shrub/Scrub	3.33
Herbaceous	37.29
Hay/Pasture	5.55

Figure 19 Land Use in the Project Boundary

4.9.2 Environmental Effects

4.9.2.1 Effects of the Proposed Action

Recreation

During the prefiling consultation, WVDNR and other stakeholders provided comments with respect to recreation. WVDNR commented on boating on Cheat Lake and indicated that law enforcement records do not show any significant increase in boating incidents. WVDNR also commented that it was not opposed to the temporary (or to a continued) moratorium on new private piers/boat docks. WVDNR commented that it was opposed to creating public access to the upper reaches of Cheat Lake through a road in the Snake Hill Wildlife Management Area (WMA). Other stakeholder comments were more specific to recreation PMEs including: extending Cheat Lake Trail to the south; connecting Cheat Lake Trail to the Sheepskin Trail; creating public access to the upper reaches of Cheat Lake through the Snake Hill WMA; creating a dog beach; establishing boating guidelines and limits consistent with WVDNR regulations; improving guidance on boating guidelines, public dock maintenance, dredging, and parking lot criteria; improved and clear procedures for trail maintenance and repair; improved guidelines and procedures for Sunset Beach Marina and other marinas; supporting lake cleanup activities; making swimming beach season consistent with boating season; improved debris management at beach; improved guidelines for the fishing pier; reiterate the recreation season dates and open the Trail year-round; description of the functions of recreation personnel, security personnel, park maintenance personnel and guidelines for the interaction of these people with public; and hiring on-site recreation staff.

Based on the comments received, Lake Lynn developed a Study Plan in consultation with stakeholders and conducted a Recreation Site Enhancement Feasibility and Assessment that examined the feasibility of making recreation site/facility enhancements at the Project, as requested during the prefiling consultation. The assessment results will inform the development of a new Recreation Plan.

Lake Lynn is proposing no changes to Lake Lynn Project facilities or operations. As such, the proposed action is not expected to adversely affect recreational resources at the Lake Lynn Project. The proposed action will result in the continued provision of recreational facilities that adequately meets demonstrated use in the project area. The Recreation Plan was most recently updated in 2021 and Lake Lynn requested in the Recreation Plan

Update that the 2021 update would be the last update under the existing license. Lake Lynn is proposing to develop a new Recreation Plan for the new license term in consultation with USFWS, WVDNR, PFBC, WVDEP, PADEP, Monongalia County, Fayette County, CLEAR, FOC, and MRTC that would include a review and update of the Recreation Plan every 10 years.

Lake Lynn is proposing to formally remove the water-accessible nature viewing area across from Cheat Haven from the Lake Lynn Project boundary and to no longer designate this area as a nature viewing area. The area is accessible only by boat, but the shoreline is steep in this area making access difficult.

Land Use

During the prefiling consultation, no agencies or stakeholders expressed concern, provided comments, or requested studies with respect to land use. Lands surrounding the Lake Lynn Project are residential, commercial and recreational. Lake Lynn is proposing no changes in operations at the Lake Lynn Project and does not anticipate that continued operation of the Lake Lynn Project will adversely affect land use in the vicinity of the Lake Lynn Project.

Lake Lynn is proposing to develop a shoreline management plan (SMP) in consultation with USFWS, WVDNR, WVDEP, PADEP, PFBC, CLEAR, FOC, Monongalia County, Fayette County, West Virginia SHPO, and Pennsylvania SHPO that would manage shoreline activities within the Lake Lynn Project boundary. The SMP would clearly outline allowed activities and procedures for granting permission for shoreline activities.

4.9.2.2 Effects of the No-Action Alternative

The effects of the no-action alternative mimic the anticipated effects of the proposed action because the Licensee is proposing no changes to existing facilities or operations.

4.9.3 Unavoidable Adverse Effects

Continued operation of the Lake Lynn Project is not expected to have any unavoidable adverse effects on recreation or land use resources.

4.9.4 References

Lake Lynn Generation, LLC (LLG). 2015. Lake Lynn Hydroelectric Project 2018 Recreation Plan Update. March 2015.

Lake Lynn Generation, LLC (LLG). 2018. Lake Lynn Hydroelectric Project 2018 Recreation Plan Update. April 2018.

Lake Lynn Generation, LLC (LLG). 2021. Lake Lynn Hydroelectric Project 2021 Recreation Plan Update. March 2021.

4.10 Aesthetic Resources

4.10.1 Affected Environment

Cheat Lake and the Cheat River are popular destinations for water recreation activities. The 1,730-acre picturesque Cheat Lake attracts thousands of users each year (WVDNR 2011). Most views of the Lake Lynn Project are aesthetically pleasing and provide views of Cheat Lake (Photo 9 and Photo 10). None of the Lake Lynn Project waters are designated as Wild and Scenic Rivers (NWSRS 2019). There are no scenic highways or byways within the Lake Lynn Project boundary.

There are several roads that provide limited views of the Lake Lynn Project waters. Lake Lynn Road runs along the northeast side of the Lake Lynn Project boundary near the powerhouse and the tailrace of the dam. This road provides a view of the Lake Lynn dam and tailrace area in addition to a parking area for the Tailrace Fishing Area. Several other roads provide limited views of Cheat Lake that change with the seasons. Most notably, the I-68 bridge and Ices Ferry Bridge (SR 857) provide views of upper Cheat Lake. As the deciduous trees lose their leaves, the views become less obstructed, and areas with no view in summer may offer limited or clear views of the Lake Lynn Project in winter.

Photo 9 View of Lower Cheat Lake from the Cheat Lake Trail

Photo 10 View of Upper Cheat Lake

4.10.2 Environmental Effects

During prefiling consultation, agencies and stakeholders raised no issues or study requests related to aesthetic resources.

4.10.2.1 Effects of the Proposed Action

Lake Lynn is proposing no changes to Lake Lynn Project facilities or operations which would affect the viewshed. As such, the proposed action is not expected to adversely affect aesthetic resources at the Lake Lynn Project.

4.10.2.2 Effects of the No-Action Alternative

The effects of the no-action alternative mimic the anticipated effects of the proposed action because the Licensee is proposing no changes to existing facilities or operations.

4.10.3 Unavoidable Adverse Effects

No unavoidable adverse impacts to aesthetic resources are expected to occur as a result of the continued operation of the Lake Lynn Project.

4.10.4 References

National Wild and Scenic Rivers System (NWSRS). 2019. West Virginia Rivers. Available Online: https://www.rivers.gov/west-virginia.php. Accessed: April 5, 2019.

West Virginia Division of Natural Resources (WVDNR). 2011. The Recovery of Cheat Lake: A Success Story. Available Online: https://docs.wixstatic.com/ugd/ec6de6_e68c97639dd0442b863f6a6d9a2c051d.pdf. Accessed: March 29, 2019.

4.11 Historical and Cultural Resources

4.11.1 Affected Environment

Article 414 of the current license requires Lake Lynn to consult with the appropriate State Historic Preservation Office (SHPO) and file a cultural resource management plan for FERC approval prior to any ground-disturbing activities. Prior to the construction of Cheat Lake Park and the Cheat Lake Trail, Lake Lynn conducted a Phase 1 Cultural Resources Survey in 1996 and an addendum in 1998 to survey the additional 3.1-mile section of the Cheat Lake Trail. The 1996 survey identified two associated 19th and 20th century foundations,

six millstones, a coal tipple, and a railroad right-of-way (Christine Davis Consultants 1996). The 1998 addendum revealed no additional cultural resources (Christine Davis Consultants 1998). In letters filed June 12, 1996, and June 11, 1998, the WVSHPO stated the proposed trail would have no effect on any historic properties at the Lake Lynn Project (WVSHPO 1996, WVSHPO 1998).

There are two known potentially significant cultural resources within the Lake Lynn Project boundary: the railroad right-of-way (a historic archaeologic site identified above) and the Lake Lynn powerhouse and dam which are potentially eligible for listing on the National Register of Historic Places (NRHP). Prior to filing the PAD, Lake Lynn submitted the Lake Lynn Project information to the Pennsylvania State Historic Preservation Office (PASHPO), or Pennsylvania Historical and Museum Commission (PHMC), for review. In its June 2019 preliminary review, the PASHPO identified a potential NRHP-eligible above ground resource within the Lake Lynn Project area that may require surveying prior to developing final plans. The NRHP Interactive Map and WVSHPO Interactive Map were searched, and no NRHP-eligible or potentially eligible cultural resources were identified within the Lake Lynn project boundary (NPS 2020, WVSHPO 2022).

Lake Lynn is also submitting Lake Lynn Project-specific information related to relicensing to WVSHPO and the PASHPO for a formal review.

4.11.2 Environmental Effects

4.11.2.1 Effects of the Proposed Action

Lake Lynn is not proposing any changes to Project operations or to the potentially NRHP-eligible Lake Lynn dam or powerhouse. The proposed action does not include any ground-disturbing activities. Therefore, the proposed action is not expected to adversely affect cultural or historical resources. There are no specific proposed PME measures for cultural resources, however, Lake Lynn would continue to consult with appropriate SHPOs prior to any ground-disturbing activities at the Lake Lynn Project.

4.11.2.2 Effects of the No-Action Alternative

The effects of the no-action alternative mimic the anticipated effects of the proposed action because the Licensee is proposing no changes to existing facilities or operations.

4.11.3 Unavoidable Adverse Effects

Undiscovered cultural resources could be adversely affected by future activities related to the Lake Lynn Project; however, Lake Lynn would continue to consult with appropriate SHPOs prior to any ground-disturbing construction activities to minimize these effects.

4.11.4 References

Christine Davis Consultants, Inc. 1996. Phase I Cultural Resource Survey: Cheat Lake Recreational Project, Monongalia County, West Virginia. Prepared for Allegheny Power System. April 1996.

Christine Davis Consultants, Inc. 1998. Addendum Report: Phase I Cultural Resource Survey Cheat Lake Recreational Project, Monongalia County, West Virginia. Prepared for Allegheny Power. March 1998.

National Park Service. 2020. National Register of Historic Places. Available online at: https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466. Accessed April 18, 2022.

West Virginia State Historic Preservation Office (WVSHPO). 1996. Letter Responding to Phase I Cultural Resources Survey. March 11, 1996.

West Virginia State Historic Preservation Office (WVSHPO). 1998. Letter Responding to Phase I Cultural Resources Survey Addendum. May 26, 1998.

West Virginia State Historic Preservation Office (WVSHPO). 2022. Interactive Map. Available online at: https://mapwv.gov/shpo/viewer/index.html. Accessed April 18, 2022.

4.12 Socioeconomics

4.12.1 Affected Environment

The Lake Lynn Project is located on the Cheat River in Monongalia County, West Virginia near the city of Morgantown, and along the Fayette County, Pennsylvania border, near the borough of Point Marion. Monongalia County is in north-central West Virginia while Fayette County is in southwestern Pennsylvania. The following sections provide a summary of socioeconomic characteristics for Morgantown, West Virginia, and for Point Marion, Pennsylvania, as they are available. The socioeconomic characteristics of the

region discussed include land use patterns, population patterns, and sources of employment.

4.12.1.1 General Land Use Patterns

Land use near the Lake Lynn Project is primarily urban in West Virginia and rural in Pennsylvania. Table 24 summarizes the rural and urban nature in Morgantown and Point Marion, Monongalia County, Fayette County, West Virginia, and Pennsylvania for comparative purposes.

Table 24 Proportion of the Population Living in Urban and Rural Areas, 2010*

Land Use	Morgantown	Point Marion	Monongalia Co.	Fayette Co.	West Virginia	Pennsylvania
Urban	99%	0%	74%	52%	48%	77%
Rural	1%	100%	26%	48%	52%	23%

Source: U.S Census Bureau 2010a,b,c,d,e,f
*The most recent population pattern analysis for urban and rural areas was done in 2010.

4.12.1.2 Population Patterns

Data provided by the US Census Bureau shows that over a ten-year period the population of Morgantown increased by 2.2 percent while Point Marion decreased marginally by 0.3 precent. The population of Monongalia County, West Virginia, increased by 10.0 percent while the growth rate of West Virginia decreased by 3.2 percent. The growth rate in Fayette County, Pennsylvania, decreased by 6.3 percent while the growth rate of Pennsylvania increased marginally by 2.4 percent. The land area of Fayette County is larger than the area of Monongalia County. The population density is highest in the City of Morgantown, West Virginia. Table 25 summarizes population statistics in the project vicinity in 2010 and 2020, as well as recent population patterns.

Table 25 Population Statistics for the Project Vicinity

Population Statistics	Morgantown	Point Marion	Monongalia Co.	Fayette Co.	West Virginia	Pennsylvania
Population (2010)	29,660	1,159	96,189	136,606	1,852,994	12,702,379
Population (2020)	30,347	1,156	105,822	128,073	1,793,716	13,002,700

Population Statistics	Morgantown	Point Marion	Monongalia Co.	Fayette Co.	West Virginia	Pennsylvania
% Change 2010 to 2020	2.3%	-0.3%	10.0%	-6.3%	-3.2%	2.4%
Land Area in sq. mi., 2010	10.2	0.4	360.1	790.3	24,038.2	44,742.7
Population per sq. mi., 2020	2,984.0	2,752.4	293.9	162.0	74.6	290.6

Source: City Data 2022, U.S. Census Bureau 2010a, 2010b, 2010c, 2010d, 2010e, 2010f, 2010g 2022a, 2022b, 2022c, 2022d, 2022e, 2022f.

4.12.1.3 Economic Indicators and Employment

Income, poverty, and employment data from the American Community Survey (based on estimates from 2020 U.S. Census Bureau data) are provided in Table 26.

Table 26 Economic Characteristics of the Project Region (2020 Estimates)

Economic Class	Morgantown	Point Marion	Monongalia Co.	Fayette Co.
Median Household Income	$42,474	$57,125	$54,198	$49,075
Mean Household Income	$66,377	$63,752	$82,948	$64,658
Per Capita Income	$25,248	$23,716	$33,527	$27,778
Persons Below the Poverty Level	34.7%	20.0%	20.4%	16.5%
Population in Labor Force	57.8%	69.8%	62.5%	54.7%
Unemployment Rate	10.9%	7.4%	6.6%	7.3%

Source: U.S. Census Bureau 2022g-2022u

Table 27 summarizes employment by industry in the project vicinity. Educational services, and health care and social assistance has the highest employment rate surrounding the in the area.

Table 27 Employment by Industry in the Project Area

Employment Type	Morgantown	Point Marion	Monongalia Co.	Fayette Co.
Agriculture, forestry, fishing and hunting, and mining	0.6%	2.5%	2.6%	3.5%
Construction	2.2%	5.1%	3.6%	8.1%
Manufacturing	3.6%	6.5%	5.1%	10.3%
Wholesale trade	0.5%	0.0%	1.1%	2.1%
Retail trade	11.2%	16.0%	10.1%	12.9%
Transportation and warehousing, and utilities	1.5%	3.2%	2.9%	7.2%
Information	0.6%	0.8%	1.2%	1.1%
Finance and insurance, real estate, rental, leasing	4.7%	1.0%	4.6%	2.9%
Professional, scientific, and management, administrative and waste management services	12.5%	10.5%	11.2%	6.8%
Educational services, and health care and social assistance	37.4%	28.1%	37.6%	28.4%
Arts, entertainment, and recreation, and accommodation and food services	19.2%	18.0%	12.0%	9.0%
Other services, except public administration	2.5%	2.8%	3.1%	4.2%
Public administration	3.6%	5.5%	5.0%	3.5%

Source: U.S. Census Bureau, 2022j,

4.12.2 Environmental Effects

4.12.2.1 Effects of the Proposed Action

The Licensee is not proposing any changes to the Lake Lynn Project facilities or operations. The Licensee will continue to employ staff to operate the facilities as well as contract work for service and maintenance at the Lake Lynn Project. Because no changes are proposed, socioeconomic resources are not expected to be adversely affected. Continued operations of the Lake Lynn Project will continue to provide clean and reliable renewable energy for consumers in the area for the term of any new license.

4.12.2.2 Effects of the No-Action Alternative

The effects of the no-action alternative mimic the anticipated effects of the proposed action because the Licensee is proposing no changes to existing facilities or operations.

4.12.3 Unavoidable Adverse Effects

Continued operation and relicensing of the Lake Lynn Project and associated PME measures as proposed is not expected to result in unavoidable adverse effects on socioeconomic resources.

4.12.4 References

City Data. 2022. Point Marion, PA Available online: http://www.city-data.com/city/Point-Marion-Pennsylvania.html. Accessed: April 12, 2022.

U.S. Census Bureau. 2010a. DEC Summary File 1, P2 Urban and Rural Total Population, Morgantown City, West Virginia. Available online: https://data.census.gov/cedsci/table?q=morgantown%20city%20west%20virginia%20urban&y=2010&tid=DECENNIALSF12010.P2. Accessed: April 12, 2022.

U.S. Census Bureau. 2010b. DEC Summary File 1, P2 Urban and Rural Total Population, Point Marion borough, Pennsylvania. Available online: https://data.census.gov/cedsci/table?q=Point%20Marion%20borough,%20Pennsylvania%20urban&tid=DECENNIALSF12010.P2 . Accessed: April 12, 2022.

U.S. Census Bureau. 2010c. DEC Summary File 1, P2 Urban and Rural Total Population, Monongalia County, West Virginia. Available online: https://data.census.gov/cedsci/table?q=monongalia%20county%20west%20virginia%20urban&y=2010&tid=DECENNIALSF12010.P2. Accessed: April 12, 2022.

U.S. Census Bureau. 2010d. DEC 113th Congressional District Summary File, P2 Urban and Rural Total Population, West Virginia. Available online: https://data.census.gov/cedsci/table?q=fayette%20county%20pa%20urban&tid=DECENNIALSF12010.P2. Accessed: April 12, 2022.

U.S. Census Bureau. 2010e. DEC 113th Congressional District Summary File, P2 Urban and Rural Total Population, West Virginia. Available online:

https://data.census.gov/cedsci/table?q=west%20virginia%20urban&y=2010&tid=DECENNIALCD1132010.P2. Accessed: April 12, 2022.

U.S. Census Bureau. 2010f. DEC 113th Congressional District Summary File, P2 Urban and Rural Total Population, Pennsylvania. Available online: https://data.census.gov/cedsci/table?q=Pennsylvania%20rural&tid=DECENNIALCD1132010.P2. Accessed: April 12, 2022.

U.S. Census Bureau. 2010g. QuickFacts. Available online: https://www.census.gov/quickfacts/fact/table/PA,WV,fayettecountypennsylvania,morgantowncitywestvirginia,monongaliacountywestvirginia/BZA110219. Accessed: April 12, 2022.

U.S. Census Bureau. 2022a. DEC Redistricting Data (PL 94-171), P1 Race. Available online: https://data.census.gov/cedsci/table?q=morgantown%20wv%20popullation&tid=DECENNIALPL2020.P1 . Accessed: April 12, 2022.

U.S. Census Bureau. 2022b. DEC Redistricting Data (PL 94-171), P1 Race. Available online: https://data.census.gov/cedsci/table?q=point%20marion. Accessed: April 12, 2022.

U.S. Census Bureau. 2022c. DEC Redistricting Data (PL 94-171), P1 Race. Available online: https://data.census.gov/cedsci/table?q=monongalia%20county%20population. Accessed: April 12, 2022.

U.S. Census Bureau. 2022d. DEC Redistricting Data (PL 94-171), P1 Race. Available online: https://data.census.gov/cedsci/table?q=fayette%20county,%20PA%20population. Accessed: April 12, 2022.

U.S. Census Bureau. 2022e. DEC Redistricting Data (PL 94-171), P1 Race. Available online: https://data.census.gov/cedsci/table?q=west%20virginia%20population. Accessed: April 12, 2022.

U.S. Census Bureau. 2022f. DEC Redistricting Data (PL 94-171), P1 Race. Available online: https://data.census.gov/cedsci/table?q=pennsylvania%20population. Accessed: April 12, 2022.

U.S. Census Bureau. 2022g. ACS 5-Year Estimates Subject Tables. S1901 Income in the Past 12 Months (in 2020 Inflation-Adjusted Dollars). Available online: https://data.census.gov/cedsci/table?q=%20morgantown%20west%20virginia%20incom. Accessed: April 12, 2022.

U.S. Census Bureau. 2022h. ACS 5-Year Estimates Detailed Tables. B19301 Per Capita Income in the Past 12 Months (in 2020 Inflation-Adjusted Dollars). Available online: https://data.census.gov/cedsci/table?q=%20morgantown%20west%20virginia%20per%20capita%20income&tid=ACSDT5Y2020.B19301. Accessed: April 12, 2022.

U.S. Census Bureau. 2022i. ACS 5-Year Estimates Detailed Tables. S1701 Poverty Status in the Past 12 Months. Available online: https://data.census.gov/cedsci/table?q=%20morgantown%20west%20virginia%20poverty%20line. Accessed: April 12, 2022.

U.S. Census Bureau. 2022j. ACS 5-Year Estimates Detailed Tables. DP03 Selected Economic Characteristics. Available online: https://data.census.gov/cedsci/table?q=%20morgantown%20west%20virginia%20selected%20economic&tid=ACSDP5Y2020.DP03. Accessed: April 12, 2022.

U.S. Census Bureau. 2022k. ACS 5-Year Estimates Subject Tables. S1901 Income in the Past 12 Months (in 2020 Inflation-Adjusted Dollars). Available online: https://data.census.gov/cedsci/table?q=point%20marion%20income. Accessed: April 12, 2022.

U.S. Census Bureau. 2022l. ACS 5-Year Estimates Detailed Tables. B19301 Per Capita Income in the Past 12 Months (in 2020 Inflation-Adjusted Dollars). Available online: https://data.census.gov/cedsci/table?q=point%20marion%20per%20capita%20income&tid=ACSDT5Y2020.B19301. Accessed: April 12, 2022.

U.S. Census Bureau. 2022m. ACS 5-Year Estimates Detailed Tables. S1701 Poverty Status in the Past 12 Months. Available online: https://data.census.gov/cedsci/table?q=point%20marion%20poverty. Accessed: April 12, 2022.

U.S. Census Bureau. 2022n. ACS 5-Year Estimates Subject Tables. S1901 Income in the Past 12 Months (in 2020 Inflation-Adjusted Dollars). Available online: https://data.census.gov/cedsci/table?q=monongalia%20county%20income. Accessed: April 12, 2022.

U.S. Census Bureau. 2022o. ACS 5-Year Estimates Detailed Tables. B19301 Per Capita Income in the Past 12 Months (in 2020 Inflation-Adjusted Dollars). Available online: https://data.census.gov/cedsci/table?q=monongalia%20county%20per%20capita%20income&tid=ACSDT5Y2020.B19301. Accessed: April 12, 2022.

U.S. Census Bureau. 2022p. ACS 5-Year Estimates Detailed Tables. DP03 Selected Economic Characteristics. Available online: https://data.census.gov/cedsci/table?q=point%20marion%20selected%20economic. Accessed: April 12, 2022.

U.S. Census Bureau. 2022q. ACS 5-Year Estimates Detailed Tables. DP03 Selected Economic Characteristics. Available online: https://data.census.gov/cedsci/table?q=monongalia%20county%20selected%20economic&tid=ACSDP5Y2020.DP03. Accessed: April 12, 2022.

U.S. Census Bureau. 2022r. ACS 5-Year Estimates Subject Tables. S1901 Income in the Past 12 Months (in 2020 Inflation-Adjusted Dollars). Available online: https://data.census.gov/cedsci/table?q=%20Fayette%20County,%20Pennsylvania%20income&tid=ACSST5Y2020.S1901. Accessed: April 12, 2022.

U.S. Census Bureau. 2022s. ACS 5-Year Estimates Detailed Tables. B19301 Per Capita Income in the Past 12 Months (in 2020 Inflation-Adjusted Dollars). Available online: https://data.census.gov/cedsci/table?q=%20Fayette%20County,%20Pennsylvania%20per%20capita%20income&tid=ACSDT5Y2020.B19301. Accessed: April 12, 2022.

U.S. Census Bureau. 2022t. ACS 5-Year Estimates Detailed Tables. S1701 Poverty Status in the Past 12 Months. Available online: https://data.census.gov/cedsci/table?q=%20Fayette%20County,%20Pennsylvania%20poverty. Accessed: April 12, 2022.

U.S. Census Bureau. 2022u. ACS 5-Year Estimates Detailed Tables. DP03 Selected Economic Characteristics. Available online:

https://data.census.gov/cedsci/table?q=%20Fayette%20County,%20Pennsylvania%20selected%20economics&tid=ACSDP5Y2020.DP03. Accessed: April 12, 2022.

4.13 Tribal Resources

4.13.1 Affected Environment

On June 27, 2019, FERC sent letters to the tribal leaders inviting the Delaware Nation, the Delaware Tribe of Indians, and the Osage Nation to participate in the relicensing process of the Lake Lynn Project (FERC 2019 a,b,c). As of the filing date of this DLA, FERC has not received responses from the Native American tribes regarding the Lake Lynn Project. In addition, Lake Lynn included the following Native American tribes on the Lake Lynn Project distribution list and sent an information request for the PAD on May 20, 2019:

- Absentee-Shawnee Tribe of Oklahoma
- Cayuga Nation
- Cherokee Nation
- Delaware Nation, Oklahoma
- Delaware Tribe of Indians
- Eastern Band of Cherokee Indians
- Eastern Shawnee Tribe of Oklahoma
- Oneida Indian Nation
- Oneida Indian Nation of Wisconsin
- Onondaga Nation
- Osage Nation
- Seneca-Cayuga Tribe of Oklahoma
- Seneca Nation of Indians
- Shawnee Tribe
- Stockbridge-Munsee Band of the Mohican Nation of Wisconsin
- St. Regis Mohawk Tribe
- Tonawanda Band of Seneca
- Tuscarora Nation
- United Keetoowah Band of Cherokee Indians in Oklahoma

On June 19, 2019, the Cherokee Nation stated that the Lake Lynn Project is outside their Area of Interest and deferred to federally recognized tribes that may have an interest in the area. On July 10, 2019, Delaware Nation stated that the location of the proposed Lake Lynn Project does not endanger cultural or religious sites of interest and requested to be contacted within 24 hours if any artifacts are discovered. No other tribes have responded to the information request. On October 24, 2019, the Stockbridge-Munsee Community indicated that it did not wish to participate in the Project relicensing and stated that the Project is outside their area of cultural interest. Environmental Effects

4.13.1.1 Effects of the Proposed Action

Lake Lynn is not proposing any changes to Lake Lynn Project operations and no tribal interests or issues have been identified. No groundbreaking activities are proposed. As such, the proposed action is not expected to adversely affect tribal resources. There are no specific proposed PME measures for tribal resources, however, Lake Lynn would continue to inform the tribes throughout the relicensing process.

4.13.1.2 Effects of the No-Action Alternative

The effects of the no-action alternative mimic the anticipated effects of the proposed action because the Licensee is proposing no changes to existing facilities or operations.

4.13.2 Unavoidable Adverse Effects

There are no unavoidable adverse effects identified for tribal resources.

4.13.3 References

Federal Energy Regulatory Commission (FERC). 2019a. Delaware Nation. Consultation with Tribes for the Lake Lynn Hydroelectric Project No. 2459. June 27, 2019.

FERC. 2019b. Delaware Tribe of Indians. Consultation with Tribes for the Lake Lynn Hydroelectric Project No. 2459. June 27, 2019.

FERC. 2019c. Osage Nation. Consultation with Tribes for the Lake Lynn Hydroelectric Project No. 2459. June 27, 2019.

5.0 CONSISTENCY WITH COMPREHENSIVE PLANS

5.1 Consistency with Comprehensive Plans

Section 10(a)(2)(A) of the Federal Power Act (FPA), 16 U.S.C. section 803 (a)(2)(A), requires FERC to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by a hydropower project. On April 27, 1988, the Commission issued Order No. 481-A, revising Order No. 481, issued October 26, 1987, establishing that the Commission will accord FPA section 10(a)(2)(A) comprehensive plan status to any federal or state plan that: (1) is a comprehensive study of one or more of the beneficial uses of a waterway or waterways; (2) specifies the standards, the data, and the methodology used; and (3) is filed with the Secretary of the Commission.

5.1.1 FERC-Approved Federal and State Comprehensive Plans

FERC currently lists 66 federal and state comprehensive plans and of those, the following 8 comprehensive plans are identified as pertaining to waters in the vicinity of the Lake Lynn Project:

- National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.
- Pennsylvania Department of Environmental Resources. 1983. Pennsylvania State water plan. Harrisburg, Pennsylvania. January 1983. 20 volumes.
- Pennsylvania Department of Environmental Resources. 1986. Pennsylvania's recreation plan, 1986-1990. Harrisburg, Pennsylvania.
- Pennsylvania Department of Environmental Resources. 1988. Pennsylvania 1988 water quality assessment. Harrisburg, Pennsylvania. April 1988.
- West Virginia Division of Natural Resources. 1982. Monongahela River Basin plan. Charleston, West Virginia.
- West Virginia Division of Natural Resources. 2015 West Virginia State Wildlife Action Plan. Charleston, West Virginia. September 1, 2015
- West Virginia Governor's Office of Community and Industrial Development. West Virginia State Comprehensive Outdoor Recreation Plan: 1988-1992. Charleston, West Virginia.

- 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.

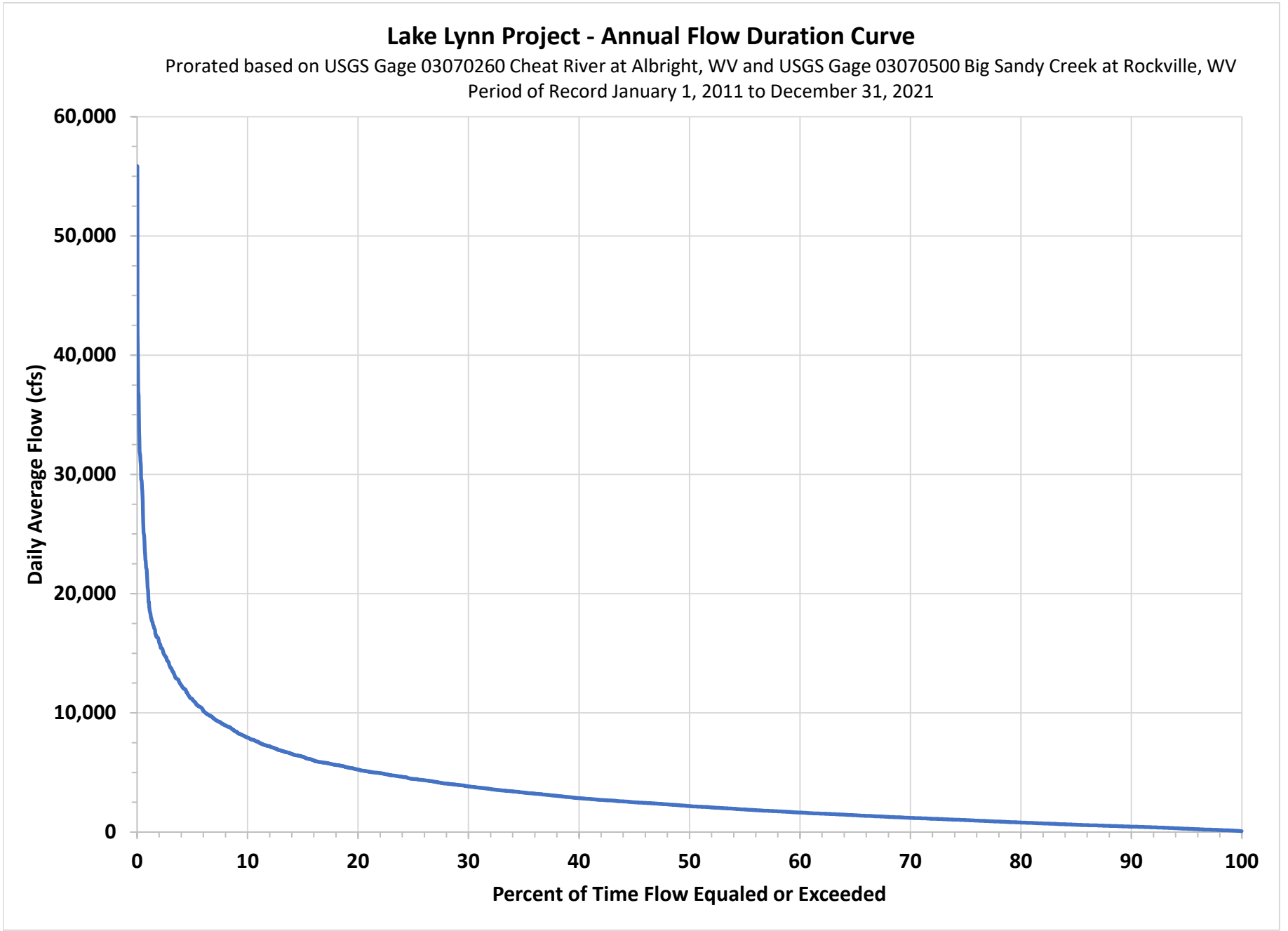
Based on a review of these plans, Lake Lynn has determined that current and proposed operations of the Lake Lynn Project facilities are consistent with these plans.

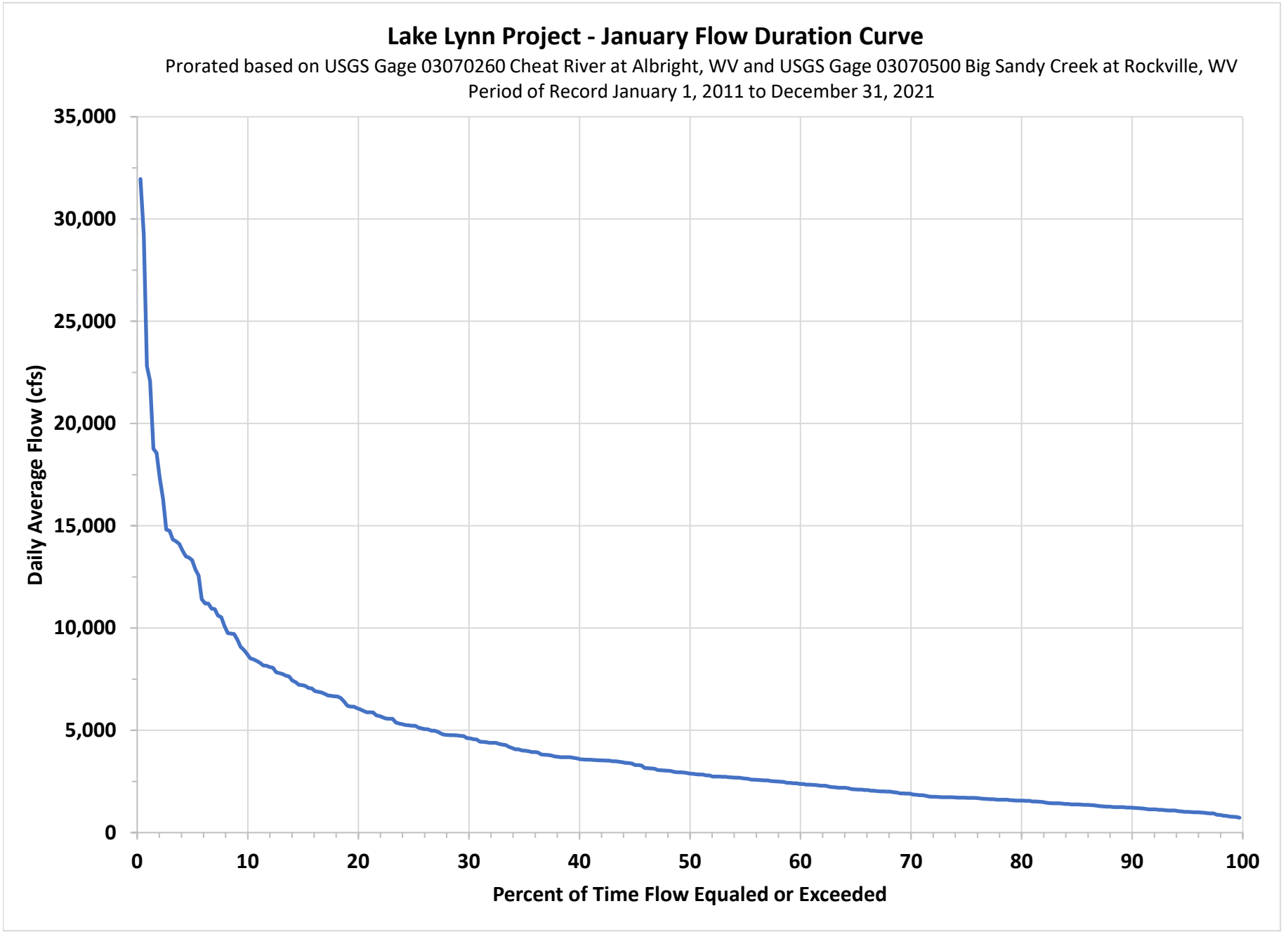
APPENDIX A

CONSULTATION SUMMARY (TO BE PROVIDED IN THE FINAL LICENSE APPLICATION)

APPENDIX B

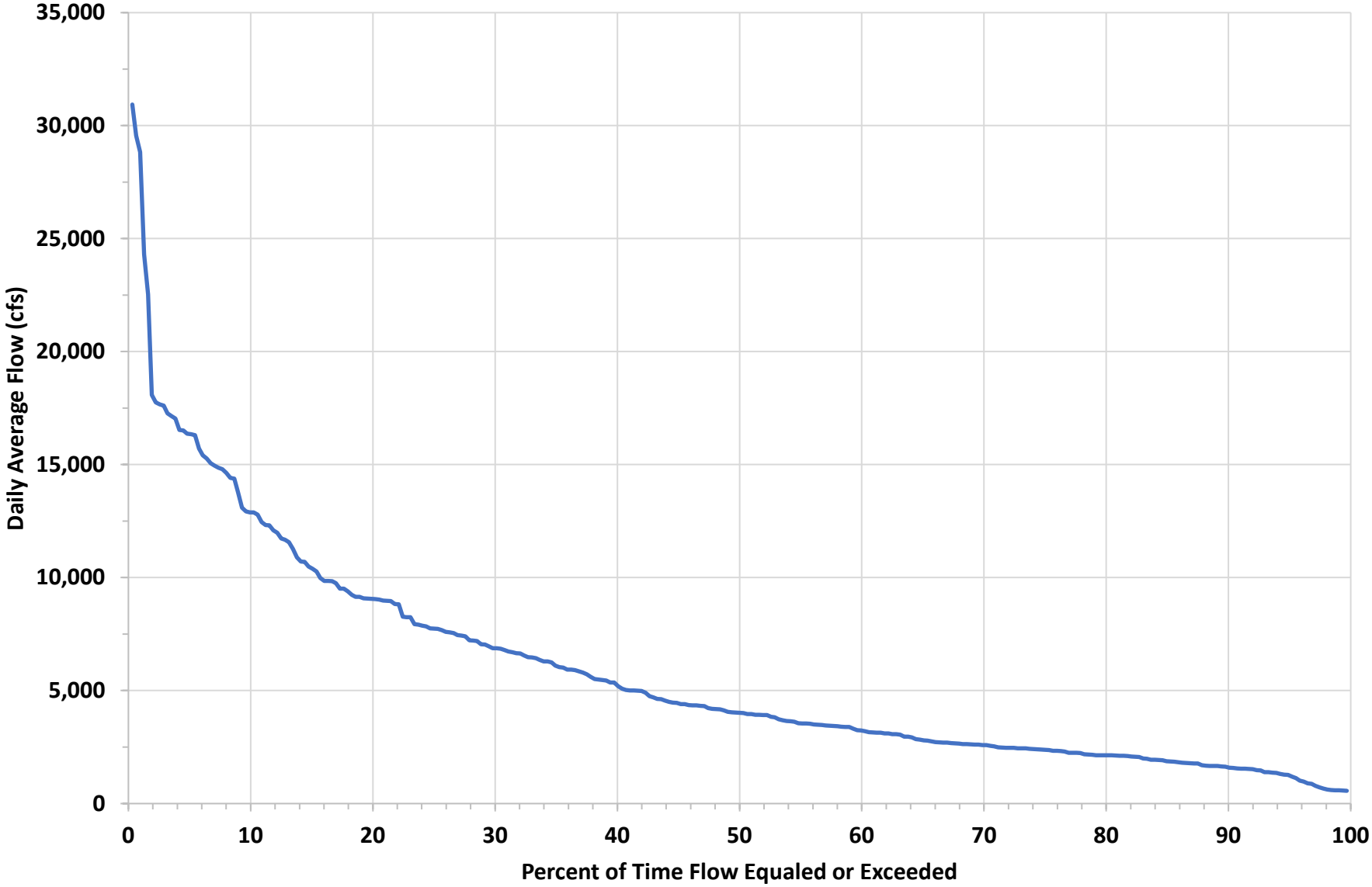
FLOW DURATION CURVES

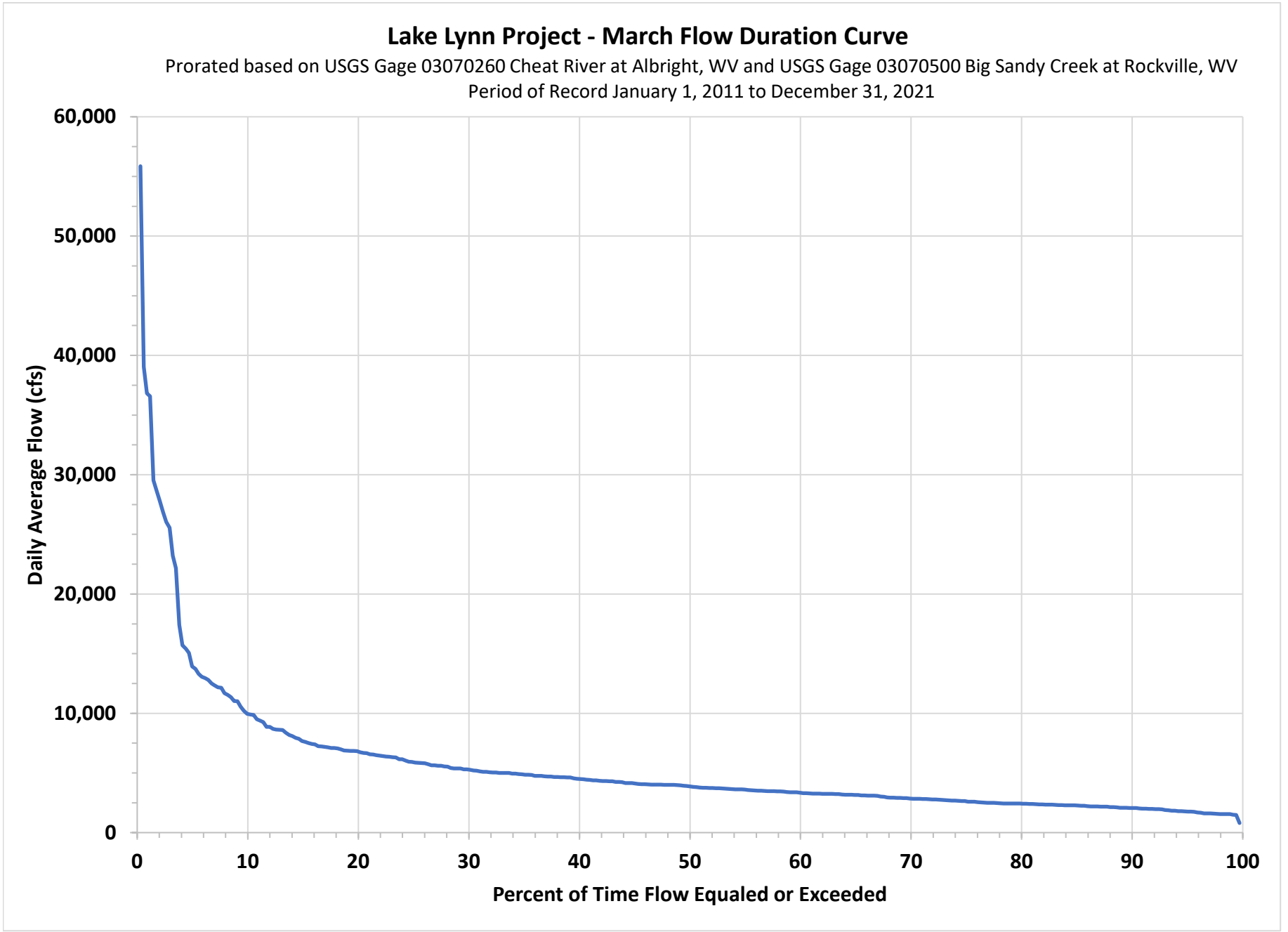

Lake Lynn Project - Annual Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
60,000
50,000
40,000
30,000
20,000
10,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded

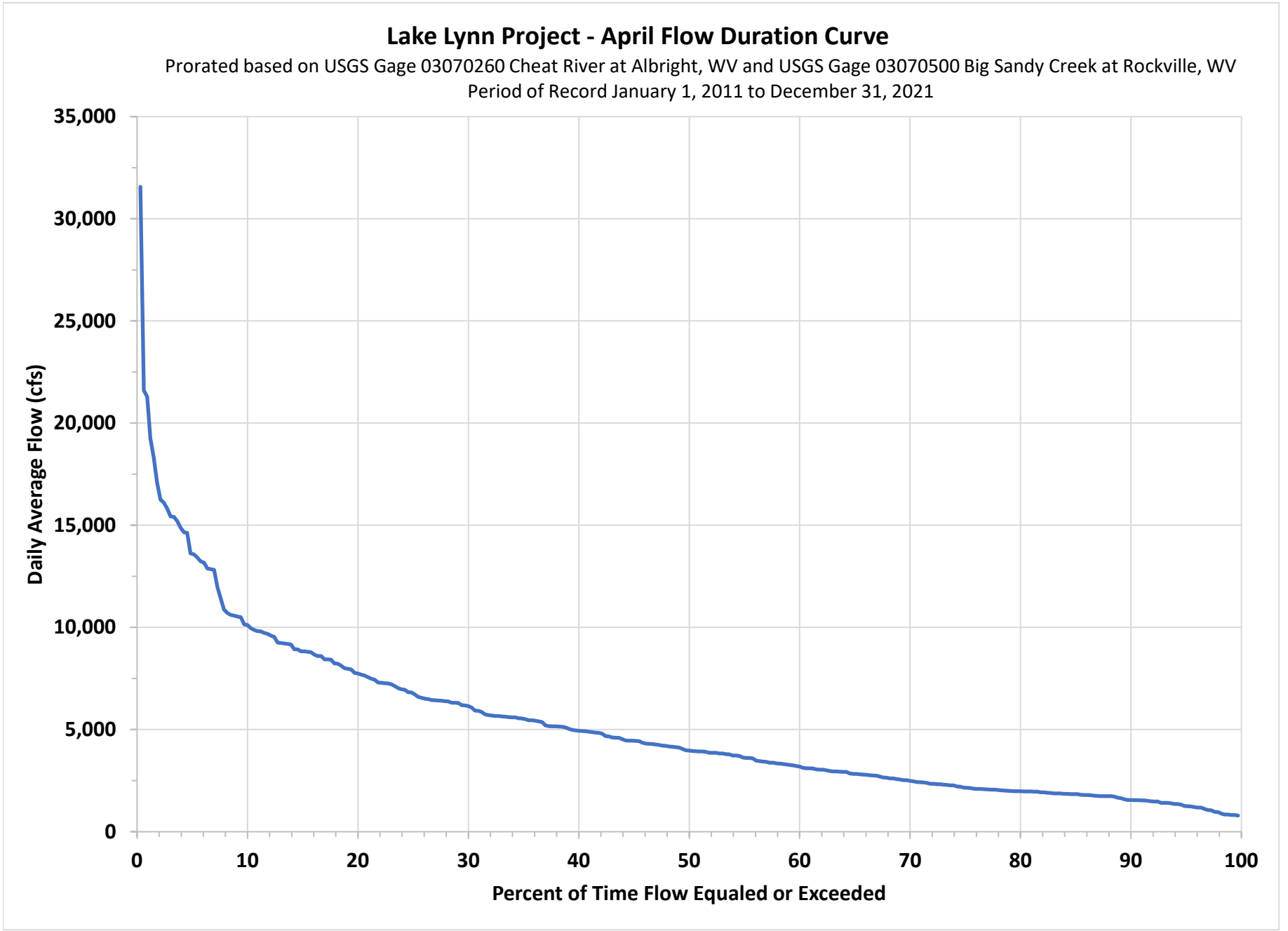

Lake Lynn Project - January Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded

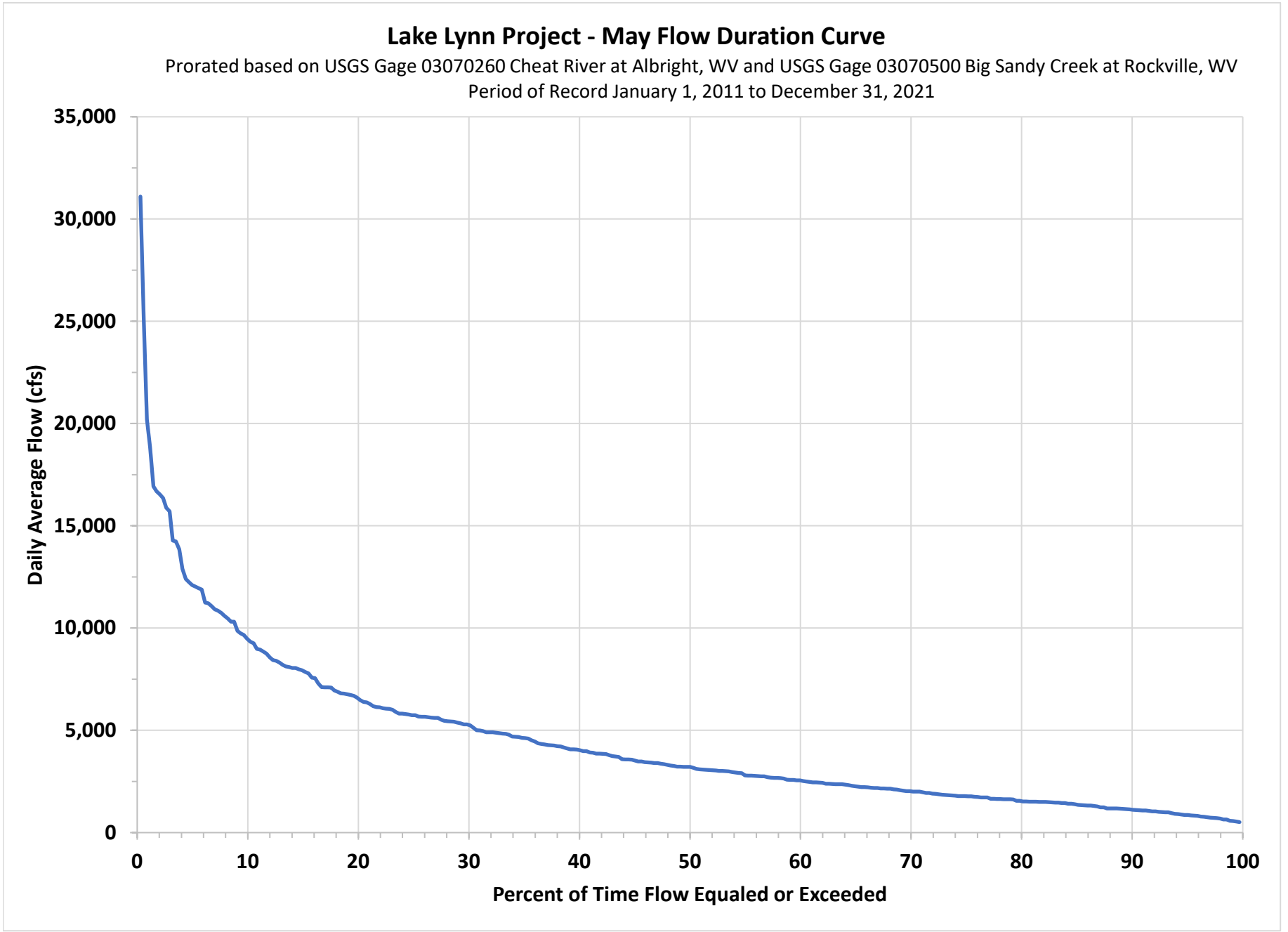
Lake Lynn Project - February Flow Duration Curve

Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021



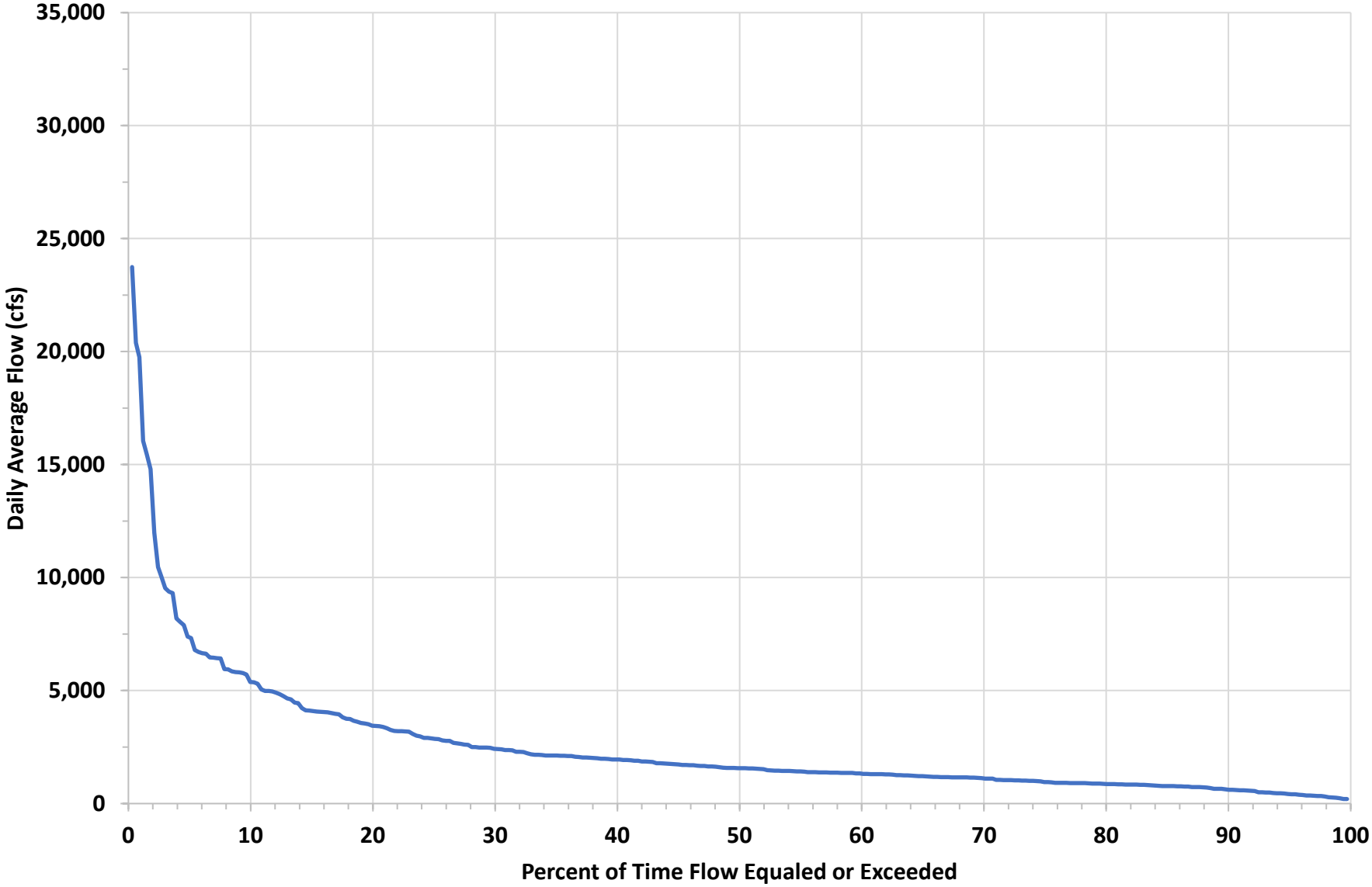

Lake Lynn Project - March Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
60,000
50,000
40,000
30,000
20,000
10,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded


Lake Lynn Project - April Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded


Lake Lynn Project - May Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded

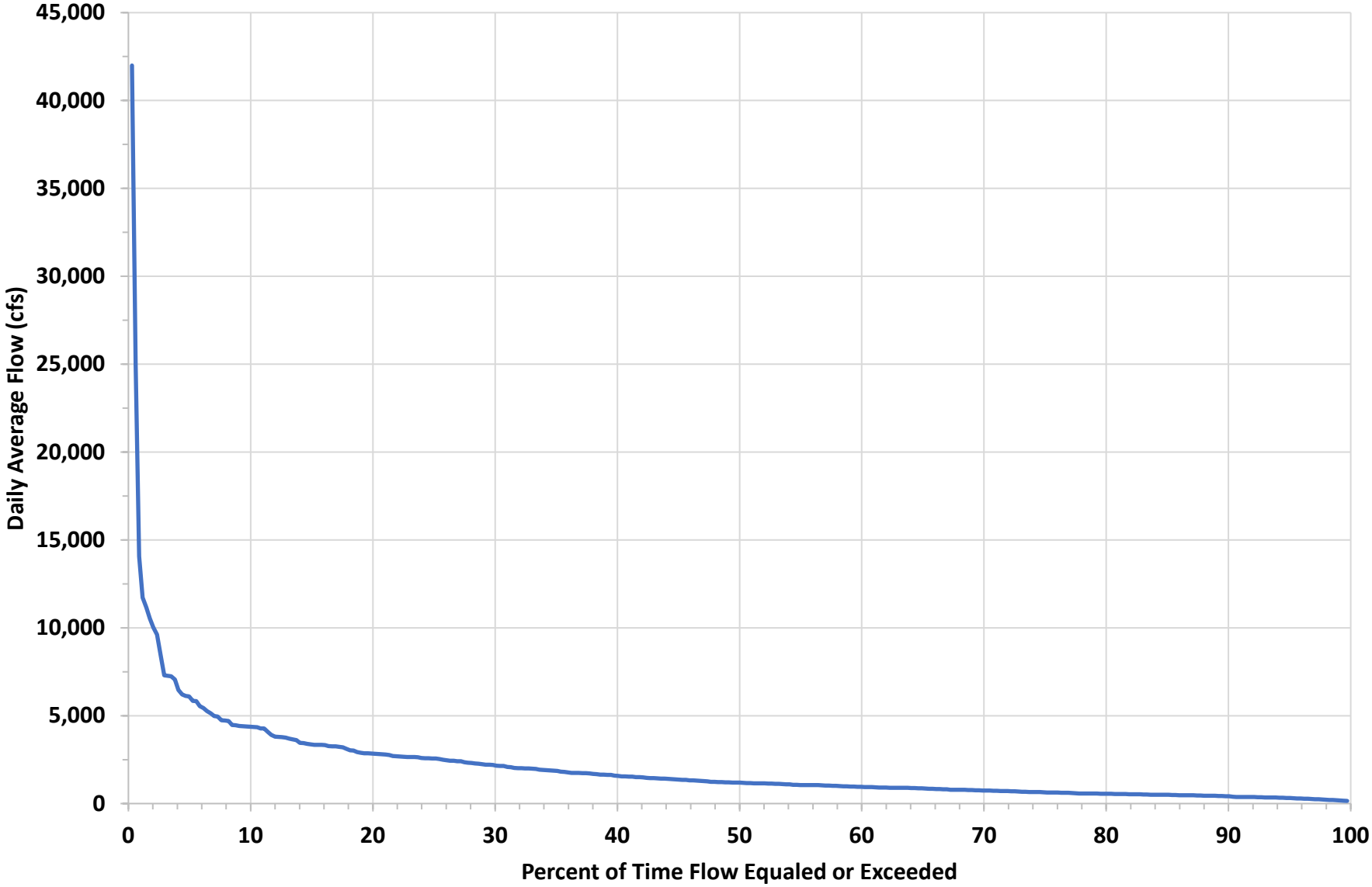
Lake Lynn Project - June Flow Duration Curve

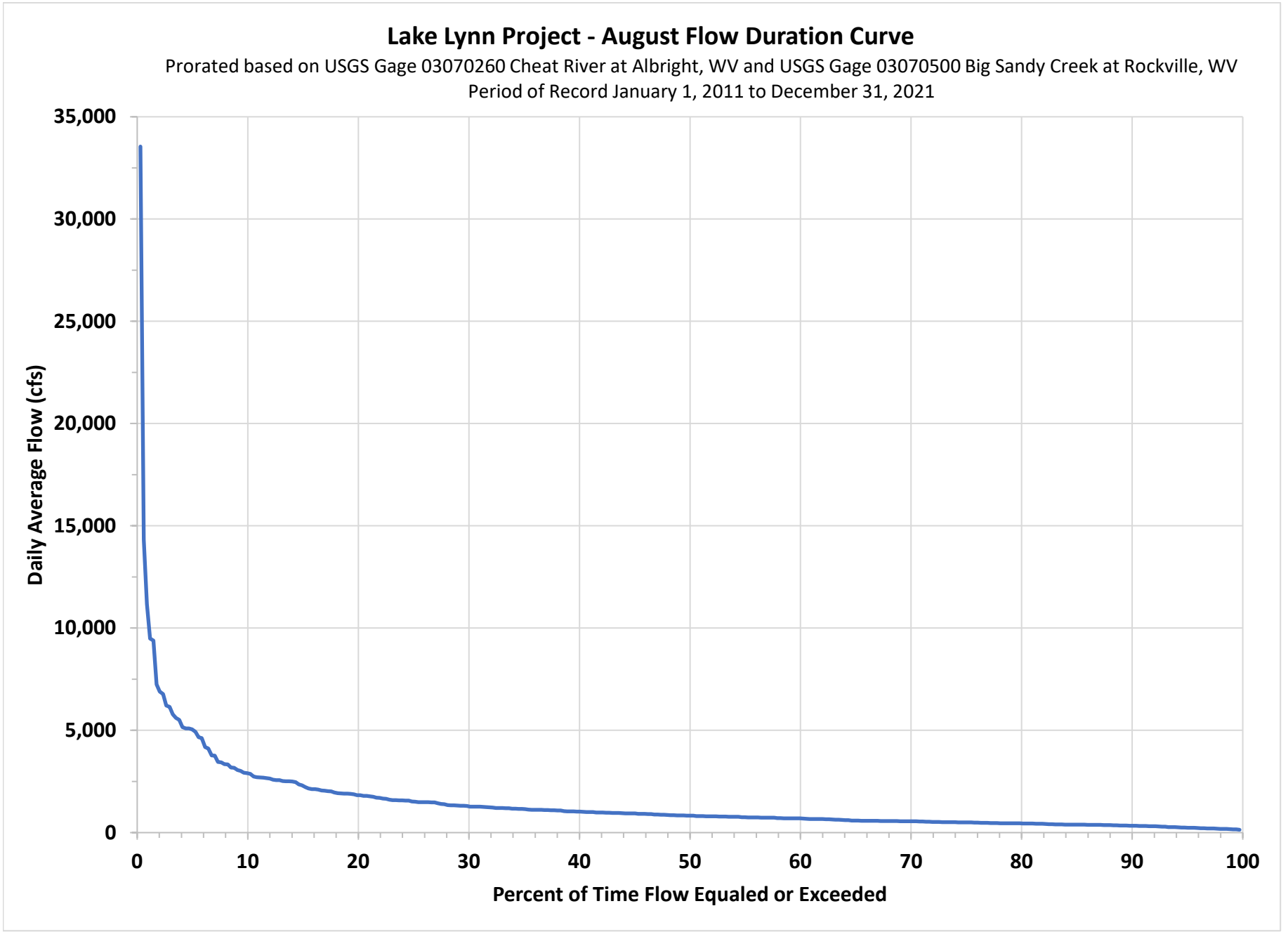
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021

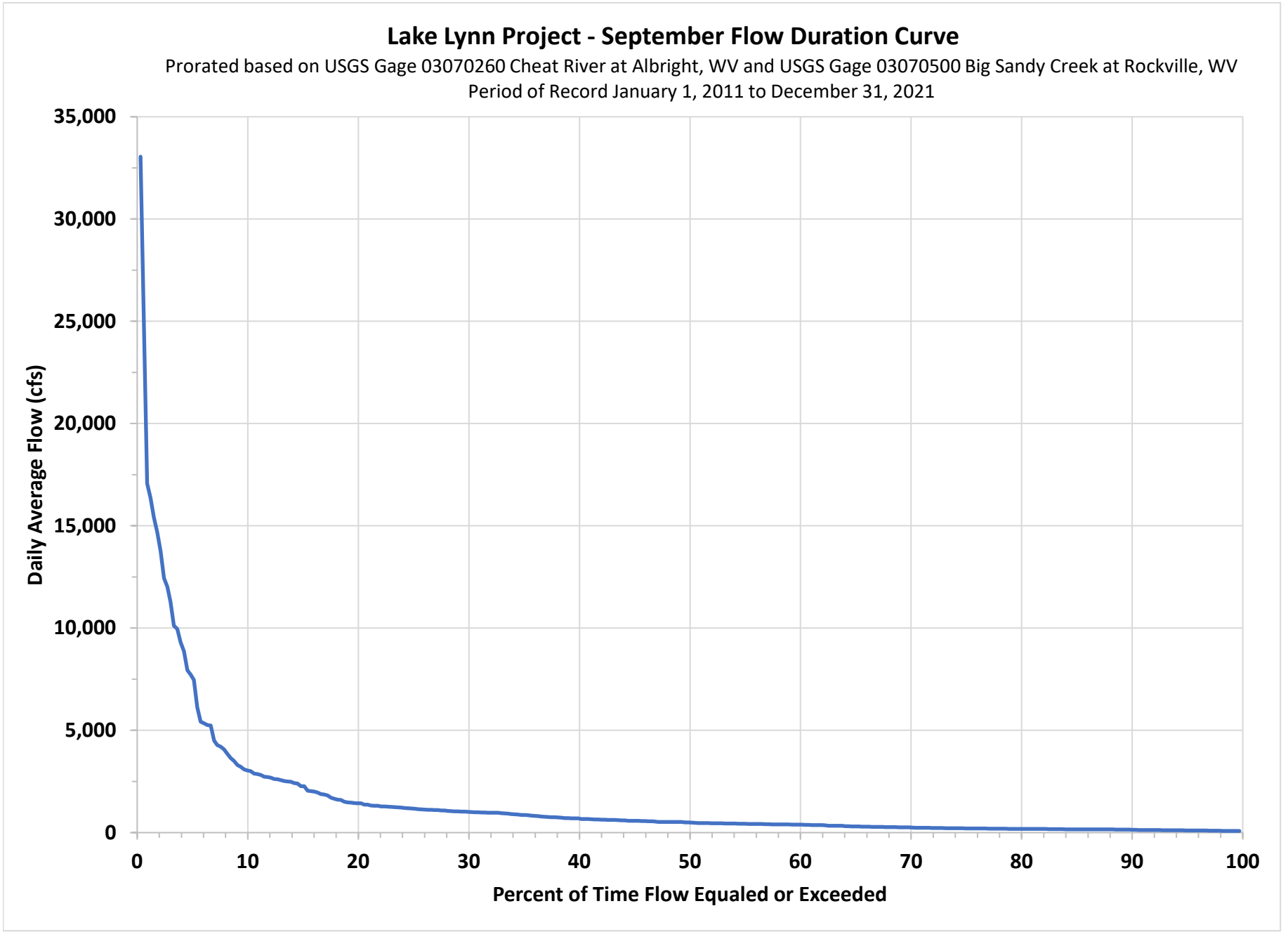


Lake Lynn Project - July Flow Duration Curve

Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021

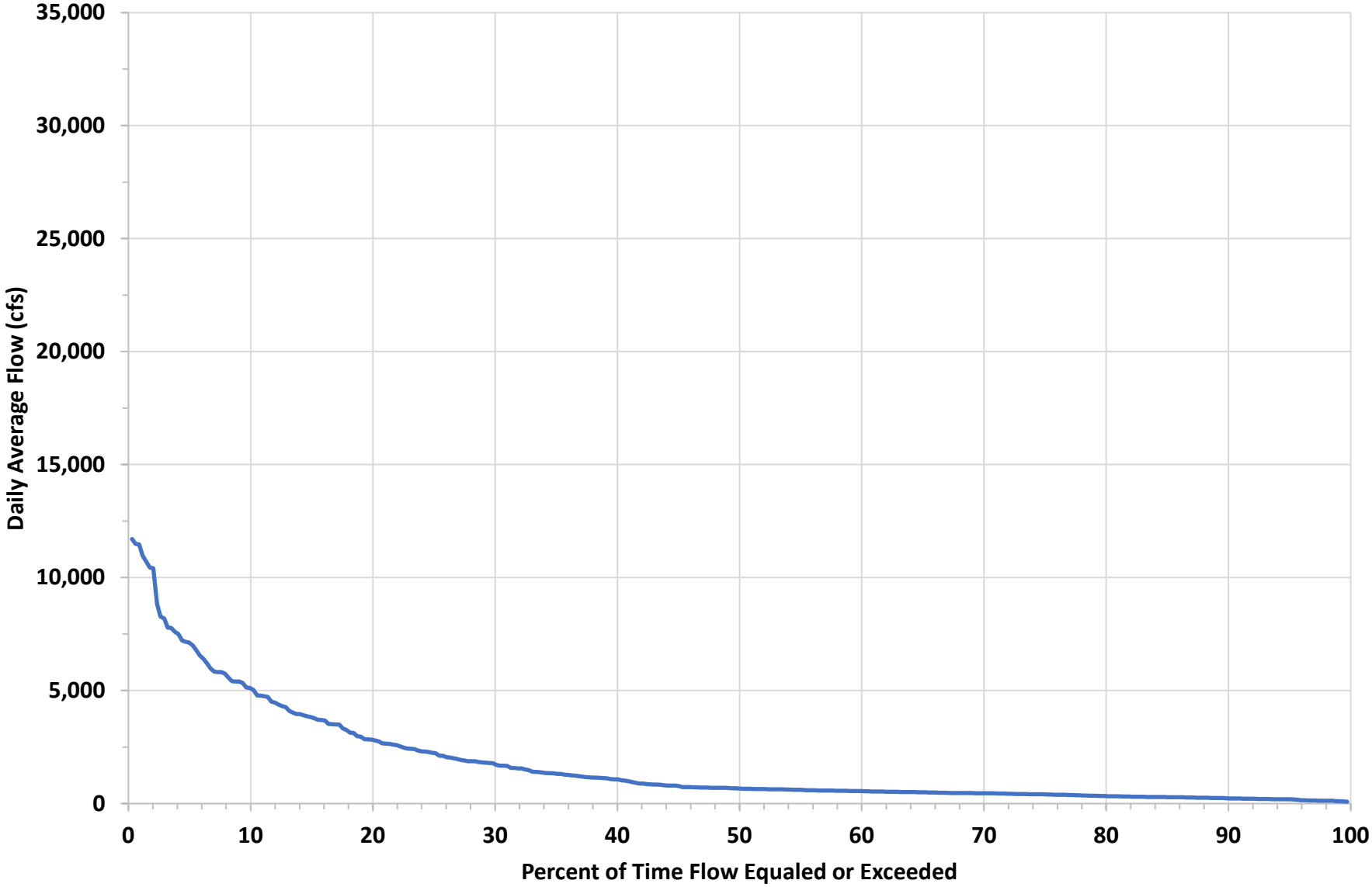


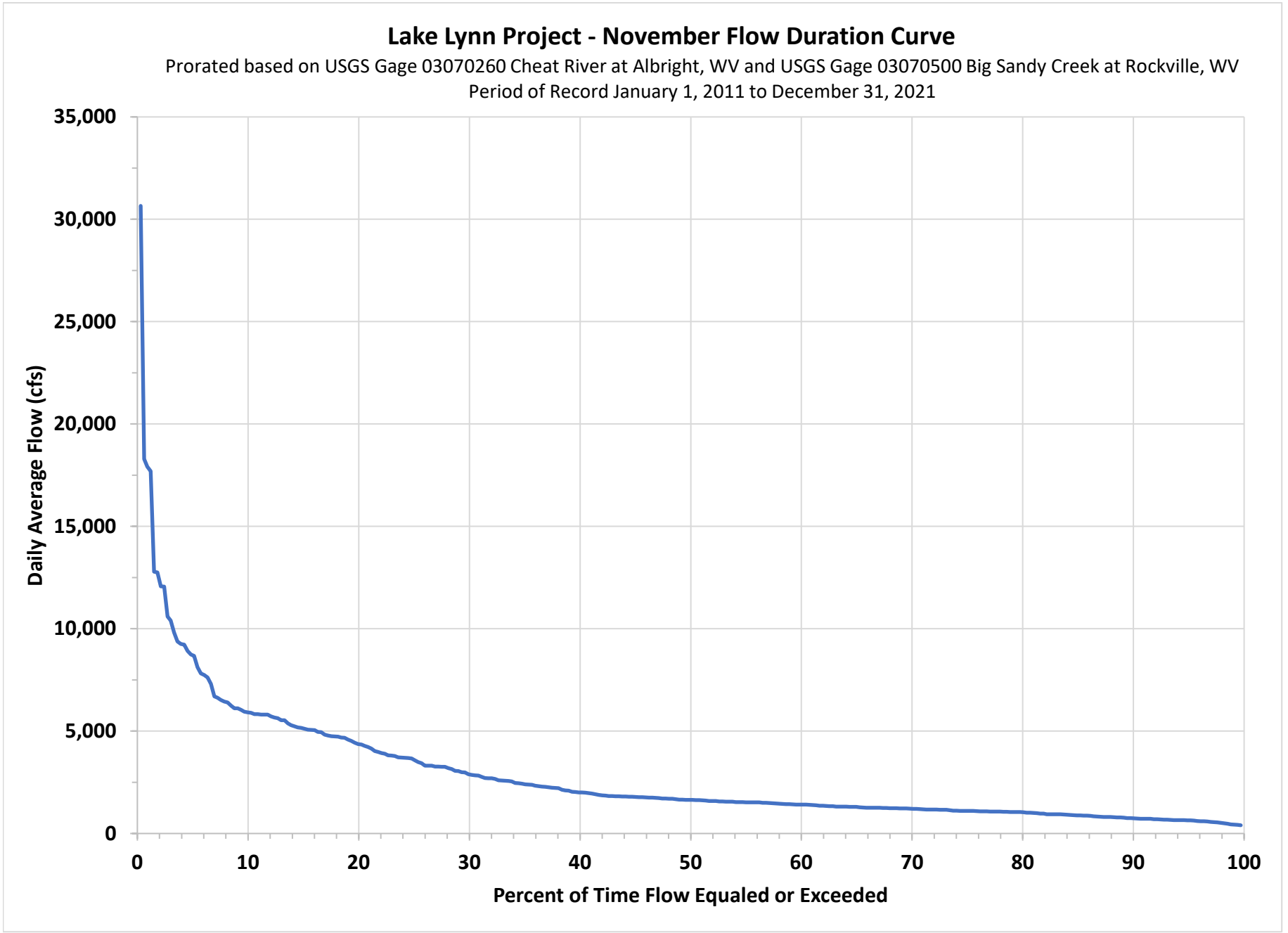

Lake Lynn Project - August Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded

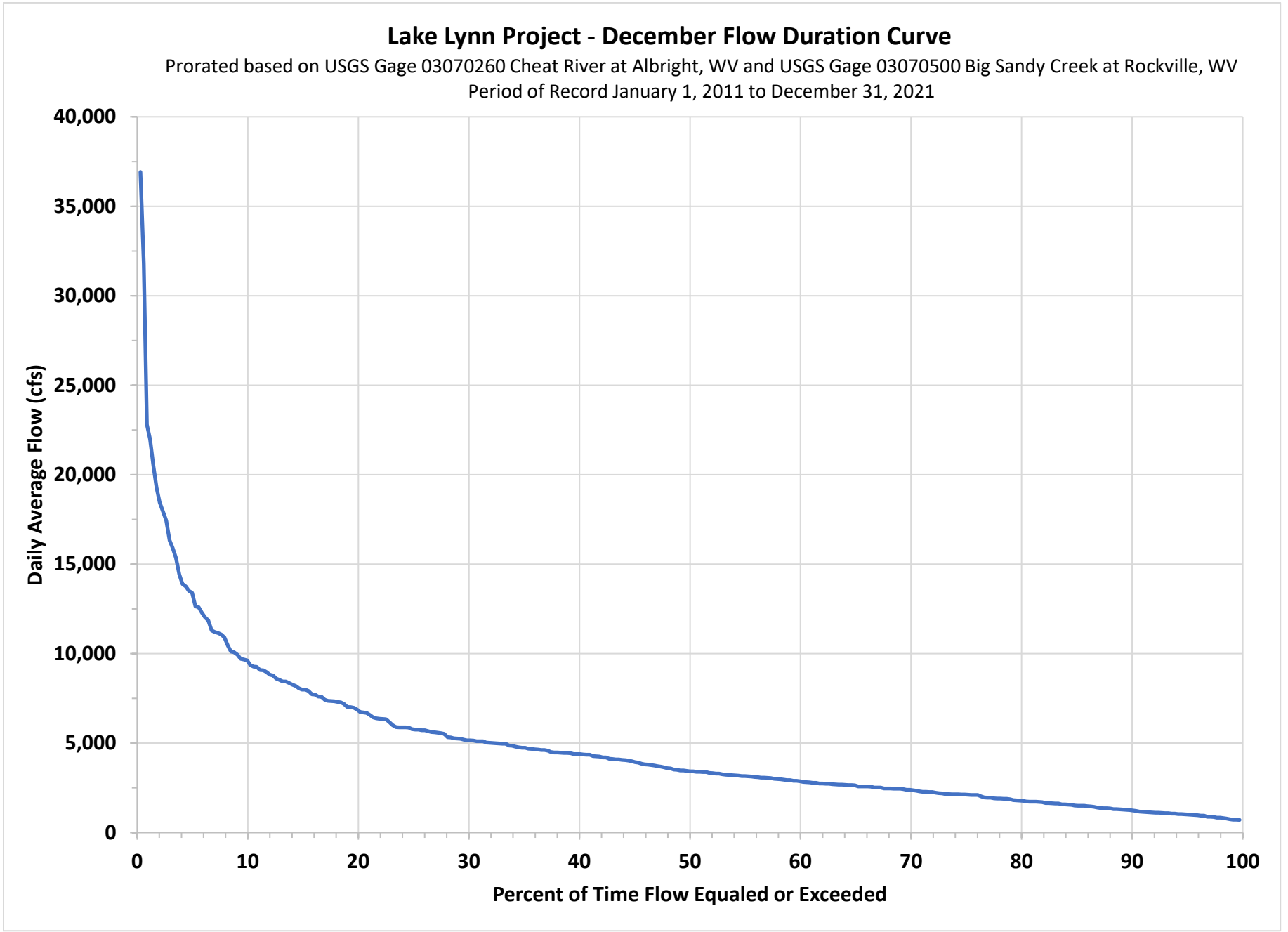

Lake Lynn Project - September Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded

Lake Lynn Project - October Flow Duration Curve

Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021




Lake Lynn Project - November Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded


Lake Lynn Project - December Flow Duration Curve
Prorated based on USGS Gage 03070260 Cheat River at Albright, WV and USGS Gage 03070500 Big Sandy Creek at Rockville, WV
Period of Record January 1, 2011 to December 31, 2021
Daily Average Flow (cfs)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
10
20
30
40
50
60
70
80
90
100
Percent of Time Flow Equaled or Exceeded

APPENDIX C

SPECIES LISTS

Mammal Species that Potentially Occur in the Project Vicinity

Order	Family	Common Name	Scientific Name
Didelphimorphia	Didelphidae	Virginia opossum	*Didelphis virginiana*
Insectivora	Soricidae	long-tailed shrew	*Sorex dispar*
		masked shrew	*Sorex cinereus*
		northern short-tailed shrew	*Blarina brevicauda*
		pygmy shrew	*Sorex hoyi*
		smoky shrew	*Sorex fumeus*
		southeastern shrew	*Sorex longirostris*
	Talpidae	eastern mole	*Scalopus aquaticus*
		hairy-tailed mole	*Parascalops breweri*
		star-nosed mole	*Condylura cristata*
Chiroptera	Vespertilionidae	big brown bat	*Eptesicus fuscus*
		eastern pipistrelle	*Pipistrellus subflavus*
		eastern red bat	*Lasiurus borealis*
		hoary bat	*Lasiurus cinereus*
		Indiana bat [1]	*Myotis sodalist*
		northern long-eared bat [2]	*Myotis septentrionalis*
		silver-haired bat	*Lasionycteris noctivagans*
		Virginia big-eared bat [1]	*Corynorhinus townsendii*
Rodentia	Castoridae	American beaver	*Castor canadensis*
	Dipodidae	meadow jumping mouse	*Zapus hudsonius*
		woodland jumping mouse	*Napaeozapus insignis*
	Erethizontidae	common porcupine	*Erethizon dorsatum*
	Muridae	Allegheny wood rat	*Neotoma magister*
		black rat	*Rattus*
		deer mouse	*Peromyscus maniculatus*
		golden mouse	*Ochrotomys nuttalli*
		house mouse	*Mus musculus*
		meadow vole	*Microtus pennsylvanicus*
		muskrat	*Ondatra zibethicus*
		Norway rat	*Rattus norvegicus*
		rock vole	*Microtus chrotorrhinus*
		southern bog lemming	*Synaptomys cooperi*
		southern red-backed vole	*Clethrionomys gapperi*
		white-footed mouse	*Peromyscus leucopus*

Order	Family	Common Name	Scientific Name
		woodland vole	*Microtus pinetorum*
Lagomorpha	Leporidae	Appalachian cottontail	*Sylvilagus obscurus*
		eastern cottontail	*Sylvilagus floridana*
		snowshoe hare	*Lepus americanus*
Carnivora	Canidae	coyote	*Canis latrans*
		gray fox	*Urocyon cinereoargenteus*
		red fox	*Vulpes*
	Felidae	bobcat	*Lynx rufus*
	Mephitidae	eastern spotted skunk	*Spilogale putorius*
		striped skunk	*Mephitis*
	Mustelidae	fisher	*Martes pennant*
		least weasel	*Mustela nivalis*
		long-tailed weasel	*Mustela frenata*
		mink	*Mustela vison*
		fisher	*Martes pennant*
		river otter	*Lutra canadensis*
Artiodactyla	Cervidae	white-tailed deer	*Odocoileus virginianus*

Source: WVDNR 2001; WVDNR 2003; PGC 2019

[1]Federally Endangered

[2]Federally Threatened

Amphibians and Reptiles that Potentially Occur in the Project Vicinity

Family	Common Name	Scientific Name
Salamandridae	newt, red spotted	*Notophthalmus viridescens*
Ambystomatidae	salamander, Jefferson	*Ambystoma jeffersonianum*
	salamander, spotted	*Ambystoma maculatum*
	salamander, sarbled	*Ambystoma opacum*
Plethodontidae	salamander, green	*Aneides aeneus*
	salamander, northern dusky	*Desmognathus fuscus*
	salamander, seal	*Desmognathus monticola*
	salamander, Allegheny Mountain dusky	*Desmognathus ochrophaeus*
	salamander, northern spring	*Gyrinophilus porphyriticus*
	salamander, four-toed	*Hemidactylium scutatum*
	salamander, northern two-lined	*Eurycea bislineata*
	salamander, long-tailed	*Eurycea longicauda*
	salamander, eastern red-backed	*Plethodon cinereus*
	salamander, northern slimy	*Plethodon glutinosus*
	salamander, northern ravine	*Plethodon richmondi*
	salamander, Cheat Mountain[1]	*Plethodon nettingi*
	salamander, Wehrle's	*Plethodon wehrlei*
	salamander, northern red	*Pseudotriton r. ruber*
Bufonidae	toad, eastern american	*Bufo americanus*
	toad, fowler's	*Bufo fowleri*
Hylidae	peeper, northern spring	*Pseudacris crucifer*
	frog, mountain chorus	*Pseudacris brachyphona*
	treefrog, gray	*Hyla chrysoscelis*
Ranidae	bullfrog, American	*Rana catesbeiana*
	frog, northern green	*Rana clamitans melanota*
	frog, northern leopard	*Lithobates pipiens*
	frog, pickerel	*Rana palustris*
	frog, wood	*Rana sylvatica*
Chelydridae	turtle, common snapping	*Chelydra serpentine serpentina*
	turtle, eastern painted	*Chrysemys picta*
	turtle, northern map	*Graptemys geographica*
	turtle, eastern box	*Terrapene carolina*
Kinosternidae	turtle, common musk	*Kinosternon odoratus*
Phrynosomatidae	lizard, northern fence	*Sceloporus undulatus*

Family	Common Name	Scientific Name
Scincidae	skink, common five-lined	*Eumeces fasciatus*
Colubridae	racer, northern black	*Coluber constrictor*
	snake, northern ringneck	*Diadophis punctatus edwardsii*
	ratsnake, black	*Elaphe obsoleta*
	snake, eastern hognose	*Heterodon platirhinos*
	snake, eastern milk	*Lampropeltis Triangulum*
	snake, northern water	*Nerodia sipedon*
	snake, smooth green	*Opheodrys vernalis*
	snake, queen	*Regina septemvittata*
	snake, northern red-bellied	*Storeria o. occipitomaculata*
	gartersnake, eastern	*Thamnophis sirtalis*
Viperidae	copperhead, northern	*Agkistrodon contortrix*
	rattlesnake, timber	*Crotalus horridus*

Source: Marshall 2019

[1]Federally Threatened

Bird Species that Potentially Occur in the Project Vicinity

Family	Common Name	Scientific Name
Gaviidae	loon, common	*Gavia immer*
	loon, red-throated	*Gavia stellata*
Podicipedidae	grebe, horned	*Podiceps auritus*
	grebe, pied-billed	*Podilymbus podiceps*
Pelecanidae	pelican, American white	*Pelecanus erythrorhynchos*
Phalacrocoracidae	cormorant, double-crested	*Phalacrocorax auritus*
Ardeidae	heron, great blue	*Ardea herodias*
	heron, green	*Butorides virescens*
	egret, cattle	*Bubulcus ibis*
	egret, great	*Ardea alba egretta*
	bittern, American	*Botaurus lentiginosus*
	bittern, least	*Ixobrychus exilis*
	swan, mute	*Cygnus olor*
	night-heron, black-crowned	*Nycticorax hoactii*
Anatidae	goose, Canada	*Branta canadensis*
	mallard	*Anas platyrhynchos*
	gadwall	*Anas strepera*
	pintail, northern	*Anas acuta*
	teal, green-winged	*Anas crecca carolinensis*
	teal, blue-winged	*Anas discors orphna*
	wigeon, American	*Anas americana*
	shoveler, northern	*Anas clypeata*
	duck, American black	*Anas rubripes*
	duck, wood	*Aix sponsa*
	canvasback	*Aythya valisineria*
	redhead	*Aythya americana*
	duck, ring-necked	*Aythya collaris*
	scaup, lesser	*Aythya affinis*
	goldeneye, common	*Bucephala clangula*
	bufflehead	*Bucephala albeola*
	merganser, common	*Mergus merganser*
	merganser, hooded	*Lophodytes cucullatus*
	duck, ruddy	*Oxyura jamaicensis*
Cathartidae	vulture, turkey	*Cathartes aura*
	vulture, black	*Coragyps atratus*

Family	Common Name	Scientific Name
	osprey	*Pandion haliaetus*
Accipitridae	harrier, northern	*Circus cyaneus*
	hawk, sharp-shinned	*Accipiter striatus velox*
	hawk, Cooper's	*Accipiter cooperii*
	goshawk, northern	*Accipiter gentilis*
	hawk, red-tailed	*Buteo jamaicensis*
	hawk, red-shouldered	*Buteo lineatus*
	hawk, broad-winged	*Buteo platypterus*
	hawk, rough-legged	*Buteo lagopus johannis*
	eagle, bald	*Haliaeetus leucocephalus*
	eagle, golden	*Aquila chrysaetos*
Falconidae	falcon, peregrine	*Falco peregrinus*
	kestrel, American	*Falco sparverius*
	merlin	*Falco columbarius*
Phasianidae	grouse, ruffed	*Bonasa umbellus*
	pheasant, ring-necked	*Phasianus colchicus*
	turkey, wild	*Meleagris gallopavo silvestris*
Odontophoridae	bobwhite, northern	*Colinus virginianus*
Rallidae	gallinule, common	*Gallinula galeata*
	coot, American	*Fulica americana*
	rail, Virginia	*Rallus limicola*
	sora	*Porzana carolina*
	moorhen, common	*Gallinula chloropus cachinnans*
Charadriidae	plover, semipalmated	*Charadrius semipalmatus*
	killdeer	*Charadrius vociferus*
Scolopacidae	yellowlegs, greater	*Tringa melanoleuca*
	yellowlegs, lesser	*Tringa flavipes*
	sandpiper, upland	*Bartramia longicauda*
	sandpiper, solitary	*Tringa solitaria*
	sandpiper, spotted	*Actitis macularia*
	sandpiper, semipalmated	*Calidris pusilla*
	sandpiper, least	*Calidris minutilla*
	sandpiper, pectoral	*Calidris melanotos*
	sandpiper, white-rumped	*Calidris fuscicollis*
	dunlin	*Calidris alpina*
	snipe, Wilson’s	*Gallinago delicata*

Family	Common Name	Scientific Name
	woodcock, American	*Scalopax minor*
Laridae	gull, Bonaparte's	*Chroicocephalus philidelphia*
	gull, ring-billed	*Larus delawarensis*
	gull, Herrington	*Larus argentatus*
Columbidae	pigeon, rock	*Columba livia*
	dove, mourning	*Zenaida macroura*
Cuculidae	cuckoo, yellow-billed	*Coccyzus americanus*
	cuckoo, black-billed	*Coccyzus erythropthalmus*
Tytonidae	owl, barn	*Tyto alba*
Strigidae	owl, long-eared	*Asio otus*
	owl, short-eared	*Asio flammeus*
	owl, great Horned	*Bubo virginianus*
	owl, barred	*Strix varia*
	owl, northern saw-whet	*Aegolius acadicus*
	screech-owl, eastern	*Megascops asio*
Caprimulgidae	whip-poor-will, eastern	*Antrostomus vociferus*
	nighthawk, common	*Chordeiles minor*
Apodidae	swift, chimney	*Chaetura pelagica*
Trochilidae	hummingbird, ruby-throated	*Archilochus colubris*
Alcedinidae	kingfisher, belted	*Megaceryle alcyon*
Picidae	woodpecker, red-headed	*Melanerpes erythrocephalus*
	woodpecker, red-bellied	*Melanerpes carolinus*
	sapsucker, yellow-bellied	*Sphyrapicus varius*
	woodpecker, downy	*Picoides pubescens*
	woodpecker, hairy	*Picoides villosus*
	flicker, northern	*Colaptes auratus*
	woodpecker, pileated	*Dryocopus pileatus*
Tyrannidae	flycatcher, olive-sided	*Contopus cooperi*
	wood-pewee, eastern	*Contopus virens*
	flycatcher, yellow-bellied	*Empidonax flaviventris*
	flycatcher, Acadian	*Empidonax virescens*
	flycatcher, willow	*Empidonax traillii*
	flycatcher, alder	*Empidonax alnorum*
	flycatcher, least	*Empidonax minimus*
	phoebe, eastern	*Sayornis phoebe*
	flycatcher, great crested	*Myiarchus crinitus*

Family	Common Name	Scientific Name
	kingbird, eastern	*Tyrannus*
Laniidae	shrike, loggerhead	*Lanius ludovicianus*
	shrike, northern	*Lanius excubitor*
Vireonidae	vireo, white-eyed	*Vireo griseus*
	vireo, blue-headed	*Vireo solitarius*
	vireo, yellow-throated	*Vireo flavifrons*
	vireo, warbling	*Vireo gilvus*
	vireo, Philadelphia	*Vireo philadelphicus*
	vireo, red-eyed	*Vireo olivaceus*
Corvidae	jay, blue	*Cyanocitta cristata*
	raven, common	*Corvus corax*
	crow, American	*Corvus brachyrhynchos*
	crow, fish	*Corvus ossifragus*
Alaudidae	lark, horned	*Eremophilla alpestris*
Hirundinidae	martin, purple	*Progne subis*
	swallow, tree	*Tachycineta bicolor*
	swallow, bank	*Tachycineta thalassina*
	swallow, rough-winged	*Stelgidopteryx serripennis*
	swallow, cliff	*Petrochelidon pyrrhonota*
	swallow, barn	*Hirundo rustica*
Paridae	chickadee, Carolina	*Poecile carolinensis*
	chickadee, black-capped	*Poecile atricapillus*
	titmouse, tufted	*Baeolophus bicolor*
Sittidae	nuthatch, red-breasted	*Sitta canadensis*
	nuthatch, white-breasted	*Sitta carolinensis*
Certhiidae	creeper, brown	*Certhia americana*
Troglodytidae	wren, Carolina	*Thryotherus ludovicianus*
	wren, house	*Troglodytes aedon*
	wren, winter	*Troglodytes hiemalis*
	wren, marsh	*Cistothorus palustris*
Regulidae	kinglet, golden-crowned	*Regulus satrapa*
	kinglet, ruby-crowned	*Regulus calendula*
Sylviidae	gnatcatcher, blue-gray	*Polioptila caerulea*
Turdidae	bluebird, eastern	*Sialia sialis*
	veery	*Catharus fuscescens*
	thrush, gray-cheeked	*Catharus minimus*

Family	Common Name	Scientific Name
	thrush, Swainson's	*Catharus ustulatus*
	thrush, hermit	*Catharus guttatus*
	thrush, wood	*Hylocichla mustelina*
	robin, American	*Turdus migratorius*
Mimidae	catbird, gray	*Dumetella carolinensis*
	mockingbird, northern	*Mimus polyglottos*
	thrasher, brown	*Toxostoma rufum*
Sturnidae	starling, european	*Sturnus vulgaris*
Motacillidae	pipit, American	*Anthus rubescens*
Bombycillidae	waxwing, Bohemian	*Bombycilla garrulus*
	waxwing, cedar	*Bombycilla cedrorum*
Calcariidae	longspur, lapland	*Calcarius lapponicus*
	bunting, snow	*Plectrophenax nivalis*
Parulidae	ovenbird	*Seiurus aurocapilla*
	warbler, worm-eating	*Helmitheros vermivorum*
	waterthrush, Louisiana	*Parkesia motacilla*
	waterthrush, northern	*Parkesia noveboracensis*
	warbler, black-and-white	*Mniotilta varia*
	warbler, golden-winged	*Vermivora chrysoptera*
	warbler, blue-winged	*Vermivora cyanoptera*
	warbler, orange-crowned	*Oreothlypis celata*
	warbler, Tennessee	*Oreothlypis peregrina*
	warbler, Nashville	*Oreothlypis ruficapilla*
	warbler, Connecticut	*Oporornis agilis*
	warbler, Kentucky	*Geothlypis, Formosa*
	warbler, mourning	*Geothlypis philadelphia*
	yellowthroat, common	*Geothlypis trichas*
	warbler, hooded	*Setophaga citrina*
	redstart, American	*Seophaga ruticilla*
	warbler, Cape May	*Setophaha tigrina*
	warbler, cerulean	*Setophaga cerulea*
	parula, northern	*Setophaga americana*
	warbler, magnolia	*Setophaga magnolia*
	warbler, blackburnian	*Setophaga fusca*
	warbler, yellow	*Setophaga petechia*
	warbler, chestnut-sided	*Setophaga pensylvanica*

Family	Common Name	Scientific Name
	warbler, black-throated blue	*Setophaga caerulescens*
	warbler, blackpoll	*Setophaga striata*
	warbler, bay-breasted	*Setophaga castanea*
	warbler, pine	*Setophaga pinus*
	warbler, prairie	*Setophaga discolor*
	warbler, palm	*Setophaga palmarum*
	warbler, yellow-throated	*Setophaga dominica*
	warbler, yellow-rumped	*Setophaga coronata*
	warbler, black-throated green	*Setophaga virens*
	warbler, Wilson's	*Cardellina pusilla*
	warbler, Canada	*Cardellina canadensis*
	chat, yellow-breasted	*Icteria virens*
Emberizidae	towhee, eastern	*Pipilo erythrophthalmus*
	sparrow, American tree	*Spizella arborea*
	sparrow, field	*Spizella pussila*
	sparrow, chipping	*Spizella passerina*
	sparrow, Savannah	*Passerculus sandwichensis*
	sparrow, vesper	*Pooecetes gramineus*
	sparrow, grasshopper	*Ammodramus savannarum*
	sparrow, Henslow's	*Ammodramus henslowii*
	sparrow, fox	*Passerella iliaca*
	sparrow, song	*Melospiza melodia*
	sparrow, Lincoln's	*Melospiza lincolnii*
	sparrow, swamp	*Melospiza georgiana*
	junco, dark-eyed	*Junco hyemalis*
	sparrow, white-crowned	*Zonotrichia leucophrys*
	sparrow, white-throated	*Zonotrichia albicollis*
Cardinalidae	tanager, summer	*Piranga rubra*
	tanager, scarlet	*Piranga olivacea*
	cardinal, northern	*Cardinalis*
	grosbeak, rose-breasted	*Pheucticus ludovicianus*
	bunting, indigo	*Passerina cyanea*
Icteridae	blackbird, rusty	*Euphagus carolinus*
	grackle, common	*Quiscalus quiscula*
	blackbird, red-winged	*Agelaius phoeniceus*
	cowbird, brown-headed	*Molothrus ater*

Family	Common Name	Scientific Name
	bobolink	*Dolichonyx oryzivorus*
	meadowlark, eastern	*Sturnella magna*
	oriole, orchard	*Icterus spurius*
	oriole, Baltimore	*Icterus galbula*
Fringillidae	finch, purple	*Haemorhous purpureus*
	finch, house	*Haemorhous mexicanus*
	crossbill, red	*Loxia curvirostra*
	redpoll, common	*Acanthis flammea*
	siskin, pine	*Spinus pinus*
	goldfinch, American	*Spinus tristis*
Passeridae	sparrow, house	*Passer domesticus*

Source: BBC 2014, Sibley 2014

Botanical Species that Potentially Occur in the Project Vicinity

Common Name	Scientific Name	Common Name	Scientific Name
sugar maple	*Acer saccharum*	Clayton's sweetroot	*Osmorhiza claytonii*
black cohosh	*Actaea racemosa*	shortleaf pine	*Pinus echinata*
yellow buckeye	*Aesculus flava*	eastern white pine	*Pinus strobus*
yellow birch	*Betula alleghaniensis*	Virginia pine	*Pinus virginiana*
sweet birch	*Betula lenta*	black cherry	*Prunus serotina*
mockernut hickory	*Carya alba*	white oak	*Quercus alba*
bitternut hickory	*Carya cordiformis*	swamp white oak	*Quercus bicolor*
pignut hickory	*Carya glabra*	scarlet oak	*Quercus coccinea*
blue cohosh	*Caulophyllum thalictroides*	southern red oak	*Quercus falcata*
American beech	*Fagus grandifolia*	swamp chestnut oak	*Quercus prinus*
white ash	*Fraxinua americana*	northern red oak	*Quercus rubra*
mountain silverbell	*Halesia tetraptera*	northern red oak	*Quercus rubra*
black walnut	*Juglans nigra*	black oak	*Quercus velutina*
Canadian woodnettle	*Laportea canadensis*	bloodroot	*Sanguinaria canadensis*
yellow poplar	*Liriodendron tulipifera*	American basswood	*Tilia americana*
cucumber tree	*Magnolia acuminata*	eastern hemlock	*Tsuga canadensis*
mountain magnolia	*Magnolia fraseri*	Canadian white violet	*Viola canadensis*
blackgum	*Nyssa sylvatica*		

Source: NatureServe, 2009